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**Northumbria
University**
NEWCASTLE

The Role of Entrepreneurial Universities within Post-conflict
Countries: Case Studies of Rwanda and Northern Ireland

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A commentary submitted in partial fulfilment of the requirements of the
University of Northumbria at Newcastle for the degree of Doctor of
Philosophy by published work

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Declaration

I declare that no outputs submitted for this degree have been submitted for a research degree of any other institution.

Alain Clement Nkusi (Candidate)

24th December 2021

Abstract

Globalisation and the ever-increasing demands of the knowledge-based economy have caused higher education in most countries around the world to undergo significant transformation to adapt to such changes. This transformation can be seen through the evolutionary roles of universities in the expansion of their traditional missions of teaching and research to add an equivocal third mission - commercialising the results of their research. Therefore, universities are key agents in supporting economic growth and wealth creation within their regions and beyond through engagements with external stakeholders. Entrepreneurial universities have become more socially and economically relevant institutions. In developed contexts, universities play a role in economic development. However, little is known about how entrepreneurial universities operate in a post-conflict situation where there are not the same institutional structures, contexts etc., in place. As an anchor actor, the role of universities may need to evolve to reflect added consideration around social cohesion and peacebuilding.

Existing studies of entrepreneurial universities offer a narrow perspective of the third mission as it is more often conceptualised in stable and developed contexts with a strong emphasis on economic contribution. The contemporary literature also indicates that university-based entrepreneurs in societies emerging from the conflict face numerous challenges while engaging in entrepreneurial activities. The study seeks to identify and analyse critical drivers for the development of entrepreneurial universities in post-conflict contexts, examine how entrepreneurial architectures and conditioning factors enable or constrain entrepreneurial universities' development and their contribution to the development of the entrepreneurial ecosystem and the wider social and economic development. The study adds to the existing body of knowledge on the evolution and the

development of entrepreneurial universities by extending the third mission role of entrepreneurial universities. Set in the post-conflict countries of Rwanda and Northern Ireland, this study found that non-market factors (nature of the conflict, conflict resolution pathways, economic and social) shape the entrepreneurial university's conceptualisation and development.

The study also identifies that in a post-conflict entrepreneurial university, entrepreneurial ecosystem development is constrained and/or enabled by several institutional factors including, structures, strategic partnerships and collaboration, leadership, strategies, and culture. When an entrepreneurial ecosystem system has been destroyed during a national conflict, these institutional and environmental factors present significant challenges to the evolution of the entrepreneurial ecosystem in a post-conflict; however, they act as enablers in developed economies in which conditioning factors are well developed and indirectly impacted by the conflict. The study also outlines the role of the entrepreneurial university in the unique evolution of the post-conflict entrepreneurial ecosystem in Rwanda and Northern Ireland.

The study adds to the existing body of studies on entrepreneurial universities that focus on the third mission of entrepreneurial universities to include peacebuilding and social cohesion. The study identifies that when an entrepreneurial ecosystem system has been destroyed during the conflict, these constraints present significant challenges to the evolution of the entrepreneurial ecosystem post-conflict. Second, in a departure from other studies, our findings also outline the role of the entrepreneurial university in the unique evolution of the post-conflict entrepreneurial ecosystem in Rwanda and Northern Ireland. The study further identifies that the entrepreneurial ecosystem evolves through

stages, including embryonic, destruction, formation, and capacity building stages. This study provides recommendations for policymakers to take an incremental approach to foster and encourage entrepreneurship through context-specific and targeted policy initiatives by fully understanding the elements that contribute to the success of establishing entrepreneurial universities in a post-conflict context.

Keywords: Post-conflict, entrepreneurial ecosystems, entrepreneurial university, Rwanda, Northern Ireland

Publications associated with this research

Nkusi, A. C., Cunningham, J. A., Nyuur, R. and Pattinson, S. (2020) 'The role of the entrepreneurial university in building an entrepreneurial ecosystem in a post-conflict economy: An exploratory study of Rwanda', *Thunderbird International Business Review*, 62(5), pp. 549-563. (See appendix 7)

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Chapter 1: Introduction

This chapter outlines the focus of the research: The role of entrepreneurial universities within entrepreneurial ecosystem development in post-conflict countries: Rwanda and Northern Ireland case studies. The chapter sets the background of the thesis by discussing the context of the research, the evolution of entrepreneurial universities in post-conflict environments, and their roles in developing the entrepreneurial ecosystem in their regions, as well as addressing the legacies of the conflict. The fundamental concepts of the thesis are clarified, giving way to highlight the identified research gaps and their corresponding research questions, and the theoretical and practical contribution of the study.

1.1 The rationale for the thesis

The role of universities is changing and many universities have adopted the emerging entrepreneurial university model by incorporating the third mission - the additional role of the commercialisation of knowledge and active contribution to the development of private enterprises in the local and regional economy (Compagnucci & Spigarelli, 2020; Klofsten et al., 2019). This changing landscape forces universities to become entrepreneurial institutions by adopting a “third mission” (Etzkowitz & Leydesdorff, 2000a). This model has fundamentally changed the structure, processes, and for a select few, culture and mission of the university (Gianiodis & Meek, 2020). Now they are considered central actors in the knowledge-based economy due to their contribution to social and economic development through their active engagement with a wide range of networks and relationships, with both private and public organisations (Guerrero et al., 2014). Traditionally, universities have not been entrepreneurially focused (Cunningham et al., 2016). However, Etzkowitz (2013) argues that in the transition from an agrarian

society to a knowledge-based society, clusters and regions increasingly rely on universities to improve economic and social conditions within their community and beyond.

Entrepreneurial universities in post-conflict environments face significant challenges brought about directly or indirectly by conflict, in terms of physical destruction of infrastructure and facilities of higher education, population displacement (brain-drain) and deaths, reduced enrolment levels, rapid erosion of educational quality and research capacity (Milton & Barakat, 2016b). Moreover, entrepreneurial universities in post-conflict contexts need to balance post-conflict nation-building and peacebuilding carefully and re-establishing conducive learning environments that support the integration of those involved directly and indirectly in conflict (Feuer, Hornidge, & Schetter, 2013). However, the extant literature indicates that university-based entrepreneurs emerging from the conflict face numerous challenges while trying to engage in entrepreneurial activities due to political instability, lack of entrepreneurial skills, lack of finance, lack of legitimacy, unfavourable laws and regulations, adequate infrastructure (Legas, 2015, Atiase et al., 2018), and cultural support (Cacciotti et al., 2016).

Universities are expanding on their traditional missions, teaching and researching by adding on the third mission by building links with government and industry to increase their impact within regions and beyond in tangible ways by engaging in entrepreneurial activities (Etzkowitz & Leydesdorff, 2000b). In the same vein, university leaders currently find themselves with expanded roles, they must now manage relationships with external stakeholders in the private and public sectors (Etzkowitz, 2016). Therefore,

universities are no longer considered as “ivory towers” but as institutions that are actively engaged with a range of external partners to become significant contributors to social and economic development through the provision of knowledge and human capital, promotion of entrepreneurial culture and catalysts for start-ups and spin-offs (Cohen, 2006; Guerrero, Urbano & Fayolle, 2016). This is more problematic in societies emerging from conflicts as the role of universities is further expanded to include addressing the thorny issues that led to that conflict (peacebuilding and reconciliation) and contributing to the establishment of sustainable entrepreneurial ecosystems. The role of entrepreneurial universities in these contexts is underplayed and under-researched in the existing literature.

1.2 Research objectives and focus

Entrepreneurial universities have been acclaimed as a significant contributor to social, economic, cultural and political progress through the provision of human capital to the economy through teaching; the creation of knowledge through (collaborative) research and the dissemination and use of knowledge through research commercialisation and other knowledge spillover mechanisms (Etzkowitz et al., 2000; Bramwell & Wolfe, 2008; Abreu & Grinevich, 2013). Johnson (2013) posits that education can lead to personal and social change when combined with relevant non-educational inputs. The non-educational inputs are third stream activities that promote the transfer of academic knowledge to companies and foster socio-economic development (Guerrero et al., 2012; Zhang et al., 2016; Trequattrini et al., 2018) and peacebuilding (Feuer et al., 2013b; Johnson, 2013; Milton & Barakat, 2016b; Williams & Vorley, 2017).

Current understanding of entrepreneurial universities is taken from the west, where institutions with well-established norms and routines are regarded as catalysts for regional and national economic development (Culkin, 2016; Guerrero et al., 2014; Trequattrini et al., 2018; Urbano & Guerrero, 2013). Entrepreneurial universities support the commercialisation of research through patents and licenses, or the development of business incubators and technology parks (Abreu & Grinevich, 2013; Bramwell & Wolfe, 2008; Meyers & Sarika, 2011) and are, therefore, key enablers in technology, innovation, and economic development, as well as significant change agents in current competitive society (Klofsten et al., 2019).

In a post-conflict context, understanding the role of the entrepreneurial university is critical for the rebuilding of civil society and institutions, and thus reducing the possibility of a return to future conflict (Ishiyama & Breuning, 2012). By providing a mechanism for peaceful resolution of the underlying causes of the conflict, fostering public participation, and promoting social cohesion, whilst at the same time fulfilling their entrepreneurial agenda mission, Gianiodis and Meek (2020) indicate that universities to effectively pursue a third mission, by changing their structure, processes, culture and their strategic focus. For instance, some universities invest in new facilities and programs, while leveraging existing infrastructure to drive entrepreneurial activities and support the third mission (Cunningham et al., 2021; Grimaldi et al., 2011; O'Reilly et al., 2019; Redondo & Camarero, 2019; Siegel et al., 2007). This means that the entrepreneurial university implements several strategies and new institutional configurations to work together with the government and industry to facilitate the generation and exploitation of knowledge and technology (Abreu et al., 2016; Bramwell & Wolfe, 2008; Cunningham et al., 2021; Cunningham & Link, 2014; Guerrero et al., 2014; Rosa Lombardi et al., 2019; Philpott et al., 2011). As a result, universities become an increasingly important

component of the national innovation system, and need to operate increasingly within a Triple-Helix nexus involving close interaction with government institutions and private industries (Etzkowitz & Leydesdorff, 2000a). Little is known about how external and internal factors condition the development of, the conceptualisation of entrepreneurial universities in post-conflict context with the teaching, research and entrepreneurial missions that they need to achieve, as well as entrepreneurial universities' contribution to the development or re-establishment of entrepreneurial ecosystem (EE). Adopting a critical realist (Bhaskar, 2008; Gorski, 2013) philosophical stance and qualitative methods, the overall research objectives of this study are:

- To identify and analyse critical drivers for the development of entrepreneurial universities and how they shape structures, processes, culture and mission of the university
- To examine organisational factors that enable or constrain the development of entrepreneurial universities in the post-conflict
- To examine the contribution of the entrepreneurial university to the development of the entrepreneurial ecosystem in the post-conflict

1.3 Research questions

Entrepreneurial universities have emerged as a popular concept to explain the persistence of high-growth entrepreneurship within regions (D'Este & Perkmann, 2011; Urbano & Guerrero, 2013; Trequattrini et al., 2018; Klofsten et al., 2019). The entrepreneurial university conceptualisation and development differ from region to region (Maribel et al., 2016) and extant literature focus on western and established universities with little or no attention paid to post-conflict contexts (Kirby et al., 2011; Guerrero & Urbano, 2012; Link & Sarala, 2019). Entrepreneurial universities are considered a catalyst for social and

economic development through the creation of spin-offs and commercialisation of research (Berggren, 2017; Franco-Giraldo & Gentilin, 2021; Guerrero et al., 2014; Lynskey, 2008; Roncancio-Marin et al., 2022; Walsh et al., 2021). Entrepreneurial universities need to have effective organisational units (Cunningham et al., 2021), entrepreneurial architectures (Nelles & Vorley, 2011) and conditioning factors (Guerrero & Urbano, 2012; Urbano & Guerrero, 2013) to support further development of the third mission. Clark (1998) posited five steps universities need to take to become entrepreneurial institutions and several scholars highlighted the characteristics of entrepreneurial universities (Clark, 1998; Etzkowitz, 2013; Kirby et al., 2011).

While we know about the drivers, organisational structures, culture, and environmental factors that condition the development of entrepreneurial universities, there has been sparse research focused on the development of entrepreneurial universities in post-conflict environments (Berggren, 2017; Clark, 1998; Etzkowitz, 2014; Fuller & Pickernell, 2018; Lahikainen et al., 2018; María José et al., 2020; Purcell & Chahine, 2019), and whether such drivers, organisational structures and environmental factors hold in post-conflict context. Little is known about how entrepreneurial universities are conceptualised, what factors facilitate or restrict the evolution of entrepreneurial universities, and how they operate (in terms of structure and mission) in post-conflict context as current conceptualisation is based on stable and well developed institutions (Bizri et al., 2019b; Guerrero & Urbano, 2012; Kirby et al., 2011; OECD, 2012). Therefore, the purpose of this study is to provide a contextualised understanding of how entrepreneurial universities develop and evolve in post-conflict contexts and factors that constrain and enable such evolutionary processes, as well as how they contribute to the broader entrepreneurial ecosystem development. This dissertation aims at answering three main research questions:

- How are entrepreneurial universities conceptualised in post-conflict environments?
- What factors encourage or hinder the dynamics of the process of becoming an entrepreneurial university in post-conflict environments?
- How does the entrepreneurial ecosystem evolve, and what is the role played by entrepreneurial universities during ecosystem development stages in a post-conflict context?

1.4 Significance of the study

The importance of entrepreneurial universities to regional and national economic development is widely acknowledged by academics and policymakers alike (Atiase et al., 2018; Audretsch & Belitski, 2017; Kuratko et al., 2017; Roundy, 2017). They are vital in developing a sustainable and vibrant entrepreneurial ecosystem (Maroufkhani et al., 2018; Ratten, 2014; Trequattrini et al., 2018; Wadee & Padayachee, 2017). Universities have historically been used as a tool to aggravate social divisions and tensions along religious, political, social, and ethnic lines (Hayes & McAllister, 2009; McLean Hilker, 2011). In the same vein, universities have promoted peacebuilding and national reconciliation (Gallagher et al., 2018; Johnson, 2013; Sabic-El-Rayess, 2009). Northern Ireland and Rwanda are somewhat heterogeneous in terms of their characteristics (nature and evolution of the conflict, culture, social and economic development, level of government interventions, structure and focus of higher education sector etc.), and homogenous in terms of context – they are both post-conflict countries.

Both case studies offer unique and contrasting perspectives from the developed and developing countries on how entrepreneurial universities have evolved over time, thereby

proving a contextualized understanding. Thus, enabling the study to make significant theoretical and practical contributions to the entrepreneurial university's debate. Although Northern Ireland is a post-conflict country, it provides the epitome of post-conflict entrepreneurial university model with architectures and other conditioning factors similar to other well-established institutions to support the third mission including peacebuilding and reconciliation. Northern Ireland case study also demonstrates that, when entrepreneurial ecosystem elements are destroyed during the conflict, they pose significant challenges to the re-establishment of the ecosystem that, in turn, adversely impacts the development of entrepreneurial universities.

In post-conflict contexts, entrepreneurial universities to fulfil their missions (teaching, research and entrepreneurship) take more responsibilities as institutional key players actively promote unity and reconciliation, thus fulfilling their professional duties and acting as peacebuilders (Murphy, 2020). Such duality in the roles of institutional key actors is particularly relevant in societies that have gone through the conflict to restore the destroyed social connections. The research findings add to the existing body of knowledge and understanding of the development of entrepreneurial universities and their role in post-conflict contexts, both in transitional and developed economies.

1.5 Research Contribution

In the main the existing body of literature and empirical studies of entrepreneurial universities knowledge indicates that entrepreneurial universities in stable and well-established institutions is extensively explored (Audretsch, 2014; Cunningham & Link, 2014; Etzkowitz, 2016; Guerrero, Urbano, & Fayolle, 2016; Klofsten et al., 2019; Lahikainen et al., 2018; Rosa Lombardi et al., 2019; María José et al., 2020; Ratten, 2017;

Sperrer et al., 2016; Uslu et al., 2019) there has been a deficit of studies of entrepreneurial university. This study address this deficit by highlights numerous challenges that entrepreneurial universities face that are taken for granted in stable and well-established economies such as infrastructure physical destruction, brain drain, emigration, social disconnect and mistrust, human life losses (Barbara & Walsh, 2018; den Boer & van der Borgh, 2011; Johnson, 2013; Majaliwa et al., 2016; Niyonkuru, 2005) that directly and indirectly influence the conceptualisation and interpretation of entrepreneurial universities (Delgado, 2008; Feuer et al., 2013b; Johnson, 2013; McLean Hilker, 2011). To mitigate the legacies of the conflict, entrepreneurial universities in post-conflict have to deal with international collaborative and bilateral support to gravitate organisational culture to build their third mission which is essential for any entrepreneurial ecosystem to grow.

The study makes six contributions to the ongoing debate about the evolution and development of entrepreneurial universities in the following ways. Firstly, this study provides a new perspective and contextualised understanding of factors that shape entrepreneurial universities development in post-conflict environments by proposing a conceptual framework.

Secondly, the study extends our understanding of the conceptualisation of entrepreneurial universities that in a post-conflict environment, by demonstrating that the development of the entrepreneurial university is shaped by non-market factors (Doh et al., 2012) including nature of the conflict and the reconciliation pathway, the focus and competitive nature of the higher education sector, and economic factors. There are different institutional factors etc that are play in post conflict contexts. In post-conflict contexts,

the nature of the conflict and the type of the reconciliation are pivotal in shaping the role of entrepreneurial universities as social cohesion and reconciliation pervade all entrepreneurial university's missions (teaching, research, and entrepreneurship) (Etzkowitz et al., 2000; Guerrero & Urbano, 2012; Mascarenhas et al., 2017a).

Thirdly, the interpretation of the third mission in extant literature associate it with entrepreneurial activities (Abreu et al., 2016; Compagnucci & Spigarelli, 2020; Knudsen et al., 2021; Philpott et al., 2011; Sá et al., 2018; Schnurbus & Edvardsson, 2020). This study extends our understanding of the third mission of entrepreneurial universities in post-conflict contexts encompass national building roles of peacebuilding, humanitarian, and development than just focusing on entrepreneurial activities. The study refers to this added dimension of the third mission as the extended third mission. Some of these extended third-stream activities are rudimentary but require entrepreneurial universities to cut across conflicting parties to address immediate societal and economic needs within their locality.

Fourthly, the study finds senior leaders, departmental managers academics, professional supporting staff, star scientists as key players not only in shaping and steering the third mission and further development of entrepreneurial university. This study extends the understanding of Murphy (2020) that highlights roles academics perform in post-conflict by demonstrating their dual roles by assuming more active and (in)visible roles in peacebuilding and reconciliation processes, through activities oriented to reconstruct the social foundations of communities as well as fulfilling professional responsibilities.

Fifthly, the study provides empirical evidence in a post-conflict context to the conceptual framework posited by Cunningham et al. (2021) by highlighting how different configurations of entrepreneurial architecture support university-based entrepreneurs across the stages of entrepreneurship and how they operationalise the third mission. The study demonstrates how some of the entrepreneurial architectures support the early stages of entrepreneurship (exploration phase) which enable further development of the entrepreneurial university, whereas later stages of entrepreneurship (exploitation phase) facilitate further operationalisation of the third. The early stages of entrepreneurial university development are characterised by explorative entrepreneurial architectures that restrict the operationalisation of the third mission and vice versa.

Lastly, the study further extends our understanding of the development of the entrepreneurial ecosystem in post-conflict (Allahar & Sookram, 2019; Arruda et al., 2015; Cantner et al., 2021; Comeche Martínez et al., 2017; De Jager et al., 2017; Feld, 2012; Jha, 2018; Kshetri, 2014; Lahikainen et al., 2018; McKague et al., 2017; Spiegel, 2016; St-Pierre et al., 2016; Stam & Van de Ven, 2021). Few of these studies have examined post conflict environments, hence the deficit in our understanding. The study demonstrates that the level of destruction of entrepreneurial ecosystem (EE) structures during the conflict impact on its re-establishment and subsequent evolution. The study identifies how the entrepreneurial ecosystem, in a post-conflict environment, evolves through a number of stages; embryonic, destruction, formation, and capacity building and the role that entrepreneurial universities play in contributing to entrepreneurial ecosystem development.

1.6 Thesis structure

The overview of this thesis includes a review of the relevant literature, the research objectives, the design, methods, and procedure. The thesis addresses the data analysis techniques, ethical considerations, the implication and contribution of the study. This thesis is divided into six chapters.

Chapter Two examines the pertinent literature about entrepreneurial universities, triple helix and entrepreneurial ecosystems, relevant conceptual frameworks, and the role of universities in post-conflict societies. The chapter also presents a critical review of pertinent literature, the relevant literature on entrepreneurship, examining the current understanding of entrepreneurship and entrepreneurial activities' economic impact.

Chapter Three discusses the methodology used in undertaking this study, the researcher's ontological positioning and describes the theoretical framework for analysing data. The chapter also discusses data gathering tools used and why they were chosen, it also discusses how data was collected and challenges encountered in the process to gather the data

Chapter Four highlights the findings for each research question, and explains how these contribute to the existing body of knowledge. The chapter presents an overview of the higher education system in Rwanda and Northern Ireland. The chapter describes the evolutionary process of the entrepreneurial ecosystem and presents the factors that have enabled or constrained the development of entrepreneurial universities.

Chapter Five discusses the findings and proposes a theoretical framework to study entrepreneurial universities in a post-conflict context. It also discusses how the entrepreneurial university is conceptualised and interpreted, and what factors influence its success. The chapter presents and discusses the extended third mission of entrepreneurial university that focuses on social cohesion and how this extended third mission is operationalised in different contexts

Chapter six presents the conclusions from the study findings, which considers the contribution of this thesis; it discusses the limits of the research and makes suggestions for future research.

Chapter 2: Literature Review

2.1 Introduction

The evolution of entrepreneurial university is considered in terms of how the mission of the traditional university has changed over time, from teaching and research to include a third mission. The addition of the third mission has become increasingly common within universities in the last twenty years, particularly in western economies due to their contribution to social and economic impact to the regions and beyond (Culkin, 2016; Guerrero et al., 2015; Lombardi et al., 2019; Trequattrini et al., 2018). With the evolution of economies from agrarian to knowledge-based economies, entrepreneurial universities have become the focal point of policymakers, and governments are increasingly relying on universities to improve economic and social conditions within their community and beyond (Etzkowitz, 2013). Furthermore, entrepreneurial universities are now being considered as having an ever more critical role in supporting innovation and facilitating regional economic development (Audretsch, 2007) and in promoting and advancing critical political debate to build national identity and social cohesion (Barbara & Walsh, 2018; Milton & Barakat, 2016).

The core activities of universities have been universally recognised as teaching and research. Still, universities have undergone internal transformations to adapt to external conditions and legitimise their role in the economy, giving birth to a new kind of university: the entrepreneurial university. The university's role has evolved from the traditionally ascribed role of teaching and research to include the 'third mission', which can positively impact national economies (Etzkowitz, 2013, Guerrero et al., 2015, Ratten, 2017). There is a plethora of evidence concerning entrepreneurship and entrepreneurial

activities in developed and stable universities; however, the literature on entrepreneurial universities is underdeveloped and under-researched.

Systematic Literature Review

The aim of conducting a literature review is to enable the researcher to map and assess the existing literature on the subject matter and specify a research question to develop the existing body of knowledge further. From a general point of view, a systematic literature review (SLR) establishes the state of current knowledge in a given field (Tranfield et al., 2003). SLRs provide objective summaries of what has been published, highlight the knowledge gap and position the research to address knowledge gaps. This is an invaluable method to research the topic at hand where many publications exist, each focusing on a narrow aspect of the field. The difference between traditional and systematic review is that systematic review adopts a replicable, scientific and transparent process that aims to minimise bias through exhaustive literature searches of published studies and by providing an audit trail of the reviewer's decisions, procedures and conclusions (Rousseau et al., 2008, Tranfield et al., 2003). SLR is also recommended from the methodological and entrepreneurship literature as it is a systematic, transparent and thus replicable (Pittaway & Cope, 2007; Thorpe et al., 2005; Tranfield et al., 2003).

A systematic review aims to provide a complete overview of research conducted on a specific field until the present date. All research procedures must be made explicit before the actual conduct of the review to make the process objective and replicable. The systematic reviews process also entail a series of techniques for minimising bias and error and is widely regarded as providing high-quality evidence (Tranfield et al., 2003). A systematic review is a rigorous and transparent form of literature review that involves

identifying, synthesising, and assessing all available evidence, quantitative and qualitative, to generate complete, empirically derived answers to a focused research question. SRL can enhance methodological rigour, suggest further avenues for research, and help address managerial issues by creating a reliable knowledge base by putting together findings from a range of studies (Briner & Denyer, 2012). SRL allow researchers to conclude with varying levels of certainty, consistency, and confidence about what is known and not known about the answer to the review question.

SLR enables the research to answer the empirical question based on unbiased assessment with a methodology that can be reproduced independently with results that can be easily verified. A SLR synthesises the evidence on a well-formulated question and uses replicable systematic and explicit methods to identify, select and critically appraise relevant primary research (Pittaway et al., 2004). It enables the extraction and analysis of data from studies included in the review, as well as provide an unbiased assessment of these studies to provide the best form of evidence to answer specific research questions (Harris et al., 2014). Kitchenham et al. (2009) posit that the SLR aims to aggregate all existing evidence on a research question and support the development of evidence-based guidelines for practitioners.

2.2 Research methods

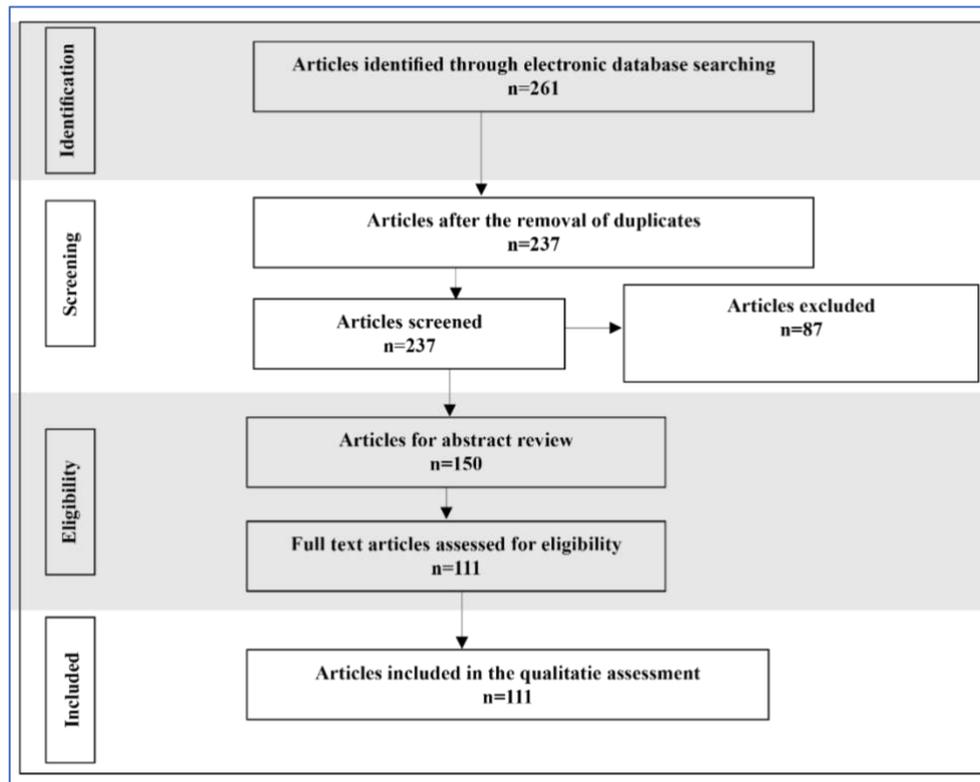
The study adopted a SLR as an appropriate method to answer the research questions because it establishes the state of current knowledge in a given field (Tranfield et al., 2003). Meglio and Risberg (2011). The study followed the 10-stage review processes proposed by Brereton et al. (2007) grouped into three main phases: planning, conducting the review, and reporting the review. The purpose of setting out the protocol is to

minimise bias in the study by defining in advance how the systematic review is to be conducted and is itself a document that should be reviewed. The protocol embodies the detailed plan for the review, specifying the process to be followed, any conditions to apply when selecting primary studies, any boundary conditions, quality measures etc.

2.2.1 Data sources and search strategy

The review protocol was developed around the following research question. The domains for the research synthesis are the empirical papers on the evolution and development of entrepreneurial universities in post-conflict contexts. To conduct the systematic review, a 4-stage protocol (see Fig. 2.1) adapted from phase 2 of Brereton et al. (2007) 10-stage review process was used to identify relevant publications. The retrieved publications are then screened (based on abstracts) for quality of method and findings (evidence) and narrowed down to only those publications considered appropriate for the review and report compilation based on key emergent themes (see Appendix 6).

Figure 2-1: Search process and study identification



Source: Adapted from Brereton et al. (2007)

2.2.1.1 Stage 1 – Identification – database search

Stage one involved a keyword search in helping identify the boundaries of the subject; the researcher consulted the experts who helped identify keywords that would fully encapsulate the entrepreneurial university. The study utilised systematic searching techniques (McFadden et al., 2012) to retrieve relevant research studies about entrepreneurial universities. The review of an entrepreneurial university's most significant factors started with reading through key and frequently-quoted articles on entrepreneurial university models – for example, Guerrero and Urbano (2012), Clark (2001), and (Audretsch, 2014). The same approach was used for the entrepreneurial ecosystem (Audretsch & Belitski, 2017; Cohen, 2006; Schmitz et al., 2017; Spigel, 2016). This gave rise to the most relevant keywords in the subsequent formal literature review.

The search for articles was mainly conducted as a structured keyword, based on the keyword: 'Entrepreneurial Universities, third mission, third stream, academic entrepreneurship, knowledge transfer. The search was deliberately broad to cover as many articles as possible in the first search and to produce a significant number of articles, even if many were less relevant to the present study. Tailored search strings were devised and applied to electronic databases covering the social sciences, Thomson Reuters Web of Science (WoB) and Elsevier's Scopus. Scopus and Science Direct databases feature other related studies to conduct SRL (Compagnucci & Spigarelli, 2020; Schnurbus & Edvardsson, 2020; Silva et al., 2018; Walsh et al., 2021). Scopus is the largest abstract and citation database of peer-reviewed literature. It includes published articles from EBSCO, ABI/Inform, and other similar search engines, therefore containing the relevant journals for the study.

WoB and Scopus are the most frequently used database in business and management as academic publication searching sources and deliver easy access to high-quality, diversified scholarly information in sciences, social sciences, and arts and humanities, as well as search and analysis tools that enhance its content. The key terms were combined by applying the Boolean search operators OR and AND, and the truncation character (*) was used to retrieve search terms variations. The following combination of terms was adopted for all searches: "entrepreneurial university*" OR "third mission" OR "third stream activity*" OR "entrepreneurial mission", AND "Universit*" OR "triple helix". Initial research yielded 266 articles; Scopus 174 articles, WoB 92, removed duplicates.

2.2.1.2 Stage 2 – Inclusion and exclusion criteria

To maintain quality standards, only peer-reviewed journals were selected to ensure that selected journals were of high disciplinary standing, presented validated knowledge that had been evaluated in terms of academic quality and rigour, theory robustness, implications for practice, methodology, data and supporting argument, and contribution to knowledge (David & Han, 2004; Gast et al., 2017). Books, book chapters, reviews, discussion papers and other non-refereed publications, as well as introductions to special issues, were excluded. Also excluded are grey literature to enhance quality control.

2.2.1.3 Stage 3 - Eligibility

Once all potentially relevant studies were identified, duplicate articles were removed, and grey literature yielded little relevant material for research purposes. Also removed from the study are the papers that did not include a direct reference to the search terms and then screened, using title and abstract, against the inclusion and exclusion criteria as stated in the above section; 271 articles were identified in this phase for the screening phase.

2.2.1.4 Stage 4 - Analysis of data

This study examines the evolution of entrepreneurial universities in post-conflict contexts and their contribution to building a sustainable entrepreneurial ecosystem. Therefore, the study included empirical articles using any type of research method. Studies were excluded from non-experimental, conceptual, discussion and review papers. The initial search yielded 271 articles (Scopus 174 articles, WoB 92); after removing duplicates, 179 articles remained were screened and filtered using the inclusion and exclusion criteria. Ninety-two articles were selected for a complete manuscript evaluation, and those articles were downloaded, saved and labelled appropriately. This was done through reading the

abstracts of identified journals to determine relevance. After reading the articles, 72 articles were found relevant. Articles content analysis identified the terms used, respective definitions, theoretical frameworks, empirical models, and research gaps (see appendix 6).

2.2.1.5 Stage 5 - Synthesis

The final step of Phase 2 is to synthesise the data. This step uses critical interpretive synthesis (CIS) to conduct an interpretive synthesis, which analysed the literature on the entrepreneurial university Fields (Dixon-Woods et al., 2006). The primary concern of interpretive synthesis is the development of concepts and theories that integrate those concepts. It also avoids specifying concepts in advance of the synthesis. This approach differs from aggregative synthesis, which is concerned with assembling and pooling data, may use techniques such as meta-analysis, and require basic comparability between phenomena so that the data can be aggregated for analysis. Using CIS, the following key themes emerged from the data collected: (I) entrepreneurial university development, (II) Entrepreneurial University impact, (III) University-industry collaboration, (IV) Structures, (V) Cultures, and (VI) strategies.

2.3 Triple helix

Universities are frequently identified as critical actors in entrepreneurial ecosystems development and sustainability (Bramwell & Wolfe, 2008; Cohen, 2006; Mazzarol, 2014; Motoyama & Knowlton, 2017; Nyman, 2015) and as a source of technology development that is useful to entrepreneurial activity (Shane, 2004). Therefore, universities play a critical role in the entrepreneurial ecosystem evolution and development (Cantner et al., 2021; Lahikainen et al., 2018; Mack & Mayer, 2016; Spigel, 2016; Wadee & Padayachee,

2017). The most important function of a university is to provide highly skilled and specialized talent to the economy (Bramwell et al., 2008), and producing graduates who are the primary entrepreneurial agents for company establishment and development of spinoffs (Berggren, 2017; Fuller & Pickernell, 2018). Universities also act not only as educators but also as institutional entrepreneurs, proactively networking, shaping regional strategies and attempting to change local routines as well as national policies (Bramwell & Wolfe, 2008; Etzkowitz, 2014; Klofsten et al., 2019; Rosa Lombardi et al., 2019; Rae et al., 2009; Ratten, 2017; Urbano & Guerrero, 2013; Wong et al., 2007). For instance, the Bayh–Dole Act of 1980 in USA restructured university–industry relations and incentivised a broad range of universities, well beyond those traditionally involved in technology transfer (Etzkowitz et al., 2008). The triple helix helps the study to explore the inter-relationships between key stakeholders (university, industry and government), the importance, the development and the role of entrepreneurial universities within an ecosystem.

Etzkowitz (2013), indicates the transformation to entrepreneurial university is in response to the rapidly changing demands of the knowledge-based economy that goes beyond the traditional roles of universities (teaching and research) by incorporating the third task (entrepreneurship). This phenomenon is facilitated by the close collaboration between industry, government and university - *The triple helix* that facilitates knowledge transfer and stimulates the production of new knowledge and technology (Etzkowitz & Leydesdorff, 2000a). The triple helix enables to study the inter-relationships between industry, government and university as key indicator of entrepreneurial ecosystem development level. The closer the relationship the more developed the entrepreneurial ecosystem is, and vice versa. Therefore, the triple helix is a precursor of entrepreneurial ecosystem development and is used in this context to analyse the development and

evolution of entrepreneurial university and operationalisation of the third mission through which universities engage external stakeholders (industry and government).

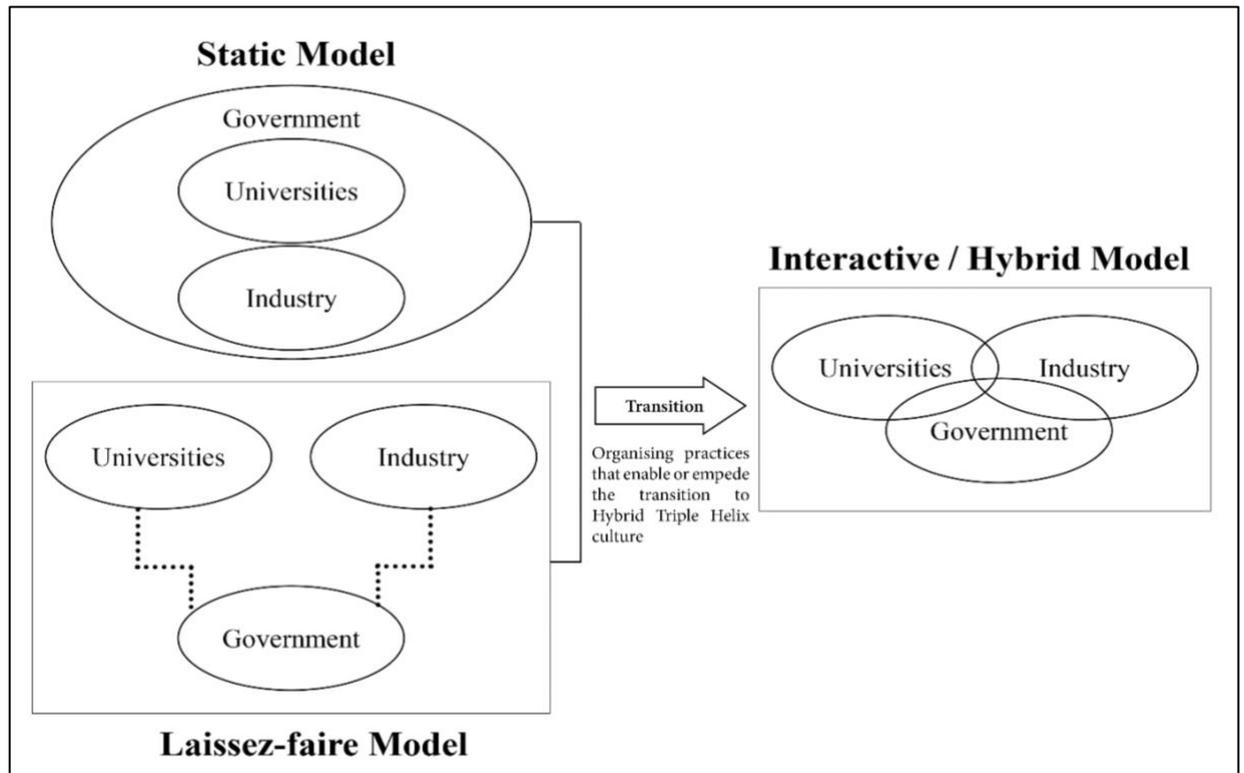
Triple Helix is an analytical framework that demonstrates the interaction between universities, industry and government that work cooperatively and in coordinated manner to stimulate innovation (Etzkowitz & Leydesdorff, 2000a; Nyman, 2015). The framework suggests that the institutional layer acts as the retention mechanism of a developing system whereas universities play an enhanced role to collaborate with other stakeholders. It requires high degree of interaction, coordination, and acts the focal point of such knowledge-intensive transitions, thus acting as the basis of introduction or creation of new products and new firms. The Triple Helix system provides a clear view of innovation actors, the relationships between the actors, and knowledge flows within the system. María José et al. (2020), state that the relationship between these three actors (university, industry and government) is interdependent, condition each other and constitute an organic unit.

Triple Helix model falls into 3 distinct typologies; Static model, Laissez-faire Model and Interactive Model (Sarpong et al., 2017) see Fig. 2.2. In static model, the government plans, controls and direct the interaction between university and industry in the quest for innovation. Universities' roles are teaching and conducting academic research whereas the industry is regarded as a champion for innovation. The knowledge transfer in this model is quite limited due to the role ascribed to universities; teaching and academic research, inhibits knowledge exploitation to address industry needs and universities perceive little or no incentives in engaging with industry to commercialise its academic

research. Such characteristics are synonymous with early stages of entrepreneurial ecosystem development (Mack & Mayer, 2016).

In Laissez-faire regime, each institutional sphere is more or less acting independently with little synergetic relationship, university and government act as an ancillary supporting structure to industry that act as champion of innovation. The government's role in harnessing innovation is mainly concerned with addressing market failure, universities stick to their traditional role of teaching and academic research. There is a lack of synergetic relationship exist even among firms in the same industry and are only linked by the same market which further impedes knowledge share and technology transfer. For universities to interact with external stakeholders, they begin to establish structures including Technology Transfer offices (TTO), industrial liaison office (ILO) to facilitate such interactions, and industry develops specialised departments and other entrepreneurial structures to further to further develop the ecosystem and entrepreneurial university. A productive entrepreneurial ecosystem contributes to success by providing access to finance, government support and policies, as well as government-based entrepreneurship programs, and access to entrepreneurship education. It improves infrastructure, market dynamics associated with change and openness, ease of entry regulations to start a business, and protection of intellectual property rights (Cohen, 2006; Feld, 2012; Hechavarría & Ingram, 2018; Isenberg, 2011; Mazzarol, 2014; Neck et al., 2004; Nicotra et al., 2017; Spigel, 2017; Suresh & Ramraj, 2012) are beginning to develop but limited in capacity to support the development of entrepreneurial universities.

Figure 2-2: Triple Helix typology



Source: Figure adapted from Sarpong et al. (2017)

Interactive / Hybrid model, which this research advocates, is built on mutual collaborative relationships and linkages among industry, government and universities and innovation is a result of that interaction rather than a government prescription. Each institution maintains its characteristics as well as taking on some roles of others. In this system, each stakeholder has a unique role to play; for instance government through its policies that encourage and promote entrepreneurial activities, and universities for its knowledge-capacity building through entrepreneurial education (Hahn et al., 2017; Vasilache & Rînciog, 2017). Alvedalen and Boschma (2017), state that the success of EE depends on the interactions among the three components as they influence the creation, discovery and exploitation of entrepreneurial opportunities. Interactive Triple Helix Model, university-industry-government collaboration entity requires the knowledge of the vital forces which can be economic, technological, social, policy-related, academic, cultural, and

psychological in nature, that in turn feed the emergence of such ecosystems and exist on the underlying platforms (Nyman, 2015). Such relationship between those three entities requires strong and diverse connections and linkages across several institutional layers and for such relationship to bring about a healthy and sustainable ecosystem, the system must be mutually beneficial and self-sustaining among institutions, industry and government with the common objective of creating successful entrepreneurial ventures (Wadee & Padayachee, 2017).

Triple Helix relies on mutual interaction between university, government and industry that allows information and knowledge to be easily exchanged. This relationship is incumbent on the institutions' policies, where they place their priorities in terms of long-term strategic goals and ambitions as well as internal capabilities to engage and maintain such relationships. In developing countries such close collaboration is sparse or not effective for a number of reasons including lack of sufficient structure and infrastructure, lack of diversified funding, poor university output (applicability of research to address social and economic challenges) among others. Wadee and Padayachee (2017) point out that entrepreneurial ecosystem to be viable and successful, it should be mutually beneficial, self-sustaining and self-replicating involving government, universities and industry. The trilateral relationship between industry, institution and industry reduces uncertainty in the ecosystem when their functions become synergetic (Etzkowitz & Leydesdorff, 2000a).

University–industry collaboration has been recognised as a practice that accelerates innovation, effectively fostering universities' knowledge diffusion to society (Giones, 2019b). Guerrero et al. (2012), suggest that establishing strong relationships with

industry, collaboration networks and alliances are seen as steppingstones towards the entrepreneurial university. It is through such subsidised university-industry partnerships that will lead to the generation, the dissemination and the commercialisation of knowledge that strengthen societal, economic and technological development in post conflict societies. Universities are encouraged to realise their broader socio-economic potential through knowledge exchange and partnerships (Cunningham & Link, 2014; Guerrero et al., 2015).

At the heart of the triple helix framework lies entrepreneurial universities whose role is to generate technology advances and facilitates the technology diffusion process through university entrepreneurial structure such as Technology Transfer Office, incubation centres or science parks that lead to the creation new firms and university spin-out companies. Entrepreneurial universities act as producers and disseminators of scientific knowledge (Etzkowitz 2003), and use a variety of formal and informal mechanisms to increase the economic and societal impact of universities. Continuous engagement between university and industry can potentially turn a university's invention into innovation for the betterment of society, as well as enhancing the university's financial resources. The close collaboration between university and industry potentially leads to the commercialisation of research through patenting, licencing and creation of spin-offs. University is embedded in environmental context from which it receives feedback that continuously influences the way the universities participate in entrepreneurial activities thus creating vicious cycle.

Governments are now considering universities as part of their regional growth strategies (Guerrero, Urbano, & Fayolle, 2016). In knowledge-based societies, universities play an

enhanced role in innovation and economic development through structures such as Business Incubation Centres (BIC), Technology Transfer Centres (TTO) and entrepreneurship centres (ECs) (Cunningham, Lehmann, et al., 2019; Cunningham & Link, 2014; Guerrero et al., 2015). Such structures provide a platform on which government, industry and universities, through close collaboration and coordination, bring about the development of technology and business ideas (Etzkowitz & Leydesdorff, 2000a). ECs within EU campuses facilitate to achieve educational goals by creating robust co-curricular opportunities for students by providing an experiential learning environment to develop future entrepreneurs and innovative employees as well as acting as facilitator by reducing communication barriers between diverse key actors by providing facilities, features and capacity (Pittz & Hertz, 2018).

Universities in developing economies and post-conflict are transitioning towards the entrepreneurial university model are faced with unfavourable conditions such as weak connections to the regional innovation ecosystem, weak links between the regional industry activities and the university research fields, despite their close proximity. Organisations engagement, on the other hand are influenced by institutional void that leads to high levels of uncertainty/risks in the venture and knowledge creation. To mitigate such institutional void, Guerrero et al. (2019) suggest that the government needs to subsidise university-industry programmes to stimulate research collaboration, innovation, technological advances and impacts on society as well as the role that entrepreneurial universities play in mitigating the institutional void through their core activities (teaching, research and entrepreneurship) and enhancing the quality/quantity of research endeavours.

2.4 Entrepreneurial ecosystem development

To understand the evolution of entrepreneurial universities, we need to understand the environments in which they develop – the entrepreneurial ecosystem. The literature on EE has identified a range of actors and supporting institutions that encourage and support formally and informally entrepreneurial activities and their diffusion (Cunningham et al., 2017; Nicotra et al., 2017). Different studies (Cohen, 2006; Feld, 2012; Hechavarría & Ingram, 2018; Isenberg, 2011; Mazzarol, 2014; Neck et al., 2004; Nicotra et al., 2017; Spigel, 2017; Stam & Van de Ven, 2021; Suresh & Ramraj, 2012) have indicated different elements that contribute to success and a productive ecosystem; such include access to finance, government support and policies, the presence of government-based entrepreneurship programs, entrepreneurship education, infrastructure, market dynamics associated with change and openness, ease of entry regulations to start a business, and protection of intellectual property rights.

Entrepreneurial ecosystems are dynamic, constantly evolving, iterative and socially interactive with unique characteristics in which ecosystem stakeholders create a conducive environment and culture that promote and spur further entrepreneurial development, thus creating a virtuous cycle (Spigel & Harrison, 2018). For any ecosystem to survive, it must be flexible, adapt to changes (both internally and externally); and there must be a variety of distinct species to ensure that at least part of them can cope with any new situation (Peltoniemi & Vuori, 2004). New ventures emerge and flourish because talented entrepreneurs successfully exploit entrepreneurial opportunities (Shane & Venkataraman, 2000), and operate in a supportive environment to promote their entrepreneurial activities through complex interactions between entrepreneurs and the elements of the ecosystem which are interdependent that are also

coordinated to enable productive and long term entrepreneurial success (Neck et al., 2004). These interconnected and interdependent elements create a unique ecosystem by creating a habitat for certain economic activities (Cavallo et al., 2018; Nicotra et al., 2017).

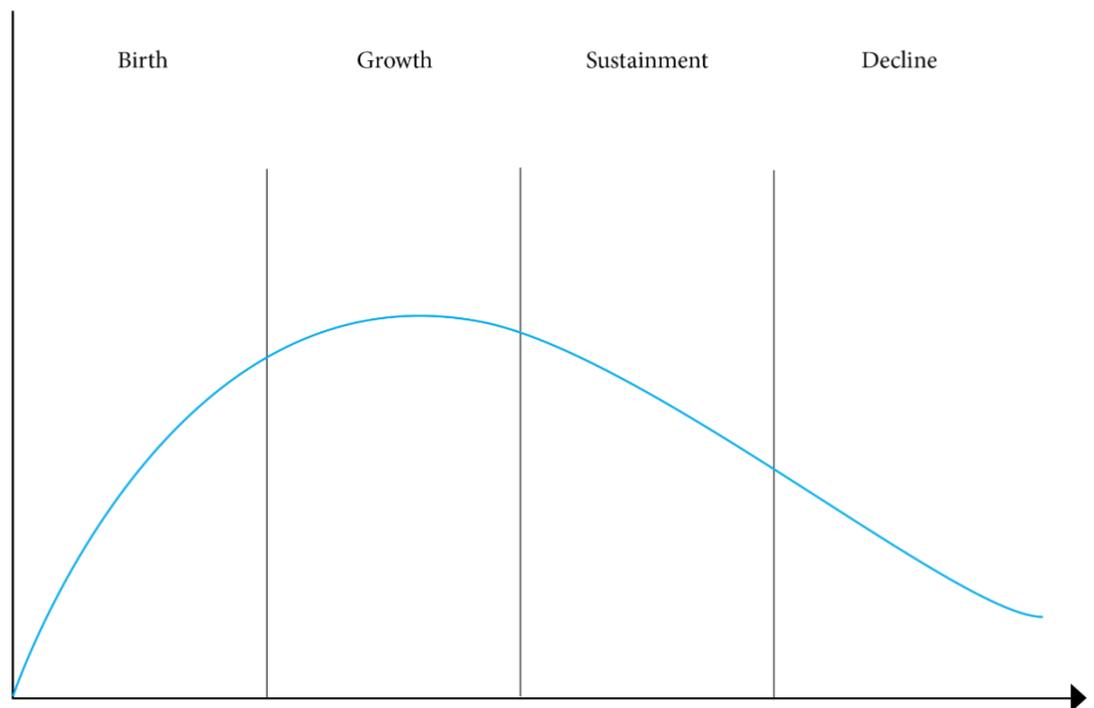
Post-conflict societies are often characterised by high unemployment, poor infrastructure, insufficient entrepreneurship-specific human capital and other resources. These conditions pose numerous challenges to the development of a sustainable entrepreneurial ecosystem. To overcome such challenges requires specific academic tailored-fit entrepreneurial-friendly policies to promote and encourage new ventures creation, attract other firms and talent pool to relocate to that region, increase its economic possibilities, and spur growth as cities are not homogenised entities (Roundy, 2017).

Evolution of Entrepreneurial Ecosystem

As discussed above, EE involves a network, a system, of interactions of individuals and organisations, like financial intermediaries, universities and research institutions, suppliers and customers, multinational companies, or the government (Colombo et al., 2019; Spigel, 2017) that interact in a way that makes entrepreneurship more likely, prevalent, and self-sustaining (Neumeyer & Santos, 2018). The evolution of such EE is not a static phenomenon but rather dynamic and changes over time (Isenberg, 2016; Mack & Mayer, 2016), characterised by multidirectional causality and high order interaction. The table below (Table 2.11) summarises the four stages of EE development as posited by Mack and Mayer (2016) using Isenberg's six core domains across the stages of EE development; birth, growth, sustainment and decline. Cantner et al. (2021) advance Mack Mayer entrepreneurial ecosystem cycle by adding the re-emergence phase whereby,

assuming the same mechanisms that existed in the first stage are still at play, individuals begin to exploit ideas outside firm boundaries as spin-offs or new venture creation. The entrepreneurial ecosystem lifecycle starts again, but in a different way as the supporting institutions, networks and routines that had to be established in the first phase are present, so is the entrepreneurial culture.

Table 2-1: Entrepreneurial Ecosystem development stages



	Birth	Growth	Sustainment	Decline
Firm entries and exits	More firm births than death as number of firms increase as entrepreneurs start to take risks	Growing firm birth rates, but also growing number of firms exit, however there are more firm births than firm deaths	Declining firm birth rates, as more firm death than firm births due to decline in market opportunities	More firms die than entering
Policy	Policy oriented towards traditional economic development efforts Not yet oriented towards Entrepreneurship.	Growing perception among regional policymakers about the need to build EE, first activities to tailor policy towards entrepreneurship	Dedicated and widespread leadership in support of entrepreneurship is critical to sustain evolution of EE	Leadership in favour of EE starts to disappear, possibly reoriented towards traditional economic development.

Finance	Financial capital however scarce is becoming available and starts to be more risk-oriented, but limited in terms of quantity and risk-orientation	Financial capital is getting easier to access as investors have started to develop trust in EE	Financial capital still available, but harder to access because investor confidence and trust is beginning to decline	Decline of financial capital, investors' confidence and trust has considerably diminished
Culture	Few success stories, culture not risk-oriented and not conducive to new ventures, fewer role models to promote entrepreneurship	Networks among entrepreneurs in the region become important as entrepreneurs are better known; societal norms start to change in favour of entrepreneurship. Entrepreneurship is perceived as favourable option to employment	Success stories become critical as firm deaths are starting to increase and the culture is starting to turn against entrepreneurship	Entrepreneurial culture starts to decline in terms of both success stories and favourable societal norms. Entrepreneurship is not perceived as an attractive proposition
Support	Emergence of pioneering support organisations such as incubators, non-profit groups, entrepreneurship-oriented infrastructure etc.	Non-governmental institutions in support of entrepreneurship start to become more specialized and targeted towards new firm creation	Non-governmental institutions start to diversify, possibly away from EE support	Loss of support through non-governmental institutions
Human Capital	Educational institutions mostly perform traditional role (teaching and research), oriented towards general degrees to develop and enhance skills, few experienced entrepreneurs	EE starts to see first serial entrepreneurs; educational institutions start offering specific entrepreneurship training programs. Human capital becomes more entrepreneurially minded and successful entrepreneurs begin to function as role models for potential nascent entrepreneurs	Decline of serial entrepreneurship because opportunity cost to create and sustain venture rises and entrepreneurs trade self-employment for other types of employment	Entrepreneurship is not seen as a career option anymore
Market	Markets for entrepreneurs not yet developed; Firms - often large	Market opportunities for entrepreneurs in the region	Market opportunities decline	Market connections and networks disappear

	firms - in the region do not function as incubators nor are they customers for regional entrepreneurial firms	develop, also start to see national and international market opportunities	(regionally, nationally and internationally), networks start to decline	
Policy implications	Lowering the hurdles for entrepreneurship, networking existing and nascent entrepreneurs, building an entrepreneurship-friendly support infrastructure	Expansion of firm births through support in terms of financial capital, but also networking opportunities, etc	Strengthening of networks: particularly diaspora and multinational networks to extend this sustainment phase	Avoid lock-in of EE through e.g. infusion of new ideas, connections to other entrepreneurial ecosystems nationally and internationally

Source: Table adapted from Mack and Mayer (2016)

2.5 Understanding entrepreneurial universities

The emergence of a knowledge-based society has changed the university's role in the society and economy as a whole by adopting the entrepreneurial university model, whereby universities focus on economic development in addition to their teaching and research missions (María José et al., 2020; Redondo & Camarero, 2019; Trequattrini et al., 2018; Urbano & Guerrero, 2013). They are no longer simply teaching and research institutions and now encompass a "third mission" of economic development, adding to research and teaching activities an entrepreneurial role (Carayannis et al., 2016; Etzkowitz & Leydesdorff, 2000b). In many developed countries universities are encouraged to contribute to regional and national economic development and assume responsibility for transferring knowledge from university to industry and the public (Audretsch & Belitski, 2022). This implies breaking down traditional organisational, cultural, and normative structures to facilitate those collaborative relationships. Entrepreneurial universities are important contributors to the development of

entrepreneurial ecosystems through the research that provides knowledge and human capital (Etzkowitz & Leydesdorff, 2000a; Guerrero, Urbano, Fayolle, et al., 2016; Nyman, 2015; Trequattrini et al., 2018; Wadee & Padayachee, 2017), promotes an entrepreneurial culture and acts as catalysts for start-ups and spin-off (Lahikainen et al., 2019).

The entrepreneurial university model is referred to as the ideal type of a university in responding efficiently and effectively to challenges and opportunities and being able to be competitive in today's reality of universities. There is no consensus on the definition of entrepreneurial universities (Fayolle & Redford, 2014). There is a myriad of definitions, examples and case studies of entrepreneurial universities have been produced to date (see Table 2.2). According to Meyers and Sarika (2011), universities are considered entrepreneurial when trying to maximise the potential for commercialisation of their research and create value in society without seeing this as a threat to academic values. Entrepreneurial universities create a culture of innovation on their campuses and attempt to instil an entrepreneurial mindset in graduates and faculty members by building the structure and processes designed for stimulating innovation and value in the marketplace (Senelwa et al., 2016). Etzkowitz et al. (2000) define the EU as any university that undertakes entrepreneurial activities with the objectives to improve regional and national economic performance and improve regional and national economic performance and the university's financial advantage of its faculty. Rothaermel et al. (2007) define EU as any university involved in any entrepreneurial activities. Mascarenhas et al. (2017b) define EU as entities offering opportunities, practices, cultures and favourable environments that actively encourage and embrace the entrepreneurship of students and graduates.

Kirby (2002)	As at the heart of any entrepreneurial culture, Entrepreneurial Universities have the ability to innovate, recognize and create opportunities, work in teams, take risks and respond to challenges
Etzkowitz (2003)	The Entrepreneurial University is a natural incubator, providing support structures for teachers and students to initiate new ventures: intellectual, commercial and conjoint
Jacob et al. (2003)	An Entrepreneurial University is based on both commercialisation (customs made education courses, consultancy services and extension activities) and commoditization (patents, licensing or student owned start-ups)
Williams (2003)	Is nothing more than a seller of services in the knowledge industry
Kirby (2005)	A survivor of competitive environments with a common strategy oriented to being the best in all its activities (e.g., having good finances, selecting good students and teachers, producing quality research) and tries to be more productive and creative in establishing links between education and research
Guerrero et al. (2006)	Universities that have the ability to innovate, recognise and create opportunities, work in teams, take risks and respond to challenges on its own, seeks to work out a substantial shift in organisational character to arrive at a more promising posture for the future
Rothaermel et al. (2007)	Any university that is involved in any entrepreneurial activities
Meyers and Sarika (2011)	Universities are considered entrepreneurial when they are trying to maximize the potential for commercialisation of their research and create value in society without seeing this as a threat to academic values
Mascarenhas et al. (2017a)	Entities offering opportunities, practices, cultures, and favourable environments that actively encourage and embrace the entrepreneurship of students and graduates

Source: Author's

The extant literature confirms that universities play a critical role in countries' entrepreneurship as well as the development of knowledge-based economies through marketing their research outcomes and establishing new knowledge-based enterprises (Bronstein & Reihlen, 2014; Clark, 1998; Guerrero et al., 2006; Kirby et al., 2011; Rothaermel et al., 2007). Different studies have highlighted characteristics of entrepreneurial universities that facilitate them to pursue the third mission (see Table 2.2) effectively.

Table 2-3: Characteristics of entrepreneurial universities

Authors	Characteristics
Clark (1998)	<ul style="list-style-type: none"> • A strengthened steering core: universities cannot depend on traditional control or steering; they need to become quicker, more flexible, more focused in reacting to demands from their environments • An expanded developmental periphery: universities need to have mechanisms to relate to the outside world; they have to reach across their traditional boundaries; they need to set up special organisational units • A diversified funding base: universities need to have diversified resources of funds; they have to widen their financial base and become less dependent of government • A stimulated academic heartland: universities need academic units that act as entrepreneurial units; these units have to be stimulated to react positively to change • An integrated entrepreneurial culture: universities need a culture that embraces change; a set of beliefs that is university-wide and that become the very basis of the institution's identity
Etzkowitz et al. (2000)	<ul style="list-style-type: none"> • Internal transformation • Trans-institutional impact • Interface processes • Recursive effects
Etzkowitz (2003)	<ul style="list-style-type: none"> • The organisation of group research • The creation of a research base with commercial potential • The development of organisational mechanisms to move research out of the university as protected intellectual property • The capacity to organize firms within the university • The integration of academic and business elements into new formats such as university–industry research centres
Etzkowitz (2004)	<ul style="list-style-type: none"> • The capitalization of knowledge becomes the basis for economic and social development and, thus, of an enhanced role for the university in society • The interaction with the government and industry • The university independence from other institutional spheres • The creation of hybrid organisational formats that incorporate business sector practices and those of traditional universities • The continuing renovation of the university's internal structure as its relationship to the industry and government changes
Kirby et al. (2011)	<ul style="list-style-type: none"> • They strive to be more entrepreneurial in transforming their organisational structures to better respond and adapt to the external environment • They seek to encourage collective entrepreneurial action at all levels by using various mechanisms to promote entrepreneurial culture
Mainardes et al. (2011)	<ul style="list-style-type: none"> • The capacity to adapt to demands from the surrounding environment • They are to develop and set out clear mission declarations and objectives • A business focused culture and an internal university structure that is differentiated by sub-units and by professional university management • Shared models of governance for implementing adaptive strategies • A committed leadership to represent an essential factor for successful adaptation

Etzkowitz (2013)	<ul style="list-style-type: none"> • Interaction: the entrepreneurial university interacts closely with industry and government • Independence: the entrepreneurial university is a relatively independent institution • Hybridization: the resolution of the tensions between the principles of interaction and independence are an impetus to the creation of hybrid organisational formats to realize both objectives simultaneously • Reciprocity: there is a continuing renovation of the internal structure of the university as its relation to industry and government changes, and of industry and government as their relationship to the university is revised
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Source: Author's

2.5.1 The development of entrepreneurial university

Universities are not traditionally entrepreneurial due to their inherent nature (Kirby, 2006). However, universities are now shifting from their traditional roles, teaching and research, to adopt entrepreneurial university model that includes the third mission - the commercialisation of knowledge and active contribution to the development of private enterprises in the local and regional economy (Etzkowitz et al., 2000). As a result, universities face pressure to become knowledge-based agents for local value creation to support social and economic development (Rosa Lombardi et al., 2019). This is more problematic in an environment that experience violent conflict in which the role of entrepreneurial universities will need to include addressing the thorny issues that led to that conflict and promoting peacebuilding.

With the transition from an agrarian society to a knowledge-based society, clusters and regions increasingly rely on universities to improve economic and social conditions within their community and beyond through the third mission (Etzkowitz, 2013). Entrepreneurial universities produce knowledge that promotes technological, economic, and social developments crucial to regional growth and competitiveness in the global economy in the medium to long term (Guerrero, Urbano, Fayolle, et al., 2016; Sá et al., 2018). Furthermore, universities are no longer considered as an island of knowledge

“*ivory tower*” where both students and faculty operate in a protective bubble but as institutions that are engaged with a range of external partners through entrepreneurial activities that promote innovation and development through the transfer of technology and knowledge from academia to industry and generation of spin-off companies (Philpott et al., 2011; Rubens et al., 2017).

Entrepreneurial universities respond strategically to field logic changes by acquiring and innovatively employing resources, underpinned by an integrated entrepreneurial culture that provides support structures in order to fulfil their entrepreneurial agenda (Bronstein & Reihlen, 2014). Entrepreneurial universities offer a conducive environment in which the university community (academics, staff, and students) can explore, evaluate, and exploit ideas that can potentially be turned into entrepreneurial ventures (Guerrero et al., 2012), enhance connectivity between people and regions, and provides opportunities for new venture creation through the exchange of knowledge and ideas with external stakeholders (Audretsch et al., 2015; Bronstein & Reihlen, 2014; Martin et al., 2019; Spiegel, 2016).

Entrepreneurial universities are also pivotal to economic development because they commercialise their innovation and transfer their advances in knowledge into the economic growth (Brown & Mason, 2017). Entrepreneurial universities are regarded as catalysts for regional and national economic development because they are natural incubators that provide support, structure and knowledge for potential entrepreneurs (Culkin, 2016; Guerrero et al., 2012; Trequattrini et al., 2018; Urbano & Guerrero, 2013), contributes to the Research and Development (R&D) capability of the economy and transfer of technology and its application from academia to industry (Philpott et al., 2011).

Entrepreneurial universities have been shown to have an economic impact (Cavallo et al., 2018; Guerrero & Urbano, 2012; Guerrero et al., 2012; Ikebuaku & Dinbabo, 2018; Roundy, 2017; St-Pierre et al., 2016; Urbano & Guerrero, 2013). Studies have shown the importance of the entrepreneurial university to regional economic development (Culkin, 2016; Guerrero et al., 2015; R. Lombardi et al., 2019; Trequattrini et al., 2018), and such importance has also been widely acknowledged by academics and policymakers alike (Atiase et al., 2018; Audretsch & Belitski, 2017; Autio & Fu, 2014; Cavallo et al., 2018; Ikebuaku & Dinbabo, 2018; Kuratko et al., 2017; Roundy, 2017; St-Pierre et al., 2016). Universities are critical elements of sustainable and vibrant EE (Maroufkhani et al., 2018; Wadee & Padayachee, 2017) but more particularly entrepreneurial universities (Ratten, 2017; Trequattrini et al., 2018).

Traditionally, universities' role was twofold; teaching and research, but such role does not address the modern challenges of globalisation and political and societal pressures (Kirby, 2006). In contemporary society, universities are being required to operate more entrepreneurially because they are regarded as a critical factor of economic development by not only fulfilling their teaching and research agenda but also being more engaged with external stakeholders through third stream activities and playing an active role in the knowledge economy (Etzkowitz, 2003).

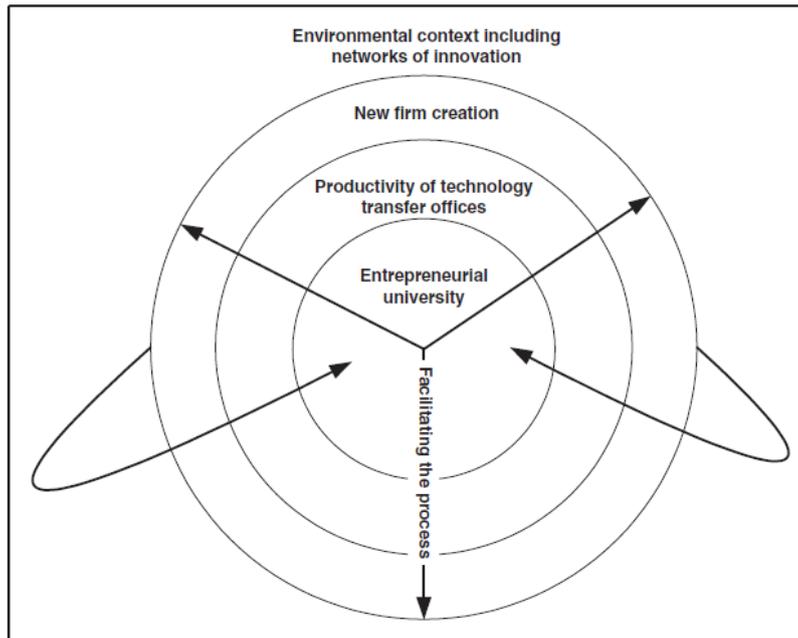
To become entrepreneurial institutions, universities need to fulfil three missions; teaching, research, and entrepreneurship (Guerrero et al., 2015; Philpott et al., 2011; Urbano & Guerrero, 2013). To effectively pursue the third mission, entrepreneurial universities need to implement several strategies and calibrate internal institutional

configuration to work together with government and industries to facilitate the generation and exploitation of knowledge and technology (Guerrero & Urbano, 2012). The incorporation of the third mission does not mean the replacement of traditional roles of universities (teaching and research) but incorporating new activities to fulfil the objectives of the third mission whilst fulfilling the first mission (teaching) and the second mission (research).

To achieve entrepreneurial missions of entrepreneurial universities requires changes in the function and structure of universities; according to Etzkowitz (2013), there are three stages they need to go through for a traditional university to achieve entrepreneurial status. Firstly, universities need to find a diversified source of funding and be less dependent on traditional funding sources such as government, research contracts, campus services, tuition fees, thus becoming independent entities with their own financial capital than bureaucratic organisations. Secondly, universities need to commercialise their research. Thirdly, universities need to engage the community more to bridge the gap between academia and practice.

Several studies and academics have posited entrepreneurial universities development frameworks and their characteristics. Rothaermel et al. (2007) proposed a framework that identified four main areas that emerged from a detailed analysis of the 173 academic journals published between 1981 and 2005 that show the dynamic and evolutionary process of the university innovation system (see Fig. 2.2). The four main areas are (i) entrepreneurial research university, (ii) productivity of Technology Transfer Offices, (iii) new firm creation, and (iv) environmental context, including networks of innovation.

Figure 2-3: University entrepreneurship framework



Source: Rothaermel et al. (2007)

According to Clark (1998), five pathways of transformation (see Table 2.4), traditional universities can become entrepreneurial universities by having a diversified funding base and become financially independent and self-reliant, strengthened steering core. Internal decentralisation can give departments power to align their aspirations with their responsibilities and learn new ways to co-ordinate independent departments, expanded development periphery to effectively engage external stakeholders, the stimulated academic heartland, and integrated entrepreneurial culture. These five pathways contribute to the building of proactive autonomy, from the diversified funding base to the gradual development of a wrap-around entrepreneurial culture.

Table 2-4: Pathways of organisational transformation

The strengthened steering core	<ol style="list-style-type: none"> 1. 'need for a greater managerial capacity to become quicker, more flexible, and especially more focused in reactions to expanding and changing demands' (Clark, 1998, p. 5) 2. 'must embrace central managerial groups and academic departments' (Clark, 1998, p. 5) with a combination of the two - a 'centralised decentralisation' 3. 'must operationally reconcile new managerial values with traditional academic ones' (Clark, 1998, p. 6) to carry the notion of entrepreneurship from centre to academic heartland, the basic departmental units
The expanded development periphery	<ol style="list-style-type: none"> 1. 'a growth of units that reach across old university boundaries to link up with outside organisations and groups' (Clark, 1998, p. 6) 2. 'professionalised outreach offices [including the incubator service of science parks] that work on knowledge transfer, industrial contact, intellectual property development, continuing education, fundraising, and even alumni affairs' (Clark, 1998, p. 6) 3. 'interdisciplinary project-oriented research centres that grow up alongside departments' (Clark, 1998, p. 6) as secondary, but more flexible units to group academic work
The diversified funding base	<ol style="list-style-type: none"> 1. need for 'greater financial resources, ... particularly discretionary funds,' (Clark, 1998, p. 6) in universities to meet the ascending cost of student and knowledge growth 2. 'widening [the governmental support through the competitive funds of] research council(s)' (Clark, 1998, p. 6) 3. generating 'third-stream income sources that stretch from industrial firms, local governments, and philanthropic foundations, to royalty income from intellectual property, earned income from campus services, student fees, and alumni fundraising' (Clark, 1998, p. 6)
The stimulated academic heartland	<ol style="list-style-type: none"> 1. as 'the operating base of the university as sites of research and particularly of teaching, the basic units and their more encompassing multi-department faculties, continue to be the places where most academic work is done' (Clark, 1998, p. 7) 2. 'For change to take hold, one department and faculty after another needs itself to become an entrepreneurial unit, reaching more strongly to the outside with new programs and relationships and promoting third-stream income' (Clark, 1998, p. 7) 3. 'need to accept that individuals as well as collegial groups will have stronger authority in a managerial line that stretches from central officials to heads of departments and research centers' (Clark, 1998, p. 7)
The integrated entrepreneurial culture	<ol style="list-style-type: none"> 1. develop[ing] a work culture that embraces change' (Clark, 1998, p. 7) in the entrepreneurial university 2. starting the entrepreneurial culture 'as a relatively simple institutional idea about change that later becomes elaborated into a set of beliefs which, if diffused in the heartland, becomes a university wide culture' (Clark, 1998, p. 7) 3. interacting ideas and practices, 'the cultural and symbolic side of the university becomes particularly important in cultivating institutional identity and distinctive reputation' (Clark, 1998, p. 7)

Source: Table adapted from Clark (1998)

Using intrapreneurship theory and the University of Surrey as a case study, Kirby (2006) demonstrates how traditional universities can achieve the status of an entrepreneurial university by addressing barriers to entrepreneurship (See Table 2.5). This can be achieved by having clear (entrepreneurial) policies that demonstrate the university's entrepreneurial intent. For example, by removing obstacles that prevent entrepreneurship, creating a conducive and supporting environment for entrepreneurial activities, promoting entrepreneurship behaviours that pervade the whole organisation, embracing entrepreneurship principles by those in charge, providing encouragement and supporting mechanisms to equip the academic community with the knowledge and skills to explore and exploit entrepreneurial opportunities, effectively rewarding with monetary and non-monetary incentives.

Table 2-5: Strategic action to promote entrepreneurship

Action	Activities
Endorsement	Senior staff act as role models and senior management commitment to entrepreneurship
Incorporation	Into University, Faculty/Departmental and personal plans, corporate model for entrepreneurship
Communication	Publication and dissemination of the strategy and consultation on it, formulation of strategies clearly demonstrate that the university encourages entrepreneurial behaviour
Encouragement and support	Hard support—enterprise laboratories, pre-incubators, incubators, science parks, meeting rooms, computing support, office support services and seed corn funding Soft support—training, mentoring and advice, signposting to sources of external support, ongoing technical and management support once the venture is launched
Recognition and reward	Equity sharing, promotion - The monetary and non-monetary rewarding of intrapreneurs
Organisation	Cross-disciplinary research and teaching groups, educational partnerships, a multi-disciplinary Entrepreneurship Centre
Promotion	Business plan competitions, entrepreneurship “halls of fame”, Cases, role models

Source: adapted from Kirby (2006)

Different scholars have defined entrepreneurial universities based on their role (Cunningham et al., 2017), ability to innovate (Kirby et al., 2011; Senelwa et al., 2016), engagement in entrepreneurial activities (Etzkowitz et al., 2000; Rothaermel et al., 2007), commercialisation (Jacob et al., 2003; Meyers & Sarika, 2011). Others have demonstrated the characteristics attributed to entrepreneurial universities (Etzkowitz et al., 2000; Kirby, 2006; Mascarenhas et al., 2017a; Röpke, 1998; Rothaermel et al., 2007; Subotzky, 1999). For the purpose of this study, entrepreneurial universities are defined as institutions characterised with well-developed third mission supported by effective structures and entrepreneurial culture of some degree that enable the academic community (students and

lecturers) to explore and exploit entrepreneurial opportunities as well as contribute to social and economic development regionally, nationally and globally. This definition of entrepreneurial university is underpinned by the characteristics of entrepreneurial universities; close interaction with industry and government, financial independence/autonomy, the creation of hybrid organisational formats to realize both objectives of interaction and independence simultaneously, and continual renovation of the internal structure to effectively engage with industry and government (Etzkowitz, 2013). To understand how entrepreneurial universities are conceptualised and how the third mission is operationalisation, the study proposes a conceptual framework, which is further discussed in Chapter 6 (see Figure 3-3).

2.5.2 Entrepreneurial university frameworks

The pressure as a result economy transitioning from an agrarian society to a knowledge-based society and the rise of the knowledge-intensive economy, especially in post-conflict, have posed significant challenges to higher education to become more responsive to such pressures (Sam & Sijde, 2014). To address those pressures, universities are in the process of becoming entrepreneurial by adopting numerous strategic approaches that include engagement with the business community, entrepreneurship education, academic entrepreneurship (Urbano & Guerrero, 2013); research commercialisation (Cunningham & Link, 2014), the establishment of entrepreneurship department (Pugh et al., 2018) among others.

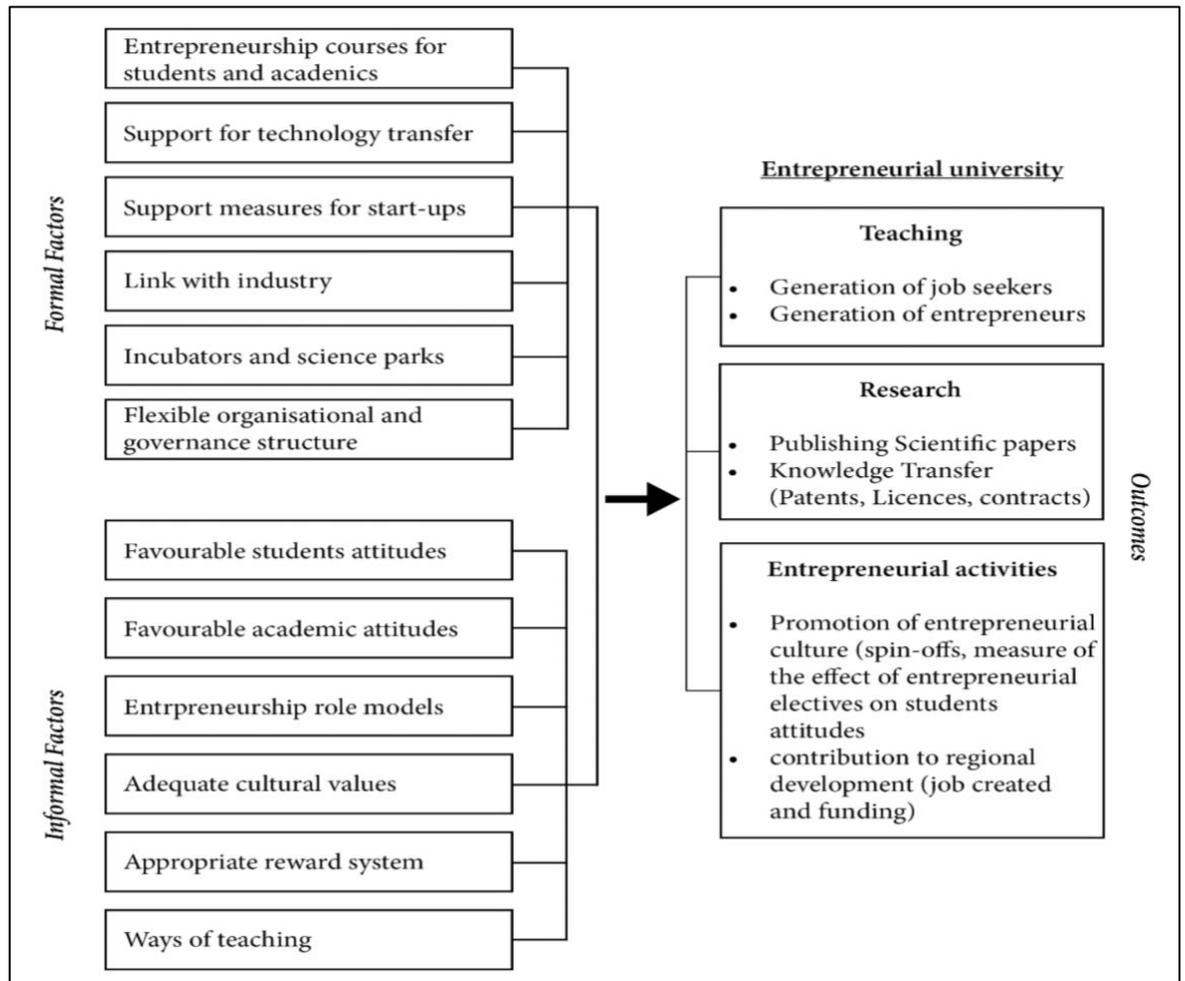
As pointed out by several authors (Guerrero, Urbano, Fayolle, et al., 2016; Klofsten et al., 2019) the model of entrepreneurial university is a complex phenomenon that involves different academic traditions, decision-making levels, research values, and sub-

organisational cultures. The current conceptualisation of entrepreneurial university and elements that contribute to its development is taken from well-developed and established higher learning institutions based on the models and conceptual frameworks developed in the literature that seek to identify the features that should characterise the entrepreneurial university.

2.5.2.1 Kirby et al. (2011) Entrepreneurial University conceptual framework

Kirby et al. (2011) put forward a theoretical framework indicating how institutional factors (formal and informal) facilitate and hinder the development of entrepreneurial universities (see Fig. 2.3). The study was done in two phases; phase one was to gauge a consensus from experts in the fields to what constitutes entrepreneurial universities and rank factors thought to facilitate and hinder the development, whereas phase two involved testing the outcomes from the previous phase at an entrepreneurial university how they facilitate and/or hinder university transformation development.

Figure 2-4: Kirby et al, (2011) entrepreneurial university conceptual framework



Source: adapted from Kirby et al. (2011)

The criteria to measure the outcomes and outputs of these universities are based on the engagement of the academic community in entrepreneurial activities, supported by policies and practices whose objective is to create not job seekers but future job creators - graduates who have not only theoretical knowledge but also practical abilities to explore and exploit entrepreneurial opportunities. The effectiveness industry-university relationship is realised through the commercialisation of research for social or economic good and the application of research outcomes to address social or economic challenges that act as a catalyst for spin-out companies.

For the universities to achieve their entrepreneurial objectives, they require introducing education strategies geared towards improving students' skills, attributes, and behaviour to develop and enhance creative and critical thinking and create a conducive environment that promotes such activities. Abreu et al. (2016) demonstrate the role of Universities to facilitate knowledge dissemination and industry connections in the process of value creation and co-creation promote industrial clusters, which leads to regional capacity-building using a variety of formal and informal mechanisms to increase universities' economic and societal impact. Markuerkiaga et al. (2014) used Kirby's model to develop an integrated model based on a qualitative review of theoretical and empirical studies of entrepreneurial universities and an analysis of diverse frameworks and models.

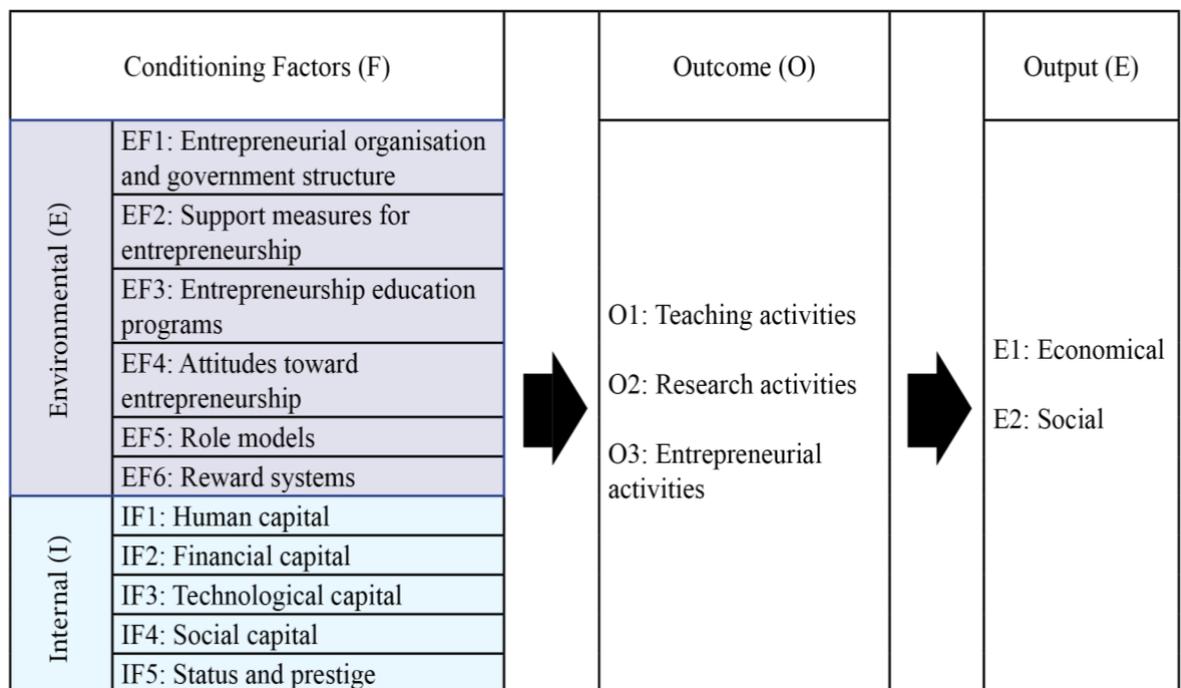
2.5.2.2 Guerrero et al. (2012) Entrepreneurial University conceptual framework

To achieve the university's commercially oriented mission, Guerrero et al. (2012) propose a theoretical framework that helps understand and analyse conditioning factors and the relationship with entrepreneurial university outcomes and outputs in a specific region. This framework (see Fig. 2.4) results from a comparative study of entrepreneurial universities in two European regions by adopting institutional economics and Resource-Based View (RBV). Conditioning factors are drawn from institutional economics, and internal factors are drawn from the resources and capabilities supported by the resource-based view of the firm.

According to Guerrero et al. (2012), environmental factors refer to the internal management organisation structure, decision-making mechanisms and leadership functions that have implications on support measures developed within the universities, the introduction of entrepreneurship education programs, exchange programs and collaboration strategies between university and industry, effective reward system, as well

as nurturing positive attitudes toward entrepreneurship. This framework was used by Guerrero et al. (2014) in their comparative study of Spanish and Irish universities, analysing similarities and differences of the conditioning factors, output and outcome of entrepreneurial universities in those two different regions that share similar social, economic and political conditions. It was also used to analyse the socio-economic impacts of 7 out of 8 public universities in Catalonia in Spain (Urbano & Guerrero, 2013).

Figure 2-5: Guerrero et al. (2012) entrepreneurial university conceptual framework



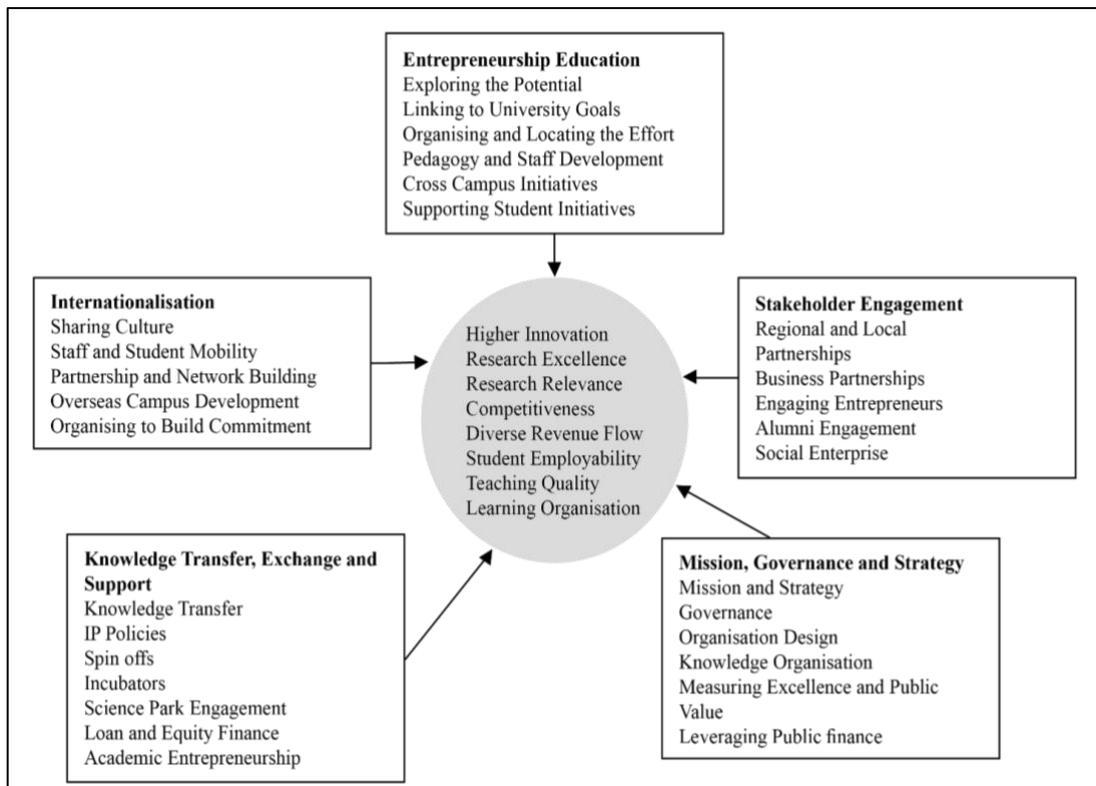
Source: Figure adapted from Guerrero et al. (2012)

2.5.2.3 Gibb (2012) entrepreneurial university conceptual framework

Gibb (2012) proposed a framework on the key areas essential for EU development by applying United Kingdom's context. The framework highlights five key strategic areas that can develop a more soundly based strategic orientation of a university towards entrepreneurship (see Fig. 2.5). They include mission, governance, strategy; stakeholder

engagement; knowledge transfer, exchange and support, internationalisation activities and entrepreneurship education. The commitment of various actors to entrepreneurial activities, the resources and mechanisms, innovative pedagogical approaches and the creation or existence of some roles in the entrepreneurial university structure are among the issues the model addresses. The model sets out the potential for exploring the contribution of the entrepreneurial concept to such broader strategic goals of enhancing innovation, strengthening and building stakeholder relationships, enhancing student employability, improving teaching quality and perhaps, by closer involvement with entrepreneurs, building more revenue-generating project work as well as enhancing the competitive image of the institution (Gibb, 2012).

Figure 2-6: Key areas of university entrepreneurial potential



Source: Adapted from Gibb (2012)

2.5.2.4 Organisation for Economic Co-Operation and Development (OECD) model

Universities have to pursue various strategies and new organisational arrangements to collaboratively support the generation and exploitation of knowledge and technology with governmental and industrial partners through teaching and commercialisation (Cunningham & Link, 2014). The European Commission and the OECD developed HEInnovate – a tool intended to assess universities’ entrepreneurial and innovative potential across eight critical areas related to entrepreneurial teaching and learning and the support of entrepreneurs. The framework helps universities assess themselves against statements organised under seven key areas. Those key areas are Leadership and Governance; Organisational Capacity; Digital Transformation and Capability; Entrepreneurial Teaching and Learning; Preparing and Supporting Entrepreneurs; Knowledge Exchange and Collaboration; The Internationalised Institution, and Measuring Impact (OECD, 2012). HEInnovate aims to support Universities to empower students and staff to demonstrate enterprise, innovation and creativity in their teaching, research and third missions.

2.5.2.5 Bizri et al. (2019a) entrepreneurial university conceptual framework

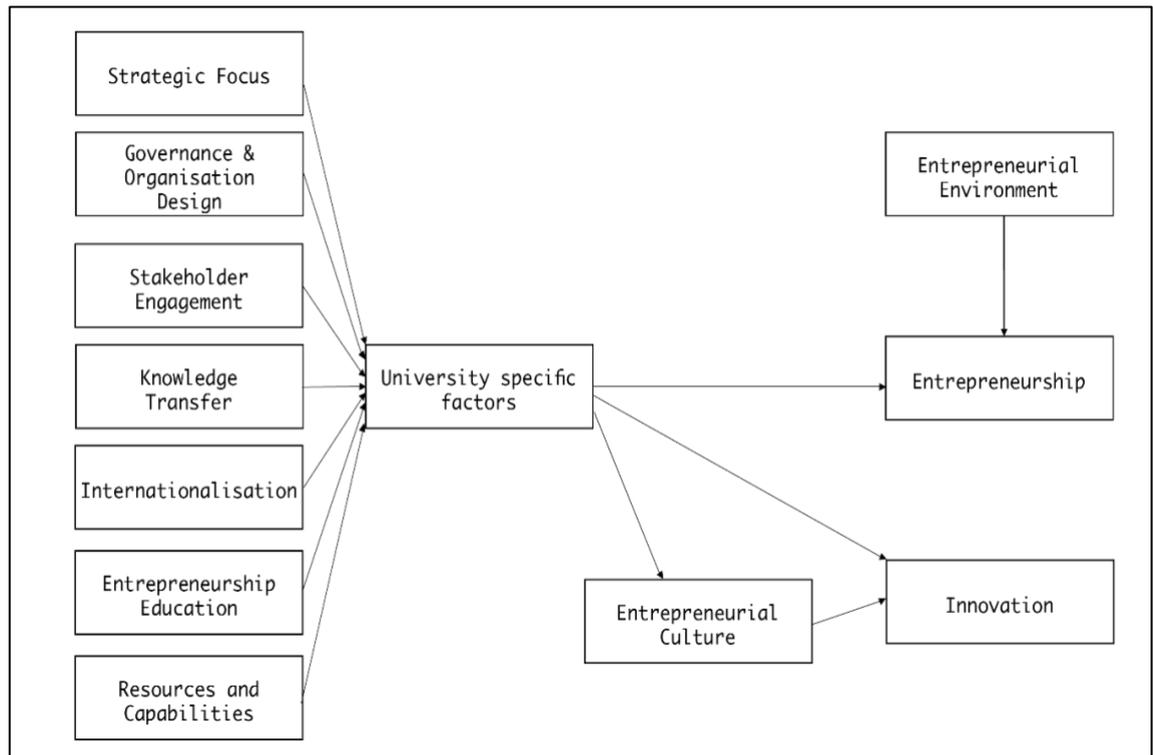
The role of the university, as already mentioned, is not solely to generate knowledge but also to disseminate knowledge for social and economic good. Bizri et al. (2019a) propose a conception model (see Fig. 2.6) that responds to the post-conflict environment characteristics that recognise the limitations of the context in which they operate. This model identified seven factors contributing significantly to universities’ ability to stimulate innovation and entrepreneurship in developing economy context underpinned by resources and capabilities to transfer knowledge to industry and government. Those factors are the strategic focus, governance and organisation design, stakeholder engagement, knowledge transfer, internationalisation, entrepreneurship education and

resources and capabilities. The model identifies “resource and capabilities” used to produce knowledge and effective “knowledge transfer and support” as the most critical factors within the Triple Helix. Therefore, universities to achieve their third mission objective need to focus all efforts on establishing them to ensure the achievement of their intended outcomes.

Leadership that views innovation as a central function of the university incorporates entrepreneurship in the university’s strategy and is committed to its execution, committed to local and regional development through collaboration and partnerships and dynamic capability development to achieve socio-economic objectives and gain competitive advantage is paramount (Leih & Teece, 2016a). Governance and organisational design reflect the degree to which entrepreneurial activities among the academic community are institutionally supported and how organisation systems are organised to support bottom-up entrepreneurial behaviour.

Internationalisation of university happens through collaboration with international institutions to enhance its prestige and status and strengthen the university’s Research and Development (R&D) capabilities that attract domestic and foreign investments to enable the university to fulfil its entrepreneurial mission, hence increasing contribution to regional and national socio-economic development. The collaboration between university, industry and government in the creation of knowledge ensures that it is not a one-way process but rather a continuous exchange of ideas, proven methods and best practices that contribute to the constant advancement of knowledge that will consequently lead to new innovations (Etzkowitz et al., 2000; Sarpong et al., 2017).

Figure 2-7: Bizri et al. (2019a) entrepreneurial university conceptual framework



Source: Figure from Bizri et al. (2019)

2.6 Entrepreneurial university architectures

The focus on the organisational structures needed to support entrepreneurial universities has not been the focus of many empirical studies. The term “entrepreneurial architecture” was first introduced by Burns (2005) as an organisational framework for understanding entrepreneurship in a corporate context. However, it can be useful to explore organisational entrepreneurship in the context of institutions of higher education. To understand the transitional process of universities to become entrepreneurial, internal structures that act as enablers or hindrances need to be explored and analysed. Nelles and Vorley (2010a) define entrepreneurial architecture as the institutional, communication, coordination, and cultural factors that are internal to an organisation that is oriented towards innovation. Entrepreneurial architectures help frame institutional approaches towards the university’s entrepreneurial mission that shape and influence the form and

effectiveness of entrepreneurial activities. Nelles and Vorley (2010a) indicate that entrepreneurial architecture consists of five institutional elements: structures, strategies, systems, leadership, and culture.

The entrepreneurial architectures help analyse structures put in place by institutions, establish routines and norms and act as a conduit of knowledge and innovation to other actors in the ecosystem and the wider market (Audretsch, 2014). To achieve that, entrepreneurial universities need to have organisational architectures that fit into the strategy-environment context to promote and enhance entrepreneurial attitude among academic communities consisting of formal elements and informal structures adaptable enough to respond effectively to entrepreneurial imperatives (Roberts, 2004). Cunningham et al. (2021) have further contributed to the entrepreneurial architectures debate. They propose a conceptual framework that focuses on formal organisational units within entrepreneurial architectures aligned with the institutional, local and regional contexts as well as the national policy and political environment support university-based entrepreneurs across stages of entrepreneurship by addressing the actual needs of entrepreneurs during the different stages of entrepreneurial growth (See Table 2.6).

Source: adapted from Cunningham et al. (2021)

2.7 Entrepreneurial university conditioning factors

The institutional theory provides a lens through which different institutional environmental factors such as state, trade associations, cultural dynamics, social norms, educational institutions, professional associations and markets encourage or hinder entrepreneurial initiatives of individuals in a given society, and how those institutions change over time within those settings (Atiase et al., 2018). Guerrero et al. (2012) highlighted the conditioning factors required to provide a conducive atmosphere for the university community to explore, evaluate and exploit ideas that can potentially turn into social and economic endeavours to achieve the third mission objectives.

Guerrero and Urbano (2012) entrepreneurial university framework was chosen to analyse the entrepreneurial transformation process of entrepreneurial universities in developing countries as it considers the relevance of universities' environmental and internal factors to fulfil their teaching, research and entrepreneurial activities and the socioeconomic impacts generated by these activities. Moreover, it was empirically used more for further studies, confirming the existence of some of these elements. Guerrero and Urbano (2012) framework integrated with Nelles and Vorley (2010a) entrepreneurial architecture (see Table 2.7) enable the study to explore the evolution of entrepreneurial universities in a post-conflict context.

Table 2-7: Entrepreneurial university architecture and conditioning factors

Entrepreneurial university architecture	Description	Conditioning factors
Structures	Consist of entrepreneurial architecture through which faculty, staff, and students interface with actors outside the university (and vice versa) and acts as a conduit of knowledge exchange. They include Technology Transfer Offices (TTO), business incubators, accelerators, Technology parks, Industrial Liaison Offices	Physical resources – designed to satisfy social and economic demands (TTO, industrial liaison offices, incubators, research labs etc.)
Systems	These are networks of communication, norms of interaction, the configuration of linkages between structures and departments, admin, etc. and the degree to which these structures are imbedded within broader mission of the university	Alliances and network – transdisciplinary and heterogeneous structures for collaborating and networking with multiple universities, government institutions and industries
Leadership	The ability of key actors to drive the 3 rd mission of universities – the extent to which key actors can shape and alter structure, process and strategic vision that governs organisational evolution.	<ul style="list-style-type: none"> • Organisation structure (hierarchical or flat) • Governance structure (policies and practices) • Human resources- (skills and experience) • Financial resources – financial autonomy • Rewards system (monetary and non-monetary to academic entrepreneurs)
Strategies	Organisational goals set out in planning documents; includes internally determined formal incentive structures to support the 3 rd mission and avenue through which those goals will be pursued as well as providing an overview of the trajectory of the development	Organisational goals and how these will be pursued – the degree, nature and distribution of research funding
Culture	Attitudes of individual towards innovation and entrepreneurship – degree of entrepreneurial orientation	<ul style="list-style-type: none"> • Academic community’s attitudes towards entrepreneurship • Presence of Role models • Status and prestige

Source: Author’s

The development of the entrepreneurial university is conditioned by formal and informal external factors (Kirby et al., 2011) and internal and environmental factors (Guerrero et al., 2012), which include entrepreneurial organisational and governance structure, new teaching methods, rewards and incentives, formation of strategic alliances with external stakeholders, technology transfer office, and business incubators and by internal factors relating to resources and capabilities.

Many studies (Culkin, 2016; Guerrero et al., 2012; Philpott et al., 2011) have identified several challenges faced by entrepreneurial universities, which include loss of teaching time, lack of human capital, conflict of interest between academic and entrepreneurial activities, intensification of internal conflicts strong network ties with scientific communities but not with commercial networks, and monetary losses. However, these challenges are likely to be reversed in the near future; according to Philpott et al. (2011), fundamental pressures such as reduced government funding dependency, change in IP legislation, political willingness, recognition of the role of universities in regional social and economic development.

2.7.1 Entrepreneurial Education and entrepreneurship provisions

Entrepreneurial knowledge required to explore and exploit entrepreneurial opportunities is significantly influenced by the institutions within which it is located (Carayannis et al., 2016). The extant literature (Ács et al., 2014; Audretsch & Belitski, 2017; Liñán & Fayolle, 2015) indicates that entrepreneurship initiation has its foundations in individuals' intuition, society and culture, which is influenced by economic, social and political factors. Katz and Gartner (1988) argue that venture creation results from entrepreneurial

intentions and planned behaviour (Ajzen, 1991). Academics can create an awareness of entrepreneurial opportunities and teach the needed skills to explore and exploit those entrepreneurial opportunities, increasing Entrepreneurial Intentions (Sandip & Salve, 2016).

There is a direct correlation between education and entrepreneurial intention in which low education leads to decreased entrepreneurial intentions and vice versa (Schultz, 1980). For an entrepreneurial university to achieve its third mission ambitions, De Jager et al. (2017) and Lindh and Thorgren (2016) postulate that higher learning institutions need to adopt entrepreneurial education in the development of the right mindset, knowledge and skills as foundations for entrepreneurship focusing on students in building their attitudes, knowledge and skills for the purposes of entrepreneurship. In so doing, universities create entrepreneurial capital (Guerrero et al., 2015; Pittaway & Cope, 2007; Ratten, 2017; Turner & Gianiodis, 2018; Wadee & Padayachee, 2017).

Entrepreneurship education is defined by Meyers and Sarika (2011) as the building of knowledge and skills about or for the purpose of entrepreneurship generally, as part of recognised education programs at primary, secondary or third level educational institutions. The university's traditional mission mainly focused on knowledge and preserving knowledge in libraries (R. Lombardi et al., 2019; Philpott et al., 2011). For entrepreneurial skills and attitudes to be enhanced and developed, there needs to be a move away from traditional teaching methods that are deep-rooted within passive learning strategies and techniques that limit students learning (Henry et al., 2005) and move towards a hands-on approach entrepreneur-centric methods – experiential learning

in which students are not passive (spectator-like) learners but involved and pro-active (Higgins & Elliott, 2011; Ratten, 2017).

Entrepreneurial education is widely believed as an important factor in shaping one's entrepreneurial intention. Zhang et al. (2016) argue that universities educate and foster entrepreneurs, who are deemed as the critical factor that constitutes the source of all economic development and job creation. The underlying assumption is that teaching and learning will create the antecedents to aspirations and engagement in student and graduate business start-ups through appropriate teaching methods and entrepreneurship programmes. Entrepreneurial universities provide entrepreneurship programmes to equip students with entrepreneurial competencies to explore and exploit entrepreneurial opportunities and with dedicated enterprise centres in which business start-up spaces such as incubators and learning opportunities for students co-exist (Cunningham et al., 2021; Martin et al., 2019). Entrepreneurial competencies can be taught and/ in lectures (cognitive competencies) or be learned by interacting with the world outside the university, working in multi-disciplinary teams, working iteratively and learning from failure (non-cognitive competencies) (Lackeus, 2014).

Entrepreneurial universities offer more than an entrepreneurship curriculum; they also provide multiple entrepreneurial initiatives and opportunities to encourage and support the entrepreneurial behaviour of their academic community (Gibb, 2012). Entrepreneurial universities provide entrepreneurship transfer through education and advancement of knowledge through research, publishing activities, education to all students but not necessarily as part of their taught (Morland et al., 2021). Entrepreneurial universities are seen as a permeating culture (Rae et al., 2009) that facilitates and motivates educators

and learners to engage in entrepreneurial behaviours as part of developing critical thinking and communications skills considered a prerequisite that enables students to develop critical thinking and communications skills considered as a prerequisite for success, not just in entrepreneurship, but also on the broader business context.

To promote an entrepreneurial mindset among students, entrepreneurial universities need to adopt non-traditional teaching methods that are immersive and contextualised to raise entrepreneurial awareness of students and highlight the entrepreneurial path as a viable career option, thus increasing entrepreneurial behaviour (Cope & Watts, 2000; Fayolle & Gailly, 2015; Ratten, 2017). To achieve its third mission objectives, Etzkowitz et al. (2000) contend that entrepreneurial universities need to engage their stakeholders (government and industry) through partnerships and collaboration to help deliver part of the curricula. This triad collaboration plays a pivotal role in activating innovation and entrepreneurship activities in the university. It accelerates innovation and effectively fosters universities' knowledge diffusion to society (Giones, 2019b).

Learning takes place in different ways. Studies (Dunn & Holtz-Eakin, 2000; Hamilton, 2011; Zozimo et al., 2017) have demonstrated a link between parental role models influence on their children to become future entrepreneurs by observing and interacting with them. The same effect has been observed on university students exposed to entrepreneurial guest speakers as they shared their own entrepreneurial experience, demonstrated and articulated behaviours associated with entrepreneurship (Fiet, 2001) and highlighted the challenges associated with entrepreneurial endeavours (Shepherd, 2004). Collaboration with local businesses, one of the ways of experiential learning, which draws on the notion of social embeddedness (Lindh & Thorgren, 2016), students

are given practical entrepreneurial experience and opportunities to learn outside the classroom, which is important for learning and entrepreneurial development (Zozimo et al., 2017).

Experiential learning is a reflective practice (Cope & Watts, 2000; Ratten, 2017) that can be achieved through the exposure of entrepreneurs to a variety of experiences and business scenarios, the practice of embedding experiences, conversation and interaction with different business entities, entrepreneurs among others regarding the experiences to make further sense and reflections on what they do, see and hear (Jennings & Wargnier, 2010). Ratten (2017) states that entrepreneurial universities are conduits of knowledge that must be disseminated to the greater community via knowledge spill-over mechanisms to have socio-economic impact.

Guerrero et al. (2012) indicate that knowledge and technology transfer occur when actors' experiences influence the behaviour and activities of others. This has also been acknowledged by Cacciotti and Hayton (2015) and Cacciotti et al. (2016) that the presence of successful entrepreneurs (role models) alleviate the fear to engage in entrepreneurial activities. Third mission objectives cannot be achieved by university actors working separately, or by a team working conventionally. Rather, entrepreneurial learning must be promoted by working in entrepreneurial ways, adopting inclusive rather than exclusive curricula, which is also extended to engage with other people inside and outside the university in entrepreneurial activities, thus creating an entrepreneurial culture among the academic community (Rae et al., 2009).

Universities that engage in entrepreneurial activities enjoy greater access to industry facilities, laboratories and industrial technology know-how, opportunities for sponsored research, access to a diversified source of funding (Grimaldi et al., 2011). By increasing a local skills base through the provision of employer-led, bespoke and flexible alternative learning pathways, even in the absence of a strong local economy that might demand those skills, according to University UK (UUK, 2015), can set in motion the virtuous circle of a highly-skilled workforce attracting investment and innovation. For entrepreneurship education to blossom, Lindh and Thorgren (2016) identified four building blocks built around entrepreneurial culture; (1) prepare students for current and future business life, (2) involve local businesses in education, (3) locate education at local businesses and (4) stimulate students to strengthen existing, and create new, businesses. Lindh and Thorgren (2016) argue this approach will be able to provide future entrepreneurs with a variety of skills required to identify and exploit entrepreneurial opportunities, thus becoming “jack of all trade” as expressed by Lazear (2005) rather than having specialist skills.

2.7.2 Academic entrepreneurship

In knowledge-based economies where the need for knowledge transfer is paramount, entrepreneurial universities are regarded as a generator of knowledge intended for sale to the industry, and the shift to entrepreneurship and the commercialisation of knowledge is necessary through the academic entrepreneurship (Bizri et al., 2019a). There is a growing body of evidence that academically educated entrepreneurs are more critical in developing regional economies than entrepreneurs with a lower level of education (Grimaldi et al., 2011; Wood, 2011). Sá et al. (2018) define academic entrepreneurship as various ways academics participate in research commercialisation or all

commercialisation activities outside the normally accepted duties of basic research and teaching.

Academic entrepreneurship is a phenomenon where an entrepreneur, a researcher, or an academic develops their daily activities within a university that provides an adequate environment and resources to support the generation, transformation and commercialisation of knowledge and technology (Urbano & Guerrero, 2013). At the core of the entrepreneurial university, academics are inherently expected to contribute to economic growth and social development through their third stream activities in collaborations with external stakeholders (Uslu et al., 2019).

In order to accomplish the third mission goals, Trequattrini et al. (2018) suggest that universities have to address three main issues; commercialisation of knowledge, creation of spin-off organisations and start-ups, supply of professional services, public engagement; and design entrepreneurial curricula. This phenomenon of commercialising knowledge through copyrights, patents, licences, trademarks and university-industry partnerships is referred to as academic entrepreneurship (Cunningham & Link, 2014; Grimaldi et al., 2011; Urbano & Guerrero, 2013). The basic principle behind academic entrepreneurship is a wide range of scientific research within universities. Some of the research results may have commercial applications that generate revenue for those universities through university-industry joint ventures and spin-off organisations. The research generated by entrepreneurial universities contributes to academic publications and the creation of new companies through knowledge spill-over or spin-offs creation that will have socio-economic contribution (Urbano & Guerrero, 2013). The commercialisation of research and innovative ideas includes taking a proactive role in

investing in academic and graduate spin-offs, backing ventures that can add value and complementary expertise to their internal R&D facilities, and setting up structures that support those activities (Senelwa et al., 2016).

Academics are pivotal to entrepreneurial universities achieving their third mission objectives. Academics are a critical vehicle for economic and social development because, without them, knowledge transfer cannot happen (Miller et al., 2018). They bridge the gap between university and external stakeholders (industry and government) through their engagement in third mission activities through formal and informal channels (see Table 2.8). Academic entrepreneurship involves formal knowledge transfer activities such as the creation of spin-out companies, licences and joint ventures as well informal activities including consultancy, contract research, joint/collaborative research, shared facilities, secondments, training and continued professional development, student placements and student projects that produce significant economic and social value for both academics and external partners (Abreu & Grinevich, 2013; Miller et al., 2018).

Table 2-8: Modes of engagement relating to entrepreneurial academics and academic entrepreneurs

Channels of knowledge transfer												
Networking	Joint industry conference	Joint journal publication	Joint supervision	Grad/Student projects	secondment	Executive education	Collaborative research	Contract research and consultancy	Shared facilities	Joint venture	Patent and licences	Spin-outs and startups
Informal			Degree of Formality						formal			
Softer, more informal, relational, partnering-style engagement utilised by Entrepreneurial academics								Harder, more formal, transactional, contracting-style engagement utilised by academic entrepreneurs				
<ul style="list-style-type: none"> • Networking – groups of professionals and/or academics come together and meet face-to-face under a banner of common interest or subject discipline • Joint Conference – audience of company employees and academics. Speakers are taken from both groups. • Joint Journal Publications – academics and professionals develop a paper together into professional journals. • Joint Supervision – academics and industrialists come together to supervise a piece of research. • Student Placements / Graduate Employment - transfer of a graduate into a company partner. • Secondment – a member of staff is present for a period of time in another organisation. • Collaborative Research – commercial and academic partners agree to work together to discover new knowledge or to propose solutions to solving a problem. 								<ul style="list-style-type: none"> • Contract research and consultancy – a company has a problem and wishes for either: a “known” solution to be applied to their problem (consultancy); an unknown solution to be researched and then presented to the company • Shared facilities – a university and a commercial partner join together to invest in the development and operation of a facility or share existing facilities for product development, testing or research. • Joint ventures – rely on a set of legal agreements that ties a company partner and an academic with a common purpose without creating a new legal entity. • Patents and licenses – a particular piece of knowledge or know-how is protected by either an academic partner or a commercial partner. • Spin-offs creation – University personnel join together with commercial partners to create a company. 				

Source: Table adapted from Miller et al. (2018)

There is a differentiation between these types of entrepreneurial activities. Academics engaged in formalised knowledge transfer activities are referred to as academic entrepreneurs. Those who engage in less formal collaborative knowledge transfer activities are referred to as entrepreneurial academics (Miller et al., 2018). Such differentiation in channels used by academics to engage in entrepreneurial activities categories according to their degree of formality (formal or informal) or by the type of knowledge flows (implicit or explicit) requires different support from institutions to enable such engagement, which constitute university-industry knowledge transfer (see Table 2.9). Business schools, alongside other schools and faculties, contribute to shaping and supporting academic entrepreneurship through formal and informal knowledge transfer activities by providing generic and targeted support (Walsh et al., 2021). In the wider context, entrepreneurial universities need to establish new internal policies, procedures and initiatives to promote and support scientists and graduates, using institutional mechanisms to support entrepreneurial activities, to realise the commercial potential of their research endeavours and activities through academic entrepreneurship activities at micro-level (Cunningham & Menter, 2020).

Table 2-9: Forms of academic entrepreneurship and their social and economic contribution

Forms of academic entrepreneurship	Description	Contribution to economic development	Contribution to financial advantage
Creation of a technology park	Supplying a formal site where businesses (normally of a high-tech nature) can locate and interact with the university itself.	Construction of a seed bed for the development of multiple new ventures that will contribute to regional cluster development and regional employment. The infrastructure contributes to the research capability of the university by	University may generate small income through its role as 'landlord'. However main financial contribution is indirect, where linkages with firms will lead to research and education opportunities, together with potential for

		attracting highly skilled individuals and technological resources to the region.	licensing and technology transfer.
Spin-off firm formation	The creation of firms based on university research.	The creation of new entrepreneurial ventures in an economy that transfer technology from the lab bench to the market, exploits IP and generates employment for the region.	University, though owning a share of the equity, will generate a revenue stream from the company's trading and eventual sale/IPO
Patenting and licensing	The securing of intellectual property rights on discoveries and know-how developed within the university.	The protection of intellectual property documents the knowledge contribution of the university and allows the controlled transfer of IP to suitable industrial partners that can exploit its novelty for competitive advantage and wealth generation.	Revenue stream generated directly through licence deal and ongoing royalties. Securing IPR also provides the basis to form spin-out ventures. Also provides a 'shop window' for university research output, attracting industry attention.
Contract research	Undertaking specific research projects with industry; many of these projects have a strong commercial focus.	Contract research facilitates industry by solving practical problems that enhance business performance. Engaging in contract research also contributes to stronger social relations between university and industry that can lead to deeper research interaction in the future.	Revenue stream generated by industry co-funding research. However, indirect financial support associated with contracts (in form of equipment, human resources, IP and materials from industry) can also advance research capability of university.
Industry training courses	Teaching students from industry. These courses can include executive education.	Upskilling the national or regional workforce regarding emerging state of the art practise and technology. This ensures that regional industry maintains its competitiveness by increasing its internal skill base.	Revenue stream from industry or Government for undertaking the training. Indirect benefit in industry linkages that may lead to opportunities for future entrepreneurial activities
Consulting	Directly selling academic expertise to external organisations to	The provision of personalised advice and mentoring that can	Revenue streams from industry or Government for undertaking the

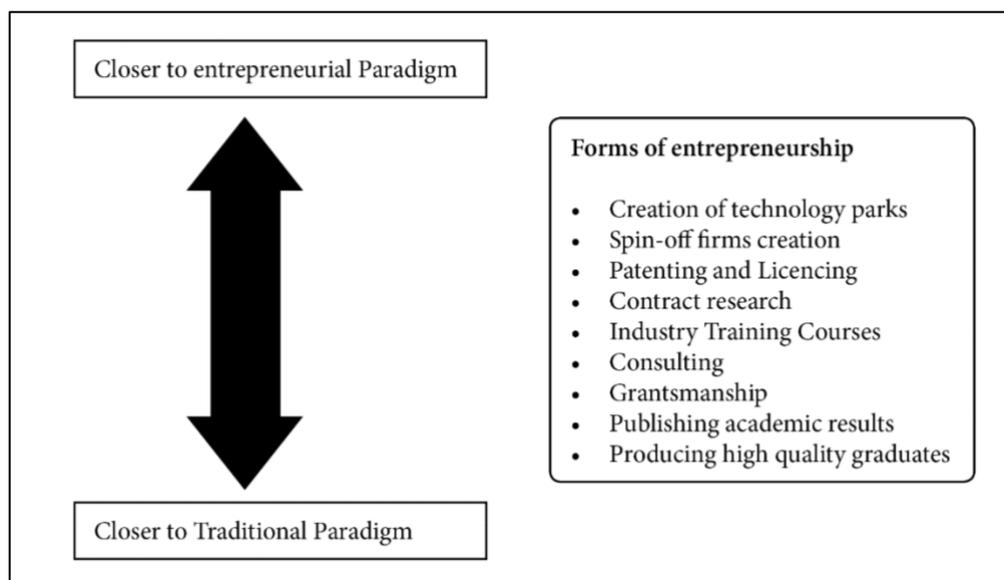
	solve practical problems.	improve enterprise performance. This can also develop linkages between university and industry that can be further exploited in the future.	consultancy. Indirect benefit in industry linkages that may lead to opportunities for future entrepreneurial activities
Grantsmanship	Obtaining large-scale research grants from external sources for basic research.	Enhances the reputation of the university, which attracts industry to the region and may lead to production of harder forms of academic entrepreneurship	Financial benefit by external body funding research costs for university. Indirect benefit from contribution to other entrepreneurial activities (e.g. discovery from funded research may be patented and then become the basis of a licensing agreement or spin-out.)
Publishing academic results	Publishing books, chapters and articles.	Enhances the reputation of the university, which attracts industry to the region and may lead to production of harder forms of academic entrepreneurship	Indirect financial benefit that establishes university as world class and attracts industry to interact with it (e.g. publishing alerts industry to the university's capability and may result in contract research and licensing.)
Producing highly qualified graduates	Providing the workforce with skilled undergraduates and postgraduates.	The production of suitably skilled graduates for the regional and national workforce, capable of meeting the current and future industry demands. Ensures national industry has the absorptive capacity to engage with university as part of the triple helix model.	Development of new and relevant programmes attracts students to the university generating fee income. Indirect benefit from network contacts as graduates enter industry and maintain links with university.

Source: Table adapted from Philpott et al. (2011)

Philpott et al. (2011) suggest universities can contribute to the regional and national economic development by moving away from traditional and linear models that focused on knowledge transfer through traditional education. They suggest the advancement of

knowledge through basic research and adopting “systemic, the networked phenomenon”. Entrepreneurial universities position themselves to the centre of society's knowledge production system in order to achieve the third mission as well as demonstrating how different forms of academic entrepreneurship contribute to socio-economic development. Entrepreneurial activities (Philpott et al., 2011) (see Table. 2.7) that universities can engage in to achieve this objective exist across a spectrum of soft activities that align better with the traditional academic culture and hard activities which are synonymous with already established entrepreneurial universities (such as patenting, licensing and spin-off firm formation).

Figure 2-8: Spectrum of entrepreneurial activities



Source: adapted from Philpott et al. (2011)

Several policies have been implemented to provide commercialisation incentives to grant universities ownership of intellectual properties from their research. For instance, the 1980 Bayh-Dole Act in the USA (Grimaldi et al., 2011) inspired reforms of university patenting rights in other institutions such as Law on University Patenting (LUP) in

Denmark. Different policies have been implemented to encourage and promote universities – industry engagement in partnerships and personnel exchange via Technology Transfer Centre (TTO), science parks (Cunningham & Link, 2014; Siegel et al., 2003). Siegel et al. (2001) note that the success of TTOs depends on the participation of academic faculty and the supporting structures (Audretsch et al., 2002) positively impact the commercialisation of academic research.

In Kenya, for instance, the spin-off firms are a product of the Triple Helix model (Etzkowitz & Leydesdorff, 2000b) - interaction between three main actors: university, industry and government - universities focus on establishing institutional architecture, including industry liaison/technology transfer offices, business and technology incubators, science and industrial parks and fostering entrepreneurialism through various policies and incentives. Kenya Vision 2030, as published by the Ministry of Education, Science and Technology (2012) setting out the policy framework for Science, Technology and Innovation (ST&I), emphasises the role to be played by Research and Development (R&D) and Innovation in accelerating economic. The main objectives of ST&I policy are to create endogenous ST&I capacities appropriate to national needs, priorities and resources, and to create a science, technology and innovation culture whereby solutions to socio-cultural and economic problems of the individual, the community and the nation are recognised and sought within the domain of ST&I. (Technology, 2012).

Academics and students/graduates are seen as critical agents whose inventions serve as a seedbed for high-growth companies and start-ups (Cunningham & Menter, 2020; Lahikainen et al., 2018). The basic premise behind academic entrepreneurship is that a wide range of scientific research and other less formal knowledge exchanges within

universities may have commercial applications capable of generating revenues and increasing institutional social capital. Berggren (2017) and Grimaldi et al. (2011) contend the importance of academic entrepreneurs as enablers of commercialisation as they regard commercialisation as one way to utilise their research findings to fulfil their “need for utilisation” and contribute to socio-economic development – thus enabling entrepreneurial universities to fulfil their missions; teaching, research and entrepreneurship.

Entrepreneurial universities need to create an environment for academic entrepreneurship to flourish and that support the fulfilment of the third mission of the entrepreneurial university. Studies have shown that universities need to empower and promote entrepreneurial culture (Guerrero & Urbano, 2012; Uslu et al., 2019) by developing its academic community’s competitive spirit and commercial awareness and set up essential structures to support units for innovative activities as well as aligning entrepreneurial and academic values to find a balance between research, education and entrepreneurship (Cunningham et al., 2021; Lahikainen et al., 2019). Philpott et al. (2011) suggest that a bottom-up rather than a top-down approach is more appropriate to support academic entrepreneurship. In universities where support structures are in place, studies have shown increasing numbers of university researchers engaging in academic entrepreneurship, several patent registrations from university is also increasing (Abreu & Grinevich, 2013; D’Este & Perkmann, 2011).

2.8 University as a social good

The role of the university has changed considerably over time (Audretsch 2014). The perception of universities as engines for regional growth has long captured the attention of scholars and policymakers, and the ‘Triple Helix’ model has marked universities’

departure from 'ivory towers' to proactive entrepreneurial entities (Etzkowitz, 2014). In many developed countries, universities engage in technology transfer, establish links with industry and facilitate the creation of innovation infrastructure, i.e., research laboratories, science parks and industry clusters. They are therefore encouraged to contribute to regional and national economic development and assume responsibility for transferring knowledge from university to industry and the public (Audretsch & Belitski, 2022).

In the same vein, universities are also regarded as crucial for the economic and political stability that underpins successful reconciliation and have a critical role to play in the broader reconstruction of the society, from peacebuilding and social cohesion to facilitating economic recovery and getting the country onto an accelerated development track (Hayes & McAllister, 2009). As a result, universities are expected to engage in interdependent networks with a wide range of stakeholders including government, spin-offs, alumni communities, large and small businesses, entrepreneurs, investors, professional and academic communities, local communities, research institutions, science-parks, incubators and Non-Government Organisations (NGOs). Etzkowitz and Leydesdorff (2000) emphasize that the university plays a critical and challenging role in leading innovation initiatives in the knowledge-based society since demands on academic institutions to meet this expectation keep growing.

Globalisation and the rise of the knowledge economy have contributed to redefining and extending the roles of universities in society by adopting the third mission in order to respond to the rapidly changing demands of the knowledge-based economy in the global context. Globalisation is being accompanied by a regionalisation process and universities are expected to contribute to the development of the territory where they are embedded.

Within this context, universities are reconsidering their role in society and their contribution to regional, economic, social and cultural development. For instance, complex global societal problems including the current COVID-19 pandemic, have increased pressure on universities to mobilise resources, knowledge and expertise for the common good (Bayuo et al., 2020). European Commission (EC, 2017) indicates that in Europe, this is being accomplished by political guidelines related to the modernisation of HE and highlight its role in mitigating social inequalities through the development of social innovative solutions appropriate to the needs of the community.

Historically, universities served as a social good as were seen as a central and essential part of the local community involved in regional development and local economic growth and had a strong vocational role in society through social innovations that are primarily intended to address complex societal challenges rather than earn profits for individual social entrepreneurs (Moscardini et al., 2022; Pugh et al., 2018). In developing economies, universities play a pioneering role in addressing problems of poverty, social disorganisation, low production, unemployment, hunger, illiteracy, and diseases. Currently, the third mission is being adopted by universities to effectively address external social and economic challenges (Cunningham & Link, 2014; Guerrero et al., 2014; Guerrero et al., 2006; Mascarenhas et al., 2017a; Rubens et al., 2017; Sam & Sijde, 2014). However, the third mission has been generally understood and applied almost exclusively from an economic perspective (Trencher et al., 2013). This interpretation appears to be too narrow to address cross-cutting and complex issues such as that of sustainability, as elaborated in United Nations Sustainable Development Goals (SDGs) (UN, 2022).

The SDG concept was defined by the World Commission on Environment and Development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” in an attempt to balance the economic and environmental concerns to achieve human well-being. In particular, SDG 4 (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all) requires active action by universities, as most of its targets are directly related to learning and teaching (Leal Filho et al., 2019). More broadly Mader and Rammel (2015) suggest that research based knowledge created by universities is crucial for all of the 17 goals. Universities have a critical role in achieving the SDGs, as they can support their implementation and initiate change and social prosperity through study programs, curricula and research, adapting strategies encouraging other actors to participate (Natividad & Margarita, 2021). The role of universities in supporting sustainable development is, thus, vital for the society as a whole, as its students represent a mechanism through which the transformation of the society towards sustainable development becomes possible.

Currently, there are increasing expectations placed on universities to become regional agents of change combined with greater external and internal pressures to generate solutions to economic and social problems through the third mission. Universities are therefore reacting to changes in their environment. Despite the intensely competitive international higher education sector, universities play a significant role in providing public good through building social solidarity and mobility in volatile and increasingly divided societies. In developed countries, such responses are supported by a sophisticated research infrastructure and vast resources for R&D through university-industry collaborations (Guerrero et al., 2012) whereas such collaborations is in early stages of

development and often seek to benefit society through frugal innovations or social entrepreneurship (Rinaldi et al., 2018; Roncancio-Marin et al., 2022).

More widely, universities are facing numerous challenges, including a reduction in government funding, declining enrolment numbers, competition with other higher learning institutions in their main activities and a need to develop new operating models supported by strategies to achieve broader social and economic development goals (Rosa Lombardi et al., 2019). These challenges are accentuated in a post-conflict environment in which universities face additional challenges, including the destruction of university structures, shortage of human capital, increased financial constraints, and political and economic instability.

Most entrepreneurial universities' studies and models were developed in stable and developed economies (Cunningham, Lehmann, et al., 2019; Grimaldi et al., 2011; Guerrero, Urbano, & Fayolle, 2016; Guerrero, Urbano, Fayolle, et al., 2016; Kirby et al., 2011; María José et al., 2020; Nelles & Vorley, 2010a) and the evolution of entrepreneurial university in post-conflict society is under-researched and under-theorised. To create a better understanding of how entrepreneurial universities impact societies after conflict, there is a need to consider the roles and practices of different types of university actors and their interactions with external actors and factors that enable or hinder that interaction and their implications for peacebuilding.

2.9 Universities in post-conflict societies

In a world where social, political, economic, and educational spaces intersect, educational systems cannot exist in a socio-economic and political vacuum. Peacebuilding is conceptualised by the United Nations to achieve sustainable peace and consolidate political order after a conflict (Piccolino, 2015). Historically, education was used as an ideological weapon to divide one group from another or serve as a tool to maintain inequality (Tierney, 2011). For instance, in Rwanda, schooling of Tutsis and Hutus in Rwanda and Kurds in Turkey and South Africa during apartheid, education was used to segregate and maintain inequality.

Governments play an enormous role in fostering an enabling environment that is conducive for entrepreneurs to develop and flourish (Acs et al., 2018). Government policies play a fundamental role in facilitating societally and economically beneficial forms of entrepreneurial activities at both the individual and the national level (Alvedalen & Boschma, 2017; Audretsch & Belitski, 2017; Autio & Fu, 2014; Cavallo et al., 2018; Estrin et al., 2012; Nicotra et al., 2017) as well as in determining the choice, the type of entrepreneurship to be undertaken and have a direct correlation with an ecosystem that is conducive to entrepreneurial entry (Baumol, 1990). In a post-conflict context, governments not only introduce policies to encourage and enhance entrepreneurial behaviours through the enactment of various policies but also shapes reconciliation pathways as a framework to improve social cohesion and peaceful coexistence as a foundation for entrepreneurial activities (Johnson, 2013; Milton, 2021; Pacheco & Johnson, 2014). Delgado (2008) indicates that universities in post-conflict play a crucial role in building peace that goes beyond the academic level by assuming a more active and

visible role in peacebuilding and reconciliation processes through activities oriented to reconstructing the social foundations of communities.

The study conducted by Majaliwa et al. (2016) highlights universities' role in building capacity in post-conflict countries by equipping graduates with skills required to support social and economic growth and improve competitiveness in the agricultural sector. Most recently, the research by Abdullah et al. (2020) indicates that, in Syria, university's adaptation to incorporate cultural heritage in their teaching eventually help contribute to peacebuilding as teaching cultural heritage has the potential to promote an open, inclusive and pluralistic society by contributing to a sense of shared citizenship and collective identity.

2.9.1 Universities and Nation-building

Nation-building is a tool for reconciliation and peacebuilding after ethnic conflict by softening divisions that have hardened during the conflict, rebuilding institutional capacity, supporting efforts to establish the rule of law and civic development. Simonsen (2004, p. 290) defines nation-building as "*the efforts and/or process of (re)building a sense of community within the population of a polity*". Such efforts and/or processes include activities such as the building of political institutions, strengthening of civil society, and holding of elections. There are two forms of nation-building processes inclusive and exclusive (Simonsen, 2004). Inclusive nation-building refers to efforts or processes encompassing several or all ethnic groups of the polity. In contrast, a complete nation-building process refers to efforts or processes taking place among only a few people or one ethnic group, with others being kept outside. Societies in which conflict was ethnicised, in 1994 Rwanda genocide, for instance, Barbara and Walsh (2018) state that inclusive forms of nation-building are significant efforts to consolidate peace and universities provide an arena supporting inclusive nation-building by nurturing the

emergence of political elites needed to drive peacebuilding and sustained economic development.

Universities, in their efforts to bring about nation-building and social cohesion, face numerous challenges. These include inadequate budgets as funds may be appropriated to humanitarian and security demands and small pools of skilled professional and academic staff can be highly politicised (Bache & Taylor, 2003; Pherali & Lewis, 2019) and be implicated in activities that benefit political elites at the expense of institutional integrity and effectiveness (Barbara & Walsh, 2018), prone to nurturing predatory political elite with exclusive nation-building agenda (Heuser, 2007). Other challenges, either directly or indirectly resulting from conflict, can be grouped into four categories: First, physical destruction (damage to the physical infrastructure and facilities of universities). Second, population displacement (fatalities, internal and external population displacements, recruitment of students and staff by armed groups or become civilian casualties, large scale emigration of skilled individuals – brain drain, violence against academics). Third, war-related conditions (mental health issues, erosion of education qualities, diversion of funds to other causes, distortion of research environment due to lack of academic freedom and autonomy). Fourth, low resilience of the sector (dependency on high levels of financial support, skilled labour, technical inputs and more sophisticated management to function) (Milton & Barakat, 2016b).

2.9.2 Universities and Peacebuilding

Peacebuilding is defined as a comprehensive concept that encompasses, generates and sustains the full array of processes, approaches, and stages needed to transform conflict towards more sustainable, peaceful relationships (Sahar & Kaunert, 2020). Peacebuilding

refers to the processes that seek to establish positive peace by addressing the root causes and the consequences of conflict, recognising and supporting social initiatives that inhibit violent conflict, contribute to peace, and aid the development of a “post-conflict” society. In post-conflict societies, universities can facilitate or hinder the peacebuilding process as it can be a force in a potential fuel to exacerbate violent response to conflict and through inequitable opportunities or promotion of negative stereotypes. To reduce the risk of a society relapsing into conflict requires a mix of operational, structural, and systemic measures that rebuild national capacities to manage, prevent, and address conflicts and their underlying dynamics and root causes (Larrauri & Kahl, 2013).

Conflicts destroy nations’ political, economic, security structures and significantly undermine the social fabric of a country by distorting community traditions and networks, destroying social capital and human capacities, and creating and reinforcing inequalities. The environment in the aftermath of the conflict is characterised by badly functioning economies, lawlessness and insecurity, notwithstanding a lack of a social contract and social cohesion (Sahar & Kaunert, 2020). As part of the peacebuilding process, conflict-affected states require strategies and resources to regain lost capacities and innovate new approaches to address the impact of conflict, in which case universities can help to shape policies and build democratic systems of governance by producing researchers, teachers, education practitioners, scientists, entrepreneurs and other highly skilled professionals who are advocates for peacebuilding (Feuer et al., 2013b; Milton, 2021; Murphy, 2020). Pherali and Lewis (2019) indicate that universities have a crucial role to play in peacebuilding and economic recovery as a critical space for knowledge production and engagement in a plurality of political views to alleviate political tensions and concurrently address ethnic, gender-based and social issues that undermine equity of access and quality.

Universities represent a microcosm of society because they attract students of various national and international backgrounds. This provides an opportunity to encounter and learn to respect cultural diversity and class differences or reproduce intolerance and sharpen inequalities (Gallagher et al., 2018; Sabic-El-Rayess, 2009). Through universities, students are imparted with norms, values, attitudes, and ethics that are the foundation of the social capital necessary for constructing healthy civil societies and cohesive cultures, the epicentre of good governance and democratic political systems (World-Bank, 2002). Campus life and student social interaction are more suitable to promote social cohesion and tolerance than academic curriculum (Tomlinson & Benefield, 2005). This contextualised understanding of the role of universities is particularly relevant in societies emerging from conflict where universities can bring the then-warring communities closer together to rebuild the nation.

Universities play a crucial role in developing functioning institutions capable of projecting the state's authority (Borgerhoff, 2006), training public policy professionals (UNDP, 2010), contributing to the consolidation of inclusive governance cultures. Universities provide neutral institutional space for policy-makers to discuss sensitive policy issues, help revitalise public policy processes, act as an institutional forum where critical policy ideas can be developed, serve as space that nurtures the emergence of political agents to drive state building with a commitment to drive sustained collective action in support of national development (Barbara & Walsh, 2018). The role of universities in the post-conflict evolves as the situation on the ground improves, from addressing immediate human capital shortage to stimulating economic activities, playing a pivotal role in developing a sustainable entrepreneurial ecosystem (Guerrero et al.,

2015; Guerrero & Urbano, 2012). To stimulate those economic/entrepreneurial activities, universities add the *Third Mission* to their traditional role of teaching and researching – becoming an entrepreneurial university.

Violent conflicts and complex emergencies cause significant capacity losses in education, including infrastructure destruction, human capital losses, population displacement, war-related traumas constrain the country's capacities needed for post-conflict recovery and economic progress (UNESCO, 2011). States require strategies and resources to regain lost capacities and innovate new approaches to address conflict's social, political, and economic impact (Pherali & Lewis, 2019). Johnson (2013) posited a conceptual framework for conflict transformation in which she highlights the role of higher education in conflict transformation (see Table 2.10).

Universities and actors hold the most potential for transforming conflict because organisations and individuals in this position are often 'able to cut across conflict lines, have a greater degree of flexibility, and may employ influence derived from formal and informal relationships' (Lederach, 1997, p. 42). Those actors have some degree of connection to government officials while their institutions are linked to local communities through community engagement, outreach programmes, or third mission activities. Public universities in developing economies such as Singapore and Rwanda are owned and regulated by the government as opposed to their counterpart in developed economies (Wong et al., 2007), university administrators (such Vice-Chancellors), as are usually government appointees, have much less autonomy than public universities in Europe, tasked to carry out government policies.

Table 2-10: Actors and approaches to peacebuilding

Levels of actors	Types of actors	Approaches	Affected population
Top leadership	Military/political/religious leaders with high visibility	High-level negotiations, emphasis on ceasefire, highly visible mediators	<p style="text-align: center;">Many</p>  <p style="text-align: center;">Few</p>
Middle-range leadership	Leaders in respected sectors, ethnic and religious leaders, academics/ intellectuals, aid agencies and NGOs	Problem-solving, training in conflict resolution, peace commissions, insider-partial teams	
Grassroots leadership	Local leaders, leaders of indigenous NGOs, community developers, local health leaders, refugee camp leaders	Local peace commissions, grassroots training; prejudice reduction, psychosocial work in conflict trauma	

Source: adapted from Johnson (2013)

In fragile and post-conflict societies, universities represent a distinct sub-sector within tertiary education with the potential to engage with critical development issues. These issues include training the labour force, contributing to building a middle-income class, improving social engagement, creating space for diplomacy and political debate to build national identity and social cohesion (Barbara & Walsh, 2018; Milton & Barakat, 2016a), thus becoming a setting for formal learning and an arena for political socialisation, critical for tolerance and peacebuilding, intercultural communication, and regional and international integration (Feuer et al., 2013a). Universities' role in post-conflict differs depending on the nature of the conflict and external (non-market factors) in the Balkan region that experienced conflict; there are various perceptions about the role of

universities in the reconstruction of a post-conflict and transitional society/economy (Miklavič & Komljenovič, 2014). For instance, the academics from Albania and Kosovo attribute higher priority to civic education and pluralism, highlighting civic and social concerns of the academic staff in unstable institutional settings than from Croatia and Slovenia are significantly less inclined towards those priorities.

Universities are viewed as crucial to economic development by providing high levels of skills and knowledge and building enhanced civic cultures, serving as a catalyst for stabilisation and securitisation, reconstruction, state-building and peacebuilding. Universities make constructive contributions to rebuilding institutional capacity, supporting efforts to establish the rule of law and civic engagement and serving as a critical space for knowledge production and engagement in a plurality of political views that can alleviate political tensions. Universities also equip students with civic skills and help develop democratic values and ideals complemented by campus-based activities that positively affect students, transforming attitudes, values and behaviour, thus reducing enmities, fostering tolerance, and promoting respect (Milton & Barakat, 2016a). Therefore, higher education's role goes beyond economic development to social transformation. Universities play a vital role in addressing systemic injustices both within and around the education system that underpin the notion of positive peace.

For universities to achieve peacebuilding objectives, they must be more than just a reaction to the conflict; social cohesion and peaceful coexistence must be pervaded throughout their core missions by countering inequalities and reinforcing civic responsibilities among its academic community (Sahar & Kaunert, 2020). Similarly, Brannelly et al. (2011) argue that universities are about the provision of skills required in

the labour market; it is also about building a middle class that contributes to economic development, promoting social engagement, and improving governance will lead to sustainable positive peace. Feuer et al. (2013a) argue that most of the literature about the impacts of campus and university administration on peacebuilding is taken from stable and advanced economies. The focus tends to be on optimising conditions for learning rather than building tolerance and peace.

However, countries emerging from violent conflict lack the capacity and resources to improve quality in modernising teaching and learning facilities, pedagogical approaches, and research. The struggles faced by those countries to restore physical and intellectual infrastructure highlight the lack of qualified academics and regulatory frameworks that are the backbone of the quality provision (Pherali & Lewis, 2019). Post-conflict education reconstruction faces a sectoral imbalance particularly higher education sector which is often neglected at the expense of basic education that enjoys the support of major donors and international agencies (Feuer et al., 2013a; Milton & Barakat, 2016a; Pherali & Lewis, 2019). A growing body of evidence shows that investment in higher education can lead economic growth and political by providing high levels of skills and knowledge and building enhanced civic culture as well contributing to peacebuilding and state-building (Delgado, 2008; Johnson, 2013; McLean Hilker, 2011; Pherali & Lewis, 2019; Sahar & Kaunert, 2020).

2.10 Conflict resolution framework

Conflict is a dynamic and social phenomenon in which one actor reacts to another's action, leading to further actions, and the conflict escalates (Wallensteen, 2019). Ramsbotham et al. (2016) indicate that conflict takes its origins from economic differentiation, social

change, cultural formation, psychological development and political organisations, which are conflictual and become explicit through the formation of conflict parties that perceive to have mutually incompatible goals. Ramsbotham et al. (2016) further argue that conflicts are dynamic as they escalate and de-escalate and are constituted with the interplay of attitudes and behaviours that can assume the reality of their own.

Conflict can arise between relatively similar parties (symmetric conflict) or different parties (asymmetric) with unequal in power either qualitatively (strong vs weak states), quantitatively (state vs non-state actors) or both in which the root of the conflict lies in the very structure of who they are and the relationship between them (Ramsbotham et al., 2016). The conflict resolution frameworks enable us to understand and analyse behaviours of universities key actors and steps taken or ought to be taken to contribute to social cohesion and peacebuilding, at the same time fulfilling their professional obligation. As highlighted by Lederach (1997) universities' key actors have the potential to transform conflict as they can cut across conflict lines and employ influence from formal and informal relationships.

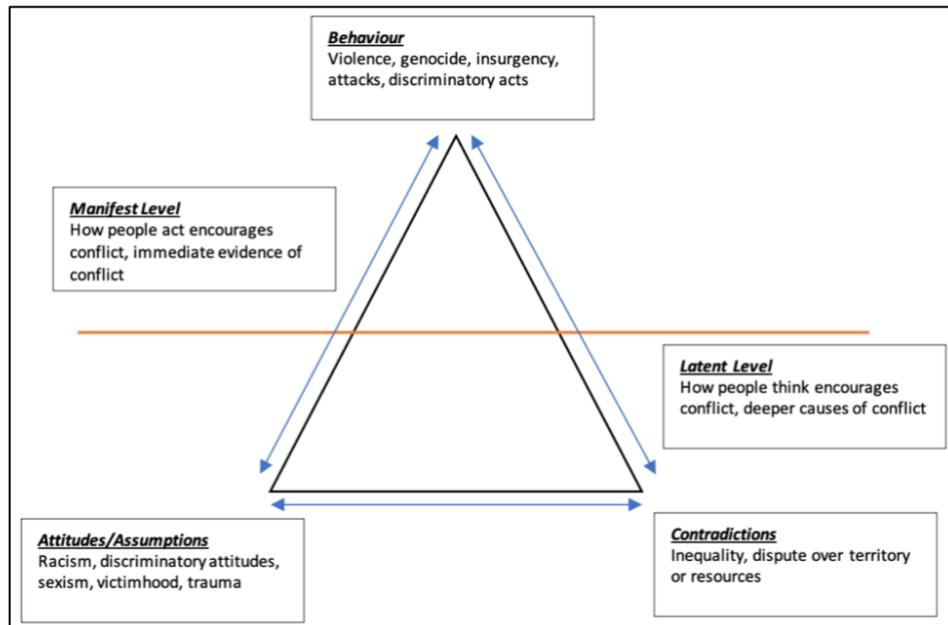
2.10.1 Galtung's Conflict Triangle (ABC Triangle)

The conflict triangle, also known as the ABC triangle (see Fig. 2.8), was developed by the Norwegian sociologist Johan Galtung in the 1960s which encompasses both symmetric and asymmetric conflicts; it has three aspects: the attitudes (A) of the actors involved, their behaviour (B), and the contradiction (C) (Galtung, 1996). The models suggest that a conflict moves among the triangle's three corners (Attitude, Behaviour and Contradiction), and a conflict sequence can begin in any of these corners. Galtung sees

conflict as a dynamic process in which structure, attitudes and behaviour are constantly changing and influencing one another.

According to Galtung's model, an *attitude* refers to perceptions and misperceptions of and between the actors themselves that tend to be negative in violent conflict because they develop demeaning stereotypes of one another, and such attitude is fuelled by negative emotions such as anger, hatred, bitterness and fear. Attitude also involves emotive (feeling), cognitive (belief), and conative (desire, will) elements (Ramsbotham et al., 2016, p. 12). On the other hand, *behaviour* is characterised by threats, coercion, and destructive attacks. *Contradiction* refers to the underlying conflict situation, which includes actual or perceived incompatibility of goals between conflicting parties (Ramsbotham et al., 2016; Wallensteen, 2019). The contradiction (conflict) is defined by the actors involved in terms of the incompatible values or goals between them. The three aspects are interrelated, and any one of them may be the starting point for developing a conflict. The ABC triangle illustrates that the attitudes and contradictions among the sides of a conflict exist on the latent level and are not immediately visible. At the same time, behaviours provide visible evidence of the conflict. This triangle applies to both symmetric conflicts and asymmetric conflicts.

Figure 2-9: The ABC Triangle



Source: Figure adapted from Gatlung (1996)

The ABC triangle is a simplistic model to use when attempting to understand a given conflict. The model is straightforward, and the non-specialist can apply it to understand the underlying contradictions, the attitudes to each other of the actors involved, and their behaviour resulting from the contradiction and attitudes. As the analysis can begin using any of the aspects as a starting point, there is potential for the analyst to identify what is driving the conflict and how the conflict can be de-escalated. The model can be applied to highlight the role of the university's key actors in the post-conflict societies in peacebuilding and social cohesion.

2.10.2 4 R Framework

For post-conflict societies to flourish, it requires a much greater focus on the potential role of HE in addressing the causes that led to the conflicts and prioritising interventions

that favour the promotion of social cohesion and reconciliation. 4R framework is based on, which contends that a sustainable approach to peacebuilding addresses the underlying causes of conflict, including political, economic and social inequalities and injustices. Fraser (2005) suggests that those inequalities and injustices that do not exist in their pure form because they overlap can be remedied by redistribution of resources and opportunities and include socio-cultural remedies for better *recognition* and political *representation*.

4Rs framework (see Fig. 2.10) was developed in order to critically analyse the role that education might play in conflict-affected contexts and to reflect more holistically on the education systems' relationship to economic, social, cultural and political development processes, its role and relationship to the production of inequalities that fuel the grievances that often drive conflicts (Novelli et al., 2015; Novelli et al., 2019). The framework also shows how reconciliation is closely linked to redistribution, recognition and representation and helps contextualise the role universities plays in conflict-affected societies that can stand in the way or reinforce reconciliation processes, as shown in Table 2.10.

Table 2-11: Applying the Analytic Framework to Education

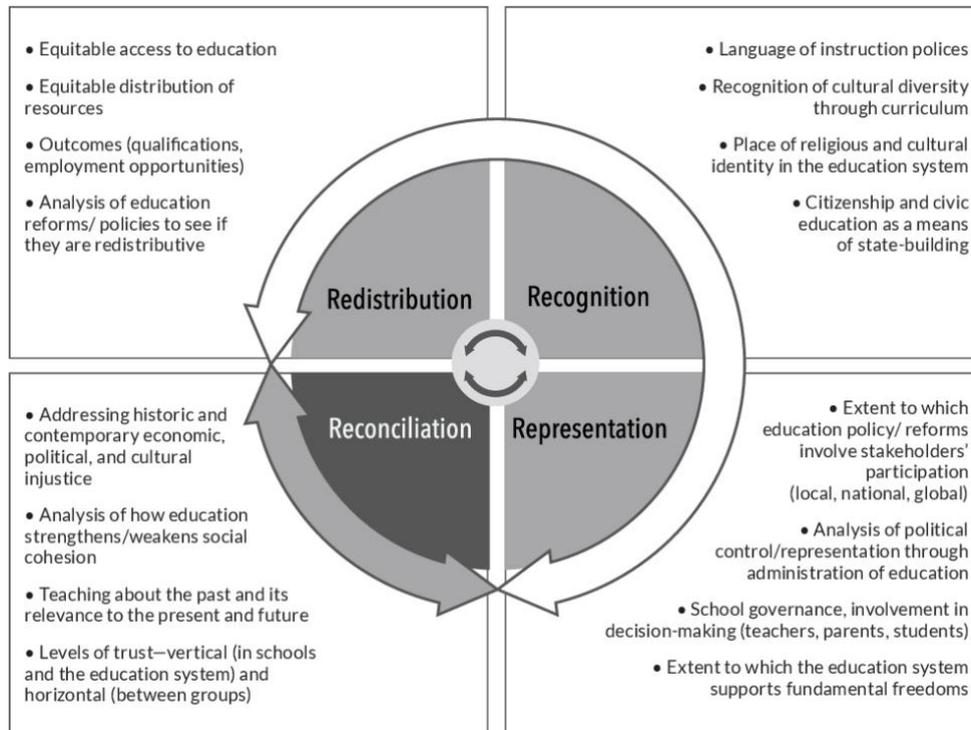
	To what extent is Higher Education contributing towards sustainable peacebuilding (4Rs)? Potential 'indicators' for a mixed methods approach
Redistribution (Addressing inequalities)	<ul style="list-style-type: none"> • Quantitative analysis of existing data to examine vertical and horizontal inequalities relevant to education inputs, resources and outcomes. • Analysis of macro education reforms or policies to see if they are redistributive, for example, the impact of decentralisation, privatisation and how they impact different groups and affect conflict dynamics.
Recognition (respecting difference)	<ul style="list-style-type: none"> • Language of instruction polices; • Recognition of cultural diversity through curriculum; • Place of religious identity in the education system; Citizenship and civic education as a means of state-building.

Representation (ensuring participation)	<ul style="list-style-type: none"> • Extent to which education policy and reforms are produced through participation (local, national, global); • Analysis of political control and representation through the administration of education; • School governance, school-based management, involvement in decision making (teachers, parents, students); • Extent to which education system supports fundamental freedoms.
Reconciliation (dealing with past, present and future injustices)	<ul style="list-style-type: none"> • Extent to which historical and contemporary economic, political and cultural injustices that underpin conflict are addressed in/through education (e.g. quota systems, school relocation, textbooks, teacher allocation) • Analysis of how education contributes to integration and segregation (social cohesion, shared or separate institutions); • Teaching about the past and its relevance to the present and future; • Levels of trust – vertical (trust in schools and the education system) and horizontal (trust between different identity-based groups).

Source: Table adapted from Novelli et al. (2015)

Peacebuilding is as delicate a process as complex, involving varying factors, non-linearity, power asymmetry, and requiring grounds that support the components of a successful peacebuilding (Sahar & Kaunert, 2020). Novelli et al. (2015) argue that peacebuilding is not sustainable if there is no *reconciliation* between two warring factions to address historical and present tensions, grievances and injustices to build a more sustainable, peaceful society. The framework claims that the critical post-conflict transformations needed to produce sustainable peace – positive peace (Sahar & Kaunert, 2020) involve redistribution, recognition, representation and reconciliation, which are linked to transitional justice and dealing with the legacies of conflict to bring about greater social justice.

Figure 2-10: 4R Framework



Source: Novelli et al. (2015)

Economic injustices involve exploitation, economic marginalisation, and deprivation that require a politics of redistribution that attempts to reduce the obstacles caused by socio-economic inequalities by eliminating economic barriers or reallocating resources to redress the deficit. Redistribution provides a range of ‘remedies’ to social injustices caused by unequal distribution of resources, exclusive systems of participation in economic structures and a lack of equal opportunities (educational, health, employment etc.) (Power, 2012). Recognition entails possible solutions to injustices that have to do with status inequalities that prevent some people from equal or full interaction in institutionalised cultural hierarchies, often related to little acceptance or space for cultural, ethnic, linguistic, racial, gender, age or other diversities. Cultural injustices include cultural domination, non-recognition, and disrespect (Power, 2012). Such injustices, according to Fraser (2005), require a politics of recognition, which can involve strategies of affirmation in which misrecognised groups attempt to invert their low status

and affirm the value of their previously ‘despised’ identity, as well as attempting to deconstruct the categories which underpin status distinctions between groups and which generate the misrecognition.

Political injustices are linked to economic and cultural injustices because, inevitably, they limit people’s capacity to engage in all kinds of civic and political activities (Power, 2012). Political injustices contribute to the marginalisation and misrepresentation of some members or groups in society where some members and groups are deemed outside the legitimate political community. Representation helps to analyse the (absence of) transformative politics of framing at multiple scales (global, national, local), and leading to this the (un)equal participation in decision-making or claim-making processes of all citizens (Fraser, 2005).

Reconciliation is a process of addressing conflictual and fractured relationships through voluntary acts that cannot be imposed and comprised of five interwoven stands; developing a shared vision of an interdependent and fair society, acknowledging and dealing with the past, building positive relationships, significant cultural and attitudinal change, substantial social, economic and political change (Kelly & Hamber, 2004). Therefore, reconciliation is crucial for post-conflict societies to prevent a relapse into conflict. It is a process of moving toward mutual acceptance, developing a vision of peaceful coexistence, creating practices and creating institutions that maintain and promote constructive attitudes and practices, and dealing with the legacies of the conflict to achieve a positive peace (Sahar & Kaunert, 2020). During reconciliation, the parties attempt to move from negative peace to positive peace, and actors (conflicting parties) try to fully engage their respective people and transform relations from hostility to amicability.

2.11 Entrepreneurship in post-conflict regions

Entrepreneurship is still a contested area; academics have suggested many definitions and policy-makers alike (Ács et al., 2013; Eckhardt & Shane, 2003; Edoho, 2015; Hall et al., 2012; Kuada, 2015; Morrison, 2000). Entrepreneurship is defined as a process of recognising, constructing and pursuing opportunities to create value (Roundy, 2017). Lazear (2005) defines entrepreneurship as the process of assembling necessary factors of production consisting of human, physical, and information resources and doing so in an efficient manner. Kuratko et al. (2017) define entrepreneurship as new ways of organising scarce resources, novel production methods of new goods and services, penetrating and establishing new markets. Acs et al. (2018, p. 506) regard entrepreneurship "*as individual-led behaviour that mobilises resources for opportunity exploitation by creating a new production function*". Entrepreneurship is a process of exploring, evaluating and exploiting opportunities to create new goods and services (Eckhardt & Shane, 2003; Shane & Venkataraman, 2000). However, this definition is not universally accepted by scholars and policymakers.

Entrepreneurship is central to innovation, wealth creation, job growth and creation, and political stability (Atiase et al., 2018; Cavallo et al., 2018; Hall et al., 2012; Kuratko et al., 2017; McMullen, 2011; St-Pierre et al., 2016). Entrepreneurship makes markets more competitive, encourages investments, and inspires job and economic growth vitally important to the nation's economic development (Atiase et al., 2018; Brixiova, 2010). At its core, entrepreneurship is about new ways of organising scarce resources, novel production methods, introducing new goods and services, penetrating, and establishing new markets (Kuratko et al., 2017). Furthermore, entrepreneurship is a source of emancipation for the economically disadvantaged (Roundy, 2017). It can bring about

social and economic mobility at the bottom of the pyramid through job creation (Prahalad, 2005). Current studies demonstrate the positive influence of productive entrepreneurship on countries' economic growth (Cavallo et al., 2018; Jha, 2018; Maroufkhani et al., 2018; Neumeyer & Santos, 2018; Nicotra et al., 2017). In developed economies, a considerable number of people engage in entrepreneurial activities such as creating new ventures; introducing new products to existing markets or creating new products for a new market; creating new businesses on behalf of large, public corporations; purchasing franchises; or licensing newly invented pieces of technology (Mason & Brown, 2014).

Entrepreneurial activities are made more acceptable and better rewarded through a process of legitimation, enabling entrepreneurs to access much-needed support and resources to develop their business ventures (Higgins & Elliott, 2011; Kuratko et al., 2017). In societies in which the societal contribution of entrepreneurs is not valued and appreciated, such societies are characterised by the low social status of entrepreneurs, failure is despised, and financial success is resented resulting in negative entrepreneurial flair - the tendency for people to be prone towards an entrepreneurial (John & Stephen, 2015; Morrison, 2000). Therefore, the precedence of a new venture involves opportunity discovery, recognition, evaluation and exploitation by an individual (Shane & Venkataraman, 2000). This societal attitude towards entrepreneurship influences how entrepreneurship is conceptualised by university key actors who strategize the university third mission and shape organisation architectures.

Some entrepreneurs are pushed into it due to lack of viable opportunities as means of the survivor to provide for their families - necessity-driven entrepreneurs, whereas other are driven by opportunities they have identified in the market (by choice) – opportunity-

driven entrepreneurs. Necessity-driven entrepreneurs (Devece et al., 2016) do not have the entrepreneurial traits or skills suggested in theory. They cannot grow their businesses due to competing demands on their resources and contributions to overall economic growth, including job creation. Sometimes, entrepreneurs cannot fully exploit those opportunities without the support of business incubators that act as platforms through which entrepreneurs collaborate and co-create (Ebbbers, 2014; Hughes et al., 2007). Business incubators allow entrepreneurs to forge ties and relationships with other entrepreneurs and businesses in the ecosystem that they would not have had access to otherwise as they seek information, technical support, legal advice, and accounting support to exploit opportunities fully.

Audretsch and Moog (2020) highlight the links between entrepreneurship and democracy. They argue that public policy to support and promote vibrant entrepreneurial activities requires viable democracy because democracy reflects freedom, it also is conducive to the ability of people and organisations both to engage in behaviour and activities to discover and create opportunities as well as to act on and pursue those opportunities. Entrepreneurship in developing economies often takes the form of collaborative entrepreneurship (Ratten, 2014). It requires the ability of universities, businesses and governments to form partnerships to achieve mutually agreed goals through sharing information and knowledge and to promote entrepreneurial behaviour in what Etzkowitz and Leydesdorff (2000a) referred to as *Triple Helix*. This collaboration among institutions acts as a mechanism for entrepreneurial universities to move commercialisable research, knowledge transfer across the institutional border and become more responsive in addressing some of society's challenges (Miller et al., 2018).

In post-conflict contexts, societies become risk-averse due to political and economic instability. Those who engage in entrepreneurial activities are driven by the need to support their families, not necessarily opportunities out there they are trying to exploit. Many factors influence how those entrepreneurial ideas are turned into business ventures; such as level of education (Fiet, 2001; Wadee & Padayachee, 2017), cultural influences (Audretsch & Belitski, 2017; Woodside et al., 2016), capital availability (Cumming & Vismara, 2017; Kim & Wagman, 2016), access to information (David-West et al., 2018; Redondo & Camarero, 2019), infrastructure (Audretsch & Belitski, 2017; Cowell et al., 2018; Neck et al., 2004) and policies (Etzkowitz & Leydesdorff, 2000a; Fuerlinger et al., 2015; Nyman, 2015). Current literature indicates that entrepreneurs in post-conflict societies are faced with challenges in starting and growing their entrepreneurial ventures due to political instability, lack of entrepreneurial skills, lack of finance, lack of legitimacy, unfavourable laws and regulations, adequate infrastructure (Atiase et al., 2018; Legas, 2015), and cultural support (Cacciotti et al., 2016).

The literature highlights common features of entrepreneurial universities demonstrated in section 2.5.2 which they are taken mostly from stable and well-developed institutions. Entrepreneurial university key features can be grouped in the following categories: governance and organisational structure, strategic partnerships and collaboration, resources and capabilities, financial capital, culture, knowledge exchange and transfer mechanisms, support measures for entrepreneurship and internationalisation. These entrepreneurial features are considered critical factors that enable entrepreneurial university development in post-conflict. However, there are subtle differences in these mentioned frameworks; Kirby et al. (2011) and Guerrero and Urbano (2012) frameworks demonstrate that the outcomes of entrepreneurial universities are linked with their missions; teaching, research, and entrepreneurial activities. Other frameworks (Bizri et

al., 2019b; Gibb, 2012; OECD, 2012) provide factors that contribute significantly to the development of entrepreneurial universities but do not distinguish what factors are institutional or external/environmental.

2.12 Chapter Summary

This chapter has argued that the existing literature does not provide an adequate contextualisation to situate and evaluate the development of entrepreneurial universities in societies emerging from the conflict. The literature acknowledges that, historically, universities were viewed as public good and focused on social cohesion and peacebuilding in order to build civic societies but that role has become obsolete as most universities are based in stable environments but such role is pushed to the fore in the post conflict context. Entrepreneurial university has long been associated with economic progress by creating spin-off companies and the commercialisation of research.

Entrepreneurial universities concepts have been developed through the lens of developed economies with well-developed institutional structures (Audretsch & Belitski, 2017; Isenberg, 2011; Neck et al., 2004; Roundy, 2017). Therefore, the need to explore the development of the entrepreneurial ecosystem and entrepreneurial universities in a less stable – post-conflict context is missing in the contemporary literature. In developed and non-conflict economies, entrepreneurial universities play an enhanced role in economic development through research commercialisation for economic or social good and applying research outcomes to address social or economic challenges (Guerrero et al., 2015). Universities are about providing skilled human capital to the economy, and building a middle class that contributes to economic development, promoting social

engagement, and improving governance will lead to sustainable positive peace (Brannelly et al., 2011).

In post-conflict societies, universities are significant actors for economic and political stability, thus facilitating economic recovery and getting the country onto an accelerated development track (Hayes & McAllister, 2009). Lederach (1997) highlighted how universities and institutional key actors hold the most potential for transforming conflict because of their ability to cut across conflict lines. Those actors have some degree of connection to the government officials while their institutions are linked to local community engagement or outreach programmes. Universities play a crucial role in developing functioning institutions contributing to the consolidation of inclusive governance cultures (Borgerhoff, 2006).

To stimulate economic/entrepreneurial activities, entrepreneurial universities in post-post conflict use the third mission as a lever or vehicle they use to nurture peacebuilding and social cohesion, at the same time contributing to the regional/national social and economic development that can be measured in terms of number of spin-offs, linkages with external stakeholders (industry and government). This conceptualisation is taken from stable and well-developed universities. To date, little work has explored how universities transition to entrepreneurial universities in societies emerging from conflicts. As a result, little is known about the evolutionary process of the entrepreneurial universities (Nkusi et al., 2020).

Chapter 3: Methodology

3.1 Introduction

This chapter describes the ontological and epistemological position of the study, the methodology and methods employed to collect data. The overall goal of the research methodology is to achieve consistency between the philosophical views underpinning this study and the objectives of the research (Easterby-Smith, Thorpe and Lowe, 1997). The research methodology took into consideration the sensitivities that surround the post-conflict context in which data was to be collected, and great care was taken to phrase interview questions do not cause offence given the nature of the data to be collected to address the research questions (Bryman, 2008). Data collected was thematically analysed using NVivo12, and themes were inductively generated from the data to develop the theory. This chapter also describes challenges encountered whilst collecting primary data before and after the Covid-19 pandemic, government restrictions to control its spread, and difficulties accessing secondary data, particularly in Rwanda.

3.2 Research philosophy

This section elaborates on the philosophical stance of the current research. According to Denzin and Lincoln (2000a: 45), “a paradigm defines the worldview and the basic set of beliefs that inform the research, thereby providing the guiding principles regarding ethics, epistemology, ontology and methodology”. Ontology is about the nature of reality and being, whilst epistemology concerns the view in which one acquires knowledge. Accordingly, Mack (2010) argued that ontology is the starting point that may lead to one’s theoretical framework in the research process. Therefore, paradigm positioning guides the philosophical assumptions that underpin the research (Denzin and Lincoln, 2000b).

The research design for this study is a descriptive and interpretive case study that is analysed through qualitative methods. The study adopts an interpretive research paradigm because it focuses primarily on understanding and accounting for the meaning of human experiences and actions as knowledge is relative to particular circumstances and exists in multiple forms as representations of reality (Fossey et al., 2002; Kirsti, 2016). This paradigm refers to a more fluid ontology, where the surrounding world changes according to the individual's interpretations and advocates notions about particular human experiences and their contexts as recognised from different subject positions (Fossey et al., 2002).

Several scholars have argued that paradigm positioning is significant in defining a particular research's philosophical assumption. It is essential to recognise the philosophical position in the research process that affects the quality of the management research (Cypress, 2017; Easterby-Smith et al., 2008). Easterby-Smith et al. (2008) highlight three main reasons it is essential to explore the philosophical underpinnings of a research study; (i) to clarify the research strategy by refining and specifying the research methods used in the study. This involves clarity about the type of evidence gathered and where it was gathered from, and how it helps answer the research questions; (ii) to help the researcher evaluate different research methodologies and methods to distil a clearer picture of appropriate methods and their limitations at an early stage of the research, (iii) to help bring out the creative potential of the researcher in the selection or adaptation of research methods. Thus, understanding the philosophical positions of different paradigms is likely to offer some clarity regarding identifying the type of research design that fits into particular research.

3.3 Philosophical Framework

This section explores the philosophical paradigm underpinning the study and justifies taking a particular philosophical stance; positivism and interpretivism are commonly referred to in social science as quantitative and qualitative research, respectively. Research philosophy is what the researcher perceives to be truth, reality, and knowledge guide the design and collection and analysis of data in a research study. Ontology is about the nature of reality and existence. In contrast, epistemology is the study of the nature of knowledge and ways of enquiring into the physical and social worlds and helps researchers understand the best ways of enquiring into the nature of the world. The nature of reality (ontology) influences how reality is known (epistemology); how we think it can be investigated (methodology and research techniques) (Fleetwood, 2005).

Positivism is sometimes referred to as ‘scientific method’ or ‘science research’. Positivist researchers’ view is that reality is intransitive (exists independently of the human), and the understanding of phenomena, in reality, must be measured and supported by evidence underpinned by the application of quantitative research techniques (Alharahsheh & Pius, 2020; Bryman, 2012; Fleetwood, 2005; Myers, 2019) which is associated with inferential statistics, hypothesis testing, mathematical analysis, and experimental and quasi-experimental design. The underlying premise of the positivist paradigm is that the task of researchers is to find reality rather than to create or interpret it, and positivist researchers formulate the propositions that portray the subject matter in terms of independent and dependent variables and the relationship between them.

Bryman (2012, p. 28) summarises the assumptions of positivism thus: (i) only phenomena and hence knowledge confirmed by the senses can genuinely be warranted as knowledge

(the principle of phenomenalism); (ii) the purpose of theory is to generate hypotheses that can be tested and that will thereby allow explanations of laws to be assessed (the principle of deductivism); (iii) knowledge is arrived at through the gathering of facts that provide the basis for laws (the principle of inductivism); (iv) science must (and presumably can) be conducted in a value-free way (that is, objective); (v) there is a clear distinction between scientific statements and normative statements and a belief that the former is the true domain of the scientist. This last principle is implied by the first because the senses cannot confirm the truth or otherwise of normative statements.

Interpretivism is a term given to a contrasting epistemology to positivism and developed through a critique of positivism with subjective perspective(s) and is more concerned with in-depth variables and factors related to a context, that reality is personal and only accessible through social constructions such as language, shared meaning, consciousness and instruments (Alharahsheh & Pius, 2020; Myers, 2019). Reality is a socially constructed phenomenon, and interpretive paradigm allows researchers to view the world through the perceptions and experiences of the participants by accepting and seeking multiple perspectives and trying to understand how people construct their own version of 'reality' to help them make sense of the world (Bryman, 2012; Myers, 2019; Thanh & Thanh, 2015).

Interpretivists focus on the complexity of human sense-making as the situation emerges and attempt to understand the phenomena through the meaning people assign to them. This differs from the positivism approach that often attempts to establish scientific laws that can be generalised and applicable to everyone irrespective of the context and establish causes and effects. In contrast, interpretivism is much more inclusive and looks to develop

context-bound generalisations closely related to the researcher and research methods (Myers, 2019). Table 6 highlights the key differences between the positivist and interpretivist approaches.

Table 3-1: Comparative analysis of positivist and interpretivist epistemology

Dimension of comparison	Positivist	Interpretivist
Philosophical basis	Realism: the world exists and is knowable as it really is. Organisations are real entities with a life of their own	Idealism: the world exists but different people construe it in very different ways. Organisations are invented social reality.
The role of social science	Discovering the universal laws of society and human conduct within it.	Discovering how different people interpret the world in which they live.
Basic units of social reality	The collectivity: society or organisations.	Individuals acting singly or together.
Methods of understanding	Identifying conditions or relationships which permit the collectivity to exist. Conceiving what these conditions and relationships are.	Interpretation of the subjective meanings which individuals place upon their action. Discovering the subjective rules for such action.
Theory	A rational edifice built by scientists to explain human behaviour.	Sets of meanings which people use to make sense of their world and human behaviour within it.
Research	Experimental or quasi-experimental validation of theory.	The search for meaningful relationships and the discovery of their consequences for action.
Methodology	Abstraction of reality, especially through mathematical models and quantitative analysis.	The representation of reality for purposes of comparison. Analysis of language and meaning.
Society	Ordered. Governed by a uniform set of values and made possible only by these values	Conflicted. Governed by the values of people with access to power.
Organisations	Goal-oriented. Independent of people. Instruments of order in society serving both	Dependent upon people and their goals. Instruments of power which some people control and can use

	the society and the individual.	to attain ends which seem good to them.
Prescriptions for change	Change the structure of the organisation to meet social values and individual needs.	Find out what values are embodied in organisational action and whose they are. Change the people or change their values if you can.

Source: Table adapted from Walliman (2006)

It is, therefore, imperative for the researcher to understand the ontological and epistemological understanding of philosophical assumptions of the nature of the research, its evidence and method used, and understand how the given assumptions determine researchers' selection of an appropriate methodology and methods. Moreover, how they connect with key findings of conducted research (Alharahsheh & Pius, 2020). Therefore, these philosophical assumptions ultimately impact the formulation of the research questions, the selection of the methodology, and the research methods. They represent the 'lens' through which the researcher views the world and ultimately shape the researcher's choice of methodologies and methods, as already mentioned.

This study adopts a qualitative, interpretive ego-centric approach to explore entrepreneurial universities' role in post-conflict environments as they are the producer of knowledge in the knowledge-based economy and provide the basis to examine the evolution of entrepreneurial ecosystem. It is the most appropriate way to address my research questions to understand the meanings and nuances associated with the interviewees' experiences. Previous studies on entrepreneurial universities have taken this approach, particularly those early and seminal papers in this field (Bronstein & Reihlen, 2014; Guerrero, Urbano, Fayolle, et al., 2016; Kirby, 2006; Rasmussen et al., 2011). There is also a necessity to take a more interpretivist approach because of the context and

the post-conflict environments. Moreover, the approach fits with the researcher's ontological view that knowledge is constructed from our perspectives and experiences through observable events resulting from unobservable structures - *critical realism* (Bhaskar, 2013; Easton, 2010; Fletcher, 2017; Gorski, 2013; Wikgren & Hjørland, 2005) which is discussed in the section below.

3.4 Research Ontology

The world (reality) exists independently of our knowledge or perception of it and is not easily reducible to our perceptions and experiences (Donald & Clay, 2012). The researcher adopts Critical Realism (CR) ontology that has its origins through the work of Roy Bhaskar as a scientific alternative to both positivism and interpretivism and leverages elements of both to provide new approaches to developing knowledge (Denzin & Lincoln, 2011; Easterby-Smith et al., 2008) and sits in the middle of positivism and interpretivism (Bryman, 2012). One of the most important tenets of CR is that what is real, the nature of reality is not reducible to our knowledge of reality as the world exists independent of our knowledge of it (Fletcher, 2017).

Critical realism enables us to understand reality not only through observable and non-observable social events (the empirical and actual domains) but through identifying the causal mechanisms of these events (the real domain) in the scientific analysis (Bhaskar, 2013). Critical realists begin their research with a particular problem or question guided by a theory (Fletcher, 2017). CR adopts different logic of inference – retrodution (Fletcher, 2017; Markos et al., 2013) to explain events by postulating and identifying mechanisms capable of producing them (Markos et al., 2013; Sayer, 1992). This process comprised various ways of eliciting and collecting both primary and secondary data.

In CR the social world is a stratified, open system of emergent entities with causal powers that generate effects and so engender change: the *empirical* domain that comprises of the observable events as we experience them; the *actual* domain comprises events and actions existing in time and space; and the *real* domain, which comprises causal powers and mechanisms that cannot be detected directly, but that have real consequences for people and society (Fletcher, 2017; Walliman, 2006). Ontologically, CR is based on the following assumptions, according to Sayer (1992): the existence of independent reality; a stratified ontology comprised of structures, mechanisms, events, and experiences; emergent powers dependent upon but not reducible to lower-level powers; and an open systems perspective. The goal of critical realist research is to explain the mechanisms and structures rather than the events and acknowledge that the mechanisms can be blocking an event, such as a change or outcome (McAvoy & Butler, 2018)

CR takes the view that mechanisms produce theories and concepts about social events that are real and identifiable only through their effects and helps the researcher to identify causal mechanisms driving social events, activities, or phenomena and interpret in an understandable manner and in a way that can be acted upon (Bryman, 2012; Fletcher, 2017; McAvoy & Butler, 2018). Fletcher (2017) and Easton (2010) assert that the CR is useful for analysing social problems and providing useful solutions for social change because of its ability to explain and causal analysis. Critical realist researchers are positioned to develop causal explanations of complex events regarding the actors' interpretations and the unobservable structures and mechanisms that interact to produce an event (Donald & Clay, 2012). Structures in CR are defined as a set of internally related objects or practices that constitute the real entities we seek to investigate in a specific

contextual situation. Mechanisms are “ways of acting things” inherent to physical and social structures, enabling or limiting what can happen within a given context and conceptualised as either causal powers or tendencies, and the event is a specific happening or action as a result of the enactment of one or more mechanisms (Donald & Clay, 2012).

3.5 Research Design

The study adopts a multiple case study approach to develop a robust, generalisable and testable theory than single-case research would, therefore, the most suitable approach for conducting a broad exploratory analysis and an efficient approach to the study of organisational aspects that cannot be captured by quantitative research methods (Eisenhardt & Graebner, 2007). The methodology we used allows us to obtain creative insights from the juxtaposition of evidence and tends to produce theory that closely mirrors reality.

The study used Rwanda and Northern Ireland as case studies. The choice of cases is based not on the uniqueness of a given case but rather more on the contribution to theory development. The theoretical sampling approach used in this study is “polar types” (Eisenhardt & Graebner, 2007). The choice of the cases was based on the context as both countries are post-conflict countries. Other factors that influenced the choice of the cases include their differences in terms of reconciliation pathways, government intervention, university infrastructure and the maturity of ecosystems. Both case studies are contextually homogenous - Rwanda and Northern Ireland are post-conflict countries where peacebuilding and reconciliation are central to institutional strategies but fundamentally different in terms of other contextual factors such as culture, economic, politics (conflict resolution model), structure and focus of higher education sector, etc.

This allows the study to explore nuanced information in terms of the impacts and approach universities take in the pursuit of the third mission. Eisenhardt and Graebner (2007, p. 25) also argue that building theory from cases studies is “*one of the best (if not the best) of the bridges from rich qualitative evidence to mainstream deductive research*” and more likely to produce a theory that is testable, accurate and more robust because the propositions are more deeply grounded in varied empirical evidence.

The emphasis of theory building from case studies on developing constructs, measures, and testable theoretical propositions makes inductive case research consistent with the emphasis on testable theory within the mainstream deductive research (Eisenhardt & Graebner, 2007). Eisenhardt and Graebner (2007) further indicate that multiple-case studies provide a more substantial base for theory building. They enable comparisons that clarify whether an emergent finding is simply characteristic of a single case or consistently replicated by other cases.

3.6 Research Methods

For the critical realist, the world is complex and stratified (Bhaskar, 2013). To build our knowledge, we need to examine the underlying strata in social settings, including culture, attitude and personality, and norms and roles. According to Sayer (1992), those mechanisms exist independent of our investigation of them but are transformed and reproduced by humans. The primary objective of the enquiry is the mechanism and the events that it produces that cannot be isolated from the context. Hoddy (2019) states that “critical realist enquiry aims at developing causal explanations that map the components of a social phenomenon across stratified reality, spelling out what the relevant objects, structures, mechanisms and conditions are to that phenomenon”. The interview questions

are carefully phrased to ensure they do not offend participants, as interviews take place in post-conflict environments in which the legacies of the conflict are still present. The researcher sought advice from academics who conducted research in such an environment to minimise the risk of offending.

Interview questions are designed to explore the interacting mechanisms and structures that generate observable events. Therefore, the interview questions enable respondents to influence the agenda, and be probed to produce longer accounts to identify themes, adopting an interpretive approach to data collection (Orlikowski & Baroudi, 1991; Walsham, 1995). The chosen research approach offers a way to address the rigour–relevance gap in entrepreneurship research and to provide clear, concise, and empirically supported statements about causation, specifically how and why a phenomenon occurred (Donald & Clay, 2012). A qualitative approach combined with a social constructionist epistemology is an appropriate way to explore relationships and meanings and capture the participants' different perspectives by identifying the underlying initiators that informed and shaped the participants' construction of that reality.

3.7 Data collections Methods

The topic of this study lends itself well to qualitative research methods, as they allow an explorative approach to examine the causality between mechanisms and events that produce an outcome. CR research began with events that are observed at the empirical level using two types of data. First, extensive data, which include a systematic narrative literature review that informed the rationale of the research, enriched the researcher's knowledge about the topic under investigation as well as highlighted gaps in the existing body of knowledge. Second, intensive data obtained through semi-structured interviews

that enabled the researcher to gain an insight into how people feel and think about a research topic under investigation.

3.7.1 Semi-structured interview

A semi-structured interview is an effective tool to collect data by facilitating the researcher to ask key questions and explore deep insights into the events being investigated (Nandhakumar and Jones, 1997). It adds flexibility to explore any new avenues that might arise because having a basic structure allowed the researcher to explore issues relevant to my research questions and overall aim (Kvale, 1996). Semi-structured interview confers the researcher the flexibility to use in-depth, semi-structured interviews to probe deeply in order to follow up certain comments, open up a new dimension of an issue, to ascertain authentic accounts based upon the personal experiences, thoughts, values, prejudices, perceptions, views, feelings of the interviewees. Therefore, semi-structured interviews offered the most appropriate interview technique for this study for the stated reasons. Thus valuable data collected provides the researcher to abstract the underlying causal mechanisms of an object under investigation and think conceptually about how they operate, and explain a set of observable patterns (Bhaskar, 2013; Pham, 2018; Wengraf, 2018).

In this context, the questions asked were sensitive in nature (post-conflict environment) and phrased in such a way to allow participants to provide a true account in the context of the topic (Galetta, 2013). To ensure the consistency of data provided, the researcher asked the same questions to all respondents, using the same wording and sequence of questions, particularly because of the sensitivities surrounding the post-conflict context and also to give the interviewer control over topics discussed (Corbetta, 2003) (see

Appendix 2 and 3 semi-structured interview protocols). The pre-defined topics in the interview guide were derived from the literature.

The interview questions were exploratory in nature and required respondents to influence the agenda and produce longer accounts necessary to identify themes. Therefore asking the interviewees probing questions was an integral part of my research strategy. The following section explains the sampling technique used in the study. The interview questions were formulated to answer research questions that originated from the literature review (see Table 3.2). Data from the interviews were cross-checked with information from public sources (institutional reports, websites, and scientific articles), which allowed triangulation with evidence provided by the multiple case study and reduced possible biases due to the positions held by the interviewees.

Table 3-2: The link between RQ and literature

Literature references	Research Questions
<ul style="list-style-type: none"> • Diversified funding - Research commercialisation (Grimaldi et al., 2011; Mason & Brown, 2014; Trequattrini et al., 2018) • Government considering university as part of the regional growth strategies (Guerrero, Urbano, Fayolle, et al., 2016; Maribel et al., 2016) • Government policies (Alvedalen & Boschma, 2017; Autio & Fu, 2014; Cavallo et al., 2018; Nicotra et al., 2017) • Leadership and organisation design (Clark, 2001; Etzkowitz et al., 2000; Leih & Teece, 2016b; Sarpong et al., 2017) • Peacebuilding and reconciliation (Barbara & Walsh, 2018; Milton & Barakat, 2016b; Pherali & Lewis, 2019; Sahar & Kaunert, 2020) • Institutional policies (Cunningham, Lehmann, et al., 2019; Guerrero & Urbano, 2014; Mack & Mayer, 2016; Roundy & Fayard, 2018) • The role of universities in transitioning economies (Etzkowitz, 2013; Guerrero et al., 2015; Guerrero, Urbano, Fayolle, et al., 2016) 	<p>What factors encourage or hinder the dynamics of the process to become an entrepreneurial university in post-conflict environments?</p>

<ul style="list-style-type: none"> • Culture (Acs et al., 2018; Acs et al., 2017; Acs & Varga, 2005; Audretsch, 2014; Guerrero et al., 2012; Spigel & Harrison, 2018) • Entrepreneurial architecture (Nelles & Vorley, 2010a, 2011) • Entrepreneurial university frameworks (Bizri et al., 2019b; Gibb, 2012; Guerrero & Urbano, 2012; Kirby et al., 2011) • Entrepreneurship education and teaching (Cope & Watts, 2000; Liñán & Fayolle, 2015; Lindh & Thorgren, 2016; Ratten, 2014, 2017) • Knowledge transfer (Audretsch, 2014; Guerrero et al., 2015; Guerrero & Urbano, 2012; Rothaermel et al., 2007) • Pathways to transitioning to entrepreneurial university (Clark, 2001; Uslu et al., 2019) • Resources and capability (Cunningham, Menter, et al., 2019; Ratten, 2014; Sarpong et al., 2017; Zahra & Nambisan, 2012) • Role models to promote entrepreneurial activities and alleviate fear (Cacciotti & Hayton, 2015; Cacciotti et al., 2016; Kirby et al., 2011) • Stakeholder engagement (Audretsch et al., 2015; Giones, 2019a; Guerrero & Urbano, 2012; Pugh et al., 2018; Spigel, 2016; Urbano & Guerrero, 2013) 	<p>How is entrepreneurial university conceptualised and interpreted in post-conflict environments?</p>
<ul style="list-style-type: none"> • EE development framework: (Acs et al., 2018; Acs et al., 2017; Alvedalen & Boschma, 2017; Audretsch & Belitski, 2017; Cantner et al., 2020, 2021; Cavallo et al., 2018; Cohen, 2006; Colombelli et al., 2019; Cunningham et al., 2017; Kuratko et al., 2017; Lahikainen et al., 2018; Mack & Mayer, 2016; Mazzarol, 2014; Muldoon et al., 2018; Nicotra et al., 2017; Nkusi et al., 2020; Roundy, 2017; Roundy & Bayer, 2018; Spigel, 2017; Spigel & Harrison, 2018; Stam & Van de Ven, 2021; Suresh & Ramraj, 2012) • EE governance: (Colombelli et al., 2019; Colombo et al., 2019; Cunningham, Menter, et al., 2019; Jha, 2018; John & Stephen, 2015; Lahikainen et al., 2018; Spigel, 2016; Stam, 2015; Zahra & Nambisan, 2012) 	<p>How does entrepreneurial ecosystem evolves and what is the role played by entrepreneurial universities during ecosystem development stages</p>

Source: Author's

Data collection stages

To ensure rich data was collected, the researcher needed to test data gathering instruments effectively and collect the right data; the research was conducted in stages. Initially, there were two main stages of data collection: pilot study and fieldwork. The first stage, the pilot study, assess the data collection instruments and the quality of data collected. This

stage was planned to take place in October 2019 for one month. The outcome of the pilot study informed the next stage of conducting fieldwork involving a large sample.

The pilot study aimed to test data-gathering instruments, gain first-hand information and insights about Rwanda higher education system, and identify factors that support or impede entrepreneurial university development. Parallel to the pilot study, to gather information about the requirements to conduct research in Rwanda, as such information was not clear in the public domain. The trip to Rwanda allowed the researcher to establish working relationships with key actors within higher education sectors and industry, especially those involved in knowledge transfer. The objectives were:

1. To understand the strategic orientation of Rwanda universities and key drivers
2. To understand how universities promote entrepreneurship and analyse structures that support university its third mission
3. Identify and analyse university architectures and how they contribute to the development of entrepreneurial university's third mission.

A pilot study is an essential element in a well-designed study. The results from a pilot study inform the researcher about the reliability and validity of the instrument, measure the appropriateness of the items in the instrument to the sample, detect the problems that may arise and devise a strategy to mitigate them (Van Teijlingen & Hundley, 2001). The pilot study also revealed the importance of the conflict resolution model and the type of reconciliation to the entrepreneurial university's missions (teaching, research and entrepreneurship), particularly in the strategisation of the third mission. The element that was missing during the pilot study semi-structured interview protocol.

The second stage, fieldwork, was to collect data using revised data collection tools. In this stage, data collection tools would be analysed and adjusted based on the quality of data being harvested, therefore dynamic in nature. This stage was planned to take place from February to May 2020, with a break between 4th and 16th April 2020, as it is commemoration week of genocide victims; all institutions scale down their operations to attend various official and local events. It is a very high sensitive time to correct data in Rwanda, more so when it touches on the reconciliation. The researcher was advised not to conduct any research activities by informants on the ground. Data collection was scheduled to resume on 19th April 2020. This never materialised due to Covid -19 pandemic. As a result of the Covid-19 pandemic, another stage was introduced to collect data in Northern Ireland. The research adjusted its focus and methodology to multiple case study approaches. The researcher tried to continue collecting data in Rwanda using online platforms to no avail. This is further discussed in the research limitation section.

3.7.2 Samples

The study uses a non-probability form of sampling - purposive sampling, which involves selecting a group of participants based upon an important characteristic or set of characteristics with direct reference to the research questions being asked (Bryman, 2012). The study uses the snowball sampling technique as the researcher relies on those initial participants to help identify additional study participants, mainly due to the Covid-19 pandemic as the access to potential participants in the study was hard to reach (Bryman, 2012; Myers, 2019). Although the snowball technique can introduce an expert bias, it was beneficial in this study to capitalise on expert wisdom in identifying studies that are highly valued by different stakeholders and identifying studies outside the academic mainstream (Suri, 2011). Critical case sampling facilitated ‘logical generalisations’ with the reasoning ‘that “if it happens there, it will happen anywhere,”

or, vice versa, “if it doesn’t happen there, it won’t happen anywhere” (Patton, 2002, p. 236). Hence the selection of different universities (public and private) in serving communities in different parts of the country

The study focuses on how an academic community (students, academic and senior leaders – corporate agents and supporting staff), who are directly and indirectly involved in aspects of the third mission, are influenced by the structures limiting and enabling their engagement in third mission and peacebuilding. The study also considers how those in influential positions such as Vice-Chancellor, Deans, Head of departments, Head of School, Managers elaborate and influence structures and processes (see Appendix 1). Like Wrench (2004), these categories were selected to involve people representing different sections of the academic community and influence in setting and implementing the university's third mission.

Group one consisted of the Vice-Chancellor, Deans, Head of departments, Head of School, and Managers who are influential actors in the higher education context in setting the organisation's vision and agenda. Group Two consisted of lecturers and assistant lecturers who have intentions in research commercialisation or creating university spin-offs. Lecturers and assistant lecturers are crucial for the study not only for their teaching and research activities but also for their role as the driving force of entrepreneurial agenda of universities at the same time peacebuilders. Their experiences in carrying out their daily duties provide insights into the conditions under which they operate, regulations, and the culture that govern them. Such experiences can be used to barometer the institution’s entrepreneurial intentions and civic obligations. Group Three consisted of professional development support staff who are particularly involved with university

business incubation centres, industry liaison offices, etc. Group Four consists of students (undergraduate and postgraduate) to provide their understanding and interpretation of entrepreneurship and entrepreneurial activities in and around their university campus. The table below shows the background and number of interviews in each group.

Table 3-3: Numbers of interview in each group

Group	Category	Code	Number
1	Senior leaders	CATA	9
2	Academics (professor, lecturer and senior lecturer)	CATB	11
3	Professional supporting staff	CATC	9
4	Student (individual interview) Group 1 (4 students) Group 2 (6 students) Group 3 (4 students)	CATD	4

Source: Author's

Their input in the study provided an overview or roadmap that will guide the institution to achieve its desired ambition(s), how those ambitions are aligned to the pursuit of the Third Mission, and peacebuilding and reconciliation mission (hereafter *The extended Third Mission*). They provide insights into individuals' drive and their perceived contribution in promoting entrepreneurial culture in their respective institutions and beyond. This cluster is can also provide historical context of their respective institutions that will complement archival information about them – thus providing insights about mechanisms that led to the occurrence of an event(s).

The use of semi-structured interviews allowed the researcher to collect from a broad range of people in various roles within each of the organisations being studied. It enabled the researcher to get a nuanced, deep understanding of key issues related to the development of entrepreneurial universities in post-conflict environments. Given the limitations posed by the Covid-19 pandemic and access to a wide variety of participants and time, the informants held different positions within higher education; Vice Chancellors, Deans, Head of Departments, academics/scientists, lecturers and supporting staff, and students. No students in Northern Ireland participated as they were too hard to reach as university campuses were closed.

3.8 Primary data collection in Rwanda

The selection of third-level institutions in Rwanda was based on the following criteria; i) their ranking within Rwanda higher education sector as reported by the Ministry of Education (GHRDC, 2015), ii) their public reputation and recommendation, resources held that had the potential to support entrepreneurial activities (based on information in the public domain), iii) their location to ensure both broader range perspectives and fair representation, and lastly, iv) those who indicated their willingness to participate in the study. To gain access to study participants in Rwanda, the researcher e-mailed several individuals within universities whose contacts were available in the public domain to seek their support to facilitate the research (see Appendix 5). Those individuals were selected based on their position and presumed influence within their institutions and their potential role to influence the extended third mission, including Head of Business School, Head of Departments, Dean, and Vice-Chancellors.

To conduct any academic research in Rwanda, the Ministry of Education requires Rwandan and non-Rwandan citizens to acquire a research permit from the National Council for Science and Technology (NCTS). The researchers need to have an affiliation confirmation from the authorised affiliating institution (see Appendix 4). The process of gaining formal research approval and obtaining a research permit from (NCTS) is a lengthy process that can take up to 6 months, depending on the nature of the research. The research permit application was submitted on 15th October 2019 and was issued on 29/04/2020. The cost for the researcher permit was \$200 (Researcher from outside East African Community). The list below illustrates documents needed and steps to obtain a research permit in Rwanda. The following are the documents required for the research permit application (NCST, 2021):

- Filled application form to conduct research in Rwanda
- Filled affiliation confirmation form
- Comprehensive research proposal (Clearly showing research title, the purpose of the study, research questions, main/Specific objectives, methodologies, expected outcomes with key measurable indicators and timelines)
- Copy of Identity card or passport
- CV of the principal investigator and research collaborators
- Cover Letter addressed to the Executive Secretary of the National Council for Science and Technology (NCST)
- Recommendation letters from supervisors (Research Institution and local supervisor)
- One passport photo with white background
- Proof of Payment of research Clearance

As the researcher had established contacts with various private universities, he was advised to write to Vice Chancellors for permission to conduct research in their institutions without going through the proper government channels. The researcher could not collect any data without their approval. The researcher received permission to conduct research in three institutions at the time. The researcher was assigned a mentor - a 'gatekeeper', who decided whom I could have access to, and this restricted the choice of interviewees and to ensure fieldwork undertaken is not influenced by the representations of or portray the Government of Rwanda in the negative light, common in international media today.

3.9 Primary data collection in Northern Ireland

On the contrary, to conduct research in Northern Ireland research permit is not required. Generally, all research students in UK universities must comply with relevant health and safety legislation, University health and safety regulations, and any specific health and safety requirements applying in the school where the research is being undertaken or in any location, including locations outside the University, where the student is undertaking research. All research students must comply with the university's code of conduct and Integrity in Research; the Intellectual Property Policy; and policies and procedures for research ethics, including those applying in their discipline; and must obtain, through their supervisor(s), any necessary ethical approval for the research.

To access study participants in Northern Ireland was achieved through the supervisor's contacts at the start. Those contacts provided recommendations to potential participants; some of them sent an introductory e-mail on my behalf introducing the researcher, the area of the research and how they can contribute to the study. This helped immensely to

secure more participants. It snowballed from then on. E-mails were sent to the recommended contacts in different universities with an information sheet attached.

In Rwanda, interviews were conducted either in English, or in Kinyarwanda, both spoken fluently by the interviewer. The ability of the researcher to be bi-lingual was particularly beneficial in conducting interviews as the interviewer was able to talk to interviewees in the language, they are more comfortable expressing themselves and allowed the collection of rich data as little was lost in translation. This would have been problematic if the interviewer had spoken a different language. It would require an interpreter who understands the subject matter and context in which the interview is taking place. To ensure maximum participation for the study in Rwanda, the interview process was planned in two phases. Data collection coincided with the exam period to enable those who wished to participate in the research after their exams. The researcher was also requested to present theoretical underpinnings of entrepreneurship alongside one of Rwanda's serial entrepreneurs Mr Sina Gerald¹, who was to give a talk about his journey as an entrepreneur. However, it was disrupted by the Covid-19 pandemic. Therefore, it did not take place.

In Rwanda, group interviews became predominantly the pragmatic approach to collect data among students who tend not to speak freely when being recorded. This gave members a sense of safety, allowed participants to exchange anecdotes and comment on each other's experiences and points of view, and stimulated them to share their own thoughts (Gawlik, 2018). Group interviews acted as an ice breaker and helped the interviewer to open up and become more candid, to elicit different perceptions and ideas

¹Mr Sina Gerald, Owner, Founder and Managing Director of Enterprise Urwibutso, has built a significant name that has gone beyond Rwanda in Agro-processing. He has diverse interests, including restaurants, bakeries, a juice and wine factory, a school, and extensive land holdings.

of participants on the topics at hand, boosted participants' memory, thus making it possible to collect rich data and gain a multifaceted insight into the issues subject to research.

There are areas of contention about group interviews such as lack of confidence, or low self-esteem that often prevents participation in a group discussion. In addition, self-censure, underreporting, openness in responding create issues related to participation (Kitzinger, 1994; Krueger, 2014; Morgan, 1996). However, these drawbacks were overcome by combining group interviews with 1-2-1 interviews with other participants and data triangulation to ensure validity and reliability, as well as ensuring all participants have their turn in answering questions or giving their views. All interviews with other lecturers and senior leaders were 1-2-1, as it provided the confidentiality and freedom to express their views that would not have been possible in a group setting.

Thirty-three interviews (including 3 group interviews in Rwanda) took place between November 2019 and November 2020 (see Appendix 1). Each 1-2-1 interview lasted between 30-45 minutes. Interviews were based around an interview protocol and guide that included seven questions (see Appendix 3). Before the interview, each participant was given a copy of the interview protocol and questions before they were interviewed and an ethics form to sign. In contrast, for online interviewees, verbal consent was given. Field notes and photographs were taken as part of primary data collection in Rwanda, whereas in Northern Ireland, there are only recorded interviews due to Covid-19 (see Appendix 7). In Rwanda, the researcher also had several informal meetings with academics, Head of Department (HoD) and Dean to understand the higher education

sector and its challenges and opportunities. This allowed them to be candid about their experience in their profession.

All interviews were digitally recorded and transcribed using a transcribing application called 'Otter.ai'. This speech-to-text transcription tool works online or via a phone app using artificial intelligence (AI) and Machine Learning (ML) to carry out transcription and import as a Word document into Nvivo 12, a qualitative data analysis software tool. Written notes were taken for all the interviews held to highlight key information. Along with these, multiple informal discussions were held over the phone and face-to-face and recorded in the diary. During the semi-structured interview, the interviewer asked specific questions (to bring forth the foreseen information), open-ended questions (to elicit unexpected types of information) and follow-up questions around themes in no rigidly fixed order and can change the formulation of the questions to suit the situation. The following section provides an overview of Rwanda Universities. The transcript word count is 113,236 (85,359 from NI participants and 27,877 from Rwanda participants), and there are 195 pages (114 and 81 for NI and Rwanda, respectively).

3.10 Overview of participating universities.

The study involves six different universities; four institutions from Rwanda and two from Northern Ireland. In Rwanda, the researcher visited all four universities that had responded positively to participate in the study: Institut d'Enseignement Supérieur de Ruhengeri (INES-Ruhengeri) – Institute of Applied Science, Adventist University of Central Africa, Rwanda Polytechnic (RP) and University of Rwanda Business School. Table 3.4 and 3.5 gives an overview of universities that participated in the study.

Table 3-4: Overview of participating Universities in Rwanda

<i>Name</i>	<i>No of campuses</i>	<i>No of Students</i>	<i>No of Staff</i>	<i>Source of income</i>	<i>Schools and Faculties</i>
University of Rwanda (established 2013)	14	28125	2702	<ul style="list-style-type: none"> • State budget allocations • Government or partners' subsidies • Income from its services • Income from its investments • Interests from its property. • Loans granted to UR approved by the Minister in charge of finance and economic planning • Donations and bequests 	<p><u>College of Arts and Social Sciences</u></p> <ul style="list-style-type: none"> • School of Law • School of Journalism and Communication • School of Social, Political and Administrative Sciences • School of Arts and Languages <p><u>College of Agriculture, Animal Sciences and Veterinary Medicine</u></p> <ul style="list-style-type: none"> • School of Agriculture and Food Sciences • School of Agricultural Engineering • School of Veterinary Medicine • School of Forestry, Biodiversity and Biological Sciences <p><u>College of Business and Economics</u></p> <ul style="list-style-type: none"> • School of Business • School of Economics <p><u>College of Education</u></p> <ul style="list-style-type: none"> • School of Education • School of Open and Distance Learning <p><u>College of Medicine and Health Sciences</u></p> <ul style="list-style-type: none"> • School of Nursing and Midwifery • School of Health Sciences • School of Dentistry • School of Public Health • School of Medicine and Pharmacy <p><u>College of Science and Technology</u></p>

					<ul style="list-style-type: none"> • School of Engineering • School of Science • School of Information Communication Technology • School of Architecture and the Built Environment • School of Mining and Geology
AUCA (Established 1984) - University	3	Not reported	Not reported	Not reported	<ul style="list-style-type: none"> • Faculty of Business Administration • Faculty of Education • Faculty of Theology • Faculty of Information Technology • Faculty of Health Science and Nursing
RP (Established 2017) - Polytechnic	8	107,501 (2017)	Not reported	<ul style="list-style-type: none"> • State budget allocations; • Government or partners' subsidies; • Income from its services; • Incomes from its investments; • Proceeds from its properties • Loans granted to RP approved by the Minister in charge of finance; • Donations and bequest 	<p>RP colleges do not have faculties or school but has departments depending on each college area of specialisation. They include;</p> <ul style="list-style-type: none"> • Civil Engineering • Mechanical Engineering • Information and Communication Technology (ICT) • Electrical and Electrical Engineering Department • Fashion Design • Mining Engineering • Hospitality Management • General Course • Crop Production • Veterinary Technology
INES Ruhengeri (Established 2003) - University	1	6508 (2019)	Not reported	<ul style="list-style-type: none"> • School fees • Revenue from research projects • Other revenues 	<ul style="list-style-type: none"> • Faculty of Applied Fundamental Sciences • Economics Social Sciences and Management • Education • Law

Source: HEC (2019), INES-Ruhengeri (2020), UR (2021a), RP (2021a)

Table 3.5: Overview of Northern Ireland universities

Name of institution	No of campuses	No of students	No of staff	When established	Source of income	Support for the third mission
Queen's University Belfast (QUB)	1	24,143 (2017)	3700	1845	<ul style="list-style-type: none"> • Tuition Fees and Education Contracts • Funding Body Grants • Research Grants and Contracts • Investment Income • Donations and Endowments • Other Income 	<ul style="list-style-type: none"> • Qubis • Research and Enterprise Directorate • Innovation-to-Commercialisation of University Research (ICURe) (incubator) • Lean Launch programme • EIT Food Seedbed Incubator Programme • Enterprise SU • Entrepreneur In Residence • Proof of principle programme • Confidence in Concept programme • InvestNI Proof of Concept • EPSRC Impact Acceleration Account (IAA) • Scaling the edge programme • UKRI Future Leaders Fellowships
Ulster University	4	27000	3000	1984	<ul style="list-style-type: none"> • Tuition Fees • Government Grant • Funding Body Grants • Research Grants and Contracts • Investment Income • Donations • Other Income 	<ul style="list-style-type: none"> • Innovation Ulster Ltd • Innovation and Impact • Research Development • Research governance • UU Student Union • Business Leader Peer Mentoring Programme • KTP • Business School • Young Enterprise Start Up Programme

						<ul style="list-style-type: none">• SO SHE DID programme• Science Shop
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3.10.1 University of Rwanda (UR)

University of Rwanda (UR), formerly known as Université National Du Rwanda (UNR), is Rwanda's largest and only public-funded university. UNR was established in November 1963, and the law establishing UNR was passed in May 1964. It was first funded by Canada and later by the University de Gent of Belgium. It had only one campus in Butare, Southern Province. In 1981, NUR merged with the National Institute of Education (NIE) then NUR had two campuses: one at Ruhengeri and another at Butare. After the 1994 genocide, NUR re-opened its doors in April 1995 with 1600 students, and all the faculties and schools are regrouped in Butare Campus for security and administrative reasons; its primary mission was to provide the country with the badly needed skilled workforce for the reconstruction effort, according to its former Rector Dr Emile Rwamasirabo (Winne, 2021).

In 2013, the Government of Rwanda merged all public universities to form the University of Rwanda (UR). The primary purpose of creating this national institution was to enhance the quality of Rwanda's higher education provision while achieving economies of scale and efficiency in operation. UR consists of the following academic entities: College of Arts and Social Sciences (CASS), College of Agriculture, Animal Sciences and Veterinary Medicine (CAVM), College of Business and Economics (CBE), College of Education (CE), College of Medicine and Health Sciences (CMHS) College of Science and Technology (CST). The University of Rwanda has a triple mission: teaching, research and community service. UR views itself as a key actor in the social and economic development of the country by producing high calibre graduates as well as quality multi-disciplinary knowledge and skills, relevant research and effective community service based on community real needs and aiming to sustainable community development.

3.10.2 Institut d'Enseignement Supérieur de Ruhengeri (INES-Ruhengeri)

INES Ruhengeri is a post-genocide initiative, and the idea of its creation came in September 2000 under the initiative of the Ruhengeri Catholic Diocese. INES-Ruhengeri officially opened in November 2003. INES Ruhengeri was built on the three pillars; (1) building signs of hope, (2) contributing to unity and reconciliation and (3) contributing to the country's sustainable development. INES Ruhengeri obtained its degree awarding powers by the Ministerial order number 005/2010/MINEDUC of 16th June 2010. INES-Ruhengeri is a specialised institution in Applied Fundamental and Social Sciences that seeks to balance theory and practice in order to empower students with responsive competencies that can be applied to provide sustainable solutions for day-to-day problems afflicting society. INES-Ruhengeri seeks to contribute to national and regional development by providing specialised university education enhanced by research.

The vision of INES is expressed in two phases: “Universality in each individual; Knowledge in order to unite and better serve the world”. In April 2010, INES-Ruhengeri chose to officially profile itself as an Institute of Applied Sciences. This new orientation was in response to a technical skills shortage as highlighted by a skills audit conducted in Rwanda by HIDA-MSCBP, Ministry for Public Service and Labour, in a report entitled “National Skills Audit Report”, that Rwanda is experiencing considerable gaps in terms of critical skills especially technical skills like civil engineering, electronics, nursing, Land and Environment domain etc.

3.10.3 Adventist University of Central Africa (AUCA)

The Adventist University of Central Africa (AUCA) was founded in 1978 but officially opened in October 1984. AUCA was located in Mudende in Western Province. AUCA, known as MUDENDE, is a Seventh-day Adventist Institution of Higher Learning, which has a philosophy to operate based on the Seventh-day Adventist worldview: “God is the Creator and Sustainer of the universe and the source of true knowledge”. Like all other institutions in 1994, AUCA suspended all its activities during the genocide, during which it was looted, its properties damaged and re-open its doors in May 1996 on a transitional site in Kigali with only three of its original faculties (7 faculties), namely: Business Administration, Education Sciences and Theology.

In 1996, the AUCA Mudende campus was occupied by returning refugees from the Democratic Republic of Congo (DRC), formerly known as Zaïre. The prolonged stay of those refugees on the campus had a detrimental impact on the physical structures of the university. The situation was further exacerbated by the war of infiltrators in the Western Province between 1997 and 1999. The university could not operate in that region under those circumstances, and in 2006, the land was sold to the GoR, and Rwanda Defence Forces currently occupy the land. AUCA began its operation at Gishushu Campus Kigali in 1996 and later built a new and larger campus at Masoro, located in the outskirts of Kigali and began operating in 2005. In 2019, AUCA opened State-Of-The-Art Medical School, located in Masoro, the same campus hosts other existing faculties.

3.10.4 Rwanda Polytechnic

Technical and Vocational Education and Training (TVET) is an important component within the Rwandan policies framework to end poverty such as Economic Development

and Poverty Reduction Strategy (EDPRS), Educational Sector Strategic Plan (ESSP) 2013-2014 – 2017-18, Vision 2020. A reform of the TVET sector was approved in 2008, and two new bodies have been created within the Ministry of Education: The Workforce Development Authority (WDA) and the Integrated Polytechnic Regional Centres (IPRCs). IPRCs have to develop into centres of expertise on a provincial level, and there were 8 in total. In 2018, Rwanda Polytechnic was created when the GoR merged all 8 IPRCs to enhance the quality of education in the TVET subsector. The constituent IPRCs was elevated in status, with the ‘C’ in the acronym now standing for ‘College’, instead of ‘Centre’ because they will be offering Advanced Diploma in a wide range of marketable courses.

While previously Integrated Polytechnic Regional Centres oversaw the operations of vocational and technical training centres in their respective jurisdictions, the government handed this role to districts in which they are located. TVET has acquired prominence as a practical alternative to empowering the population to join the world of work with employable skills that would drive competitive production and the consequent economic development. TVET is one of the ways through which Rwanda can achieve its long-term development vision (Vision 2020), to be a middle-income export-oriented economy, operating as a knowledge-based service hub by 2020 as well as a crucial part of Economic Development and Poverty Reduction Strategy I (EDPRS I) 2008-2012 that targeted economy-wide productivity improvements and an economic transformation from subsistence agriculture towards commercial agriculture, manufacturing and services.

Figure 3-1: Location of Ulster University and Queen's University Belfast



Source: Author's

3.10.5 Queen's University Belfast (QUB)

Queen's University Belfast (QUB) was founded by the Royal Charter in 1845 by Queen Victoria. QUB was designed to be a non-denominational alternative to Trinity College Dublin, which the Anglican Church controlled. QUB comprises three Queen's Colleges - in Cork, Galway and Belfast. The university now consists of over 300 buildings, many of them listed for their architectural importance (QUB, 2021f). Lanyon building, designed by Charles Lanyon in 1849, is the main building and symbolises the culture using associations with historical architecture to command status and authority.

The first intake was about 90 students, and today it has approximately 25,000 students from both the United Kingdom (UK) and Ireland and more than 80 other countries. QUB is organised into fifteen schools across three faculties. The three faculties are the Faculty of Arts, Humanities and Social Sciences (AHSS), the Faculty of Engineering and Physical Sciences (EPS) and the Faculty of Medicine, Health and Life Sciences (MHLS). Each of

the faculties operates as a primary management unit of the university, and the schools are the focus for education and research for their respective subject areas (QUB, 2021c).

3.10.6 Ulster University (UU)

University of Ulster (UU) is a multi-campus institution established by the Royal Charter in 1984 due to a petition from The New University of Ulster and the Ulster Polytechnic (UU, 2021e). Ulster University has four campuses at Belfast, Coleraine, Jordanstown and Magee. UU is Northern Ireland's largest university in student numbers, with its headquarters based at the Coleraine Campus. UU delivers courses in its branch campuses in London, Birmingham and Qatar. With its big and diverse student population of approximately 27,000 students (UU, 2021h) in various locations of campuses and branch campuses, UU is uniquely placed to engage more with local communities, support expansion of the knowledge-based economy and contribute to the economic, social and cultural development of Northern Ireland. The university has a broad-based portfolio of teaching and research across four faculties, each housing several subject areas; Faculty of Arts, Humanities and Social Sciences; Faculty of Computing, Engineering and the Built Environment; Faculty of Life and Health Sciences; Ulster University Business School.

3.11 Data analysis

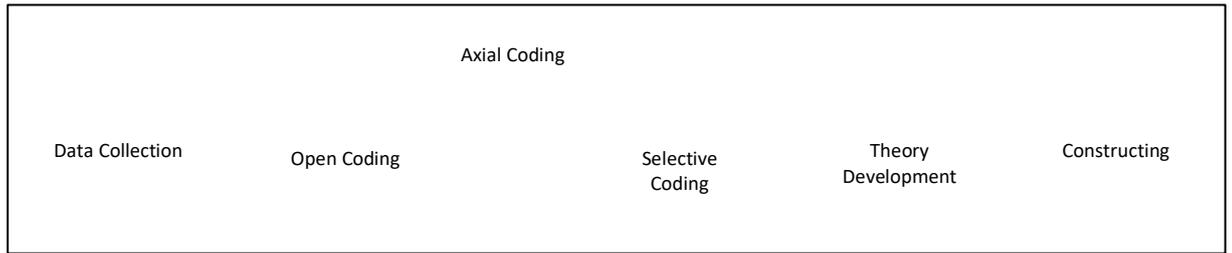
All interviews were audio-recorded and transcribed verbatim for use in thematic analysis. Frank and Landström (2016) indicate that questions asked in qualitative research can be modified, and semi-structured interviews offer the researcher the flexibility to explore further topics initially not included in the interview schedule but raised by the respondent. The interviews were recorded with the respondent's consent and transcribed verbatim to facilitate analysis. All transcriptions were carried out by the researcher and listened to the

digital recording to ensure the reliability of the transcripts and all personal identifiers removed to preserve anonymity and given a unique identifier code.

The empirical data were imported to NVivo12, where thematic analysis grounded in the empirical data was made. The researcher adopted a grounded approach towards thematically analysing and coding the data to explore emergent themes (see appendix 8.8). Thematic analysis is a method for examining research data to understand and represent the experiences of people as they encounter, engage with, and live those experiences (Denzin & Lincoln, 2011). The process of creating codes/themes were inductively defined from the raw data that were explored without any predetermined classification but rather derived from the list of research questions. An inductive approach is relevant when doing an exploratory study, or when no theoretical concepts are immediately available, to help grasp the phenomenon being studied. It allows the inductive researcher to observe transparency and thus offer credible interpretations of the empirical material (Gioia et al., 2013).

The researcher adopted Braun and Clarke (2006) stages for conducting thematic analysis. The first stage began with the researcher familiarising himself with the data. The researcher used the open, axial, and selective coding strategy in which the researcher interacted, constantly comparing data and applying data reduction and consolidation techniques. As the non-linear and dynamic coding progressed, essential non-linear themes were identified, codified, and interpreted. This cyclical process required the researcher to understand the data intimately by continuously reading and re-reading the collected data for theory to evolve, as demonstrated below (see Fig. 3.2).

Figure 3-2: Data analysis flowchart



Source: Figure adapted from Williams and Moser (2019)

In open coding, the researcher identified distinct concepts and themes for categorisation. The first level of data is organised by creating initial broad thematic domains for data assemblage. The researcher sifted through participants' responses and organised similar words and phrases, concept-indicators, in broad initial thematic domains by reading and re-reading interview transcripts, searching for thematic connectivity leading to thematic patterns.

The second stage involved generating initial codes, which were then grouped into categories to reflect the codes within each category and according to their relevance to the research objectives – Axial coding. Axial coding involved further refinement, alignment, and categorisations of the themes, identifying relationships between open codes to develop core codes. By keeping close to the data continuously sifting through themes, idea fragments and seemingly unrelated utterances, data categories can become thematically stabilised, defined and differentiated” (Charmaz, 2014).

Table 3-5: First and second-order codes: Northern Ireland Case study

First-order code	Second-order code
Structures	<ul style="list-style-type: none"> • Internal organisational units • External entrepreneurship structures
Systems	<ul style="list-style-type: none"> • Personal networks • Organisation collaborations • Community engagement programmes • Extra curricula activities
Strategic partnership and collaborations	<ul style="list-style-type: none"> • Third mission oriented • Extended third mission
Leadership	<ul style="list-style-type: none"> • Roles and responsibilities • Organisational structure
Culture	<ul style="list-style-type: none"> • Internal culture • External culture
External factors	<ul style="list-style-type: none"> • Drivers for change (push and pull effect) • Social pressure • Market demand • Economic factor • Conflict resolution model
Resources	<ul style="list-style-type: none"> • Source of finance • Human capital • Technological capital

Source: Author's

Table 3-6: First and second-order codes: Rwanda Case study

First-order	Second-order
Structures	<ul style="list-style-type: none"> • Specialised department/Team • Business incubators • Industry Liaison office
Systems	<ul style="list-style-type: none"> • Personal network • Organisation collaborations
Strategic partnership	<ul style="list-style-type: none"> • Capacity building oriented • National partnerships • International partnerships
Leadership	<ul style="list-style-type: none"> • Roles and responsibilities • Organisational structure
Culture	<ul style="list-style-type: none"> • Internal culture • External culture
External factors	<ul style="list-style-type: none"> • Drivers for change (push and pull effect) • Conflict resolution model
Resources	<ul style="list-style-type: none"> • Source of finance • Human • Technological capital

Source: Author's

The third stage involved organising those categories into themes by combining codes into overarching themes that accurately depict the data – Selective coding. The researcher selected the main thematic category, systematically aligned them to other categories that were selectively coded, and then integrated those categories of organised data from axial coding in a meaningful way. In this approach to data framing and theory development, the researcher reviewed the emerged, defined and named the themes, and extracted and classified all quotations that corresponded to a theme of the analysis grid and preserved the quality of the writings as produced.

The analysis was characterised by a movement between the different sets of data, comparing empirical data within the same type of data such as field notes and other different types of data that had been gathered, including recordings, interviews, and informal meetings enabled the researcher to develop a theory and ultimately constructing meaning. For instance, in the study, participants were asked open-ended questions related to how the conflict has shaped institutional orientation (coded as "Driver's for change"), institutional support for entrepreneurship ("Culture"), how their role fits in the wider university entrepreneurial agenda ("Roles"), how in their capacity within university support entrepreneurial activities ("Structures") (see Table 3.5 and 3.6)

3.11.1 Ethical considerations

This study was underpinned by the ethical standards of Northumbria University's Ethics Policy. The researcher ensured that the work was conducted with integrity, honesty, openness and accountability, in a manner that respected the privacy of all research participants, with the intention to do no harm but to contribute to "society's knowledge

and practice with beneficent intent" Northumbria University Research Ethics and Governance Handbook (2014-2015, 7th Ed.)

The informed and voluntary consent of research participants was gained, and information on the purpose, methods and intended possible uses of the research was provided. However, not all consent forms were not signed by participants in 1-2-1 scenarios as they deemed it unnecessary as they were only giving their own opinions on the research topic without divulging any confidential or marketing sensitive information. In contrast, in online interviews, participants were made aware of the recording to be made during the interview when the information sheet was sent to them. The e-mails sent re-iterated the message; participants' willingness to participate was also interpreted as the consent to record the interview. The interviewer advised participants that the information provided will be treated with utmost care and confidentiality in accordance with General Data Protection Regulation (GDPR) 2018. It was not the intention of this project to collect data that would enable the identification of any research participant.

Personal information was anonymised by creating pseudo names. Corresponding business names were stored separately. All records will be stored securely and disposed of according to the university's guidelines. The following codes were assigned to the participants; codes ending with letters RW were assigned to Rwandan interviewees, whereas those ending with the UK were for UK interviewees. The first three letters (CAT) are the category, and there were four categories. Category A comprised of Vice-Chancellor, Dean, Head of Department, Section or Department Manager, and Directors. Category B comprised lecturers, assistant lecturers and researchers, Category C comprised non-academic/supporting staff, and Category D comprised students. As there

were group interviews, such interviews were coded as GR after country code (e.g. CATD-INRW-GR). The numbers at the end of each code have no real significance in terms of superiority, but the order such interviews took place.

3.11.2 Secondary data

The researcher used a wide range of data and accessed archival data of different institutions, including financial reports, the project plan, feasibility studies done by students, institution online and internal reports, news clippings, company websites, government reports and non-government reports (see Table 17). The documents were reviewed to understand further the context (external factors that influence the university's strategic orientation and operations), institution policies, governance and management structure, community engagement/outreach programmes. However, publicly available data on Rwanda universities are limited, particularly pre-1994 data or challenging to source.

Table 3-7: Classification of secondary data

Rwanda	Northern Ireland
Policy documents	
<ul style="list-style-type: none"> • Vision 2020 • Vision 2050 • NST1 • EDPRS I and II • SME development Policy • Special Economic Zone policy • Strategic plan of Itorero ry'igihugu 2009-11 • National Industrial Policy • EDPRS Lessons learnt report 2008-11 • FARG Citizen Charter • Enhancement Of Rwandan Higher Education In Strategic Fields For Sustainable Growth 	<ul style="list-style-type: none"> • Entrepreneurship in Northern Ireland Report • Enterprise and Entrepreneurship Education: Guidance for Higher Education Providers 2015 • OECD Entrepreneurship Education • Independent Review of Economic Policy

<ul style="list-style-type: none"> • Ministry of Education 2018 Education Statistics • Ministry of Finance and Economic Planning - Unlocking Rwanda's Potential to Reap Demographic Dividend report 2017 • Rwanda Decentralisation Strategic Framework • Rwanda Decentralisation Policy (revised) • Labour Force Survey 2021 • Governance And Decentralization Sector - Strategic Plan (2018/19 – 2023/24) 	
Higher institutions documents	
<ul style="list-style-type: none"> • INES-Ruhengeri Brochure 2020 • Training Workshop on Starting and Managing a business Incubation center Report 2015 – INES-Ruhengeri • AUCA Academic Bulletin 2018-21 • University of Rwanda Annual Report 2017-18 • Rwanda Polytechnic Strategic Plan 2019-24 • INES-Ruhengeri Price of Services offered in Surveying • University of Rwanda Facts and Figures 2013-2020 • Ministry of Education List of contacts of heads of universities operating in Rwanda • 	<ul style="list-style-type: none"> • Research at Queen 2016-2020 report • Annual report 2017-18 and 2019-20 • Widening access policies • Equality Diversity and Inclusion Policy • Public Authority Statutory Equality and Good Relation Duties Annual report • Corporate Plan – 2016-21 • The Economic Impact of Ulster University on Northern Ireland Economy • Partnership Handbook • Corporate plan • Annual report
Other documents	
<ul style="list-style-type: none"> • World Bank Group – Poverty Rising in Africa Report • Ranking of Higher Education institution in Rwanda report 2015 • World Bank Group - Africa Pulse Volume 19 • Doing Business 2020 report • International Monetary fund - The Development Path Less Travelled: The Experience of Rwanda • Study On The Demand And Supply Of Evaluation In Rwanda 	<ul style="list-style-type: none"> • Benefits and costs of transnational collaborative partnerships in higher education report 2018 • Education Inequalities in Northern Ireland - Final report to the Equality Commission for Northern Ireland • Catalyst Impact Report • Summary Assessment of Northern Ireland

Source: Author's

3.12 Entrepreneurial university conceptual framework

The traditional missions of the university have been on the transference of knowledge through education and the advancement of new knowledge through research (Lombardi,

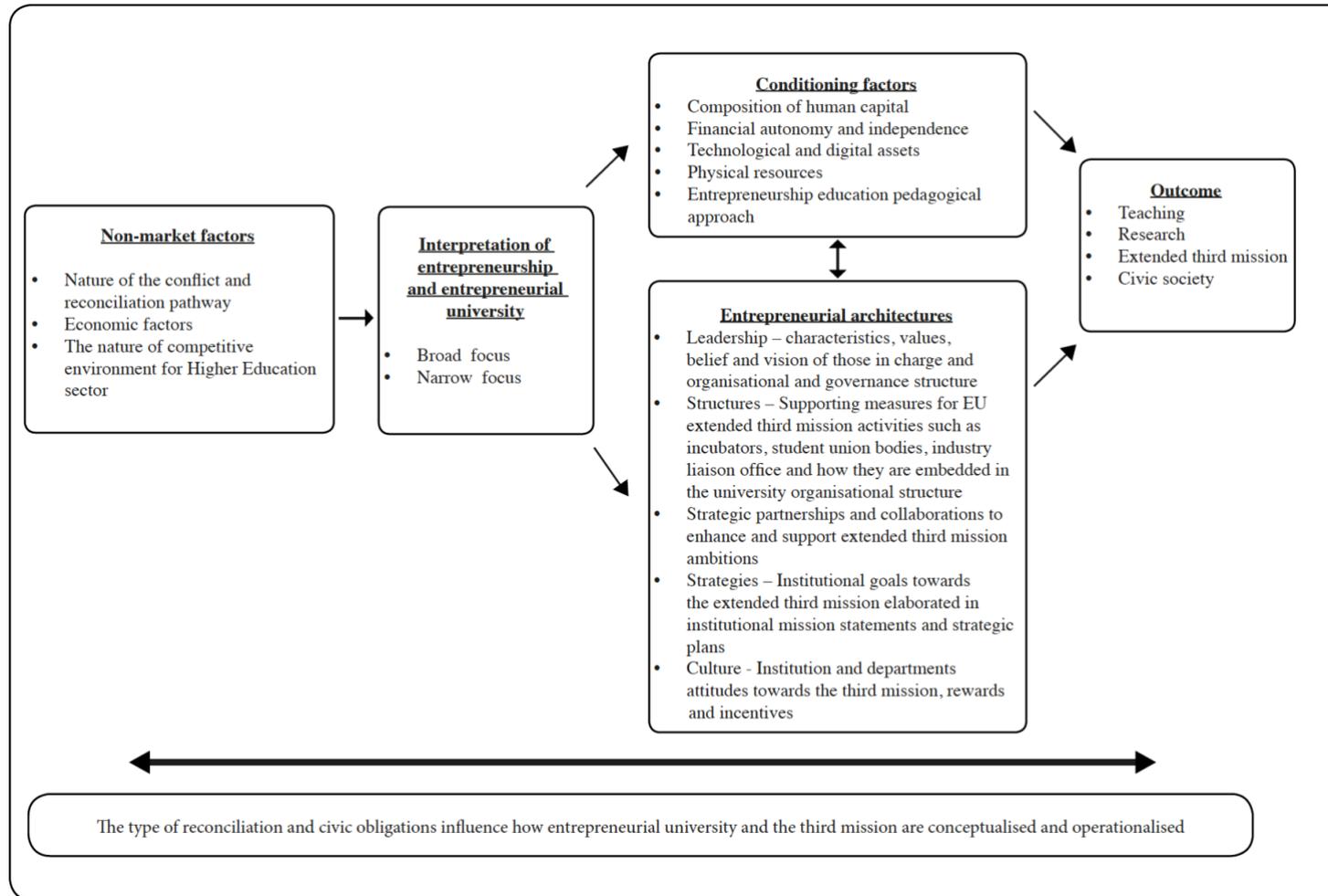
Massaro, Dumay, and Nappo, 2019; Philpott, Dooley, Amp, Reilly, and Lupton, 2011). The universities position as isolated islands of knowledge is no longer viable, leading to the institutions' increasing need to be more engaged with external affiliates through the third mission as advancement on their traditional missions of teaching and research thus turning into global economic engines (Etzkowitz, 2016). Entrepreneurial universities also play a significant role in the evolutionary process of entrepreneurial ecosystems (Cunningham, Guerrero, & Urbano, 2017; Cunningham, Menter, & Wirsching, 2017; Guerrero & Urbano, 2012; Guerrero et al., 2015; Urbano & Guerrero, 2013). This is especially true at the emergent stage of the ecosystem, in which universities serve as anchor tenants that generate and disseminate knowledge within the ecosystems to facilitate its growth (Cantner et al., 2020). Therefore, entrepreneurial universities play a central role not only in creating knowledge but also in the knowledge transfer process through various mechanisms (Colombelli et al., 2019; Mack & Mayer, 2016).

There is no consensus of what entrepreneurial university is or should be as every university is unique, and so is the context. Several authors have listed several features that characterise entrepreneurial universities (Gibb, 2012; Guerrero & Urbano, 2012; Kirby et al., 2011; OECD, 2012; Uslu et al., 2019). The lack of consensus can be partly explained because there are many different typologies of entrepreneurial universities, with different views of prioritising the three missions of teaching, research and contributing to the economy and society. The current conceptualisation of entrepreneurial universities revolves around entrepreneurial activities to contribute to social and economic development (Bramwell & Wolfe, 2008; Cunningham et al., 2021; Cunningham & Link, 2014; Guerrero et al., 2015; Guerrero et al., 2012; Kirby et al., 2011; Klofsten et al., 2019). Entrepreneurial universities are regarded as catalysts for sustainable regional economic development through the supply of highly-skilled workforce to the economy

and spinning out companies etc (Brennan et al., 2007; Guerrero et al., 2015; Klofsten et al., 2019; Meyers & Sarika, 2011; Urbano & Guerrero, 2013). These conceptualisations of entrepreneurial universities are based on developed and stable societies with expected norms and routines.

In a post-conflict environment, entrepreneurial universities assume the role of peacebuilding, promoting social cohesion and tolerance (Abdullah et al., 2020; Delgado, 2008; Johnson, 2013; McLean Hilker, 2011; Novelli et al., 2015; Pherali & Lewis, 2019; Sahar & Kaunert, 2020) in addition to their third mission. The role of peacebuilding, promoting social cohesion and tolerance role pervades all the missions (teaching, research and entrepreneurship). Entrepreneurial universities use the third mission as a lever or vehicle to nurture peacebuilding and social cohesion, at the same time contributing to the regional/national social and economic development that can be measured in terms of number of spin-offs, linkages with external stakeholders (industry and government) (Abdullah et al., 2020; Delgado, 2008; Johnson, 2013; McLean Hilker, 2011). The conceptualisation of entrepreneurial university and implementation of third mission objectives are driven and shaped by non-market factors (Doh et al., 2012) and environmental factors, including conditioning factors that are indigenous to institutions.

Figure 3-3: Entrepreneurial university conceptualisation framework in post-conflict



To understand the conceptualisation of entrepreneurial universities, the study adopted a multiple case study approach with the polar types theoretical sampling approach (Eisenhardt & Graebner, 2007) to develop a contextualised theoretical framework (see Fig 3.3). Rwanda and Northern Ireland case studies provide insights of the conceptualisation and operationalisation of the third mission in different post-conflict environments; one with a strong and established organisational structures and infrastructure already in place (Northern Ireland) whereas another is characterised with weak and embryonic organisational structures (Rwanda). The table below provides an overview of the Rwanda and Northern Ireland.

Table 3-8: Case studies overview

Elements of analysis	Countries	
	Rwanda	Northern Ireland
Location	Land locked, situated in East Africa	Part of the United Kingdom and is just 5.7% of the United Kingdom in terms of land size and the population of the nation is
Demographic	The country's population is approx. 12 million. The population is very young with a median age of 19 years and about 41 % of the population being below 15 years in 2012	Northern Ireland's population is over 1.8 million representing 2.9 % of the whole UK
Nature of the conflict	Genocide	Sectarian – grounded in culture and politics.
Duration of the conflict	April 1994 – July 1994	1968 - 1998
Conflict resolution model	Army victory – Government of the time was overthrown by Rwanda Patriotic Army (Current Rwanda Defence Force)	Peace agreement – Good Friday Agreement in 1998
Reconciliation model	Government imposed with the promotion Singular narrative of event – Top down	socially driven. Civil societies involved in shaping reconciliation processes Bottom-up approach
Social impact	Over a million people died, millions were internally displaced to neighbouring countries and abroad.	Estimated 3,720 people were killed, more than 47000 were injured, deeper community divisions and mental health

	deeper community divisions and mental health issues	
Maturity of high education sector	Highly developed and established higher education sector comprised of highly ranked universities equipped with modern technologies and highly qualified personnel	High education sector is comprised with high number with new entrants with modest infrastructure with low number of highly qualified personnel
Economic impact	Much of social capital was destroyed, and a climate of uncertainty was widespread, with all economic activities coming to an abrupt halt across the country (Hodler, 2018). Gross Domestic Product (GDP) was halved in that period (Porter & McCreless, 2008).	direct costs incurred to maintain a significant security presence and infrastructure rebuilding (Cairns & Darby, 1998). Indirect economic costs are reflected in high levels of unemployment, the decline in inward investment and tourist income
Impact on education sector (tertiary)	All teaching activities stopped during the conflict. 153 staff members were killed, 106 disappeared, 800 had fled the country (Bridgeland et al., 2009, p. 5) and in 1998, there was only 18.54 % of the former staff remained (Obura, 2003). Prior to conflict, there were 13 higher education institutions, 2 never reopened. Currently there are 29 registered higher education institutions with a total of over 72,000 enrolments compared to 3261 in 1994 (Obura, 2003). Destruction of physical universities structures, universities' property looted or vandalised.	All teaching and research activities continued throughout the conflict. The lower education system has been separated along ethno-religious lines in which children of different social groups attend separate schools emigration of young, highly educated people to Britain and elsewhere.

Source: Author's

3.13 Research Limitations

The study encountered numerous challenges, specifically from March 2019 due to the Covid -19 pandemic and restrictions imposed by the government to control its spread, including total lockdown. At the start of the research, the researcher travelled to Rwanda to meet contacts that had been established, including people in senior roles, to discuss terms of participation in the research. This also provided an opportunity to test-run the research questions, visit several universities in Rwanda, mostly the ones that had shown interest in participating in the research, make acquaintances that will help during the data-

gathering phase, and address any legal issues regarding conducting research in Rwanda. The researcher had done ample preparation to conduct field study with less friction. The initial focus of the research was to study the evolution of entrepreneurial universities in Rwanda and their contribution to the development of the entrepreneurial ecosystem.

Research permission protocol in Rwanda was not as straightforward as one would have hoped largely because of the lack of information in the public domain for researchers residing outside Rwanda. It is hard to find the comprehensive information necessary to familiarise with the research authorisation process. Navigating through the research permission process caused significant delays in conducting research, not to mention frustrations due to the bureaucratic nature of the process and contradicting information provided by different NCTS employees. The research permit application was submitted on 16th October 2019. To overcome such hurdles, the researcher secured written permission with Vice-Chancellors of private institutions to collect data in their institutions while waiting for a research permit to conduct research in public institutions. As already mentioned, the research permit was granted through the University of Rwanda on 29th April 2020.

The timing of data gathering in Rwanda was based on the recommendation of the already established contacts who held senior positions in different universities. The follow-up after the initial discussions was by e-mail to confirm the researcher arrival in Rwanda and to agree on specific details regarding the protocols and dates. Upon arrival to conduct field study, institutions had changed their timetable, and the field study coincided with the exam period. However, that information had not been communicated to the researcher.

Primary data collected included recorded 1-2-1 group interviews, field notes, notes from informal meetings, and pictures.

The study's biggest challenge was the Covid-19 pandemic and government restrictions to contain its spread. The Covid-19 crisis affected the way research was conducted and its trajectory. The Covid-19 crisis affected the study in many ways. The first phase of interviews was conducted in Rwanda from 27th February 2020 before the country had its first covid-19 case. When the cases on the spread of covid began to rise, the Government of Rwanda announced on national radio and television on 16th March 2020 nationwide higher education closure to take effect on 18th March 2020. The researcher had to return to England, hoping that the spread of the virus would come under control to resume research activities. Upon return to England, on the 23rd March 2019, the UK government had already imposed total lockdown, but schools across the UK were ordered to close from 20th March 2020 until further notice. Whilst waiting for the conditions on the ground to improve, conducting interviews remotely during the pandemic was unsuccessful mainly due to poor or lack of internet connectivity for the Rwandan participants in their homes.

It soon became apparent that to continue conducting research in Rwanda, access to secondary data proved challenging as most public and private institutions did not have the required information in the public domain. In consultation with the supervisor, the researcher's focus remained, but what changed was how and where data was harvested given the Covid-19 restrictions. The restrictions limited the researcher's ability to collect more data in Rwanda. Consequently, the researcher adapted the study to fit in with new working conditions and new regulations, re-designed data collection instruments

considering social-distancing measures and other government regulations regarding the control of the spread of the pandemic. Based on the data collected, the new focus and instead of using a single case study to look at the phenomenon, it now uses multiple case studies that provide a richer and contextualised understanding.

As the UK faced stricter restrictions to reduce the rate of infections, the researchers were restricted in collecting data as all face-to-face interviews were not permitted, and they were not also allowed to travel to different locations as such journeys were not classed as essential. The researcher embarked on devising different strategies to conduct research in Northern Ireland due to travel restrictions remotely. For Northern Ireland, the study opted to use online platforms such as Microsoft Teams or Zoom to conduct virtual interviews. It was the only way to collect data as they can almost replicate the interaction a participant experiences during an in-person interview. Such a method of collecting data afforded the researcher a faster and more effective way of collecting data. Interviews can easily be conducted with respondents without worrying about any pandemic-related restrictions. As a new guideline, Northumbria University recommended to use Microsoft Team whilst conducting virtual interviews, but occasionally Zoom was used based on the participant's preference, particularly when participants set up the meeting. Video interactions activate both auditory and visual senses, generating greater engagement levels.

However, there were challenges associated with using online platforms to conduct interviews. The significant challenges were low response rate and poor wi-fi or poor internet connections, which hindered smooth interviews. Conducting research under such restrictions was very challenging as the researcher could not visit Northern Ireland

universities and take field notes, nor have the opportunity to interview students. As a result, the study uses two different data sets but is similar in many respects.

3.14 Chapter summary

This chapter has detailed the research design and methodology to carry out the proposed research efficiently and systematically. This study adopted a multiple case study and ego-centric approach to explore entrepreneurial universities' role in post-conflict environments as the most appropriate way to address my research questions to understand the meanings and nuances associated with the interviewees' experiences. The chapter also sets out the details of the research philosophy, ontological and epistemological position, so this research is based on a qualitative approach related to an inductive approach to develop a theory.

The chapter also provides an overview of the counties in which the study takes place including the number of higher education institutions that participated in the study. It also elaborates on how data was collected, the challenges encountered, and how these were overcome. The researcher adopted a grounded approach towards thematically analysing and coding the data to explore emergent themes and used Braun and Clarke (2006) stages for conducting thematic analysis. The chapter also presents the conceptual framework used to analyse the case studies and discusses ethical considerations.

Chapter 4: Findings – Rwanda Case Study

4.1 Introduction

This chapter presents findings of research conducted at four Universities in Rwanda. The presentation and analysis of findings and are divided into four parts. The first part presents the conceptualisation and profile of formal entrepreneurship education at Universities in Rwanda, the level of provision of entrepreneurship education, and the support mechanisms available in those institutions to support university-based entrepreneurs at different stages of entrepreneurship. The second part examines factors that encourage or hinder the process dynamics from becoming an entrepreneurial university within the entrepreneurial ecosystem. The third part presents the entrepreneurial ecosystem development process and the role of the entrepreneurial university during the development stages. Lastly, the fourth part consists of a summary of the main findings discussed in this chapter.

Rwanda is a landlocked country and densely populated country in Central Africa whose history has been marked by ethnic violence. Rwanda is often referred to as *le pays des mille collines*, “land of a thousand hills”. Uganda borders Rwanda to the north, Tanzania to the east, Burundi to the south, and the Democratic Republic of the Congo to the west. Rwanda’s population is very young, with a median age of 19 years and about 41 % of the population being below 15 years in 2012. In 1994, Rwanda was destroyed by the senseless mass slaughtering of its civilians. About 800,000 lives perished in just 100 days (Graybill, 2001; Zorbas, 2004). The country now aspires to reach Middle Income Country (MIC) status by 2035 and High-Income Country (HIC) status by 2050. The next section provides an in-depth analysis of Rwanda Universities that participated in the study

4.2 Structure of higher education in Rwanda

Rwanda's higher education system currently consists of 31 universities and 9 of which are polytechnics, are located in different parts of the country (see Fig. 15). Public universities comprise the University of Rwanda and the Institute of Legal Practice and Development, whereas there are 26 private universities, most of which do not offer postgraduate studies. Higher education in Rwanda is regulated by Higher Education Council. It was established in 2007 to oversee and regulate universities in the country. The conflict left the country with trails of massive destruction of physical assets; university of Rwanda infrastructure was severely damaged, its academic staff killed or fled in 1995/96 there were 158 only permanent members of the UNR teaching staff out of a total of 350 posts planned (MINEDUC, 1998). The conflict had a significant impact on research infrastructure in terms of material and technical damage and losses in terms of human life. Therefore there were not enough researchers, and the quality of research is inadequate for addressing several of the country's socio-economic problems; no framework of subventions for promoting research (Obura, 2003). The conflict led to the total collapse of social, economic, and political structures. In the aftermath of the devastating situation, education was among the government's public service priorities to be re-established (MINEDUC, 2013).

Figure 3.1: Location of participating third level institutions in Rwanda



Source: Author's

4.3 Conceptualisation of Entrepreneurial university

Being entrepreneurial can mean many things to many people and there is no consensus on the definition of entrepreneurship in the existing literature. This section examines how entrepreneurship is conceptualised in the Rwanda HEI context by senior leadership, lecturers, and students. It also examines entrepreneurship education in Rwandan Universities to ascertain whether entrepreneurship education is adequate to enhance and develop students' entrepreneurial orientation and how it supports entrepreneurs across the stages of entrepreneurship. Different institutions have different provisions for entrepreneurship education in an attempt to entuse students to engage in entrepreneurial activities.

The question “How do you define entrepreneurship?” was asked to different members of the academic community (staff, students and leadership team). This allowed different interpretations to emerge as their interpretations inform and guide their actions. This also allows analysing the differences in interpretations between different groups. Table 4.1 highlights keywords different groups of interviewees associate with entrepreneurship. The analysis of the keywords indicates that there is a commonality in the description of entrepreneurship include job creation, taking risks, innovation, profit-making, and skills.

Table 4-1: terms associated with entrepreneurship extracted from interview transcripts

Categories	Key words associated with entrepreneurship
Students	“Taking risks”, “concept development for economic benefit”, “way of doing”, “creation of something”, “profit-making ventures”, “being self-employed”, “creating job”, “way of thinking”
Academic staff	“one’s ability to create something new for commercial or societal benefit”; “adding value to an existing product”, “innovative ways to create successful businesses”, “using effectively scarce resources”
Dean/Hod/VC	“Job creation”, “profitable venture creation”, “creativity”, “using ability or talent to create innovative products or processes” “The desire to start and run a new business”, “behaviour”, “attitude” and “skills”

Source: Interview transcript extracts

However, Students describe entrepreneurship in theoretical terms and abstract form, reflecting how entrepreneurship education is being delivered (see Table 11). They used words such as “*it’s a way of doing*” or “*it is a way of thinking*” rather than using “how to”. Students who participated were all undergraduates (second year to the fourth year), mixed disciplines (STEM and Non-STEM), and mixed gender. There is a nuanced difference in how different students define entrepreneurship. For instance, a group of second-year students (STEM) seem to have

an advanced and more in-depth understanding of what entrepreneurship is about; risk-taking, resilience, identifying and pursuing opportunities.

“(entrepreneurship) is about taking calculated risks to pursue (entrepreneurial) opportunities” CATD-INRW-GR3 (Female member)

“using one’s skills and competencies to create profitable ventures” CATD-INRW-GR3 (member)

“it is a way of developing one’s idea or projects for economic benefit” CATD-INRW-GR3 (Male member)

In their third year in Economic Rural Development, a group of students defined entrepreneurship as a module that teaches how to be “self-employed” and “create jobs” by developing products/services through incremental innovation.

“It (entrepreneurship) is about creating new products and services, for instance by adding value to existing ones” CATD-INRW-GR2 (Female)

Another group of students in Year 4 Land Management understand entrepreneurship as creating something new to generate a profit. A female member of the group elaborated on this conceptualisation by adding human intuition and institutional and environmental factors supporting venture creation.

“Entrepreneurship is a way of thinking in the development of an (entrepreneurial) idea to a venture creation having risk assessed the environment to ensure its profitability and sustainability” CATD-INRW-GR1 (Female)

“Undertaking any (legal) activities that generate a profit” CATD-INRW-GR2 (Male)

Whereas academics and senior leadership understanding of entrepreneurship are about cognitive abilities to explore and exploit entrepreneurial opportunities. They also associate entrepreneurship with individual characteristics/traits that support such behaviour. They use words such as *“adding value”*, *“ability to create something for commercial or societal benefit”*, *“mindset”*, *“attitudes”*, and *“skills”* in their description of entrepreneurship and entrepreneurial traits.

“Entrepreneurship is like creativity - it is about using one’s natural ability and mental capacity to create new products/services or using novel processes to enhance existing ones” CATA-AURW-2

“It is having this mindset in keeping with problem-solving skills, enhanced communications skills as well as financial literacy” CATA-INRW-1.

The common thread in the understanding and interpretation of entrepreneurship among students include economic gains (profit), products/service development and self-employment. The analysis of the terminology used by most students describing their understanding of entrepreneurship shows a good theoretical understanding of the concept. When probing students about their understanding and interpretation of entrepreneurship and entrepreneurial practices, they associate entrepreneurship with creativity, novel solutions, problem-solving,

interpersonal skills, all of which require entrepreneurial competencies to identify opportunities, explore and exploit them.

No students mentioned the social element of entrepreneurship. This can be attributed to the prevalence of necessity-based entrepreneurship in Rwanda and senior leaders are promoting entrepreneurship by highlighting the saturation in public service; therefore, they need to find alternatives to make a living once they graduate. This approach was found to be prevalent in all participating universities in Rwanda. However, there were also subtle differences in terms of their description; some students used implicit descriptions, including a way of doing things or being self-employed, whereas others were able to describe entrepreneurship in more explicit terms, including taking calculated risks to engage in entrepreneurial activities, developing and implementing idea(s) for economic benefit. At the same time, academic staff and senior leadership team acknowledge that entrepreneurship has two elements: theory and practice, a combination of skills and behaviour.

Senior leaders and academic staff were also probed to expand their conceptualisation of entrepreneurship further. They indicated that entrepreneurship has a multiplicity of interacting factors, including supporting structures, skills, and culture. Their descriptions included the importance of institutional supporting mechanisms and environmental factors that nurture and encourage entrepreneurship and entrepreneurial behaviour inside and outside the campus. However, there was a nuanced institutional difference in the approach on how entrepreneurship is promoted and supported, which is a signal of the entrepreneurial orientation of those in charge. Private institutions are more focused on developing graduates who are critical-thinkers and problem-solver among other entrepreneurial skills they need to be competitive in the job

market or create their own business. Public universities emphasise embedding a culture that promotes and supports behaviours favourable to entrepreneurship.

“if you cannot sell your idea, if you cannot do an elevator pitch, kind of things. And if you cannot network, if you cannot communicate that idea, then you are really going to struggle (to become an entrepreneur)... all of those things should be part of what you experience and encounter during your time in university so the university is very much looking at different ways of teaching different ways of approaches to learning and different ways of assessing students so that we can develop people who are independent thinkers and critical thinkers and problem solver” CATA-INRW-1

“it's really about embedding innovation and (conducive) culture in their journey at university so that students don't just sit in classrooms learning theory and passing exams, but actually create something, think differently, discover something and through that discovery and development, they actually get academic credits and, learn all these, key transferable (entrepreneurial) skills.” CATA-URRW-1

How entrepreneurship is conceptualised, particularly by those in charge, influences how they establish structures and policies to support entrepreneurship and entrepreneurial activities and how they implement the third mission. The section below explores how such conceptualisation influences institutions to pursue and support the third mission.

4.3.1 Entrepreneurship provision and pedagogy

One of the indicators of how entrepreneurship is conceptualised and supported is through entrepreneurship education provisions, and how the entrepreneurship module is delivered. Universities widely promote entrepreneurship education and entrepreneurship in Rwanda as a viable career option. In Rwanda, the unemployment rate of university graduates in the country is 16.7 %, the highest rate faced by any employable group. According to the Rwanda Institute of Research and Statistics (NISR, 2020), therefore, the competition for jobs among graduates is intense, as a university degree is no longer a guarantee for graduates to gain secure employment, and there are a limited amount of jobs in the formal sector. Universities key actors (academics and senior leadership) are raising awareness of entrepreneur career options, promoting entrepreneurial activities among students, offering entrepreneurial modules to enhance their entrepreneurial competencies, creating a conducive environment for entrepreneurial activities to flourish.

“Undergraduate students are encouraged to do feasibility studies in pairs instead of a traditional thesis, and we do encourage them to implement them. We do hold a weekly assembly, and we tell our students that the university will support them” CATA-AURW-1.

However, institutional architectures do not support that level of enthusiasm to support university-based entrepreneurs through stages of entrepreneurship (Cunningham et al., 2021) and effective entrepreneurship education to provide skills and competencies to students to explore and exploit entrepreneurial opportunities, including validation of entrepreneurial ideas and new venture creation.

Among the four Universities in this study, the pedagogical approach to entrepreneurship teaching in universities is broadly theory-based with little engagement with alumni community or role models. This is consistent with other universities (Ikebuaku & Dinbabo, 2018; Mbeteh & Pellegrini, 2018). This is also evidenced by the conceptualisation of entrepreneurship by students by also limited institution organisational unit to support university-based entrepreneurs across stages of entrepreneurship (see Table 20). All institutions are making efforts to stimulate students' entrepreneurial orientation that will inversely lead to the creation of new businesses as well as new job opportunities such include, feasibility studies, holding various entrepreneurship-related competitions, establishing structures such as business incubators to promote entrepreneurial activities, regular forums that bring entrepreneurs and students together.

Higher Education Council, the government agency to regulate higher education institutions, states that the university's role is to conduct research, consultancy services, and community engagement to support social and economic development (HEC, 2021b). The research capabilities of the four higher learning institutions in the study are limited due to insufficient resources in terms of human resources and financial capacity. These inefficiencies are prevalent in other institutions that did not participate in the study. Most research conducted by academics is published mostly internally and in international journals. However, there is little application of research outcomes, and the commercialisation of research is still at the embryonic stage, with very few mechanisms and structures to support it.

As already mentioned, different institutions have put in place strategies to promote entrepreneurship among students, including introducing entrepreneurship programs and

modules, organising field trips for students, inviting guest speakers to talk about their journeys as entrepreneurs. The University of Rwanda has made it mandatory that all students do entrepreneurship and innovation module, it is combined with other modules such as Agribusiness, Architectural Practice, Project Management, Entrepreneurship Skills (Distance Learning), Management and Marketing of SMEs, Health Service Management, IT Innovation, and Veterinary entrepreneurship and Business Management (UR, 2021c). The University of Rwanda also involves a wide stakeholder group to develop and review curricula or develop new curricula to ensure they address market needs.

“The university has a mandatory module that all students in the university do and entrepreneurship and innovation... we also work with industry in developing curricula and reviewing curricula, so you have to have a wide stakeholder group when you review your curricula or come up with a new curriculum, we use a system that came out of Ohio University I think in the 80s which is called Dacum Approach for curriculum review curriculum design” CATA-URRW-1

To promote entrepreneurship, AUCA is more focused on undergraduate students by actively promoting feasibility studies, thus taking entrepreneurship education outside the lecture theatres, and it has started to invite entrepreneurs, alumni and experts from different sectors to be involved in delivering the curriculum by sharing their experiences, deliver workshops and inspire students. AUCA’s main campus (Masoro campus) is in Kigali Special Economic Zone

(KSEZ)². This area accommodates different industries from which AUCA is actively trying to establish strategic collaboration and partnership to help deliver on the Third Mission.

The field note of 28th February 2020 indicates that the researcher was also asked to deliver a presentation at AUCA on the theoretical aspects of entrepreneurship alongside a serial entrepreneur Sina Gerald³ who would present practical aspects. However, this did not materialise due to Covid-19. This demonstrated the institution's appetite and flexibility to promote entrepreneurship within their institution. The review of the AUCA e-learning portal shows entrepreneurship modules at the undergraduate level focuses on business plan design; project planning and management; business or project implementation; organising and staffing business or project; business or project budgeting; project schedule; project monitoring and evaluation; enterprise resource planning; project closeout and termination, whereas at postgraduate level, Masters of Business Administration students have the option to write a traditional thesis or conduct feasibility study that shows the critical evaluation of the viability of a proposed business (AUCA, 2021).

Since its foundation in 2003, INES-Ruhengeri has positioned itself as a “university of applied science”, shifting from traditional university format. This meant setting up internal structures to support university engagement with external stakeholders to address economic and societal needs. This institutional focus is through Entrepreneurship education provision both at undergraduate and postgraduate level; inter-departmental competition to promote

² Special Economic Zone (SEZ) program is designed to address some of the domestic private sector constraints such as availability of industrial and commercial land, availability and the cost of energy, limited transport linkages, market access and reduced bureaucracy and availability of skills

³ Sina Gerald is Rwanda serial entrepreneur, the Owner, Founder and Managing Director of Enterprise Urwibutso

entrepreneurship, and incubation centre to support students and other university-based entrepreneurs to develop their entrepreneurial ideas further.

“Our mission is to make sure our graduates are highly employable, can work for someone also to create their own jobs. And how do we do it? First of all, we teach our students modules to promote critical thinking, critical thinking and creative thinking. Then, we have a module on entrepreneurship, which is cross-cutting. And we have, as I have just mentioned, the career day, which encourages students to create projects. And last but not least, we have a business incubation centre, which is a centre where whoever has an idea or a project goes to seek advice and guidance” CATA-INRW-1

Rwanda Polytechnics, one of the higher institutions, delivers entrepreneurship through the Business Organisation module that covers the skills, knowledge and attitude required to create and organise a business using online resources, reference books and case studies (RP, 2018). TVET Certificate in Business Services Curriculum, the course content focuses on evaluating resources for venture creation, aligning them to exploit identified opportunities, create and run the venture (RP, 2018). However, the students are assessed on their written and oral evidence, which include multiple-choice exercises, essay and case study, true or false questioning, sentence completion, and observation checklist, which is not compatible with the entrepreneurship education (Cope & Watts, 2000; Ratten, 2017; Shepherd, 2004).

The overwhelming number of students indicate that the pedagogical approach to teaching entrepreneurship in the four institutions is mostly didactic (theory-oriented), mainly consisting of lectures and reading, occasionally the use of guest speakers, but this is not prevalent in all

institutions. The resources used are mostly textbook examples and case studies, but they do not use business simulation, multimedia exercises and video cases as teaching methods.

“Practical element of our module (entrepreneurship) is about 20%” CATD-INRW-GR2
(male)

“One of the challenges in learning about entrepreneurship is because it is all theory. For instance, we learnt about arable farming, but we never set a foot in any business farm nor spoke to any farmer about their businesses” CATD-INRW-GR1 (Female)

“We are third-year Rural Development Economics; we have not been on any field trip that would help link theory to practice. There is no inspiration in only learning theories” CATD-INRW-GR1 (Male)

“We are approaching the end of our undergraduate journey; our heads are full of theory with no hands-on experience or exposure to external businesses” CATD-INRW-GR3 (male)

Field notes dated 9th March 2020 INES-Ruhengeri students confirm that all entrepreneurship lessons are theory-based. At AUCA, entrepreneurship as a module is not taught until the third year for the Rural Development Economics programme when students are about to write their theses when they promote feasibility studies over traditional theses. It is delivered through

carrier modules such as Principles of Management. The study found that entrepreneurship courses are primarily available to third (final) year students.

The field note dated 28th February 2020 indicates that fear of failure is prevalent among students, as the Dean explained due to insufficient support for entrepreneurial activities, even though policies to promote entrepreneurship are not implemented due to lack of funding. The students are encouraged to get market information from government institutions. However, in most cases, such information is often out of date, and sometimes the students do not know which government institution to approach. Private institutions are renowned for not sharing data, and there is no structure to support industrial relations. Moreover, the study also indicated that most entrepreneurship learning content focuses primarily on business plan development, venture management, and marketing and not so much on opportunity identification and exploitation (AUCA, 2018a). In the broader context, the study conducted by Niyonkuru (2005) assessing the levels of provision of entrepreneurship education at Universities in Rwanda demonstrates that no institution offers a degree or diploma in entrepreneurship, the highest level of delivering of entrepreneurship education taught mainly through other modules which do not focus on entrepreneurship as their primary aim.

4.3.2 Institutional entrepreneurship support

To fully grasp what entrepreneurship means within an organisational context, the study analyses the higher education structures to support academics and students in their endeavours to understand how entrepreneurship and entrepreneurial university are conceptualised and supported. Individuals (academics and students) go through different stages to become entrepreneurs, starting with no intention to become entrepreneurs and ending creating their own

businesses. It is imperative to know the processes involved in early entrepreneurship stages to establish supporting structures and systems, improve academic training programmes and practices targeted at university-based entrepreneurs, thus promoting the spirit of entrepreneurship in Universities. Higher education institutions in the study have established different organisational units to support and promote entrepreneurship among the academic community in their entrepreneurship endeavours. To analyse to what extent these organisational units support such endeavours, the study uses a conceptual model posited by Cunningham et al. (2021). The framework highlights the shortage of entrepreneurial architecture and organisational units to support university-based entrepreneurs across stages of entrepreneurship.

The study found a significant deficiency of entrepreneurial structures to support university-based entrepreneurs across four stages of entrepreneurship (see Table 4.2). All organisational structures solely focus on opportunity identification phases, inhibiting university-based entrepreneurs from driving their ideas to fruition. These inefficiencies profoundly impact the organisation entrepreneurial culture, as indicated by all participants in this study (from students to Vice-Chancellors). The field notes dated 10th March 2020 taken by the researcher at INES-Ruhengeri indicates a visible shortage of human and technological resources to facilitate the delivery of entrepreneurship education.

Table 4-2: Entrepreneurial University Organisational Architecture (Rwanda)

Stages of entrepreneurship		Exploration Phase		Exploitation Phase	
		Latent	Emergent	Launch	Growth
Exclusive focus on Exploration phases	Entrepreneurship centre	UR-Center for Innovation and Entrepreneurship, Department of Enterprise Management, AUCA Faculty of Business Administration 			
Selective focus on Exploration and Exploitation Stages	Incubator	Ines BIC, RP incubation centre 			
Overarching focus on all Exploration and Exploitation Stages	Technology transfer office	Industrial Liaison Office, Ines BIC, RP Incubation centre 			

Table adapted from (Cunningham et al., 2021)

INES-Ruhengeri Business Incubation was locked during the entire visit of the researcher (4 days) as its co-ordinator (PhD student) was away to conduct his research. Also noted in the researcher field note diary is limited access to learning materials to students as they heavily rely on google scholar for academic journals complemented with 27,000 books and about 1352 e-books (INES-Ruhengeri, 2021b).

Two of nine Rwanda polytechnic colleges called Integrated Polytechnic Regional Colleges (IPRC) have incubation centres that provide space for university-based entrepreneurs to explore their ideas, get advice, and access professional support. Services available at IPRC incubation centres include access to business information facilitation and concept development idea formulation, assessment and market validation facilitation, provision of office spaces and facilities for research, patent right application assistance, linking incubates with potential funders etc. (RP, 2020). IPRC Ngoma student won €2,500 for his innovative idea using a website and mobile application to link farmers (individual or cooperative farmers) and their customers and biomedical engineers from IPRC- Kigali locally produced ventilators to in response to Covid-19 pandemic with a battery that can last up to 186 hours and work for five days without stopping and without using electricity. The University of Rwanda has Centres for Excellence to support its entrepreneurial agenda. It collaborates with the University of Koblenz-Landau to boost entrepreneurship by promoting academic and scientific start-ups. AUCA recently approved a budget to set up a business incubation centre and currently does not have any structure specifically to promote entrepreneurship.

A business incubator is a predominant feature when examining organisation units, focusing on exploration and exploitation stages. The existence of a business incubator is vital to support

and assist primarily students who have a business idea or be able to expand and advance their business activities and motivate new entrepreneurs to turn their business ideas into successful ventures. Current literature (Cunningham et al., 2021; Li et al., 2020; Pellegrini & Johnson-Sheehan, 2021) demonstrates that incubators support university-based entrepreneurs with a variety of services mainly to explore entrepreneurial opportunities by providing access to initial funding and a pool of shared support services to reduce overhead costs; offering a form of professional and managerial assistance, links to higher education resources, links to strategic partners, help with comprehensive business training programs, advisory boards and mentors and technology commercialisation assistance etc.

The support from incubators in Rwanda Universities is rather limited in capacity in terms of human and resources to provide essential services, as the researcher observed according to the field notes dated 11th March 2020. Moreover, incubators in universities are very few. Those in operation are not well developed, poorly supported and promoted, thus limiting their capacity and contribution in supporting university-based entrepreneurs. The next section discusses how deficiencies in structures impact the development of entrepreneurial universities.

4.4 Entrepreneurial Architectures

Entrepreneurial architecture by Nelles and Vorley (2011) provides a lens through which to analyse the dynamics of the third mission in traditional universities in terms of constraints and enablers and how conceptualisation affects implementation. The architecture frames institutional approaches towards the Third Mission, which both shape and influence the form and effectiveness of third-stream activities. Architecture refers to the extent to which routines and norms are established, illustrating how entrepreneurial activities can be embedded into

institutional structures oriented towards teaching and research. The study findings demonstrate how in a post-conflict, transitional economy, the role of the entrepreneurial university in EE development is constrained by several institutional factor constraints, including structures, systems, leadership, strategies, culture and conditioning factors including human, finance, technological and physical.

4.4.1 Leadership

Higher Education Council set the standards designed to provide guidance to all Universities on what is acceptable for granting accreditation to private providers in terms of the composition of their organisational structure. Private Universities organisational structure should include the Board of Directors, The Senate, Faculty Councils, Department Councils, Rector/Vice-Rectors or Principal/Vice-Principals, Deans, Heads of Departments, and Staff and Student Involvement (HEC, 2021a). Expectedly, the Universities in the study meet those standards (see Table 27). However, public and private institutions differ noticeably in how senior posts are filled. While a private institution may have a board of trustees or supervising organ, public institutions are nested in a state system and do not have trustees of their own. The key posts in public Universities such as Vice-Chancellor, key members of the Board of Governors (The Chairperson, The Deputy Chairperson, ten external persons outside UR including seven experts in education, science and technology and three from the private sector) are appointed by Presidential Order. Private institutions have different arrangements on how such key posts are filled. For instance, members of the Office of the Vice-Chancellor of INES-RUHENGERI are appointed by its owner and may decide and determine any other Deputy Vice-Chancellor upon the request of the Council (INES-Ruhengeri, 2010).

Regarding institutional orientation, the four universities' leadership in the study focuses on teaching and research, some of which are more applied to meet local economic and societal needs. INES-Ruhengeri is an early mover towards the third mission by establishing external linkages with industry based on the departmental vision that feeds into the overall vision of the institution, and the leadership is the driving force. Other Universities are following INES-Ruhengeri's footsteps by introducing different initiatives geared towards third mission objectives with limited structural support. More widely among Rwanda's institutions, there seems to be limited focus leadership which respect to third mission activity, and this is reflected with only 3% of institutions having patents, 24% having laboratories sponsored by the industry, and 28% providing consultancy work to industry (GHRDC, 2015).

The qualifications and orientation of key influencers within the organisation, including administrators, boards of directors, department heads and researchers, rather than their role as change agents as important to developing an entrepreneurial architecture and their influence in and outside of academia. Leadership is fundamental in Universities as it has an enormous influence on structures, strategic collaborations and partnerships, and organisational culture (Nelles & Vorley, 2010a). Based on biography published on their institution website and their LinkedIn profile (those that have it), Rwanda HEI senior leaders background is predominantly made up of individuals with solely academic background with little or no industry experience (see Table 4.3).

Table 4-3: Rwanda university leadership professional background

Roles	UR	RP	Ines-Ruhengeri	AUCA
The Chancellery	Both academic and non-academic	None	Not reported	Not reported
Board of Governors / Directors	Mostly non-academic	Not reported	Mostly academic	Not reported
Vice Chancellor	Academic	Academic	Academic	Academic
Senior Committee	Mixed background	Mostly academic	Not reported	Mostly academic
Principal	Mostly academic	Mostly academic	None	Not reported
Academic Senate	Not reported	Not reported	Mostly academic	Not reported

Sources: (INES-Ruhengeri, 2021a; UR, 2021b)

There is, however, increasing pressure on Universities to engage more with industry to ensure that they are teaching what is required in the job market by establishing linkages with external stakeholders as there is a significant gap between university and industry, as indicated by the Rwanda Development Board (RDB, 2019). However, establishing university-industry relations is difficult as the industry in Rwanda has not matured to the point of investing in universities for better human resources, and even those in such position to invest in higher education don't do so as they regard Universities as 'beggars' not as partners.

“Businesses perceive that we need them more than they need us and they don't see us as partners; we are beggars. Industry in Rwanda has not yet matured to the point of saying I'm going to invest for better human resources” CATA-INRW-1

Table 4-4: Institutions management organs

Name of institution /Management organs	Role and responsibility	University of Rwanda*	Rwanda Polytechnic*	Ines-Ruhengeri	AUCA
The Owner	<ul style="list-style-type: none"> • Overall governance of the institution 	X	X	X	Not reported
The Chancellery	<ul style="list-style-type: none"> • Ceremonial and ambassadorial head of the University. • Presiding over academic ceremonies 	X	None	X	Not reported
Supervising Organ	<ul style="list-style-type: none"> • Has the power to make and amend its Statutes and Regulations for the general government of the University • Link between the owner and institution 	X	X	X	Not reported
The Council of the institution /Board of governors	<ul style="list-style-type: none"> • Management decision making organ 	X	X	X	Not reported
The Office of Vice Chancellor	<ul style="list-style-type: none"> • Coordinate daily activities of institutions • Implement decisions by The council • Prepare action plan and budget proposal 	X	X	X	X
The Senior Management Committee	<ul style="list-style-type: none"> • Advisory body to the office of Vice chancellor on academic affairs, education, planning, financial management, property and administration 	X	X	X	X
Principal	<ul style="list-style-type: none"> • To provide leadership, direction and co-ordination within the school. 	X	X	None	None
The academic senate	<ul style="list-style-type: none"> • In charge of teaching and research • Assess and monitor academic programmes research and education 	X	X	X	X
The Faculty Council	<ul style="list-style-type: none"> • In charge of the co-ordination and follow-up of the activities of the faculty and the smooth running of the organisation 	Not reported	Not reported	X	Not reported

Source: Authors

*Public institutions

Private institutions such as INES-Ruhengeri's leadership play a key role in promoting and enhancing social capital that increases entrepreneurial competencies through the co-delivery of entrepreneurship modules. Heads of department and section leaders in collaboration with the Vice-Chancellor have the power to pursue and establish external linkages with industry based on the departmental needs, mission, and objectives.

“They (school departments) have this autonomy, based on the expertise to find the relevant partners and keep in touch with them” CATA-INRW-1

The Rwanda Polytechnic (RP) Vice-Chancellor is trying to steer RP towards the third mission. He is championing entrepreneurship education across all disciplines and entrepreneurial activities in different colleges. He held a high-level meeting with the Principals and department managers of the Integrated Polytechnic Regional Colleges Rwanda Polytechnic. These meetings were about how to best imbed entrepreneurship in the curriculum. He proposed setting up the School of Business and Creative Arts as a champion for entrepreneurship and entrepreneurial culture within and outside the institution. The University of Rwanda's key influencers have limited power to alter or shape structures, processes, and strategies that govern institutional evolution. This was due to the bureaucratic nature of the institution, by the CATA-URRW-1, who suggested a need to be *“flexibility in the system”*, to allow them to respond effectively and promptly to the environment but are unable to do so because they are *“limited by this process, this system or this way of working”*. However, more widely among Rwanda universities, there seems to be a limited focus of institutional leadership to promote and facilitate third mission activities this reflected with only 3 % of institutions having a patent, 24

% having laboratories sponsored by the industry, and 28 % providing consultancy work to industry (GHRDC, 2015).

4.4.2 Structures

As already demonstrated, there is a noticeable lack of institutional structures to support the third mission and entrepreneurial activities among university-based entrepreneurs in all Universities in the study. The structures in place to support the university missions (teaching, research and entrepreneurship) are poorly resourced (financial, human and technology) thus inhibiting those institutions from effectively achieving their objectives.

Structural elements that facilitate knowledge exchange, such as Technology Transfer Offices, incubators, Industry Liaison Offices etc., are not prevalent across the Universities in the study and indeed across Rwanda. This deficiency in structure has resulted in poor university-industry relations and community engagement programmes inefficiencies in terms of knowledge spill-over, curricula design, curricula delivery and skills development.

“For students, there is no department or organisational unit to promote entrepreneurship, except Career Advisory but on university level there is Industry Development department established last year tasked to find other revenues generating projects besides school fees” CATB-AURW-1

Although there are incubators in some of the universities, in Rwanda (Ines-Ruhengeri, IPRC Kigali and IPRC Ngoma), and others are in the process of being developed, they are faced with

capacity and efficiency mainly due to lack of resources (human, capital and technological), supporting entrepreneurial architecture such as business accelerators, linkages and collaboration with industry, culture, supportive leadership, and promotion inside the campus. INES-BIC was established to support university-based entrepreneurs to develop their ideas, promote entrepreneurial culture, provide professional support and link students to potential funders, among other services they offer, but according to the researcher field note, some students do not know where it is located, nor services it provides. The researcher notes indicate that INES-BIC is located in the place with the lowest footfall on the campus (less visible). During the field study, its office was closed, an indicator of human capital resources. The ineffective promotion of INES-BIC is reflected by the vast majority of students who participated in the study, who indicate that it is poorly promoted by the administration and academic staff, particularly those with programmes closely related to entrepreneurship.

“I have not used it (business incubation centre) ... if there is any information about it, what it does and how it can help me I have not seen it myself” CATD-INRW-GR2
(Male).

As a result of insufficient resources to provide the basic services and lack of adequate structural support, incubation centres are yet to produce tangible results that other universities can emulate or adapt, as indicated by The Dean of Business School. Without a successful business model for incubation centres that other institutions can learn from, it is unlikely new institutions will create one considering the high cost involved and potential risks involved.

“There is no sample (functional) incubation centre around to show us how (it operates),” CATA-AURW-2

No institution that took part in the study had an organisational unit tasked to support and promote research outcomes that are commercially viable or support or promote academic entrepreneurship. The study found no evidence of a university spinout among the participating institutions. There is a remarkable lack of structures to facilitate knowledge transfer or interaction with actors outside academia. This can be partly explained by the limited capacity of industry to absorb knowledge, which diminishes the need for an established structure to facilitate knowledge transfer and establishment of business support structures. It can also be attributable to the development stage as traditional universities transition to an entrepreneurial one.

“I think they do (understand the value of university-industry collaboration), but I think they (industry) don't have the capacity often to take that forward. they don't have the staff, and they don't have research and development offices actually to go and get it, or to open up a conversation” CATA-URRW-1

The other observable issue is the location of those structures that facilitate interaction between university and industry; they are located within the school-gated compound, which a security guard around the clock guards as research's field note indicates. Therefore, getting access to them can be intimidating. The researcher stated in his field note that he was patted down before entering one of the campuses; at the UR campus in Kigali, the car was thoroughly checked. A physical barrier hinders effective university-industry as well as university-community relations

“AUCA – Gated compound with a security guard, a brick wall around the campus and thoroughly checked. Gishushu campus situated next to the Rwandan parliament with heavy security” field note 03/10/19 extract

“INES-Ruhengeri – gated compound with security” field note 07/10/2019 extract

“RP Head Quarters situated in the grounds of former ETO Kicukiro, with one gated and staffed entrance and exit. IPRC Kigali Principal office guarded by security with a gun.”

More broadly, in 2015 Global Human Development Centre PVT LTD (GHRDC) 2015 carried out an assessment of universities in Rwanda in which 29 institutions participated. They found that 31 % of universities have incubation centres, 24 % produce entrepreneurs; only 14 % provide placement assistance to their students, 59 % consult industry to update or revise their course curriculum, and no universities have applied for any patent in 2014.

The inefficiencies in universities structures to support students to acquire the necessary skills and competencies to create jobs, or be competitive in the job market were further highlighted by Rwanda parliamentary commission that audited universities. As reported by INES-Ruhengeri (2016), who concluded that most institutions operate *“under pathetic conditions, where the poor quality of students who graduate from them, poor quality of education offered, poor salaries of teachers and lack of teaching equipment are the salient features of most institutions”*. These sentiments were echoed by INES-Ruhengeri VC, who asserts that universities are either teaching wrong things or teaching the right things in the wrong way. The situation is exacerbated by the reduction of state funding to universities in favour of vocational training led to universities struggling to support their third activities, over commitment of academic staff who hold numerous part-time jobs in different institutions to supplement their income resulted in diminished research output and adversely impacting the quality of education (Schendel et al., 2013).

4.4.3 Strategic Partnership and collaboration

The study found that the overall objectives of strategic partnership and collaboration with external national and international organisations are to strengthen their institution and build capacity regarding the first and the second mission (teaching and research). Different universities interact with external actors mostly through Memoranda of Understanding (MoU), partnerships, collaboration, and membership with different teaching and research institutions. Universities that participated in the study have established various collaborative relationships ranging from large-scale research projects involving private and public universities and multinational industrial corporations to bespoke degrees and diplomas.

UR has a close working relationship with The Government of Sweden through the Swedish International Development Cooperation Agency (Sida) on research collaboration and also signed MoU with Bloomsburg University of Pennsylvania to mutually collaborate in student exchange programs to promote the development of joint studies, research and training activities, and other educational programs of mutual interest (UR, 2019). INES-Ruhengeri partnered with Netherlands Initiative for Capacity Development in Higher Education (NICHE) on Project to enhance sustainable food security in Rwanda. Rwanda Polytechnic is collaborating with Mastercard Foundation on TVET development. AUCA signed MoU that Memorandum of Understanding (MoU) with EC-Council that certifies AUCA as an authorised EC-Council Academia Partner to deliver high-quality EC-Council Cybersecurity courses (AUCA, 2020).

Within the study, most institutions partnerships are predominantly about capacity building, particularly with international Universities in skills development, training and exchange

programs for both students and academics (see Table 4.4). Very few collaborations and partnerships are related to developing an entrepreneurial architecture that will facilitate the transition from traditional to entrepreneurial university. More widely, the Global Human Resource Development Centre (GHRDC, 2015) indicates that 69 % of universities have affiliations with international institutions/universities.

Table 4-5: Types of partners/collaborations and areas of partnership

Areas of partnership/ Types of partners	First Mission		Second Mission	Third mission
	Skills Development/Exchange programme/Teaching	Sponsorship of students	Research	Entrepreneurship related
National Universities	I,R,U	None	I, R, U	None
National institutions	I, R,	I, R, U, A	I, R, U	None
International Universities	I, R,U, A	I	I, U, A	None
International organisations / corporations	I, R	None	I, R	I, R
Foreign Government	R, U	None	R, U	R
Local industry	I, R	None	I, A	R

Data source: (AUCA, 2018b; INES-Ruhengeri, 2021c; RP, 2021b; UR, 2020)

U = University of Rwanda I=INES-Ruhengeri A=AUCA, R=Rwanda Polytechnic

The study also found evidence of schools and their departments using their limited industrial network to invite guest speakers in their classroom or school assembly to speak to students,

share their knowledge and experience to promote entrepreneurship and change of mindset to become more entrepreneurial.

"When we are teaching, we invite visitors (entrepreneurs and experts) to come and share their experiences with students...and it's not hard for us to do so as it's an opportunity for them to promote their businesses" Dean CATA-AURW-1

As already discussed in the earlier section, universities in the study do not have the structures designed to facilitate interactions with external stakeholders. This has led to a big gap between industry and university. This lack of interconnectedness between university and industry has been highlighted by numerous government and international organisation reports, often expressed in terms of skills gap (ADF, 2014; RDB, 2019). This gap led to very low contribution of industry to curriculum design and delivery, consequently leading to universities failing to equip graduates with skills desired in the labour market or competencies to create their own jobs. Within the Universities in the study, measures were taken to co-develop curricula with industry to ensure skills and knowledge imparted to graduates are relevant to enhance the local economy. For instance, the University of Rwanda involves industry developing its curricula while AUCA and INES-Ruhengeri use external stakeholders to deliver part of the curricula, particularly entrepreneurship. More widely, the picture is mixed as 59% of universities consult the industry to update or revise their curriculum (GHRDC, 2015). The inadequacy of industrial input to curriculum design and delivery further starves the institution of the financial capital required to engage in entrepreneurial activities.

"We do not formally collaborate with industry, but we support the visits of students to various industry sectors by providing transport, but lecturers organise such visits"

CATA-AURW-1

4.4.4 Strategies

Entrepreneurial universities to have clearly defined strategies and mission statements that embrace the word 'enterprise' or 'entrepreneurship' (Gibb, 2012; Kirby, 2006), to be accepted as part of the culture of the university and its employees share a common purpose and vision to create and develop an entrepreneurial university. However, the strategies of institutions in the study are predominantly rooted in a traditional university, focused on teaching and research based on their culture and practices. Other factors at play influence the institutional strategic orientation, including longevity in the sector – most of them are new entrants and focused on their survival, leadership and organisational structure (bureaucratic in nature and centralisation of power), and organisational support mechanisms. The next section analyses institutions mission statements and strategic plans in relation to the third mission development.

4.4.4.1 Mission statements analysis

A mission statement is a key indicator of an institution strategic intent and a mechanism to communicate organisational policies, practices and policies for the short and long term. A well-formulated mission statement provides the foundation for analysing business objectives that institutions intend to accomplish. The study found that some of the Universities' mission statements appear ambiguous or not entrepreneurial in orientation. In contrast, others have clearly set out their mission statement that shapes their identity, purpose, and direction, articulating the organisation's philosophy to its internal and external stakeholders. Table 4.5

shows the analysis of mission statements of participating institutions using Pearce and David (1987) eight components.

Table 4-6: Analysis of Rwanda Universities' mission statements

Name of institutions / Mission statement components	UR	AUCA	RP	INES- Ruhengeri
The specific of target customers and markets	3	2	2	1
The identification of principal products/services	3	3	3	3
The specification of geographic domain	3	2	3	3
The identification of core technologies.	2	2	2	2
The expression of commitment to survival, growth, and profitability.	1	1	1	1
The specification of key elements in the philosophy.	3	3	1	2
The specification of key elements in the philosophy.	3	2	3	3
The identification of self-concept	1	1	2	2
The identification of desired public image.	1	1	1	1

Table adapted from (Fitzgerald & Cunningham, 2016)

Scale

- 1 = the statement does not include the component
- 2 = the statement includes the component in vague terms
- 3 = the statement includes the component in specific term

The analysis of components of mission statements as using Pearce and David (1987) model found that many mission statements lacked the comprehensiveness of the eight mission

statement components. The University of Rwanda has the most components of the mission statement and AUCA has the least (2), and can be classed as the vaguest, as it scores highly on 2 (score is 4). Three out of four Universities clearly identify service they offer, geographic domain and philosophy but lack specificity on public image, distinctive competencies, and concern for financial soundness, but they all vaguely include technologies that will be used to provide, but they all emphasise collaborative approaches to create and impart knowledge. Words such as “*holistic*”, “*interactive conjunction*”, “*research*”, “*cooperate and collaborate*”, “*participate*” and *exchange*” are indicative of the nature of the higher education system and, more particularly for entrepreneurial universities whose mission include teaching, research and entrepreneurship.

Mission statements of institutions in this study bear the hallmark of entrepreneurial university in describing their principal objectives and used words such as “*developing enterprising graduates*”, “*providing specialised university education enhanced by research to create competitive enterprises*” and enabling “*beneficiaries to acquire skills required to create jobs*”. Mission statement as institutional guiding principle depends on structures, strategy, leadership and culture. This is discussed in the sections below.

4.4.4.2 Strategic plans

The study found that only public institutions have strategic plans available in the public domain, University of Rwanda and Rwanda Polytechnic (see Table 4.6). University of Rwanda strategic plan 2018-2025 (UR, 2018) focuses mainly on capacity building through the development of “*diverse strategic engagement and initiatives that connect it to other research networks*” that will require improvement and establishing structures and systems to achieve its

strategic goals. Third mission objectives are not explicit in this strategic plan but address how UR will engage with the local community and international organisations to address socio-economic challenges.

“University of Rwanda aspires to be a leader in % of research output translated into quality service provision, % of research output used to inform policy formulation and % research translated into innovation which is still very low” (UR, 2018, p. 23).

Table 4-7: Institutional strategic goals

Institutions	Strategic goals
UR (strategic plan 2018-25)	<ul style="list-style-type: none"> • Research-led university – To be globally engaged, competitive, and innovative research-driven university well positioned to respond to major social, economic, and environmental challenges • Quality teaching and learning – To be globally recognised university for creative and innovative curriculum development, delivery and assessment • Responsible community engagement and networking – to promote, demonstrate and communicate meaningful interactions with local, regional and international partners, stakeholders, and alumni for mutual benefits • Institutions of choice for committed competent and talented staff – To attract, develop and retain committed, competent and talented staff that demonstrate professionalism in the realisation of UR’s shared vision • Institution of choice for students – To develop infrastructure and support services for students, and create an exceptional and distinctive experience, which prepares them for life beyond their studies • High quality infrastructure and systems – to ensure efficient utilisation of modern infrastructure, facilities and equipment for the university’s strategic priorities of teaching and learning, research, innovation and development, and engagement • Responsible leadership and management – to ensure accountable, efficient and effective organisational and management environment through high quality leadership • Financial sustainability – To strengthen the university’s financial capacity, adaptability, responsiveness and resilience
RP strategic plan (2019-24)	<ul style="list-style-type: none"> • Legislative, Regulatory, and Policy Framework - To ensure a sound legislative, regulatory, and policy framework

	<ul style="list-style-type: none"> • Oversight and Governance - To provide strong oversight and governance mechanisms to ensure the smooth operations of Rwanda Polytechnic and its Institutions (Colleges and TVET Schools) • Curriculum - To develop and regularly update quality TVET competency-based curricula that responds to labour market needs • Teaching and Learning - To ensure the delivery of high-quality teaching and learning support services aimed at improving access to quality teaching and learning in TVET Institutions • Student Support - To establish effective student support systems that ensure adequate career guidance, student welfare, and prepare students to enter the labour market • Infrastructure and Resources - o develop and maintain infrastructure and resources for effective training • Human Resource Development - Establish professional development systems for teaching and administrative staff to strive for excellence in service delivery. • Research and Innovation - Promote the culture of research and innovation in the TVET sector to ensure TVET programs are responsive to and address community and national challenges • Partnerships - To develop partnerships that strengthen synergies to enhance trainees' and graduates' opportunities for local, national, regional, and international labour market access. • Management Information and Statistics • Perception of TVET - To improve the public perception of TVET • Access - To increase equitable and inclusive access
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Source: (RP, 2019; UR, 2018)

Like UR, Rwanda Polytechnic's strategic plan 2019-2024 (RP, 2019) also focuses on capacity building by modernising the technical workforce for national development, ensuring that the curricula are competency-based and providing students with appropriate work readiness and technical skills demanded by the labour market with appropriate structural support. The strategic plan clearly set out how each objective will be achieved. Both strategic plans are heavily focused on capacity building. This is reflected in the nationwide shortage of skilled labour reported by government institutions (MINECOFIN, 2017; RDB, 2019), and guided by the strategic thinking that directs the Government of Rwanda development agenda, including

Vision 2050, the National Strategy for Transformation (NST 1), and the education sector and TVET sub-sector as described in the Education Sector Strategic Plan 2018/19-2023/24. The institution's focus in both UR and RP seems to be more focused on the first mission – teaching and aligned with national needs.

4.4.5 Culture

The overall institutional culture is not conducive for entrepreneurial activities among the academic community, reflecting a societal culture that is risk averse. The study found a lack of active engagement of the academic community in entrepreneurial activities and a lack of supporting structures to promote entrepreneurial behaviour. The culture is impeded by institutional factors, including lack of effective structure, collaboration with external stakeholders, incentives and rewards, leadership guide, and external societal culture.

Institutional culture is a key determinant of the type of entrepreneurial activities the institution engages in based on individual attitude towards entrepreneurship, the value they place on research and innovation and the propensity to engage in entrepreneurial activities. Culture and embedded practices both at the individual and departmental level reflect universities' inclination to engage in activities in pursuit of the third mission. Universities play an essential role in diffusing entrepreneurial culture by promoting and supporting entrepreneurial behaviours as desirable and feasible human behaviour in their academic community (Klofsten et al., 2019). Moreover, universities are research-based organisations that set up virtuous circles linking knowledge production (research activities) to knowledge diffusion (teaching/learning activities). Within the institutions in the study, there was little evidence of active engagement among the academic community to engage in entrepreneurial activities, including creating

spinouts or research commercialisation, which is accentuated by the inefficiencies in the organisational architectures to support such behaviours and activities. Most institutions are still deep-rooted in their traditional role (teaching and research), and as new entrants, they are more focused on their survival and establishing their legitimacy in the sector at the expense of the third mission.

For Universities to achieve third mission objectives, they need to have the support from institutional key actors who can actively promote third mission activities with policies and practices. Creating a conducive environment for third mission activities to flourish is complemented by effective collaboration with external stakeholders that allows different key players in a different industry to partake in designing and delivering curricula. As a significant player, the government can play a vital role in creating funding mechanisms for programmes, activities, and initiatives associated with entrepreneurial education. The culture in universities is influenced by both institutional (internal) and environmental (external) factors.

4.4.5.1 Internal culture

The study found that broadly organisational culture is still weak in supporting institutional entrepreneurship activities, including academic entrepreneurship activities that are pivotal for entrepreneurial university. This is attributable to institutional focus on teaching at the expense of other missions (research and entrepreneurship), which is a barrier to academic entrepreneurship or other forms of entrepreneurial activities.

“Every staff is supposed to cover 1980 hours per year. So you divide teaching hours, research hours, community service hours and other services. And the way INES is structured in the teaching, we use a modular system whereby two people who share the same module teach it and finish it. Then we start another module, so if you have finished your work. You are free (to do research); that's how it goes. You can do your research here or outside or wherever you want. The important is that you are here to teach your module.”

There was a lack of active promotion of academic entrepreneurship in all institutions in the study. In part, this was due to lack of effective university-industry relationship, over-emphasis on the teaching and research mission, research-to-publish culture, heavy workload etc. that deter academics from engaging in the formal activities such commercialisation of research via spinouts, patenting and licensing activities or informal activities such as contract research or consultancy.

“It is still on low level (academic entrepreneurship). As I told you, we hold department meetings every Tuesday between 11 am and 1 pm, where once in a while, we encourage them (academics) to engage in such activities. We don't have anything tangible yet in terms of results. We are still at the promotion level” CATA-AURW-1

Rwanda Polytechnic organises such events in its eight colleges, and most winners come from colleges with incubation centres; therefore, entrepreneurship is not promoted and supported equally. AUCA does not have any competition to promote entrepreneurial culture except

through feasibility studies among its students (both at undergraduate and postgraduate level), but no evidence on how it supports entrepreneurial culture among its academic staff.

Fear has been identified as one of the major hindrances to entrepreneurship in Rwanda context as noted by researcher field notes dated 28th February 2020, “*fear of failure is prevalent among students*”. All institutions that participated in the study indicate that they include external stakeholders to deliver part of the entrepreneurship curriculum to demystify entrepreneurship by sharing their own journeys and alleviate that fear. The researcher experienced this when he was approached to deliver a presentation to a group of students. Although the students appreciate the opportunities, they get to interact with entrepreneurs to go on field trips and other forms of experiential learning, but such opportunities are rare, and when they happen, not all students get that opportunity to attend the session or seminar. Therefore, the fear to engage in entrepreneurial activities is rampant among students, as expressed by students.

“We do get them (external visitors). They come to train us, inspire us, but their visits are few and far between” CATD-INRW-1

4.4.5.2 Degree-seeking attitude

Rwanda culture expects that a graduate be rewarded with a well-paying job and lives happily thereafter. Most students go through higher education simply to get a degree that will land them their dream job, but not necessarily to acquire skills that will make them competitive on the job market or create their own job. This kind of attitude is prevalent among students of the four

institutions that participated in the study, as expressed by comments made by senior leaders and lecturers

“Our (Rwanda culture) does places much emphasis on getting the degree. Parents expect that once you have graduated, you’ll get a well-paying job, help them improve their living standards, therefore very many students have that mentality not to become entrepreneurial after graduating” CATA-AURW-1.

“The first challenge is a mindset. The mindset in terms of students and parents, of course, We still have people think the most important is a piece of paper, not competencies and knowledge required to become one (entrepreneurs). That mindset is killing people” CATA-INRW-1

On the other hand, when asked what they intend to do after graduating, looking for employment comes first. If they do not get a job, then entrepreneurship becomes their plan be, therefore becoming entrepreneurs out of necessity, not by opportunity orientation. Entrepreneurship is, hence *“plan B or C”* field note 9th March 2010 extract.

“If I am not lucky with finding appropriate employment, I will set up a hair salon or something related with make-up” CATD-INRW-GR1 (Male)

4.4.5.3 Student entrepreneurship

The study found that the entrepreneurial culture among students is relatively low. Firstly, students are focused on getting academic degrees, not necessarily acquiring entrepreneurial skills to create jobs, as discussed above.

“Most of our undergraduates are after a degree, even though some have exciting feasibility studies that can easily be converted into a business after they graduate, they go hunting for jobs. I only know less than three who managed to implement their feasibility study outcome” CATA-AURW-1

Secondly, entrepreneurship education provision is predominantly theory-based, therefore not equipping graduates with the required skills to create jobs. the pedagogical approach is limited to entrepreneurship modules that do not feature business simulation, multimedia exercises, live briefs, and video cases as teaching methods leave students with limited skills and competencies to identify, explore and exploit entrepreneurial opportunities. This pedagogical approach is dominant in all four institutions in the study.

“Entrepreneurship education for students here is still on a theoretical basis, we teach what entrepreneurship means, and they are assessed on their theoretical understanding” CATA-AURW-2

Thirdly, the professional support that entrepreneurs in more developed universities would experience as well as facilities to explore and exploit opportunities is significantly insufficient

therefore deter would-be entrepreneurs from engaging in third stream activities, as noted by the researcher in the field note dairy 11th March 2020 “*lack of insufficient resources to explore entrepreneurial ideas.*”

“*There is insufficient support for business idea development*” CATD-INRW-GR3
(female).

4.4.5.4 Academic Research culture

Internal research culture in universities in the study and more broadly across the country is relatively weak in terms of research capacity and resources to support research activities from the institution and government report (Fosci et al., 2019; RDB, 2019; UR, 2021a). This is reflected in this study. There is a widespread ‘*research to publish*’ culture in most institutions that participated in the research as indicated by various senior leaders of universities, that commercialisation of research is almost non-existent.

“*People (academics) are researching, and they're publishing because publishing is what gives you an academic promotion, which is what gives you status which will about give you a greater salary. But there's very little commercialisation, as you say, that comes from that*” CATA-URRW-1

Although academics are contractually obliged to spend time on research, this rarely happens in practice in institutions that participated in the study for various reasons including, weak research culture, ineffective incentives, overload, and the lack of research supporting

structures. For instance, at INES-Ruhengeri, academics can only engage in research activities once they have finished teaching their modules; more often, they have more than one module to teach. No information about Rwanda Polytechnic research engagement and output is available in the public domain. Time allocated to academics at the University of Rwanda depends on academic ranking; the higher the rank, the more time you are allocated.

“Each of the different academic ranks has a different amount of time allocated to management and administration to research and teaching. So, the higher the academic rank, the more time you get for research” CATA-URRW-1

The weak research culture is reflected in low numbers of research output. A study funded by the UK Department for International Development (DFID) conducted by the Centre for Learning on Evaluation and Results in Anglophone Africa (CLEAR-AA, 2013) indicated that the research output of the University of Rwanda was 42 between 2007 and 2010 and across the University sector as a whole there were 77 peer-reviewed articles in 2009. This is compounded by the low number of researchers in the higher education sector. At the University of Rwanda, the country's largest provider of higher education, around 26% (163 out of 625 academics) have PhDs (UR, 2021a) which limit institution research capability and research output. According to the INES-Ruhengeri academic journal ISJ, from 2011 to 2020, there were 156 publications, and out of 88 academic staff, only 29 have PhD – almost 33% of its academic staff (INES-Ruhengeri, 2021a, 2021d).

Universities have a mission to be the agent for effecting that level of change in attitude by removing barriers, promoting academic entrepreneurship, and recruiting from industrial sectors

to pursue the third mission. As already mentioned, most research conducted within Rwanda Universities is mainly for publication with little research outcome implementation. The study found almost non-existence of academic entrepreneurship and practical academics (pracademic – former and/or current practitioners who are now academics within HE). Dickinson et al. (2020) demonstrate how vital academic entrepreneurs are in providing entrepreneurship education to support students in becoming ‘knowledge-able, not knowledgeable’ and how their experiences and connections with industry facilitate industry-university collaborations.

The commercialisation of research in universities is almost non-existent because of the ‘*research to publish only*’ culture. Research in Rwanda universities is predominantly done for academic ranking promotion purposes with little emphasis on research outcome implementation. The Dean of the public institution emphasised that research done is mainly “*for publication purpose only and not to be implemented*”. Therefore, placing no value in the research output and potential contribution to EE development and economic growth. The lack of research commercialisation is acknowledged by CATA-INRW-1, who indicate that they “*haven't made the many products that are tangible, but in terms of ideas, good ideas that can be implemented, we have them*”. There is a prevalence of lack of academic entrepreneurship and research commercialisation in the universities in this study, which is attributable to lack of structures to support knowledge exchange, uncondusive research culture, and limited industry capabilities.

“Actually, we have a good network of cooperatives; seeds multipliers we partner with them cooperate with them. But they are just producers. They produce seeds and sell them. The level of research and curiosity is not there” CATA-URRW-1

4.4.5.5 Societal expectation

Graduates are the very least expected to engage in entrepreneurial activity similar to their academic background. Students who participated in the study expressed challenges they face when engaging in entrepreneurial activities that are not in line with their academic backgrounds. One student expressed that those who ‘stray’ (engage in entrepreneurial activity that is dissimilar to their academic background) are usually frowned upon. This negative societal outlook for such individuals is felt within university campuses, and it is having a negative impact on entrepreneurial culture among students. Such individuals are regarded as “failures of the education system’ in their village and become “*the talk of the village*” and “*ridiculed in your village*” CATD-INRW-GR2 (male). Senior leaders expressed the same views in other institutions in the study, highlighting the negative societal attitude toward entrepreneurship as it is perceived to be for the “uneducated”, particularly in rural areas where the majority of the population are illiterate or have the basic education and the only form of entrepreneurship, they know of is necessity-based. Therefore, entrepreneurship is not for university graduates. Such views were prevalent in all institutions in the study.

4.5 Conditioning Factors

Conditioning factors refer to internal organisational resources required to pursue and realise the third mission objectives (Guerrero & Urbano, 2012). Such resources include human, financial, physical and technological resources vital to the evolution and development of entrepreneurial universities. In environments or societies recovering from conflicts, such vital resources were destroyed, thus constraining the entrepreneurial university's transition to or further development. The conflict in 1994 had a devastating impact on resources, especially

human resources, as already discussed. Most Universities in Rwanda had to start from scratch as most of them were looted, shelled, and destroyed. 27 years on, with government and international community support, universities have made good progress in acquiring hi-tech equipment to support them both third mission activities. There is still a shortage of highly skilled and qualified personnel broadly across the country regarding human resources. The next session discusses conditioning factors that constrain the development of the four universities to become entrepreneurial universities

4.5.1 Human capital deficiency

Human capital comprises the stock of knowledge and skills within individuals that can be developed over time and transferred between individuals (Wright et al., 2007). The study found that most universities have a small percentage of lecturers with PhD qualifications. Currently, UR is presently the only university in the country that provides this type of education. According to the latest figure published by UR (UR, 2021a), the total number of staff is 1952, 68% are academics, of whom only 26% have PhD, which is about 345 of 1327 academic staff. Ines-Ruhengeri has 90 academic staff, and 29 have PhD – representing 32% of its academic staff (INES-Ruhengeri, 2021a). AUCA and IPRC do not have such information in the public domain. The lack of skilled and qualified personnel in universities is affecting the quality of higher education in Rwanda to the extent that in 2017 Higher Education Council (HEC) closed five universities because of insufficient facilities and teaching staff.

There is also a lack of academic entrepreneurs with the capacity to create multi-functional teams necessary for the spinoff organisations, as documented by the report commissioned by The UK Department for International Development (Fosci et al., 2019). The report indicates

that low levels of research production in Rwanda with only 123 researchers in 2019, only one research-intensive university and relatively few research institutes, compounded with weak research culture and lack of technological resources and infrastructure.

4.5.2 Inadequate technological capital

ICT in education is one of the core pillars in the national development strategies (MINECOFIN, 2000, 2007, 2016, 2017). ICT in education enhances the teaching and learning process and promotes students' decision-making and problem-solving skills, data processing skills, and communication capabilities (Jhurree, 2005). As already discussed, most universities were looted and shelled during the conflict, and most of the infrastructure was decimated. Before the conflict, Rwanda had only 13 universities that were poorly equipped and resourced (Mineprisec/Minisupres, 1994 cited in (Obura, 2003)).

The study found that some universities do not have salient ICT capacities required to support the third activity. AUCA's library has only 20 computers are intended for research and other academic purposes by users, and only one Computer is allowed per person at a time (AUCA, 2018a). Researcher observations some universities are still using traditional chalk and chalkboard, significantly low numbers of smart classrooms, library with very few PCs compared to the number enrolled students, thus restricting students with online research. The research field notes indicate that students' records are still being filed manually, including academic theses and feasibility studies. Therefore, the value addition of technology is not seemingly perceived.

The lack of sufficient technological resources impedes idea exploration by students, as explained by a student who had won FRW5,000,000 (about £5000) because of the prototype of a digital walking stick with sensors. The student could not develop his invention further due to insufficient access to an electronic laboratory and skilled staff for support. The lack of technological resources is a common phenomenon in many Rwanda universities. The majority of them are heavily dependent on school fees with little funding or grants from the central government or other funding bodies. However, there is an indication that some HLIs are trying to integrate technology-based tools to improve experiences in pedagogy and administration.

4.5.3 Dependency on tuition fees

In Rwanda Universities, there is an over-reliance on tuition fees as a major source of revenue with little or no income from university entrepreneurial activities such as consultancy, research commercialisation or licence fee. The lack of a diversified source of revenue can be attributed to effective university-industry collaboration. The industry is not confident about the university's capability to produce high-quality research output that addresses their respective industry challenges. It also reflects internal organisational culture and leadership focus, which is not conducive for third mission activities.

“Our revenues come from school fees...grants for research or implementation projects, that's the way we have been making money... more money again is coming from the laboratories, consultancies that we're doing. We do not have a permanent sponsor, and we have to fight and make sure we win project opportunities; we partner with our friends (Universities) in different countries of the region, and that's the way we are”

CATA-INRW-1.

The narrow conceptualisation of entrepreneurial university and the third mission by the university leadership directly impact how institutions go about finding other sources of revenues to support their entrepreneurial activities. Four Universities in the study are predominantly focused on teaching mission, not on research and even less on the third mission. This is prevalent in other institutions that did not participate in the study. The first option of generating more revenues is increasing tuition fees, particularly in private Universities, as those who attend such institutions are not eligible for government higher education scholarships. However, rising tuition fees is not a viable option, as it will considerably reduce their enrolment numbers.

“School fees are our main source of revenue... if it was possible to have other sources of revenues because increasing school fees is not a viable option” CATA-AURW-1

Some universities use their facilities, such as laboratories and equipment, to generate extra revenue by leasing them to private companies. For instance, INES-Ruhengeri leases its laboratory facilities and survey equipment for civil engineering to external private companies to conduct their research. INES-Ruhengeri also bids on project opportunities and offers consultancy services to a wide range of external clients, covering 35% of its total revenue, whereas 65% comes from tuition fees. AUCA has brickmaking equipment and other construction equipment solely used to generate revenue.

“We have Industrial Development Department, not for education purpose but to support institution financially through business activities” CATA-AURW-1

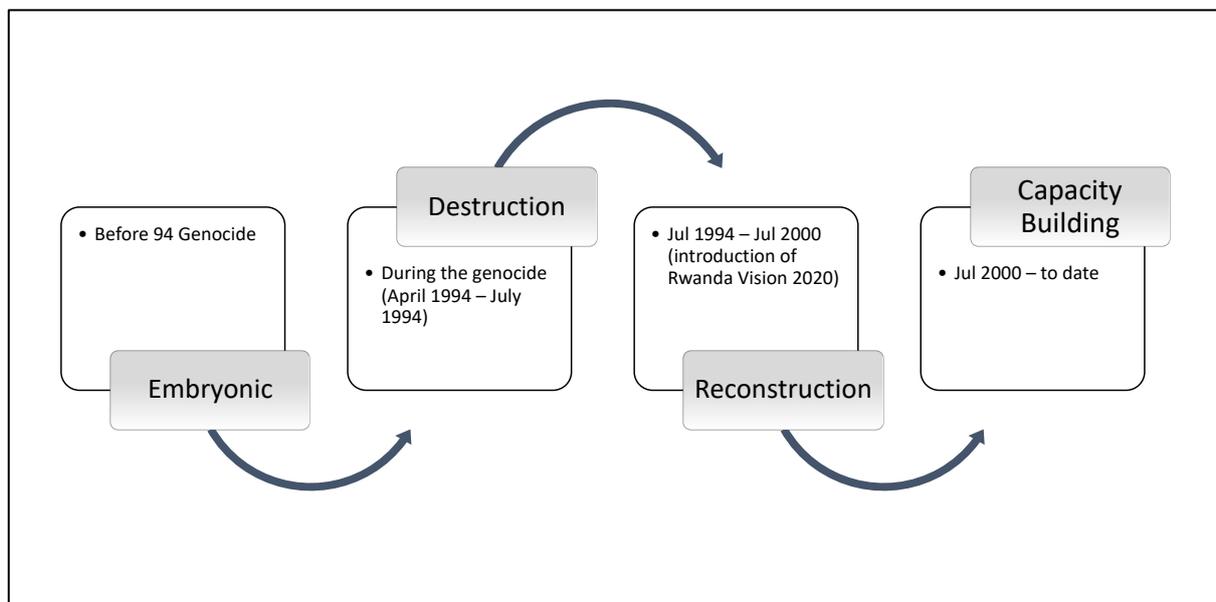
4.6 Entrepreneurial ecosystem development and entrepreneurial universities

Rwanda is landlocked and being situated far from ports is one of the major factors that raise transportation costs for exports and imports. Rwanda’s economy still depends on agriculture, lacks exportable natural resources. Its workforce is still not well skilled or educated and has spent the last twenty years rebuilding its physical, economic, and social infrastructure after the devastating 1994 Genocide (Abbott et al., 2017, p. 47). Entrepreneurial universities are considered a catalyst for economic development (Atiase et al., 2018; Audretsch & Belitski, 2017; Urbano & Guerrero, 2013). Economic growth requires a vibrant and sustainable entrepreneurial ecosystem (Neumeyer & Santos, 2018) and universities are considered as one of the key elements that constitute an entrepreneurial ecosystem (Cohen, 2006; Feld, 2012; Isenberg, 2011; Mazzarol, 2014; Neck et al., 2004; Nicotra et al., 2017; Spigel, 2017) This section discusses the stages of entrepreneurial ecosystem development in Rwanda and the role of higher education during the development of the ecosystem.

Analysis of the pilot study findings revealed the evolution of the entrepreneurial university in the context of the post-conflict EE in Rwanda. This highlighted how the EE evolves through a number of stages; embryonic, destruction, formation, and capacity building and the role that entrepreneurial universities play in contributing to EE development that is aligned with the country’s historical event (see Fig. 4.1) (Nkusi et al., 2020). The embryonic phase is the period before the genocide. The country’s economy was heavily dependent on the export of agricultural commodities; mainly tea and coffee, with low enrolment levels to higher education,

elements of the entrepreneurial ecosystem were weak and not adequately equipped to support it. The destruction phase constitutes high levels of destruction of EE elements and their supporting structures and total collapse of political, social and economic structures. Formation and capacity building phases cover the period immediately after the conflict in which the country tried to rebuild itself by restoring political, social and economic structure for social and economic development.

Figure 4-1: Evolutional stages of Entrepreneurial Ecosystem development in Rwanda



Source: Author's

4.6.1 Embryonic stage

The first stage is the embryonic stage, and it was a period prior to The Genocide Against the Tutsi in 1994 (Hereafter “the conflict”). During this stage, Universities played a significant role in the country's economic growth and supported the establishment of an EE. Such entrepreneurial universities served as incubators of knowledge creation entrepreneurship, a

primary focus during this stage (Cohen, 2006; Colombelli et al., 2019; Mack and Mayer, 2016). Rwanda was one of the world's poorest countries prior to 1994; about 60 % of the population lived in poverty, the majority of the rural population was dependent on subsistence farming, about 90% of the population, commercial farming was dominated tea and coffee exports, which are susceptible for price fluctuation (Porter & McCreless, 2008). Rwanda relied on international aid to support its economic development (IPAR, 2012)⁴.

In the Mid 1980s, Rwanda faced an economic crisis due to the collapse of the tin market (the second-largest export earner) and also caused the economic crisis was caused by a combination of declining governance and economic policy failure, aggravated by the collapse of world coffee prices. The situation was exacerbated by high population growth and falling coffee prices, which led to the famine between 1987 and 1993 that plunged 86 % of the population below the poverty line, the highest level of poverty in the world (Porter & McCreless, 2008). This period was also characterised by low industry and manufacturing sector contribution to the country GDP.

For decades, higher education was a privilege for the elite, therefore, not accessible to many. This is reflected in a small number of enrolments at university (Bridgeland et al., 2009). Most tertiary education schools were owned by Catholic and Protestant churches in 1962 when Rwanda gained independence. The Ministry of education developed an agreement with the owners. The state would cover salaries and other recurring costs, leaving the management and other day-to-day school management and administration to churches and other management bodies. Still, that arrangement created tension over school management between the state and

⁴ IPAR: Institute of Policy Analysis and Research – Rwanda

the schools (Obura, 2003). The enrolment to the third level sector was relatively low, about 921 in 1980 and rose to 5000 in the 1990s (WB, 2003). Initially, the National University of Rwanda (NUR) was made up of three faculties, the Faculty of Medicine, the Faculty of Social Sciences and the Teacher Training College, and had 49 students during its first year. Enrolment gradually rose, reaching 1,572 in 1985.

Before the conflict in 1994, there were only 13 higher learning institutions both private and public. They included: the National University of Rwanda with two campuses, the Institut supérieur d'agriculture et d'élevage; the École Supérieure Militaire, the Institut Supérieur des Finances Publiques and the Centre de Formation des Adjointes Techniques de la statistique; the Institut Africain et Mauricien de statistique et d'économie appliquée and Adventist University of Central Africa (AUCA); the École Supérieure de Gestion et d'informatique Saint-Fidèle, the Grands séminaires de Nyakibanda and Kabgayi, Institut Supérieur Catholique de Pédagogie Appliquée de Nkumba, Institut Supérieur Pédagogique de Gitwe and the Centre d'Enseignement Supérieur de Kigali (Obura, 2003). Enrolment to those higher learning institutions was small, by 1994 university of Rwanda which was the biggest in the country had only produced only 1000 graduates specialising mainly in the arts and social sciences (Hayman, 2005).

During this phase of entrepreneurial ecosystem development, higher institutions were primarily focused on the first mission (teaching) to supply the economy with skilled human capital, primarily for public service. Government two research institutes mainly conducted the research; the Rwandan Institute of Agronomic Sciences (ISAR - Institut des Sciences Agronomiques du Rwanda) focuses on poverty alleviation, food security and environmental sustainability and the Institute of Scientific and Technological Research (IRST - Institut de

Recherche Technologique). The research capacity for those research centres was quite limited. For instance, IRTS had only 38 researchers employed at IRST before 1996 (MINEDUC, 1998). Two-thirds of the researchers at ISAR held the technical, and non-research oriented, Ingenieur Agronome degree, whereas only three out of 33 researchers had a PhD degree and over 60% of ISAR's scientists and technicians have less than five years of research experience (ISNAR, 1989).

There was a gradual increase in enrolment to universities, and the number of universities increased (see Table 4.7) (MINEDUC, 2019). However, there was a slight decline in the number of enrolments in 2019. This was due to the closure of some universities that did not comply with the external audit recommendation. The role of universities at this stage was primarily focused on their traditional role of teaching to equip graduates with the knowledge to occupy public office roles with almost no emphasis on the third mission. Institution research capacity was quite limited due to shortage of skilled labour, inadequate and inefficient structure. Therefore, the contribution of universities to the development of sustainable EE was almost non-existent; there was little or no engagement with actors outside academia. In essence, during this period, the entrepreneurial ecosystem was weak given the unfavourable economic conditions, ineffective government policies, the embryonic university sector with low levels of students numbers and weak institutional structures that support the entrepreneurial ecosystem evolution (Porter & McCreless, 2008).

Table 4-8: Rwanda Higher education enrolment figures

Stages	Embryonic			Destruction	Formation			Capacity Building				
Year	1963	1972	1980	1994	1995	1998	2000	2006	2010	2014	2016	2019
Number of enrolments	49	751	921	3261	3968	5571	9820	37,149	62,734	87,103	81,813	72,128
Total Tertiary institutions	1	1	1	13	11	11	13	31	31	38	45	40

Data source: (Bridgeland, Wulsin, and McNaught, 2009; MINEDUC, 2018, 2021; Obura, 2003)

At a grassroots level, what can be compared to entrepreneurship education was being delivered by Centres for Rural and Artisan Education (CERAI), as post-primary vocational centres established in the late 1970s that provided some general academic subjects while focusing on vocational skills training (agriculture, home economics, crafts). The objectives of such training were *“To train citizens who are productive, responsible, progressive and likely to generate changes in the rural areas, in order to influence socio-economic and cultural development, as well as promoting cooperative spirit”* (Gakuba, 1991, p. 8). However, the quality of the training from these centres was very poor and uncoordinated because they were poorly resourced, therefore, did not deliver on their intended mission (Hayman, 2005; Obura, 2003).

In summary, prior to the conflict in 1994, universities mostly focused on producing graduates for public service with little emphasis on the second mission – fulfilling their traditional obligations (see Table 4.8). Supporting institutions that are the genesis of the ecosystem began to form and emerge, including financial services and other professional services during this embryonic stage, were weak and ineffective in facilitating networking of actors and the transfer of knowledge for entrepreneurial activities to adequately sustain the birth of a national EEs. Arguably, the government was considered the main actor in establishing and nurturing EEs through its programmes and incentives, which were limited in scope. In addition, support

structures through which university actors such as faculty, support staff, and students could network with actors outside the university (and vice versa) were limited.

Table 4-9: Higher Learning institution in pre-genocide Rwanda

Name	No of campuses	Education Strategic and Focus	Contribution to EE development
National University of Rwanda (NUR)	2	<ul style="list-style-type: none"> • NUR education strategies were predominantly focused on teaching and research. • The country faced high shortage of skilled labour in various sectors. • Number of enrolment in higher education in 1991-1992 was only 3389 (Lassibille & Tan, 2005). • Research activities and output were also limited given the small number of researchers. • NUR's had no explicit science and technology policies when it was established until it merged with other colleges. • University produced graduates to occupy administrative jobs • Little engagement with industry 	<ul style="list-style-type: none"> • Contribution of NUR to the development of EE was limited by weakness of other supporting elements of EE such as weak business sector, high level of poverty, and unsupportive culture. • There were little or no engagement with industry to enhance curriculum to fit market demand or address immediate societal needs • EE was fragile as the Rwanda's economy is largely informal and the majority of the population was involved in consumption-driven not market oriented farming and even though plays an important role in the country's struggle to reduce poverty, but does not contribute to the country's ambitious plans to transform into a knowledge-based, service-orientated economy by 2020 (WB, 2019)
Adventist University of Central Africa (AUCA)	1	<ul style="list-style-type: none"> • Focused mostly on teaching and research, but limited in capacity as a private institution. • There were little or no engagement with industry 	

Source: Author's

4.6.2 Destruction stage

The second stage is the destruction stage as a direct result of the conflict between April 1994 and June 1994. Before the conflict, the establishment of the supporting institutions of the

entrepreneurial ecosystem had been slow and fragile, as described in the embryonic stage. The conflict had a significant impact on social, economic, and political structures – it destroyed the country's socio-economic fabric. Much of social capital was destroyed, and a climate of uncertainty was widespread, with all economic activities coming to an abrupt halt across the country (Hodler, 2018). Gross Domestic Product (GDP) was halved in that period (Porter & McCreless, 2008). The already fragile entrepreneurial ecosystem supporting structures were destroyed. More widely, the conflict brought the destruction of property and infrastructure on a massive scale and claimed the lives of about 800,000 people (Bridgeland et al., 2009; Staub, 2014; Zorbas, 2004). According to UNHCR (2000) more than 2 million refugees in the neighbouring countries and many more internally displaced. The conflict was brought about by interdependent societal and developmental factors, which have contributed (directly and indirectly) to the genocide (Chirwa, 2015).

The education sector was also enormously impacted; Obura (2003, p. 47) indicates that teachers and students were killed or fled the country, schools and colleges were damaged, many more were in a state of urgent repair, refugees still occupied others, while others were in militarised zones, therefore, could not be used. Academics symbolised the elite and the educated in Rwandan society, and they too became a particular target during the genocide, especially the highly trained (with a university degree). For instance, at the National University of Rwanda alone, 153 staff members were killed, 106 disappeared, 800 had fled the country (Bridgeland et al., 2009, p. 5) and in 1998, there was only 18.54 % of the former staff remained (Obura, 2003).

The conflict destroyed any potential growth for entrepreneurial universities and the further establishment of an EE in Rwanda, given the widespread destruction of social, economic, and political infrastructure. The university entrepreneurial architectures were effectively destroyed as a result of the conflict. This eliminated any potential for developing an effective EE based on, including, the pre-conflict entrepreneurial universities as literally no mechanisms or infrastructure to support entrepreneurial ecosystem or entrepreneurial university. Higher education can fan the flames of the conflict based on the influence of its key actors at the individual and societal levels that can determine attitudes, values and behaviour across generations (Gallagher et al., 2018).

In Rwanda, higher education was used as a tool to foment divisions and tensions along social and ethnic lines through quota system admission to the university, therefore, contributing to the ethnic tensions that led to the genocide in 1994 (Obura, 2003). The Universities infrastructure was not spared in during the conflict. The Ministry of Education report from 1994 described the extent of destruction of NUR physical structures and resources at the end of the genocide: *“All the infrastructure of the NUR is in a deplorable state: doors smashed, windows broken, files scattered in the corridors, vehicles, scientific and laboratory equipment, office furniture, classrooms, and staff and student residences, have all been looted”*. (Obura, 2003, p. 115) Out of the four institutions in the study, only two had been established before the conflict; the University of Rwanda and AUCA. Both institutions suffered structural damage and lost significant staff and students through death and displacement. For instance, University of Rwanda, 153 staff were killed, 106 disappeared, and over 800 fled the country, its scientific and laboratory equipment, office and classroom furniture, and other equipment were looted (Obura, 2003). AUCA campus at Mudende was looted by residents, the military, militias, and

even by staff before they fled. However, the official number of staff members who died or fled is not in the public domain.

4.6.3 Formation stage

Broadly, 1994 to 1998 were characterised by reconstruction and rehabilitation of returning refugees (about 700,000) from neighbouring countries (United States Committee for Refugees and Immigrants, 1997). The government's priorities were to restore peace by establishing effective institutions and mechanisms capable of formulating and implementing policies that will stimulate social and economic development whilst addressing the failings of the educational system in line with broader policies to forge national unity. The government, therefore, embarked on extensive reconstruction programs based on economic policies, peace and reconciliation, and political stability (IMF, 2019).

Replenishing human capital lost during the conflict to accelerate social and economic development was given high priority. This is evidenced by the large proportion of the national education budget allocated to higher institutions. In the 1990s, universities received only 2 % of budgetary allocation for the education sector, which increased to acquiring over a third of the budgetary allocation in 2000 (Obura, 2003). The report produced by the World Bank (2004) indicates that Rwanda spent a higher proportion of its education budget on higher education than almost any other country in sub-Saharan Africa. This illustrates the government's intention to increase human resource capacity to stimulate and sustain socio-economic development.

The stage of ecosystem development consisted of a process of rebuilding the idea of the entrepreneurial university in the aftermath of the conflict. It was a period when universities focused solely on addressing rudimentary economic and civil society needs. The study highlights that entrepreneurial universities concentrated on rebuilding physical resources and knowledge infrastructure, and in a practical sense, developing new degree programmes that were politically sensitive to conflicting parties and that met the country's development needs at that time. During this stage, there was a focus on rebuilding the university system but limited entrepreneurial activity from universities regarding their role in developing the wider EE. It was a particularly challenging situation, even though some of the academics and graduates were the victims, others were the perpetrators, either in prison, or awaiting trial, or others in exile. The university had to deconstruct the perception of being an ideological apparatus of the murderer state, repositioning itself as a vehicle for peace and development, contributing to the economic development of the country, and providing other services compatible with its academic nature.

“Ines Ruhengeri is a post the genocide initiative, the genocide against Tutsi and was followed by a situation of despair. In 2000 we thought of doing something that could help society rise again. And we started discussing with the people, local government and the private sector about creating a university. So as a post-genocide initiative, already the vision was how we could help people rise again” CATA-INRW-1

During this ecosystem, developmental phase many private Universities entered the industry or re-opened, including the four Universities in this study. AUCA that had suspended its activities since April 1994 partially re-open in May 1996, INES-Ruhengeri was founded in 2003 to

promote reconciliation and contribute to economic development, NUR was re-structured in 2013 to align its strategy to the national goals, Rwanda Polytechnic was established in 2017 to provide higher education in the country and beyond the borders. To increase capacity, most Universities have established collaboration and strategic partnerships with international organisations and international universities; Rwanda Universities improved their curricula to address societal and economic needs, thus transitioning from their traditional role to taking on the third mission. As the only university in Rwanda, UR played several roles in Rwanda's history: symbol of sovereignty, a tool of domination and exclusion, active actor in the genocide, post-genocide healer and researcher, and tool for economic development. Broadly seven of the pre-conflict universities had closed due to the conflict; by 1999, nine new ones had been formed (Bridgeland et al., 2009).

4.6.4 Capacity building

The final stage, is the capacity-building stage, was marked by the launch of Vision 2020 (MINECOFIN, 2000, 2012) by the government of Rwanda. This signalled the end formation stage, and the country was ready to focus more on building capacity to transform and sustain socio-economic development. The roadmap highlighted the pivotal role Universities would play in driving and transforming the economy. Entrepreneurial universities begin to expand beyond the provision of teaching to explore other, arguably more third mission activities such as research and knowledge and technology transfer, necessary to re-establish and support the evolution of an entrepreneurial ecosystem.

During this stage, the number of universities doubled from 13 in 2000 to 40 in the 2019 (MINEDUC, 2019). This increase in number contributes to further development and

sustainability of EE regionally and nationally through the production of high calibre and enterprising graduates that are founding business ventures as indicated by CATA-AURW-1, one of the AUCA academic staff Goshen Finance LTD⁵. INES-Ruhengeri works closely with potato seed multipliers to produce high-quality potato seeds; INES-Ruhengeri uses its laboratories to collaborate with industry to conduct research on building material testing, water analysis, beverages, and food analysis to generate extra revenue that can be invested in other entrepreneurial activities as confirmed by CATA-INRW-1.

There is an increasing appetite to involve industry in Research and Development (R&D) and collaboration as institutions begin to widen their mission to incorporate the third mission and align institutional goals to nation ambitions. This is demonstrated by comments made by CATA-INRW-1 *“But soon we are to appoint a person in charge of bridging academia and industry. We wish the particularity of its each programme to identify the real partner because you cannot master it everything”*. This change of focus has led to increased academic productivity (the number of research published) is gradually increasing across the board. INES Ruhengeri has its own scientific peer-reviewed journal, INES Scientific Journal (ISJ). It published around 148 academic articles between 2010 and 2019 (INES, 2019). Other institutions have their internal journal; AUCA has the Journal of Inter-Discourse Academia (JIDA), and its UR publishes in African Journals Online (AJOL). However, no information is available on the number of their research output. More broadly, the number of HEI publications in an international journal is still relatively small, 41% and only 17% of academic staff authored a book (GHRDC, 2015)

⁵ Goshen Finance PLC is a Microfinance institution that provides financial services such as credits and savings to the low and medium income households in Rwanda.

As the number of Universities increased, the number of enrolments also increased. This is indicated by a survey conducted by The National Institute of Statistics of Rwanda (NISR), the enrolment in private HEI in 2015 was 43,717 (INES – 3399 students, AUCA-2363 students) and in a public institution is 40731 (NISR, 2015) whereas in 2000 there were 2744 enrolled in private Universities and 7076 enrolled in public HEI (Ines-Ruhengeri was not founded until 2003, and no data is available for AUCA that had re-opened in 1996).

To further develop and expand its skilled capital at the highest levels, the government developed policies to increase the number of international scholarships through collaboration with international Universities. For instance, Dundee University in Scotland offered free tuition and support for living expenses to Rwandan women, United States; the Rwandan Embassy has developed relationships with several American colleges and universities, including Oklahoma Christian University, Carnegie Mellon, William Penn, George Washington University, and the University of Texas (Bridgeland et al., 2009). The aim was to accelerate economic development. This capacity-building stage is supported by elements such as developing an effective culture and visionary leadership within entrepreneurial universities, complemented by government political and economic reforms to sustain national social and economic development. Other institutions do not provide international scholarships but have student and staff exchange programmes with various international universities.

For EE to have a strong foundation for growth and development, the government took different measures by introducing political, economic and education reforms to ensure the economic transformation from an agrarian to a knowledge-based economy as elaborated in Vision 2050

(MINECOFIN, 2016). These reforms are intended to increase the capacity of entrepreneurial ecosystem elements by creating a conducive environment as extant literature argue that EE development needs to be supported by favourable business-friendly policies, economic incentives, providing other forms of affirmative financial support (Autio & Fu, 2014; Estrin et al., 2012; Nicotra et al., 2017). When assessing Rwanda economic landscape compared to other African countries, firms in Rwanda are relatively young; around 80% of the existing firms today entered the market between 2006-2011 and firms with foreign ownership are 3.5 times more productive than Rwandan owned firms (Kamarudeen & Söderbom, 2013).

4.7 Non-market factors

The evolution and the development of entrepreneurial universities are largely influenced by non-market factors, including political, economic and social (Doh et al., 2012). The next section explores how non-market factors have shaped the evolution of the entrepreneurial ecosystem.

4.7.1 Nature of the conflict and reconciliation pathway

The conflict led to the total collapse of Rwanda's political, economic, and social systems and structures. The conflict seriously depleted physical capital, impeding short- and long-term economic recovery. The new government had an enormous task to rebuild the political system and mechanism to restore peace, reconcile communities, thus beginning the process of state capacity building as described by Fukuyama (2004) which requires socio-political cohesion (Lemay-Hébert, 2009). State capacity-building shaped the evolution and the development of entrepreneurial universities and the implementation of the third mission strategies.

In the process of state capacity building, the GoR embarked on radical political reform underpinned by good governance based on the principles of participation and downward accountability (Hasselskog & Schierenbeck, 2015). The GoR took a radical departure from a historically highly centralised system with top-down command and control adopted a more decentralised approach implemented through the National Decentralization Policy (NDP) in 2000 and revised in 2012 (MINALOC, 2012). In the realm of national unity and reconciliation, the objective of the decentralisation policy is ‘to ensure political, economic, social, managerial/administrative and technical empowerment of local populations to fight poverty by participating in planning and management of their development process (Hasselskog & Schierenbeck, 2015).

4.7.2 Economic reforms

For an entrepreneurial ecosystem to develop to support the evolution of entrepreneurial universities, the Government of Rwanda initiated several economic reforms to spur the broader economy. In terms of firm ownership, about 91% of the firms are family-owned or sole proprietorships, most of which are also informal not incorporated, which constrains their access to finance, particularly from the formal sources and heavily rely on term loans that have contributed to a higher rate of failure among other factors (AfDB, 2013). This weakened the EE and impeded its development; hence the government economic reforms to boost productivity encourage more firms to be in the formal sector to develop and sustain EE development.

To create a conducive environment for the entrepreneurial ecosystem to flourish, the GoR introduced numerous policy initiatives (see Table 4.9). Implementing those policies and reforms has enabled the country to achieve some economic and social successes, as reported by different international organisations (Transparency.International, 2018; WBG, 2019). However, Rwanda, as a landlocked country with a small domestic market. It still faces significant geographical and infrastructural constraints, including; lack of access to and the high cost of finance; lack of access to affordable energy; shortage of specialised skills in key sectors; vulnerability to external economic shocks; a shortage of raw materials; limited transformation and improvement in the quality of governance using information and communications technologies (ICTs) (Fosci et al., 2019). These structural and geographical constraints are inhibiting the establishment of sustainable EE development.

Table 4-10: Summary of key policy initiatives, objectives and intended outcomes

<i>Policy Initiatives</i>	<i>Main Objective</i>	<i>Intended outcome</i>
SME Development Policy (June 2010)	Aimed at guiding the implementation of a coherent and coordinated policy framework to create an enabling environment for the growth of the SME sector	<ul style="list-style-type: none"> • To reduce its dependency on foreign aid and debt by increasing internal tax revenue, • To make existing and new Rwandan SMEs more competitive in value added exports
Special Economic Zone Policy (May 2010)	To reduce some of the domestic private sector constraints such as availability of industrial and commercial land, availability and the cost of energy, limited transport linkages, market access and reduced bureaucracy and availability of skills.	<ul style="list-style-type: none"> • Increase foreign and domestic private sector investment • Job creation • Income generation – both direct (within the zone) and indirect through backwards and forwards linkages with businesses outside the zone • Export growth and diversification and increase in foreign exchange • Industrial development and other sectors requiring serviced, specialized infrastructure • Skills upgrade and technological transfer

Business Development Fund (2011)	To facilitate SME with access to Finance and Advisory services for National Development	<ul style="list-style-type: none"> • To support SMEs by offering credit guarantee facility, lines of credit, matching grants as well as advisory services.
Vision 2050 (December 2015)	to take Rwanda to high living standards by the middle of the 21st century and high-quality livelihoods	<p>To focus on 5 key priorities:</p> <ul style="list-style-type: none"> • High quality and standards of life • Developing modern infrastructure and livelihoods • Transformation for prosperity • Values for Vision 2050 • International cooperation and positioning
Made in Rwanda Policy (November 2017)	Holistic roadmap aimed at addressing the trade deficit by boosting production of and stimulating sustainable demand for competitive Rwandan value-added products by addressing factors constraining the quality and cost competitiveness	<ul style="list-style-type: none"> • To increase the competitiveness of the Rwandan economy by significantly narrowing trade deficits • Create several manufacturing jobs
Establishment of Rwanda Polytechnic and The Integrated Polytechnic Regional Colleges (2017)	To address technical skilled labour shortage in the marketplace	<ul style="list-style-type: none"> • To ensure Rwandan citizens have sufficient and appropriate skills, competences, knowledge, and attitudes to drive the continued social and economic transformation of the country and to be competitive in the global market
Education Sector Strategic Plan 2018/19 – 2023/24 (2018)	To promote access to education at all levels, improving the quality of education and training, and strengthening the relevance of education and training to meet labour market demands.	<ul style="list-style-type: none"> • To build human capital for social and economic development in line with Vision 2050 objectives

Source: MINICOFIN⁶

4.7.2.1 Rwanda Vision 2020 and 2050

In 2000 GoR published Vision 2020, revised in 2012, a 20-year national development roadmap for economic development. Vision 2020 highlighted the role of science and technology in the national development framework. The Vision highlighted the need for highly skilled scientists and technicians by promoting: *“efficiency and continuous upgrading of skills, large scale employment creation programs will be launched in the national institutions aimed at on-job-*

⁶ MINECOFIN: Rwanda Ministry of Finance

training, in-service training and distance learning ... ensure a proper link between education policies and sector development and labour policies”(MINECOFIN, 2012, p. 11) and by adapting pedagogical approaches to the teaching of science and technology at secondary and university levels that will facilitate the creation of high and intermediate technology enterprises. Vision 2020 acknowledges the importance of the commercialisation of research, technology transfer and knowledge exchange, effective university-industry collaborations, and university engagement with a wide range of stakeholders to create university spinouts.

Rwanda enjoyed some level of success in achieving the objectives of Vision 2020 (Ansoms & Rostagno, 2012; IMF, 2020; Perez et al., 2018; WBG, 2018) although some studies indicate that such successes were achieved at the expense of human rights violations (Friedman, 2012; Reyntjens, 2015; Thomas, 2018). Vision 2050 was launched in late 2018 to reach middle-income status by 2035 and upper-income status by 2050 through a series of seven-year strategies called National Strategy for Transformation (NST). Vision 2050 places universities at the centre of the country’s economic development strategies because of their potential to produce skilled and enterprising graduates, create highly performing spinout companies, and contribute to existing firms’ performance through research commercialisation and knowledge exchange. NST-1 outlines strategic interventions required to achieve Vision 2050 objectives. These include supporting and empowering citizens to create businesses through entrepreneurship and access to affordable finance, scaling up the number of TVET graduates with skills relevant to the labour market, matching skills with market demand, supporting research and development, and supporting the establishment and operationalisation of new and existing Centres of Excellence (CoE) with emphasis on science, technology and innovation (MINECOFIN, 2017).

4.7.2.2 Higher education reforms

Genocide destroyed human lives, heavily impacted educational infrastructure, and destroyed social, political, and entrepreneurial ecosystem supporting institutions (Hodler, 2018). Access to education, notably higher education, contributed to tension that led to the genocide (Obura, 2003). The government's key priority in the aftermath is rebuilding the stock of human capital that had been lost as an important part of the reconciliation process and addressing the legacies of the education system based on racial and ethnic discrimination. The government has made efforts to build the research and educational base by re-establishing earlier institutions, establishing new ones, and developing the human resource base in various areas. The other urgency to reform the HE system was to move it beyond the traditional role of teaching and research to include wider engagement with external EE actors to co-create knowledge to address local and national social and economic needs.

To transform the higher education sector and make it relevant in alignment with overall national goals, the government of Rwanda established the Higher Education Council as an independent government agency responsible for ensuring the structure, organisation and functioning of Universities and monitoring and evaluating the quality and standard of provision and ensuring the quality enhancement of teaching and research (HEC, 2021b). Since the formation of the Higher Education Council, the higher education sector changed significantly, as new institutions were established and the number of enrolments to higher learning institutions increased. HEC established national accreditation and audit policies to protect students from bogus institutions.

In 2008, the country had 25 universities. Of which 13 were public (six universities, five colleges and two specialist postgraduates) and 12 were private; the number increased to 31 Universities (17 were public, and 14 were private) in 2019. The enrolment increased from 44,000 in 2008 to 72,128 in 2019 (26,345 public HEI enrolment and 45,783 enrolled in private Universities) (MINEDUC, 2019). In addition to building up human resource capacity locally, efforts have enabled Rwandans to acquire further education and training abroad. In 2012, there were 1,091 students sponsored by the government to pursue their studies at Bachelor’s, Masters and Doctorate degrees level in 41 countries.

The government of Rwanda also addressed the issue of access to public universities. Before the genocide period, access to higher education was not based on merit only but also on ethnic quotas (Bridgeland et al., 2009; Obura, 2003). Therefore, to address the inequities of the access to higher education system was required. The government made efforts to broaden access to higher education by ending the quota system and all other forms of discrimination in the education system. This is reflected in the Ministry of Education mission ‘*to transform the Rwandan citizen into skilled human capital for the socio-economic development of the country by ensuring equitable access to quality education focusing on combating illiteracy, promotion of science and technology, critical thinking, and positive values*’ (MINEDUC, 2013, p. 8).

Table 4-11: Strategic objectives of ESSP

Strategic areas	Objectives
Basic education	Increase access to, retention in, and quality of 9-year basic education; improve institutional management, and reduce disparities and inequalities.
Secondary education	Expand secondary education in line with 9-year basic education by improving access, quality and relevance, with emphasis on the development of science and technology and on information and communication technologies (ICT).

Higher education	Reform and modernize higher education with a view to making it more relevant to better contribute to the training of the human resources needed for the socioeconomic development of the country.
Science, technology, and research	Create science and technology knowledge bases and the expertise needed to achieve the objectives defined in Rwanda's Vision for 2020.
Planning and management	Strengthen the capacities of MINEDUC and of other relevant structures at the central and decentralized levels to promote efficiency in the management, monitoring and evaluation of the education system in general and in the implementation of the ESSP in particular.

Source: Table adapted from AFD (2006)⁷

The government sets out the overall strategy for the Rwandan education system in Education Sector Strategic Plans (ESSPs). Education Sector Strategic Plans is a part of the wider education sector strategic plan, which is based on the government's commitment to make education an instrument for social mobility and reducing poverty. ESSP was developed in line with Rwanda's second Economic Development and Poverty Reduction Strategy (EDPRS) to support Rwanda achieve its ambitious goals for economic transformation, rural development, accountable governance and improved productivity and youth employment. The core policy proposition of ESSP is to ensure that Rwandans have sufficient and appropriate competencies (skills, knowledge, and attitudes) to drive the country's continued socio-economic development (see Table 4.10). The ESSP has five main strategic sectors, including four sub-sectors (basic education, secondary education, higher education, science and technology), which integrate the objectives and guiding principles of the education policy, and one cross-cutting objective (planning and management).

⁷ AFD: African Development Fund

Table 4-12: Role of entrepreneurial universities during EE development phases

<i>Embryonic</i>	<i>Destruction</i>	<i>Formation</i>	<i>Capacity Building</i>
<ul style="list-style-type: none"> • There was only 13 Higher Learning institution in the country. Intake was relatively low but gradually increasing (921 in 1980, 1,572 in 1985) • The government introduced post primary vocational centres called CERAI (centres d’enseignement rural et artisanal intégré). The objectives of the CERAI were to train citizens who are productive, responsible, progressive and likely to generate changes in the rural areas, in order to influence socio-economic and cultural development. The CERAI were not successful due to lack of equipment, trained staff and financial support and by the early 1990s their expansion was suspended. They closed after the war • National University of Rwanda (NUR) had only 2 campuses. In the early 1990’s, the expansion of the system saw public and private enrolment rising to about 5,000 students. 	<ul style="list-style-type: none"> • All higher learning institutions and vocational training centres were destroyed, or non-functional • Teachers and children were killed or fled; schools and colleges were destroyed, burned, looted and pillaged, and their properties stolen or destroyed. • The National Archives lost all its documents. The National Library was burned down 	<ul style="list-style-type: none"> • Universities focus was on rebuilding physical resources and knowledge infrastructure, and in a practical sense on developing new degree programmes that were politically sensitive to conflicting parties and that met the development needs of the country. They focus on rebuilding the university system but limited entrepreneurial activity from universities regarding their role in developing the wider EE. • The government gave the highest priority to the re-establishment of the one public university. National University of Rwanda (NUR) consolidated the two campuses into one campus for the immediate future, due to reasons of cost and security. • AUCA that had temporarily suspended its activities since April 1994 and re-open in May 1996. Primary focused was on the first mission 	<ul style="list-style-type: none"> • NUR (National Univesity of Rwanda) was re-structured in 2013 and renamed University of Rwanda (UR). UR mission and visions are aligned to Rwanda Vision 2020 and 2050. UR has 6 colleges, 21 schools located in 10 different campuses across the country offering a wide variety of programmes at undergraduate and post graduate level. • Entrepreneurship-related programmes were introduced. UR has made it mandatory for all undergraduate students to study entrepreneurship modules. UR is research-intensive university and focuses mostly on teaching and research. UR is establishing international bilateral support to develop third mission • AUCA Undergraduate programs include; Faculty of Business Administration; Faculty of Education, Faculty of Theology, Faculty of Information Technology. Graduate programs include; Master of Education, Master of Business Administration MBA. AUCA has approved a budget to build incubation centre to support its third mission. Feasibility study is promoted to enhance students’ entrepreneurial orientation

<ul style="list-style-type: none"> • AUCA had one campus at Mudende • Primary focus of Universities was the first mission (teaching) to supply the economy (mostly public sector) with skilled human capital 		<ul style="list-style-type: none"> • Tertiary education was still very small, enrolment in Universities rose from 5000 in in 2000 enrolment to nearly 17,000 by 2001-02. In 2015, enrolment in private Universities as 43,717 (INES – 3399 students, AUCA-2363 students) and in public institution is 40731. 	<ul style="list-style-type: none"> • RP is in process of incorporating entrepreneurship programs in its curriculum as well as establishing Business School and Creative Art to promote entrepreneurship. RP is building its focused in building capacity in all its missions (teaching, research and entrepreneurship) through collaborations with regional, national and international organisations • The number of enrolment increased from 44,000 in 2008 to 72,128 in 2019 (26,345 public HEI enrolment and 45,783 enrolled in private Universities). • Government introduced numerous economic, social and political reforms to encourage and promote entrepreneurship and the development of entrepreneurial ecosystem and entrepreneurial universities. Entrepreneurial ecosystem supporting institutions began to develop and supporting EE development.
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Source: (Bigsten & Lundström, 2004; English et al., 2016; NISR, 2015; Obura, 2003; UR, 2018)

4.8 Chapter summary

In Rwanda, the conflict in 1994 destroyed the social, economic, and political fabric, not to mention almost a million lives lost in as little as 100 days, and many more became either internally displaced or refugees in neighbouring countries. Universities structures were severely damaged, their properties were looted and destroyed. The 1994 conflict is considered the worst human tragedy of the 21st century. Before the onset of the conflict, the role of universities was primarily focused on teaching, equipping graduates with skills for public office jobs, and their contribution to the development of the entrepreneurial ecosystem was almost non-existent, as they did not engage with actors outside academia. The conflict ended in July 1994, and the new government embarked on a journey to rebuild the country and broken society through unity and reconciliation and political and economic reforms to kickstart the economy.

Rwanda high education institutions face numerous challenges to become entrepreneurial universities with the expected norms, attributes and characteristics of entrepreneurial universities based on the four highly ranked institutions in this study (Clark, 2001; Philpott et al., 2011; Uslu et al., 2019). Those challenges can be attributable to non-market factors, including the devastating nature of the conflict, the type of the reconciliation model (top-down and singular official narrative), and conditioning factors as well as organisation architectures that significantly influence the conceptualisation and implementation of entrepreneurial university missions (teaching, research and entrepreneurship). The study also found that social cohesion and peaceful coexistence pervade all missions.

Before the conflict, the focus of universities was the first mission (teaching) to ensure the economy is supplied with skilled human capital primarily for the public sector while supporting

the establishment of the entrepreneurial ecosystem. Enrolment in Universities was low, and the development of entrepreneurial ecosystem supporting institutions such as financial services was at the embryonic stage and weak to support a strong ecosystem. The conflict annulled the progress made to establish an entrepreneurial ecosystem; all economic activities came to an abrupt halt, the national economy collapsed, and so did the political and educational systems. Higher education institutions' properties were destroyed, scientific and laboratory equipment were stolen, thousands of students and academics died, many more disappeared or fled the country. After the conflict, the nation began re-building itself, almost from the ground up. Universities that had closed during the conflict re-opened and focused on re-building physical resources and knowledge infrastructure developed new degree programmes that were politically sensitive to conflicting parties and met the nation's development needs but limited entrepreneurial activity regarding their role in developing the wider EE.

Rwanda has made a remarkable recovery from its dark past in the broader context. It is applauded by the international communities and academics for its continued sustained economic growth and political stability but also condemned for its human rights abuses. Since 2000 the number of universities has more than doubled. The number of enrolments increased almost year on year, universities have established strategic alliances and partnerships with international universities to boost their human capital capacity, Rwanda universities are expanding their role to be more engaged with local community and industry to address their challenges more effectively thus becoming entrepreneurial in their own right. Currently, universities are focused on capacity building; the third mission is incorporated in their broader university mission alongside teaching and research.

Chapter 5: Northern Ireland case study

5.1 Northern Ireland Overview

Northern Ireland has a complex history marred with conflict and transitioning from violence to sustainable peace. Northern Ireland (NI) was created in 1920 under the Government of Ireland Act due to Ulster unionist lobbying to be excluded from Home Rule for Ireland. The Troubles refers to the roughly 30-year period of violent sectarian conflict from 1968 to 1998 between Protestants generally supporting unionism whose objective was to maintain the legal, economic, and political link with the United Kingdom and the Catholics who were generally supporting nationalism that sought the reunification of Ireland under a Dublin government. Historically, revolts were dating back to the 12th century against brutal British rule of Ireland led to the 1916 Easter Uprising in Dublin (Dorney, 2015, p. 13).

In 1919, the Irish revolted against British rule, resulting in an independent Irish state in the island's 26 southern counties. But the six counties of Northern Ireland remained part of the United Kingdom. The Catholic minority who lived in the NI faced discrimination in their daily lives, jobs, education, and housing. Catholics held civil rights demonstrations, to which the Protestant government responded with violence, setting in motion a cycle of rioting and tit-for-tat sectarian violence in cities such as Belfast and Derry/Londonderry (Hancock, 2021)

NI is perhaps most well-known for 'Bloody Sunday' in January 1972, during which 13 people were killed by soldiers of the 1st Battalion of the Parachute Regiment during a civil rights march. During the Troubles, according to The Commission For Victims and Survivors (CVS, 2021) estimates 3,720 people were killed. More than 47000 were injured before a peaceful solution ended when the two sides reached the "Good Friday Agreement" in May 1998. Sinn

Féin, the political arm of the Catholic paramilitaries and Protestant unionist parties, was elected, established a Catholic-Protestant power-sharing government for Northern Ireland. The agreement outlined how the IRA and loyalist paramilitaries disarmed (Dorney, 2015). After partition, Northern Ireland was ruled from Stormont, the seat of the Northern Irish government, but it was ultimately answerable to British Government.

The Troubles' direct and indirect economic cost of *The Troubles* such as direct costs incurred to maintain a significant security presence and infrastructure rebuilding (Cairns & Darby, 1998). Indirect economic costs are reflected in high levels of unemployment, the decline in inward investment and tourist income, and the emigration of young, highly educated people to Britain and elsewhere, as well as deeper community divisions and mental health. In Northern Ireland, the majority of the population consider themselves as belonging to one of two major branches of Christianity: Catholic and Protestant, and these religious categories are also closely aligned to political persuasions that tend toward Nationalist/Republican (Catholic) and Unionist/Loyalist (Protestant) (Burns et al., 2015; Hughes, 2011). Northern Ireland Census 2011 indicates that 41% of the population are Catholic; 42% are Protestant or Other Christian (NISRA, 2014). The Troubles resulted in Northern Ireland's economy largely depending on the public sector and (Brownlow, 2021) but did not, however, experience structural damages or catastrophic human loss as Rwanda did, and the violence was concentrated in certain hot spots in Northern Ireland, whereas in Rwanda almost every part of the country experienced violence.

The transition from the conflict left the Northern Irish society polarised, and it is mired in low but sustained levels of communal violence in interface areas leading to the erection of more 'peace walls' (physical barriers designed to separate hostile Protestant and Catholic

communities and quell interface violence) (Hayes & McAllister, 2009; Hughes et al., 2012). Despite the paramilitary ceasefires in 1994 from a conflict to a post-conflict region, NI remains a highly segregated society due to underlying issues of social segregation and political mistrust, that resulted in most students entering higher education in NI's two universities having experienced segregated educational system (Somerville et al., 2011).

5.2 Segregated education system

Northern Ireland has a complex educational structure with various bodies involved in its management and administration (Hughes, 2011; Hughes et al., 2012; Osborne, 2005). The separate education system is viewed by many as a contributory factor in the continuation of hostile inter-group relations in Northern Ireland. (Hughes, 2011; Hughes et al., 2012). To promote social cohesion and reconciliation, the Northern Ireland Department of Education introduced a range of initiatives, including curricular initiatives to promote cross-community contact between Protestant and Catholic children and young people.

The Education Reform 1989 was introduced in addition to traditional subjects, Information Technology, Education for Mutual Understanding (EMU), Cultural Heritage (CH), Health Education and Economic Awareness (McGuinness, 2012). Sharing Education Programme was introduced in 2007 to bridge the gap between integrated schools, which are accessed by only a small minority of children, and short-term opportunities for contact to promote social cohesion (Hughes et al., 2012). To understand the Northern Ireland higher education system, we need to understand how lower levels of education (primary and secondary) are structured and run. The history of education in Northern Ireland is characterised by its sectarian divisions between Protestants and Catholics, all of which preferred to run their own schools for their own

communities. The Protestant and Catholic churches have played a significant role in educational practice and policy through the ownership and management of schools and fighting for reform and/or the defence of the status quo (Akenson, 1973; Gallagher et al., 1993). There are two separate educational systems in Northern Ireland, one Catholic and one Protestant, and this division mirrors almost exactly the cultural and political divisions that led to the conflict (Dunn, 1986; Dunn & Morgan, 1991). Segregation in education is one of the conflict's most significant and enduring legacies. The education system has been separated along ethno-religious lines in which children of different social groups attend separate schools.

The UK government enacted different mechanisms focused on promoting reconciliation and tolerance and included curriculum interventions, contact programs, and the development of new religiously integrated schools (Gallagher, 2016). The segregated nature of primary and secondary school provided limited opportunities for children to learn about the 'other' (Hughes, 2011; McGuinness, 2012; Nehring, 2020). The existence of a separate school system reflects the social division that still exists in Northern Ireland. According to the most recent public data from the Department of Education (DoE, 2021), the majority of young people (6.6% and 9.1% primary and post-primary, respectively) attend separate schools. These schools educate children from only Catholic or Protestant backgrounds in which they have little, if any, contact with members of the other community due to educational, residential, and societal barriers between religious groups.

In the United Kingdom, Higher Education (HE) is a devolved matter with political oversight provided by the UK Government and Parliament (England), the Scottish Government and Parliament (Scotland), the Welsh Government and Parliament (Wales), and the Northern Ireland Executive and Assembly (Northern Ireland). Unlike other parts of the UK, Northern

Ireland has no higher education funding council; the Department for the Economy (DfE) fulfils the roles of both a government department and a funding council. The role of the Department's higher education division is to formulate policy and administer funding to support education, research and related activities in the Northern Ireland higher education sector (DfE, 2021).

5.3 Higher education structure in Northern Ireland

The third level segment of the education system in Northern Ireland is very similar to that in most OECD countries and face almost similar challenges to contribute to the social, economic and cultural development of the regions in which they operate by transferring knowledge and technologies to industry and society at large (Compagnucci & Spigarelli, 2020; Gallagher, 2019a; Guerrero et al., 2015; Kirby et al., 2011). The educational system continued to function throughout the Troubles. It represented stability and safety for academic and non-academic communities and provided steadfastness in an otherwise turbulent environment. For example, QUB tried to maintain its neutrality and distance during the Troubles. The policy promoted by then Vice-Chancellor who perceived the university's direct involvement in the conflict would negate 'professional independence and jeopardises the contract social that gives autonomy to the university in return for its institutional neutrality, and the number of Catholic students enrolment increased even though Catholics were underrepresented in the workforce (Gallagher, 2019b).

After the Good Friday Agreement was signed in 1998, the Northern Ireland higher education system was restructured to build the capacity required to address challenges posed by the Troubles' legacies and make a wider contribution to the development of the entrepreneurial ecosystem. As already mentioned, there was human cost resulting from the Troubles (Dorsett,

2013), political and civil unrest inevitably affected economic growth that was further destabilised by terrorist activities by bombing commercial targets (Fitzgerald & Morgenroth, 2019). Higher education in Northern Ireland is delivered through two main universities: Ulster University and Queen's University Belfast (Table 3.1). They offer four types of qualifications; Foundation Degrees are offered in the further education regional colleges, combining academic and work-related learning as a route into employment; Higher National Certificates (HNCs) and Higher National Diplomas (HNDs) are work-related courses available in a wide range of subjects, and are provided by higher education colleges and further education colleges (Burns et al., 2015).

The higher education system in Northern Ireland is reputed to be one of the best in Europe (Hegarty, 2006). Historically, both universities accounted for 60% of the entrants (Osborne, 2005). They attract international students with different fees arrangements. The majority of that international student cohort comes from the Republic of Ireland because they have the same fees arrangements as local NI students, other students come from the UK, but they don't receive public funding for these students and can charge higher fees, the rest of the international students are charged fees determined by competitive and market factors (Gallagher, 2019a).

5.4 Entrepreneurship in Northern Ireland universities

Entrepreneurship in the Northern Ireland context is primarily opportunity-driven as people who engage in entrepreneurial activities are out of choice to explore and exploit entrepreneurial opportunities. This is because of the presence of social security system in the UK to support individuals and deter them from necessity-based entrepreneurship, pushed into entrepreneurship because all other options for work are absent or unsatisfactory as opposed to Rwanda that does not have a welfare system (Williams & Williams, 2014). At the macro level, this is reflected by the presence of institutional architectures and conditioning factors in both institutions to support entrepreneurs in exploring and exploiting the identified opportunities, including business incubators, state-of-the-art laboratories, Technology Transfer Office, Knowledge Transfer Partnerships, among others. At the micro-level, the conceptualisation of entrepreneurship is reflected by how university actors perceive their roles in supporting university-based entrepreneurs in the exploration and exploitation of the entrepreneurial opportunities or themselves engaging in third stream activities.

Entrepreneurship in Northern Ireland main universities is conceptualised in terms of opportunities and motivation (see Table 5.2). There is a clear distinction with entrepreneurship conceptualisation, mainly driven by necessity, not by opportunities. Interviewees were asked to describe their role and how they support entrepreneurship in their working areas. Those at the senior level associated entrepreneurship with the commercialisation of research, having an impact (social or economic), scoping and scaling technologies, offer intervention, how to grow a business, etc. these terminologies can be linked to the exploitation phases of entrepreneurship (Cunningham et al., 2021).

“I am responsible for helping (academics) them connect their spinouts to relevant entrepreneurs, investors, business advisors, and mentors that can help support them on their business journey” CATC-QUUK-3

“We (as an institution) offer interventions for university based-research to explore and test the commercial feasibility of their research” CATA-QUUK-1

Table 5-1: entrepreneurship conceptualisation in Northern Ireland

Actors	Key words linked associated with conceptualisation of entrepreneurship
Academic staff and entrepreneurship supporting staff	“New way of thinking”, “innovation”, “start-up”, “developing skills”, “Training”, “Coaching”, “Mentorship”, “one to one support”, “working in multidisciplinary teams”, “deliver a suite of services”, “networking”
Managers/Dean/HoD/PVC	“Market-fit”, “scaling technologies for application”, “Scope good technologies”, “Having impact”, “how to grow business”, “running a business”, “commercialisation”, “collaboration”, “networking” “learning and practice”, “offer intervention”, “investment”, “Technology Readiness Level”, “co-create”

Source: Author’s

Academics and supporting staff describe entrepreneurship in terms of opportunity identification, exploration and exploitation, which is consistent with institution senior leaders’ perspectives. There is a consistent and common understanding and interpretation of entrepreneurship – opportunity-driven.

“I work directly with students and graduates; my targets are to increase the number of student graduates start-ups and increase the level of investment given to those start-ups from university.” CATC-ULUK-1

“I support students I suppose in developing key skills and, working in kind of multidisciplinary teams to come up with creative solutions to kind of real-life challenges” CATA-QUK-2

Both universities have established entrepreneurial architecture and mechanisms to support individuals (university-based entrepreneurs) through the stages of entrepreneurship and offer entrepreneurship education provision to equip students with entrepreneurial cognitive and non-cognitive competencies (Lackeus, 2014).

5.4.1 Entrepreneurship pedagogical approach

The conceptualisation of entrepreneurship can be analysed through various policies and structures to promote it. The QAA (2019) provide a framework on what enterprise and entrepreneurship education should look like, recognising that they need to link theory to practice and provide students with entrepreneurial competencies (cognitive and non-cognitive). The curriculum for entrepreneurship education in HE in the UK has expanded considerably (Fayolle et al., 2006). This has been driven by government policy initiatives and changes to the funding base of UK universities (Hannon, 2005), the requirement to enhance employability skills (Matlay, 2005), encouraging students to create new ventures, more recently there has been a shift in focus to a broader concept which emphasises entrepreneurship as a way of thinking and behaving (Hahn et al., 2017).

Both institutions offer a wide range of entrepreneurship awareness and education activities via traditional approaches in which knowledge is conveyed through conventional lecture format

and experiential approach where knowledge is constructed by learners through the process of ‘doing’ which are regarded as the most effective route to entrepreneurship education. The QAA Scotland report *Creating Entrepreneurial Campuses* (2014) suggested that the effective ways to teach entrepreneurship are outside a business school environment in an interdisciplinary and holistic way.

“They (students) will be given a real challenge from a local small to medium-sized business (SME) or a local start-up, and that could be a challenge they are facing in their market; it could be about recovering from the crisis (Covid-19), it could be upskilling their team, whatever. So they will be given these challenges, and the students will work on those through the design thinking process, through brainstorming sessions and working in teams for the first semester, and then as they go to semester two in January. The idea is that they will actually produce the report and spend some time with that business, either in the business that was allowed to or working remotely with the business to implement the solutions that they've been working on semester one”

CATC-ULUK-1

The study found other alternative entrepreneurship teaching methods in which students take voluntary extra curricula lessons to enhance their entrepreneurial skills and/or work on their entrepreneurial ideas with the support of internal or external experts. Ulster University Student Union Enterprise Centre offers a series of support to students through a suite of services and programmes that range from one-to-one coaching to students who are working on a business idea. They want to try and explore that a bit further, as well as a series of internal and external mentoring programmes; they have tech workshops, skills development workshops, female

entrepreneurship programmes, all of which are designed to promote entrepreneurial culture and entrepreneurial orientation.

“We deliver a suite of programmes, and they really fall into three verticals—the first one is developing new skills. We have tech and skills development workshops. The second vertical is exploring ideas and opportunities. We have a female entrepreneurship programme there within that vertical. And then the final vertical is the launch of a new venture,” CATC-ULUK-1

At QUB, they have similar services and programmes that target university-based entrepreneurs to explore and exploit entrepreneurial opportunities and enhance their entrepreneurial competencies. Table 5.4 demonstrates how university organisational architecture support university-based entrepreneurs across stages of entrepreneurship.

“Within the Student Union, we have someone who is responsible for supporting and guiding students to put their hands up and say that they want to start a business. So this is looking particularly at entrepreneurial new business venturing. And within the context of our doctoral research programmes, we have research and impact of departments within the university, and where there is an emphasis on supporting doctoral researchers to explore the possibility of a third dimension to their research.”

The study found well-structured mechanisms to support university-based entrepreneurs across different stages of entrepreneurship, as identified by Cunningham et al. (2021). This is

supported by a mixed pedagogical approach (theory and practice) to enhance entrepreneurial orientation among students. The same structural support and strategies to support academics at different stages of entrepreneurship. At the exploration phase, both institutions have adequate entrepreneurial architecture to support the early stages of entrepreneurship by equipping the individuals with skills and competencies to identify and explore entrepreneurial opportunities. For example, student unions (Enterprise SU, UUSU) are the first port of contact for students with ideas to check their viability and further idea development as confirmed by CATB-ULUK-2. Different teams and organisational units scout for research with commercial potentials and support academics to explore those opportunities for academics. Such teams also include Innovation and Impact and Research Development at UU, whereas QUB has Research Development Team focused on supporting academics as students.

As the idea is further developed or research outcome has commercial viability, but at the exploration phase, they are taken through a series of testing (proof-of-concept) to ensure they are market-fit and thereby validating the commercial potential to attract additional investment. Both institutions have programmes and structures to support students and academics through that phase to exploitation; QUB University developed a 'Proof-of-Principle' (PoP) programme to support projects with significant potential to deliver economic impact. Whereas at UU, there is iCURE programme (which is also available at QUB) 3 months full-time online customer discovery programme designed using lean start-up methodology and funded by Innovate UK to train, fund and support teams led by university early-career researchers to determine whether there is a market for products or services that utilise their research, science, or technology.

For the exploitation phase of entrepreneurship development (latent and growth), both institutions QUB and UU set up companies to manage institutions' spin-out portfolio and

commercialisation; Qubis and Innovation Ulster Limited, respectively. These companies are pivotal to institutions realising their third mission and supporting students (postgraduate) and academics in becoming entrepreneurs (see Table 25).

“Axial 3D is the most recent example. It was an idea of Danny Crawford, who was a Master’s student at Ulster University. He was interested in medical devices; he was studying bio-engineering. He engaged with our student’s union. And when he graduated. We (UU) helped find the money to get started and develop the idea that the company and secured multimillion pounds venture capital investments, including from our own venture capital funding. He got the support of the Students Union, the investment through Innovation Ulster Limited” CATA-ULUK-1

5.4.2 Entrepreneurship education provisions

For academics with researcher outcomes with potential commercial viability, additional support and structures are set up to scout such potential research and support academics to commercialise it or spin-out companies out the research (see Table 5.3). For instance, QUB has an enterprise team whose focus is on supporting academics to scouting promising technologies and providing interventions like iCure and lean programmes to help scope technologies out of those universities first commercial promises. QUB provide training and coaching, and mentorship to take them through the market discovery journey. At the end of each programme, the team looks at their next steps. Some of those next steps are linked to follow-on funding to progress the idea for the technologies and help move them up the Technology Readiness Level (TRL) scale closer to commercialisation. The IP team, almost like tech transfer office, is built around that to help exploit the most promising technologies.

“We get the academic and maybe the researcher who works on the project, we give them training on how to go out and meet customers, how to develop a business model. And then we give them some funding, and they manage a lot of the commercialisation. We put the ownership on them to go out and find the customers, and the advantages of that are they obviously know the technology better than we do, so they have that conversation with companies” CATC-QUUK-1.

Table 5-2: Northern Ireland entrepreneurship education and provisions

	QUB	UU
Students	<p>Entrepreneurship education</p> <ul style="list-style-type: none"> • Undergraduate course • Postgraduate <p>Entrepreneurship provisions</p> <ul style="list-style-type: none"> • Dragon’s Den • InnovateHer <p>External entrepreneurship provision support</p> <ul style="list-style-type: none"> • Techstart Ventures Proof of Concept Grants • Kick Start Programme • Ulster Bank Entrepreneur Accelerator 	<p>Entrepreneurship education</p> <ul style="list-style-type: none"> • Undergraduate course • Postgraduate <p>Entrepreneurship provisions</p> <ul style="list-style-type: none"> • One to one coaching • Skills development workshops • Female entrepreneurship programme (So She Did Pre-Accelerator) • UU Connects Mentoring Programme • Young Enterprise Start Up Programme <p>External entrepreneurship provision support</p> <ul style="list-style-type: none"> • Co-Founders by Catalyst • Proof of Concept Grants by TechStart NI • From Student to First Sale by Invest NI
Academic	<ul style="list-style-type: none"> • Proof of Principle programme • Lean Programme • iCure Programme 	<ul style="list-style-type: none"> • iCure • Lean Programme • Commercialisation support programme

	<ul style="list-style-type: none"> • Commercialisation support programmes • Invest NI Proof of Concept • MRC Confidence In Concept • EPSRC Impact Acceleration Account 	
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Source: author's

QUB and UU offer a wide variety of support to students and academics as they move through the process of becoming an entrepreneur to explore and exploit entrepreneurial opportunities. For instance, those at early stages of entrepreneurship may have an idea and would like to explore it further. The UU student union offer a wide range of services. These range from one to one coaching for students who want to explore a business idea they are working on, to a series of mentoring programmes that match them with an appropriate mentor. QUB offers similar services, including a female entrepreneurship programme, offering one-to-one support to students with business ideas to develop them, offer grants.

"We run a kind of bigger funding competition called Dragon's Den and is a little bit like the one on BBC; we don't make investments in these incidences, so we just give grant funding." CATC-QUUK-2

"We have a bespoke programme that we have built there that really integrates the support that exists around each of our campuses and Ulster we don't want to duplicate what already exists; we want to integrate with whatever exists, we can both collaborate and make programmes, more impactful" CATC-ULUK-1

Both universities, UU and QUB established links with external actors to support students to advance their business ideas by accessing a wide range of professional services and advice.

"If someone had an (entrepreneurial) idea, the first kind of port of call would be us, and we would speak to them, and about their business idea, what help they need to proceed forward, so there's external help from Belfast City Council for example to get a business plan. There's a programme that the council runs called the Belfast enterprise Academy. It's basically a programme for students to start a business, any student can apply, or they can get lots of funding and support from them" CATC-QUUK-2

Table 5-3: University organisational architecture of entrepreneurial universities across the stages of entrepreneurship

		Exploration Phase		Exploitation Phase	
		Latent	Emergent	Launch	Growth
Exclusive focus on Exploration phases	Entrepreneurship research centre	← QUB and UU →			
	Entrepreneurship centre	← QUB and UU →			
Selective focus on Exploration and Exploitation Stages	Cooperative research centre	← QUB and UU →			
	Proof of concept centre		← QUB and UU →		
	Incubator	← QUB and UU →			
	Accelerator		← QUB and UU →		
Overarching focus on all Exploration and Exploitation Stages	Technology transfer office	← QUB and UU →			
	Science parks	← QUB and UU →			

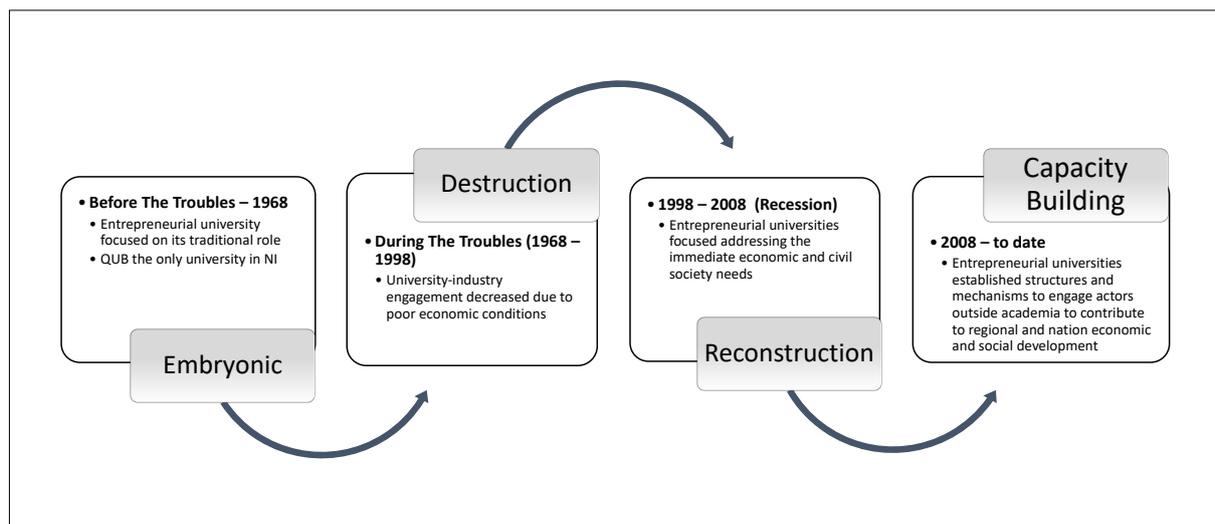
Source: adapted from Cunningham et al. (2021)

5.5 Entrepreneurial Ecosystem Development Phases

Entrepreneurial universities positively contribute to regional and national economic growth (Bramwell & Wolfe, 2008; Guerrero et al., 2012, 2014; Trequattrini et al., 2018). For entrepreneurial universities to make such an impact require a stable economic, political, social environment (stable entrepreneurial ecosystem). They need to interact with external actors to pursue the third mission. Such instabilities in the external environments impact the development of entrepreneurial universities and the entrepreneurial ecosystem directly and indirectly.

In general, The Troubles had a negative impact on the Northern Irish economy. For instance, Birnie and Hitchens (1999) estimated that £14 billion had been lost to cover personal injuries, material damages and other security costs, Fielding (2003) showed a reduction in investment in machinery (about 5.6%), Dorsett (2013) averaged the decline of GDP between 15 and 20%. In addition to the human cost (estimated 3720 deaths), political and civil and terrorism activities, primarily by bombing commercial targets, as a way to cause economic destabilisation, affected entrepreneurial ecosystem development, which in part impacted the evolution of entrepreneurial university as it flourishes in a stable and growing economy. This study demonstrates that similar to the Rwanda case study, the entrepreneurial ecosystem in a post-conflict environment develops through four non-linear stages; embryonic, destruction, formation, and capacity building (see Fig 5.2).

Figure 5-1: Evolution stages of entrepreneurial ecosystem in Northern Ireland



Source: Author's

5.5.1 Embryonic phase

Embryonic covers the period before the onset of the conflict. During this phase, entrepreneurial universities played a significant role in the growth of Northern Ireland economy and the development of EE as knowledge producers to support expanding manufacturing sector and shipbuilding that required specialised knowledge and skills and served as the driving force underlying economic growth and prosperity in the region (Rowthorn, 1981). The region was a dynamic area for manufacturing activities, with industrial production increasing after the second world war due to the increased demand for critical sectors of Northern Ireland manufacturing, such as shipbuilding and clothing (Fitzgerald & Morgenroth, 2019).

There were different interventions by the NI government to stimulate entrepreneurship through the Distribution of Industry Act 1945 to support employment creation and grant aid for the

purpose of re-equipment and modernisation (Brownlow, 2020). More broadly, NI failed to stimulate the creation of new industries sufficiently because business leaders and the devolved government had close ties, which delayed necessary structural changes, consequently hindered job creation, contributed to unemployment (Fitzgerald & Morgenroth, 2019). Rowthorn (1981) argues that the NI government played a passive role in stimulating economic activities that would support elements of EE. However, the NI government supplied finance and infrastructure as and where required by private firms and did not have an explicit policy on the location of economic activity and no systematic attempt to direct investment towards any particular area.

QUB was the only university in Northern Ireland until 1968, although a small number of students followed university courses at Magee College. Northern Ireland experienced rapid expansion in HE in 1960. Magee University College was another HE institution that opened in Derry 1865 funded by Martha Magee for theology studies. Magee University College could not award general degrees but provided courses accepted for a year of a Queen's degree or two years of a Trinity College Dublin degree. Magee University College had financial difficulties and almost collapsed when it was taken over in 1953 by a board of trustees appointed under Stormont bail-out legislation (History.Ireland, 2021). The Lockwood Committee Report (1965) recommended setting up a new university to avoid over-expansion and over-concentration in the Queen's University Belfast that had served the country since 1908 as an autonomous university, financed by the Northern Ireland government (Sutherland, 1982). The new University of Ulster was opened in Coleraine in 1968, Magee College was incorporated into the new university.

5.5.2 Destruction phase

Destruction phases cover the period of the conflict (The Troubles) from 1968 to 1998, in which Northern Ireland economy suffered because of political and civil unrest and the consequent inability to compete in a growing global market (Teague, 2016). The nature of the conflict was not widespread but a long-drawn-out conflict, only concentrated in a few hotspots as opposed to Rwanda, whose conflict was widespread, intense and very destructive. Universities were not damaged and continued to function throughout the conflict and were able to deliver on their core missions, and academic brain drain was not as acute as it was the case for Rwanda. However, the conflict did not affect the growth of the entrepreneurial university as the conflict was not widespread but disrupted the further establishment of sustainable EE in Northern Ireland, but universities did not collaborate with industry because the economic situation at the time was poor. However, both universities' strategic stance during the conflict was to show impartiality by offering neutral places that promote social cohesion and tolerance (Gallagher, 2019b).

“There was a degree of utter discouragement by University authorities on academic student research on conflict of interest quote from one of our chapters in the mid-70s, who basically said that it wasn't the university's role to look at these controversial and difficult issues because it was part of the social contract was trying to sort of not to not to deal with controversial issues, that was partly if you because I think because the university was so embedded in the establishment of society” CATA-QUUK-5

The ecosystem development also slowed down the worldwide economic slump in the 1970s, which led to the manufacturing sector's decline that continued to accelerate in the 1980s. High levels of unemployment adversely impacted entrepreneurship (Teague, 2016). This is reflected in the growth of the public sector from the mid-1960s to the late 1980s (Rowthorn, 1981). The regional government was suspended, and political authority was transferred to Westminster due to increasing political instability and related violence. During this period, a higher proportion of university entrants left Northern Ireland, mostly for British universities and a small number entering universities in the Republic of Ireland with a decrease of inflow of university entrants from outside Northern Ireland (Gallagher, 2021) (see Table 5.4).

Table 5-4: Inflow and Outflow of Northern Ireland university students and entrants (%)

Academic year	NI students		NI entrants	
	staying in NI	leaving NI	from NI	from outside NI
1965/66	79.4	20.6	-	-
1970/71	72.2	27.8	83.7	16.3
1975/76	69.7	30.3	93.5	6.5
1980/81	64.9	35.1	93.5	6.5

Table adapted from Gallagher (2021)

5.5.3 Formation phase

Formation and capacity building phases cover the period after the peace agreement was signed in 1998 that ended hostilities in the North, making it a much more attractive place to do business until 2008 when the UK economy went into recession. The study findings indicate that universities focused on addressing the immediate civil society needs, particularly in addressing

the issues regarding equality of opportunity in employment. For instance, QUB started monitoring the composition of its staff to ensure fair representation to promote social inclusion and equality in practice and, in principle, to become more socially engaged (Gallagher, 2019b). Both universities were very influential in shaping various government policies with regards to policies and methods to reduce the levels of segregation and increase opportunities for intergroup contact through several initiatives such as shared educational partnerships therefore active agents of change because they can facilitate, promote and possibly guide certain forms of social and economic change.

"I started working with a few people on a new initiative, which we call Shared Education, what that involves is, in a local area we have two or three different schools are sitting alongside one another, you get them to work in a collaborative partnership so that students move between schools to take classes and teachers move around between schools working with each other. And the idea is to try and have the best of both worlds as people have their own schools so they can be confident that their own identity will be secured. But we created porous boundaries between schools so that there's lots of mixing and engagement going on between them as a way of encouraging opportunities for dialogue." CATA-QUUK-5.

Concerning the third mission, the study conducted by Abreu and Grinevich (2013) analysed the level of academic entrepreneurship in all UK universities (including Northern Ireland) and it covered the entire range of academic disciplines, and it aimed to capture the wide range of activities that link universities and businesses and analyse the impact of these links on regional

economies in the UK. Their findings indicated that different academics are involved formally or informally in various entrepreneurial activities, including commercial and non-commercial. However, senior academics (professors and senior lecturers) were more likely to be involved in all types of entrepreneurial activities, including licensing, spinouts and consultancy, because of their expertise, reputation, contacts, security of tenure and visibility compared to their early career academics who were more likely to be engaged in the informal activities including informal advice, contract research public lectures. This suggests that QUB and UU tried to keep up with the rest of UK universities in terms of their engagement in entrepreneurial activities and contributing to social and economic growth.

5.5.4 Capacity Building

At this final stage, the capacity building stage, the entrepreneurial universities have established entrepreneurial architecture geared towards pursuing entrepreneurial missions such as research and knowledge and technology transfer, necessary to support and sustain the evolution of an EE. An effective culture supports this building stage and strong, visionary leadership within an entrepreneurial university complemented by an effective incentive scheme. University gained greater autonomy through financial independence to define its strategy and priorities. Entrepreneurial activities within the academic community are widely accepted, encouraged, and systematically supported. A significant number of spinouts are created by staff that generate more funds for research and other university activities.

A comparative study of academic entrepreneurship in the Island of Ireland by Brennan et al. (2007) showed considerable entrepreneurial activities in Northern Ireland universities as they

continue to build their research capacity and social capital capacity (see Table 5.6). Understandably, Republic of Ireland universities performed better than their counterparts for a number of reasons, including entrepreneurial culture, which was well developed in the Republic of Ireland than Northern Ireland.

Table 5-5: Comparison of academic entrepreneurship, organisational background

		Republic of Ireland (%) N=663	Northern Ireland (%) N=538
Involvement by Academics in Entrepreneurship Activities	Large-scale science	68	50
	Contracted research	69	56
	Consulting	68	51
	Patent/licensing	26	17
	Spin-off firms	19	13
	External teaching	73	42
	Sales	6	6
	Testing	40	35
Background of Individual Academic and Perception of Institutional Context for Entrepreneurship	Previously employed full time outside the university sector	63	57
	Industrial experience		
	• No direct industry contact in last five years	28	32
	• Approached industrial organisation	52	46
• Approached by industrial organisation	56	50	

	View of the university environment for entrepreneurship <ul style="list-style-type: none"> • Supportive • No effect • Hindrance 	58	51
		33	34
		10	18
	University industrial liaison office <ul style="list-style-type: none"> • Awareness of existence • Have used to develop external linkages 	71	62
		22	33

Source: table adapted from Brennan et al. (2007)

To support capacity building and help re-establish of sustainable EE, government has set up initiatives such as Invest NI to support the development of entrepreneurial spirit through the expansion of entrepreneurial universities.

5.6 Entrepreneurial Architectures

In order to provide an appropriate atmosphere for the university community to explore, evaluate and exploit ideas that can be potentially turned into social and economic endeavours and achieve the third mission objectives, the study found that, in a post-conflict in a developed economy, the evolution and development of entrepreneurial university was enabled and/or hindered by institutional factors - structures, systems, leadership, strategies, culture and internal capabilities.

5.6.1 Structure

The study found formal organisational structures and organisational architectures support and promote entrepreneurship among academic communities to explore and exploit entrepreneurial opportunities (see table 30). Both universities have similar internal structures to support both academics and students (undergraduate and postgraduate) through their entrepreneurial journey. Support included technology transfer offices, commercialisation units, student unions, science parks, specialised organisational units that facilitate academic community actively engaged with external actors within the entrepreneurial ecosystem to contribute to regional and national social and economic development. The next section discusses how both structures enable both institutions to pursue their third mission objectives

5.6.1.1 University-industry collaboration structure

QUB and UU have specialised departments to help graduates and academics with commercialisable research. QUB has the Research and Enterprise (R&E) Directorate that coordinates the university's industrial support activities and is the contact point for all organisations involved in economic development through the Business Alliance team. R&E is also responsible for developing opportunities through which academics can gain access to the business and economic development communities and support them to commercialise their research. Whereas UU has an Innovation and Impact team that supports PVC Research in developing and leading research and impact strategies. It also manages knowledge exchange, consultancy and KTP projects and supports the commercialisation of research.

“EIT Seedbed programme, which is another pre-accelerator, but it's very much focused on scaling technologies for applicability in the agri-food sector. It's a collaborative programme that I lead on behalf of Queen's University in collaboration with EIT Food. So, it sits within an EIT Food as a pan-European consortium of partners made up of key stakeholders in the agri-food sector from universities to research centres, businesses and start-ups all across Europe and the UK and to be part of this wider pan European Consortium” CATA-QUUK-1

“There is a quite very good level of collaboration between both universities, Invest NI and the business base. Through the sort of programmes of KTP and innovation vouchers, where they can get sort of four or £5000 of university time and voucher for them to use” CATA-ULUK-1

5.6.1.2 Research commercialisation organisational unit

The study found well-structured internal mechanisms to support the commercialisation of research and strategies that govern them. The study found that QUB has a research and enterprise directorate. Its role is to help secure the university's vision for excellence and impact in its research and enterprise activities. It comprises nine teams, each specialising in a different area of support structures on a faculty-facing basis. QUB research and enterprise directorate facilitate high-quality academic research through developing research strategy and policy, supporting researchers to access funding and form new collaborations, and managing governance procedures, research information systems and the contracting process.

“We have Research and Enterprise Directorate, and we have a Commercialisation Team within that directorate we basically offer interventions for university based-research to explore and test the commercial feasibility of their research through a number of programmes ... Research Development team is very much focused on supporting academics as students, funding base for blue-sky research or applied research and but then we also have like the enterprise team here and their focus is on really supporting academics to scouting really good technologies and providing interventions to help scope those technologies first commercial promise. Business alliance team which is really about supporting collaboration between university researchers and businesses” CATA-QUUK-1.

QUB research and enterprise directorate also works with university colleagues, students, industry, and the community to provide support from the conception of an idea or technology through to a range of knowledge exchange and commercialisation outcomes. Those organisational units complement each other in supporting nascent university-based entrepreneurs through different stages of entrepreneurship. In the area of Medicine, Health and Life Sciences, partnerships with Industry and Health and Social Care Trusts led to increased translation of research into practice and nine spin-out companies, in Engineering, 37 spin-out companies were created employing over 1950 individuals with their gross value contribution of £55million (QUB, 2021b)

UU has the PVC Research and Impact, responsible for developing and leading the university's research and impact strategies, ensuring that the university achieves its research objectives and targets, delivering research-led teaching and for research output to have real-world impact. Under PVC research, there are several departments to ensure that UU research targets and objectives are achieved. UU Research and Impact team support researchers to undertake interdisciplinary research in a supportive environment to produce research outcomes that address real-world issues of both local and global relevance.

“We have a team within the university called the Innovation and Impact team. Working with academics to help develop their research in ways that might engage companies. We have another team of people who work on business partnering so that we have businesses involved in our large-scale project's research,” CATA-ULUK-1

UU has other teams, such as Doctoral College team responsible for the management and development of postgraduate research and the administration of new programmes and research studentships and management of the researcher development programme, Innovation and impact team that supports research development and commercialisation of research, it also manages knowledge exchange, consultancy and KTP projects, and the research development team that promotes interdisciplinary projects, and also responsible for horizon scanning for funding opportunities.

5.6.1.3 Holding companies

Both QUB and UU have established companies to help commercialise their research and their central focal point and vehicle for technology transfer. Together, these comprise the core structures of QUB and UU entrepreneurial architecture. The university structures are imbedded in coordinated systems supported by university leaders, board members, department heads, the directors, non-academic supporting staff within the structures that support the third stream who are agents of a coherent entrepreneurial strategy, and within an environment that promotes and sustains entrepreneurship and the continual development of respective institutions.

Qubis Ltd was established in 1984 by Queens' University Belfast to commercialise the university's research and development activities through the formation of spin-out businesses, and it also manages the QUB business portfolio. Qubis is run independently from the university in terms of governance and funding and offers numerous programmes that support academics and postgraduates in exploring and exploiting entrepreneurial opportunities from their research. Such programmes provide researchers with the opportunity to validate their research, explore the most appropriate routes to market and gain further funding for their commercialisation journey. Qubis works closely with the tech transfer office and the commercialisation team to 'pull through' appropriate RandD from the laboratory into the commercial marketplace. QUB, through Qubis, is ranked the top university in the UK to develop more spin-outs; it has created more than 90 spin-outs since 1984 and remain a shareholder in 30, QUB has 50 active license agreements and 7.6m Annual income from IP commercialisation (Qubis, 2020).

“Qubis is a limited company, but it's very much affiliated with universities commercially, it's the university's company for managing their portfolio, so Qubis has its own team, they work every day with the tech transfer office and commercialisation team to kind of scope that pipeline and as the team comes through that programme, the iCure programme there's commercial potential and they do spin out and flip over to Qubis portfolio and Qubis support, support them through that spin out phase” CATA-QUUK- 1

Innovation Ulster Limited (IUL) is its commercialisation arm of Ulster University and a wholly owned subsidiary company of the university. It is the company through which UU contracts with business. IUL is a company where UU can make investments in companies and do deals with businesses. IUL evaluate new technologies for patentability and commercial potential; evaluate the need for foreign and domestic patents; prepare or facilitate patent applications; market inventions protection, licenses, and commercialises the intellectual property of the University of Ulster. IUL provides a degree of protection outside of the university, but it benefits the university as the profits and tax benefits flow back into the university and are used to advance academic activity, whether teaching or research.

UU has created 38 spin-out companies, 19 of which are part-owned by the university. With a turnover of £50 million and employ 700 staff; they include Axial 3D Ltd that specialises in 3D printing technology to advance both standards and efficiency of surgical intervention, Inlifesize Ltd specialises in creating characters for virtual reality, mixed reality, film, television and games, SiSaf Ltd that specialises in design and formulation of solid nanoparticles and their

application in topical, sublingual and other dermal forms of drug delivery, and Tactility Factory blend the technologies and cultures of textiles and concrete to create unique, tactile, infused concrete, interior design products (UU, 2021g).

“Ulster Limited is the wholly-owned subsidiary company of Ulster University. And it's the company through which we contract with business on it, and it provides us with a company in which we can make investments in companies and do deals with business. It gives us a degree of protection outside of the university, but it's benefiting the university” CATA-ULUK-1

5.6.1.4 Active student union bodies

Both institutions have student unions that are part of the organisational structure and are represented at the highest level of institution management, making important decisions. They can influence the agenda of their respective institutions, but they also play a vital role in driving the third as they are the first port of call for students with business ideas and need support to develop them further. Ulster University Student Union (UUSU) Enterprise Centre is a student service delivered in partnership with the Department of Research and Impact. It helps students explore and exploit entrepreneurial ideas by providing access to funding, mentoring services, expert and professional advice.

There are numerous examples of successful ideas from students that have become successful businesses. Examples include, Sock-Aid by Sarah McAnallen; while studying Product Design

at Ulster University, Sarah was inspired by her mum and designed a product that allows people with restricted ability to put on their socks with one hand, while in a seated position and without the need to bend down (Best-Of-Belfast, 2021). UUSU supported Sarah to get access to funding, professional support to turn her idea into a reality.

“Sarah contacted us (UUSU) after she had finished that module because her lecture had said to her there's commercial potential there (her product design concept). We (UUSU) worked with Sarah then to build a prototype; the university provided fireflies and pines after winning a pitch competition and provided £5000 for Sarah to develop (enhance) her prototype. We (UUSU) also had another grant to help Sarah go to Night X. Night X is the world's largest disability trade show. Sarah pitched to the university to receive some money have allowed her to launch her product at that trade show in March 2019” CATC-ULUK-2

UU Student Union (UUSU) supports students with business idea development to turn them into viable business ventures or to signpost them to the right support by offering services. These include one to one coaching, mentoring, delivering a suite of entrepreneurship programmes such as female entrepreneurship programme, new skills development programme and Co-Founders entrepreneurship programme delivered in collaboration with Catalyst to acquire and enhance student’s entrepreneurial skills at the same time helping them to develop a network of support (social capital).

In partnership with Santander Universities, UU launched the Student Enterprise Fund intending to remove the barriers student entrepreneurs face in the early stages of realising their business ideas while providing opportunities for other students to participate in one of these projects through freelance work or by being self-employed. For instance, Santander funding helped UU empower and enable students to develop, start-up and grow their business ideas through competitions, grants, training, mentoring and networking, including Sarah McAnallen, who designed Sock Aid and Gareth Irvine, who founded The Copeland Distillery.

UU has also partnered the global law firm Allen & Overy to develop future legal professionals and improve much-needed access to justice in Northern Ireland. Allen & Overy provide scholarship that also covers course fees to students enrolled on the LLM Access to Justice course, which not only gives them the opportunity to work in the Law Clinic that offers free legal advice on social security and employment law problems to those who, under normal circumstances, would not have access to such support.

At QUB, Enterprise SU is part of the Student Development Team in Queen's University Students' Union and the entrepreneurial arm of Queen's Students' Union, which helps students develop enterprise skills through short (in-lecture) sessions to promote entrepreneurial behaviour and entrepreneurial learning, and action.

“We try very much to get students thinking in their kind of career as well, so a lot of students think that starting a business isn't for them because you're studying geography.”

We are like right although you're studying geography, there are so many opportunities for you out there, but an employer wants to see that you have that kind of entrepreneurial skills and no matter what, what kind of job you go for so they want to see creative thinkers they want to see team leaders they want to see people who can project manager, all that kind of stuff and kind of get them thinking differently but the entrepreneurship side of things” CATC-QUUK-2

Externally, QUB students get support from Belfast enterprise academy, a programme funded by Belfast City Council to support students develop viable business ideas and business plans with the help of business professionals and industry experts. QUB is in partnership with Santander Universities to offer financial support (£800 - £3000) through Santander Entrepreneurship Fund to help Queen’s student start-ups and entrepreneurs who have been directly, or indirectly affected by the COVID-19 pandemic. The funds are available for all business ideas, regardless of the area or industry, and to be eligible for the funding, you must be a current Queen’s student or have graduated in 2020.

“We had a guy a couple of weeks ago, and he won £30,000 in the Santander emerging entrepreneur awards, which is UK wide competition. And, and he won Dragon's Den two years ago, and I think he won £6000. Altogether he's won about £130,000, but he's an undergraduate student in engineering ” CATC-QUUK-2

5.6.1.5 Entrepreneur In Residence

QUB has Entrepreneur In Residence (EiR) within the Medicine, Health and Life Sciences Faculty, who spends one day a week mentoring and advising researchers on entrepreneurship, spin-out opportunities and development of academic-commercial partnerships in the biotech and biopharma industry (QUB, 2021e). The EiR scheme, part of the Science, Industry and Translation programme, aims to increase UK universities' knowledge and awareness of cutting-edge industrial science, research, and innovation. The role of EiR in part involves exposing university staff and students to state-of-the-art industrial research and development and the scientific challenges faced by the industry, providing support and expert advice aimed at promoting innovation and the translation of research by universities. However, such a scheme is not available at UU.

“We have an entrepreneur in residence as well, so for students, businesses are a little bit more complicated, and our entrepreneur residence runs three of our own businesses. And she gives lots of help and advice too” CATC-QUUK-2

5.6.2 Collaborations and strategic partnership

The study found that policies to govern collaborative arrangements between universities and external organisations support organisational priorities in research and education. For QUB, the university's Academic Council has delegated responsibility for approving agreements between the university and a collaborating organisation to the Education Committee or Research and Postgraduate Committee as appropriate. There are significant strategic agreements; these must be approved by Academic Council and Senate (QUB, 2021a). QUB is

a member of the prestigious Russell Group and has ties with several top universities in the UK and Ireland.

At UU, The Charter of the University enables it to join or co-operate with any other university, place of learning or other body in pursuit of its objectives and all-new collaborative arrangements must adhere to the University's Principles for Collaborative Partnerships and align with the priorities identified in the university's 5and50 Strategy (UU, 2020b). There are various collaborative arrangements between universities and external organisations through a wide range of programmes to achieve third mission objectives. UU has a three-year strategic partnership with PwC delivering expertise on employability and skills required for the future of work via the Ulster EDGE skills awards and direct partnerships with Faculties and Central Departments. (UU, 2021i).

Both UU and QUB have numerous Knowledge Transfer Partnerships (KTP). KTP is a subsidised three-way partnership between a business, a high-calibre graduate and an academic institution that enables a company to bring in new skills and the latest academic thinking to deliver a specific, strategic innovation project through a knowledge-based partnership. KTP programmes are highly regarded within both institutions because of their social and economic impact. KTP Programmes have been the foundation for many research and teaching successes as they facilitate knowledge transfer and bridge academia and industry. Additionally, for industry, it is a cost-effective way to attract fresh talent from the industry and access the expertise in universities and colleges to deliver strategic, innovative solutions to achieve business growth.

UU is highly ranked among the UK's Knowledge Transfer Partnership (KTP) providers, having managed 220 KTPs since 1995 (UU, 2018). QUB, on the other hand, has 430 partnerships with businesses, with over 80% of KTP Associates (graduate or postgraduate) being offered a permanent position at the end of their project. QUB KTP team is top in the UK for the number of live projects, and last year it won Best Knowledge Base Team at the 'Best of the Best Awards in London. QUB has won 19 National KTP Awards in total.

“Commercialisation of innovation strand of work is very important to the university. It's linked to its key role as an economic driver within the region, and Queens is relatively successful at that in terms of the amount of commercial activity that it supports a number of KTPs. We have a lot of ktps, this quite a lot of. There's been at least two major successes and spin-off companies.” CATA-QUUK-5

UU strategically collaborates with national and international organisations and businesses to design bespoke academic programmes, offer training to upskill the community and enhance their employability and entrepreneurial skills. With close collaboration with global companies such as PwC, UU developed bespoke postgraduate programmes to address the needs of the modern economy and launched the UK's first master's degree in Professional Services Operational Delivery. UU also worked closely with Novosco to develop future IT skills by giving opportunities to school pupils from around Northern Ireland the chance opportunity to work with IT engineers from Novosco and specialist lecturers from the School of Computing,

a leading IT business, as part of a summer initiative to develop future computing skills (UU, 2019).

QUB is part of Russel Group, 24 public research-intensive universities with a common focus on performing excellent research and achieving academic superiority. To effectively address the societal and economic challenges, QUB is globally connected and networked with strategic partnerships worldwide, focusing on projects with significant impact beyond the academic world, whether this is economic, social or cultural.

“We will focus our efforts on high-quality international partnerships, in areas of strength, which will support our priorities in research and education. We will explore partnerships that allow us to embrace opportunities we could not access alone, with partners who are eager to support initiatives that take us forward in our mission, and in so doing help deliver the growth and global reach of the university.” (QUB, 2020c, p. 13).

QUB established four Global Research Institutes (GRIs) that brings together a critical mass of excellent researchers from a wide range of disciplines within and outside the university, partners in other institutions and others from outside the academic world both regionally and globally to tackle some of the most significant global issues (QUB, 2021d). The establishment of GRIs signals a clear indication of what QUB what to achieve and the impact it wants to make not only regionally but internationally in helping to build a stable, prosperous and civic

society. Through research, education and civic engagement, The Senator George J. Mitchell Institute for Global Peace, Security, and Justice aim to make a difference in the lives of ordinary people in post-conflict settings by empowering them to realise fairness, justice and tolerance (QUB, 2021g).

5.6.2.1 Nascent entrepreneurship programmes

There are numerous entrepreneurship programmes at QUB and UU for academics and/or graduates to enhance their research commercialisation capabilities and promote entrepreneurial culture internally delivered through their affiliated companies. iCURE (Innovation-to-Commercialisation of University Research) is a 4-month full-time online pre-accelerator programme that provides up to £30,000 for university researchers with innovative ideas to get out of the lab' and validate their ideas in the marketplace. The European Institute of Innovation and Technology (EIT) Food Seedbed Incubator Programme is delivered by EIT Food Partner Universities (of which QUB is part). The Research and Innovation Organisations, is a pre-accelerator programme focused on scaling technologies for applicability in the agri-food sector using its vast connections with industry to support researchers, scientists and entrepreneurs launch or progress a commercially viable business based on market need. Lean launch programme is an innovation and commercialisation programme funded by Innovate UK, for the north of England, Scotland, and Northern Ireland; it buys out postdoctoral researchers' time and enables them to go on '*market discovery journey*' and look at the commercial feasibility of their research or other technology.

“iCure programme funded via Innovate UK is I focused around the north of England, Scotland and Northern Ireland. It's basically a network of universities where they Scope really good technologies come out of those universities and again the same principle, provide training and coaching and mentorship to take them through this market discovery journey. At the end of each programme, we look at what are their next steps, and some of those next steps are linked to follow-on funding in order to progress the idea for technologies and help move them up the TRL scale and closer to commercialisation” CATA-QUUK-1

The proof-of-concept programme that many academics from both institutions prove the advancement of the possibility of their patent locally funded by a local enterprise agency, Invest Northern Ireland (Invest NI). There is also Proof-of-Principle programme to support projects with significant potential to deliver economic impact by providing short-term investment to develop early-stage ideas. There are some preliminary findings, moving them to the proof stage, thereby validating the commercial potential. UU has a free *SO SHE DID* female entrepreneurship programme that helps female students identify business opportunities, validate their business ideas, and start a side-hustle or new venture. It also provides service users with a business mentor who will be an Ulster alum and/or member of the business community to help them develop their business proposals. There is also a Young Enterprise Start-up programme, a competition between students from different campuses to set up a business for an academic year. The winning team will represent Ulster University and Northern Ireland at the UK Final at the end of semester 2 in London.

5.6.2.2 Community Engagement Programmes

In addition to the third mission activities, the study identified activities that focused more broadly on civic and societal issues. As a civic institution, UU aims to create shared spaces for education that can bring together communities, raise aspirations, and widen participation for young people in Northern Ireland. UU has The Centre for Flexible Education that offers a wide range of personal and professional courses and works collaboratively with individuals, business, industry, and third sector organisations to identify learning needs, provide training courses, develop bespoke programmes or accredit workplace (UU, 2021d). Such programmes include Community Fellows, Schools Outreach, Community Engagement, and Professional and Continuing Education. *School Outreach Academy* is a programme through which UU engages with primary and secondary schools across Northern Ireland to raise aspiration, widen participation, and increase attainment across primary and post-primary sectors in preparation for engagement in higher-level learning. This programme is delivered via Open Education by Blackboard to support students and schools in learning new skills, developing existing capabilities, and reaching goals. It allows students to engage with their chosen subject remotely in the comfort of their homes.

QUB Student Union has Homework Club programme where it has partnered with 20 different community centres and schools across Belfast; they recruit students from QUB to go and help those that are in areas of educational underachievement on an equal split between Catholic, Protestant kind of clubs, so openly, some are not. QUBSU also has a few refugee/migrant clubs where volunteers could teach English. Other clubs teach the Irish language. Every year Homework clubs organise a trip for the children to visit the QUB campus, meet academics

from all sorts of backgrounds; for some children, it may be the first time they meet and play with someone from the other community. This experience helps foster that sense of community and foster the purpose of living in a diverse community with a whole sort of array of people; it also helps to change those prejudices and the stereotypes they hear from their parents or grandparents who lived through the conflict. The experience enables them to develop their own set of beliefs and see things from a different perspective.

“There's a programme called Homework Clubs. We have partnered with 20 different community centres and schools across Belfast. We recruit students from Queens to go and help those communities in areas of educational underachievement. We also have like quite, quite a few refugee migrants we have volunteers who go and teach English”

CATC-ULUK-4

UU has community engagement programmes to fulfil its civic obligation, such as *The Science Shop*, a joint initiative with QUB, a community-engaged research initiative based on collaboration for the societal benefit to create connections between university students and community organisations across Northern Ireland. Both UU and QUB work with a wide range of community organisations to develop their research ideas into projects students undertake through their degrees. Any community member can submit an idea for a project that the university can do research projects for its undergraduate or postgraduate students to work collaboratively with the community to address an issue or issue. This approach further improves inter-group relations as students from different communities come together for a common purpose. According to the 2017-2018 infographic (UU, 2021h), over 900 students

from all four campuses in different disciplines took part in more than 200 projects involving 63 partners, which resulted in 16 dissertations, 46 module projects. Community Education Pathways for Young People and Adult Learners is another programme through which UU, in conjunction with local area-based college partners, enhances their social mobility through short courses, training, and workshops.

The community Fellow programme is another way UU engages with local communities in partnership and delivers positive outcomes in the communities UU serves. Community Fellows play a vital role in supporting knowledge exchange and social innovation between the UU and society, ensuring the community voice is present in the design of educational outreach and associated programmes, delivering and engaging in community education workshops, and enabling continuous improvement of community outreach practice and civic outcomes (UU, 2021a). Civic Ambassador programme is delivered in partnership with the community throughout Northern Ireland. It supports academic staff enthusiastic about improving educational attainment and ambition for both young and adults from under-represented groups across Northern Ireland to acquire vital and vocational skills to enhance their social mobility. In this programme, academic staff are encouraged to be supportive and are encouraged to engage with the broader community to share their knowledge and expertise to address a particular challenge(s) and / or explore a new idea(s) for the societal good.

“It is our job as a university to showcase our academic expertise available for consultancy and interaction with businesses to showcase our facilities, which is the real high end, top-end equipment that can be made available for local entrepreneurs ... we

do engage with what we call 'cultural areas'. So, in my area in Derry city and Strabane, we started to make our economics available for discussion on local radio on Secondary School discussion panels; we also set up local entrepreneurial programmes, where we would join teams advise and make ourselves available to that, as well as trying to push our students, academics towards those programmes to get involved and whether it be in the team, or just to make avail to the local funding” CATA-ULUK-1

In the same vein of raising aspiration and widening participation, UU has partnered with Manchester United Foundation to deliver positive outcomes and provide opportunities for young people across the Foyle Learning Community. It is a 3-year agreement with Manchester United Foundation that will support students in Pupils in Derry (Londonderry) to learn about business development, acquire entrepreneurial skills, increase their engagement in education, and improve their self-esteem and confidence to reach their potential. Foyle Foundation is a grant-making charity designed to support charities registered and operating in the United Kingdom, especially those working at grassroots and local community level, across a wide range of activities (Foyle.Foundation, 2021).

5.6.2.3 Social events

QUB has a Volunteer Department in Student Union that engages directly with the local communities to address various issues through workshops, training and organising social events and activities it holds throughout the year. One of the programmes is Handy Helper, an initiative that enables students to participate in different one-off volunteering activities with local residents and community groups. Handy Helper has been able to collaborate with local

communities to improve the actual physical environment of South Belfast in a project called ‘*Million trees for Belfast project*’. Handy Helpers also regularly tries to address littering issues, especially around June and July when students move out of their private-rented accommodation. This is when items such as furniture, bags, clothing etc. they addressed this issue by launching a donation campaign where those unwanted items are collected and donated to local charities such as cancer and heart charities where they resell them to advance their cause.

“We have started to invite a lot of residents into our other events that are affordable like dinners and, you know, kind of more high up events, and they actually feel like I don't only live here I'm actually part of a part of this Queen's, community” CATC-

ULUK-4

Another social event organised by Handy Helpers is called “*Hello Neighbour*”, where students (both home and international) and local residents are brought together to share their local delicacies. This event offered an opportunity for the group that had not interacted before to have meaningful conversations and realise they have more in common than previously thought. This event has had a positive contribution on the relationship between the university and local community. It is the only department that engages students from both communities on extra-curricular activities implicitly or explicitly promoting peacebuilding, reconciliation, and social harmony.

5.6.3 Leadership

The organisational structure can constrain or inhibit entrepreneurial behaviour (Gibb and Hannon, 2005). The organisational structure in both universities are hierarchical in nature, headed by Vice-Chancellors as Chief Academic and Administrative Officer of the University supported and senior leadership team. Despite the hierarchic governance of both institutions, the third stream, by its nature, is more heterarchical in its organisation and is more flexible and decentralised fashion with the Corporate Plan facilitating rather than dictating third stream strategy (see Table 5.7). The organisational design of both universities nurtures entrepreneurial behaviour via the decentralisation of decision-making and strategic and operational responsibility, the associated flexibility in integrating strategies and actions, and the degree to which individuals are empowered and supported to engage in third mission activities. Several autonomous organisational units overlap in function in which decision-making authority is delegated via formally designated channels with some level of devolution of financial control. Smaller structures and systems are generally more responsive and adaptive than larger ones (Burns, 2005), and as large organisations, universities are renowned for being bureaucratic.

Table 5.7: Institutions management organs

Name of institution /Management organs	Role and responsibility	Queen's University Belfast	Ulster Univerity
The Chancellery	<ul style="list-style-type: none"> • Ceremonial and ambassadorial head of the University. • Presiding over academic ceremonies 	X	X
Supervising Organ	<ul style="list-style-type: none"> • Has the power to make and amend its Statutes and Regulations for the 	X	X

	general government of the University • Link between the owner and institution		
The Council of the institution /Board of governors	• Management decision making organ	X	X
The Office of Vice Chancellor	• Coordinate daily activities of institutions • Implement decisions by The council • Prepare action plan and budget proposal	X	X
The Senior Management Committee	• Advisory body to the office of Vice chancellor on academic affairs, education, planning, financial management, property and administration	X	X
Principal	• To provide leadership, direction and co-ordination within the school.	X	X
The academic senate	• In charge of teaching and research • Assess and monitor academic programmes research and education	X	X
The Faculty Council	• In charge of the co-ordination and follow-up of the activities of the faculty and the smooth running of the organisation	Not reported	Not reported

Source: Author's

People lead faculties, schools, and other organisational units with extensive research and diverse industry experiences, involved in a multitude of collaborative research with academic and non-academic organisations. This gives institutions a competitive advantage through their expansive social capital, knowledge, and skills. Some of the university senior leaders held strategic roles in both private and public organisations nationally and internationally. Some have won prestigious awards in recognition of their outstanding work and contribution to academic research and its impact on society. The table below provides an overview of some of

the university senior leadership teams and their background based on their profiles on their respective universities and LinkedIn.

Table 5.8: NI university leadership professional background

Roles	QUB	UU
The Chancellery	Non-academic	Non-academic
Board of Governors / Directors	Mostly mixed background	Mostly mixed background
Vice-Chancellor	Academic	Mixed background
Pro Vice-Chancellors	Mixed background	Mixed background
Senior Committee members	Mixed background	Mostly academic
Principal/Provost	-	Academic
Academic Senate members	Mixed background	Mixed background

Source: Author's

Institutional structures and decision-making processes enable ideas emerging from individuals and teams through interactions with one another, stakeholder groups and students flow across and within the institution to be implemented into the broader strategic direction of the university. Both university governance and management are not traditional command-control senior management hierarchies but rather network governance which is a more adaptive and agile community of social networks, as described by Purcell and Chahine (2019). Both institutions are led by star scientists/academics who are pro-enterprise and advocate the entrepreneurial and enterprising ambition of the university. The Entrepreneurship Manager's

reflection illustrates this about leadership style and impact on decision-making processes “*we are nimble, it means we can make decisions and collaboration quicker than a bigger department could, we adapt quickly, we make changes, we are constantly casting generating new ideas, and that helps*”. This type of leadership reflects entrepreneurial leadership that transcends institutional barriers, forward-thinking, agile, adaptive, and responsive. Such a university’s entrepreneurial architecture allows cross-fertilisation and the flow of ideas to be generated, iterated, communicated and rejected or selected in line with the strategic direction and priorities of the organisation.

5.6.3.1 Leadership dynamics and Teamwork

To achieve the objectives of the third-stream mission, the study found some evidence pointing to the internal coordination that is heavily dependent on the initiative and agency of strong actors (managers, directors, HoD, researchers, etc.) to drive and steer the development of the third mission who play a key role in establishing a coherent strategy for organisational growth. The success of the structure and systems can be attributed to the organisational unit managers who are continually planning, designing, evaluating, and overseeing third-stream activities, how they relate to each other, and contribute to the institution's overall entrepreneurial mission. Such evidence is demonstrated by how those actors describe their role and responsibilities vis-à-vis the third mission objectives of their respective institutions. For instance, CATA-QUUK-1 was “brought in” to set up this EIT Seedbed programme, and her role within the university sits within the Lean Programmes Team. A Professor at UU shared his contribution in re-focusing entrepreneurship education by championing Entrepreneurial Learning and Practice.

“I'm actually now involved in developing an education strategy in the University at this moment, and I am the entrepreneurial lead for the university and based on what we have been doing” CATA-QUUK-2.

“My colleague and I are managing probably about five or six programmes to support students and developing entrepreneurial skills. We start with the light touch programmes in which we bring in inspirational guest speakers. We try to get a lot of local and successful entrepreneurs, and they share their (entrepreneurial) journey. They talk about where they started and how their career has evolved and changed throughout their life, and then where they are now” CATA-QUUK-2.

5.6.3.2 Institutional drive

Generating knowledge does not necessarily lead to knowledge spill-over (Audretsch, 2014), it requires coherent strategies and actions by institutional actors that influence structures, systems and conducive organisational culture to facilitate the transfer of technology and knowledge spill-overs. There is a high degree of coordinating and consolidating required. The entrepreneurial architecture is derived from a number of key institutional actors, including the current Vice-Chancellor and Pro-Vice-Chancellors along with the directors and managers of the organisational units mentioned that have collectively created a culture and vision of third-stream development that is both ambitious and flexible, with an emphasis on coordination and forward-thinking.

“We try to get we get the academics and maybe the researchers who work on the project to come in, we give them training on how to go out and meet customers, how to develop a business model, and then we give them some funding. They manage a lot of the commercialisation, we mentor them, but we put the ownership on them to go out and find the customers. The advantages of that are they obviously know the technology better than we do, so they have that conversation with companies.” CATA-QUUK-4

Octopus Report ranks QUB in the top position in an Entrepreneurial Impact report ahead of the University of Cambridge because of *“its highly effective approach to developing spinouts, with a key focus on ‘customer discovery’*. This is achieved through enterprise programmes such as *Innovate UK’s Innovation to Commercialisation of University Research (ICURe) programme, that help surface early-stage promising research projects and sets them on a path towards commercialisation”* (QUB, 2020b). Whereas at UU, there have a team of people who work on business partnering, and they have businesses involved in their large-scale projects, and they have about 14 companies that they have invested in their own equity.

5.6.3.3 Institutional focus

Both institutions have Pro-Vice Chancellors and professional support directorates that focus on different university key strategic priorities and participate in shared executive responsibility for their respective institutions' corporate leadership, management, and development. QUB is currently developing a new Strategy that will articulate its ambitions for the next ten years and set a framework for delivering key priorities. The Graduate School has been tasked to lead on entrepreneurship strand of the education strategies because of its successes since its creation in

2015. The Graduate School developed a whole host of activities that support students in developing key skills and, working in multidisciplinary teams to come up with creative solutions to real-life challenges.

“Research and Enterprise is a directorate, professional services within the university that support a broad remit of things within the university. Looking after the university's research portfolio, we support the university and its engagement in REF. We look after the allocation of funding across the university for research support. We help academics apply for academic grants. And in addition to all of that, we do the knowledge exchange that ranges from a collaboration with industry on their challenges, through to creating our own companies, licencing opportunities that it's so different every part of knowledge exchange” CATC-QUUK-1

5.6.4 Strategies

Regarding strategies, the study found that some of the Universities' mission statements clearly set out their mission and contribution to the society and economy in various documents and media. The nature of the university, research-intensive or otherwise, have a lot of bearing on its strategic focus. University's strategic orientation is laid out in its corporate plans and other guiding documents (annual and financial statements) containing a list of organisational goals and avenues through which these aims will be pursued (Nelles & Vorley, 2010a).

5.6.4.1 Mission statements and strategic plan

QUB and UU have highlighted their pivotal role in the local Northern Ireland economy through the direct and indirect contribution to employment, the supply of highly qualified graduates, and its engagement with local business and industry. Such is demonstrated by their strategic plans and mission statements as elaborated in their corporate plans.

UU mission is *“to deliver outstanding research and teaching that encourages the innovation, leadership and vision needed to help our community thrive.”*

QUB’s mission is *“to equip leaders to transform local and global business and society through education and research.”*

The study found that some of the Universities’ mission statements clearly set out their vision that shapes their identity, purpose, and direction, articulating the organisation's philosophy to its internal and external stakeholders. Table 5.7 shows the analysis of mission statements of participating institutions using Pearce and David (1987) eight components, and both institutions score highly in including key components of a mission statement. The clarity of the strategic ambitions in both universities is reflected in how entrepreneurship is conceptualised and supported by institutional architectures that set a clear path for the academic community to explore and exploit entrepreneurial opportunities.

Table 5-6: Description of Northern Ireland Universities' mission statements

Name of institutions / Mission statement components	QUB	UU
The specific of target customers and markets	3	3
The identification of principal products/services	3	3
The specification of geographic domain	3	3
The identification of core technologies.	2	3
The expression of commitment to survival, growth, and profitability.	1	1
The specification of key elements in the philosophy.	3	3
The identification of self-concept	2	3
The identification of desired public image.	3	3

Source: Table adapted from Fitzgerald and Cunningham (2016)

Scale

- 1 = the statement does not include the component
- 2 = the statement includes the component in vague terms
- 3 = the statement includes the component in specific term

Using Pearce and David (1987) model for the analysis of components of mission statements, the study found all mission statements have in explicit terms key elements of their philosophy, their service offering “*deliver outstanding research and teaching that encourages the innovation, leadership and vision*”, “*outstanding teaching and learning*”, desired public image “*Northern Ireland’s civic university*” “*global research-intensive university*”, their intended customers “*community*”. For their geographic domain, QUB statement can be interpreted as vague compared to UU “*As Northern Ireland and our community*”. UU goes further to identify itself concept as “*outstanding*”. However, both institutions score the minimum points for the lack of specificity on their commitment to survival, growth and profitability. However, their financial soundness is elaborated in their respective annual reports. UU statement is closer to

being a perfect mission statement as per Pearce and David (1987) model based on its high score almost in all areas. In general, both mission statements clearly set out the vision and ambitions of the institutions, which are third mission-oriented – a clear signal of their entrepreneurial intent.

For both institutions to fulfil their missions (teaching, research and entrepreneurship), they have set out how they will achieve them in their strategic plans and critical indicators (Table 5.8). QUB’s strategy 2030 sets out the university’s ambition for the next ten years provides a roadmap for QUB to enhance its role and impact on social and economic development aligned to the United Nations Sustainable Development Goals (QUB, 2020c). Whereas UU Five and Fifty vision (Five Year Strategic Plan Fiftieth Year Strategic Vision) is structured around four priorities; Civic Contribution, Global Vision, Academic Excellence, and Operation Excellence (UU, 2021b).

Table 5-7: Strategic plan and key indicators

	Strategic focus	Key indicators
QUB 2030 strategic plan	Education and Skills <ul style="list-style-type: none"> • Deliver a transformative student experience • Provide an education for societal impact • Broaden access to Higher Education 	<ul style="list-style-type: none"> • Our people - Be among the leading universities for equality, diversity, and inclusion • Our curriculum - Educating global citizens through a transformative student experience

	<ul style="list-style-type: none"> • Innovate our Teaching and Learning <p>Research and Innovation</p> <ul style="list-style-type: none"> • Strengthen our research portfolio • Enhance our research collaborations • Address real world need • Foster a creative, inclusive, and collaborative culture <p>Global Reputation and Partnerships</p> <ul style="list-style-type: none"> • Offer an international experience • Enhance our international networks and partnerships • Advance our global alumni engagement • Lead and shape the agenda on social transformation <p>Social and Civic, Responsibility, and Economic Prosperity</p> <ul style="list-style-type: none"> • Enhance future economic growth and prosperity • Drive social change • Achieve a better and more sustainable future for all • Transition to a zero-carbon society 	<ul style="list-style-type: none"> • Our staff - Invest in staff and enhance pride in the University • Our global reputation - Be ranked in the top 175 in global league tables • Our students - Be a destination of choice for talented students, growing international recruitment and diversity • Our research - Be among the UK's leading research-intensive universities • Our global impact - Be a top 50 university for our global impact • Our innovation - Develop further our outstanding track record in innovation and technology transfer • Our social responsibility - Deliver our commitment to widening access and sustainability • Our financial sustainability - Generate an annual surplus for reinvestment
UU Five and Fifty	<p>Civic Contribution</p> <ul style="list-style-type: none"> • Employment and Widening Access • Social and Economic Development • Campus Identities • Meaningful Networks <p>Global Vision</p> <ul style="list-style-type: none"> • Global Citizenship • International Networks • Global Challenge, Local Impact • Diverse University Community <p>Academic Excellence</p>	<p>Be a leader in the social, economic and cultural development of Northern Ireland</p> <ul style="list-style-type: none"> • 5 Year - 40% participation rate by students from less affluent family backgrounds • 50 year - Double the number of students who originate from the most under-represented groups in higher education <p>Consistently a top ten in UK for student satisfaction and 90% of academic teaching staff HEA-accredited</p>

	<ul style="list-style-type: none"> • Teaching Excellence • Student Experience • Research with Impact • Researcher Development <p>Operational Excellence</p> <ul style="list-style-type: none"> • People and Culture • Reputation • World-Class Infrastructure • Financial Sustainability 	<ul style="list-style-type: none"> • 5 Year - 88% undergraduate progression rate • 50 year - 95% undergraduate progression rate <p>Ratio of 2:1 for research students to academic research staff</p> <ul style="list-style-type: none"> • 5 year - 50% increase in research active staff • 50 year - Double the number of research active staff <p>Consistently in the top 10 for international student experience</p> <ul style="list-style-type: none"> • 5 year – Double the number of international students • 50 year – 20% of Ulster students are international
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Source: (QUB, 2020c; UU, 2021c)

5.6.5 Culture

The study found evidence of a positive attitude towards and propensity for the academic community to engage in entrepreneurial activities in both universities, supported by leadership pro-entrepreneurship attitude complemented by organisational architectures. Organisational culture in Northern Ireland universities and other UK universities are third stream-oriented due to the Research Excellence Framework (REF). Their outcomes are used to inform the allocation of public funding for universities' research. Externally, the study found some evidence of a lack of appetite to engage in entrepreneurial activities in the Northern Ireland community, which permeate to university campuses.

5.6.5.1 Institutional culture

The institutional key actors' attitudes influence institutional culture at QUB and UU and the value they place on innovation and their entrepreneurial orientation. This is illustrated by the presence of various structures and policies that support and encourage students and staff across stages of entrepreneurship and an effective reward system. To enhance entrepreneurial culture, both institutions provide intervention programmes aimed at a different group such as academics (iCure, EIT Seedbed Programme), postgraduates, undergraduates (Young Enterprise Start-up, Female entrepreneurship) to alleviate fear and increase their propensity to engage in entrepreneurial activities. This is encapsulated by the comments made by Queen's University Pro-Vice-Chancellor for Research and Enterprise, Prof Emma Flynn, while discussing female entrepreneurial success at Queen's University Belfast and the role that women are playing to drive innovation in the university and beyond

“It is our role to develop and nurture the innovators and leaders of the future. We want to see innovators flourish, within both research and enterprise, whether they exist in our student and academic bodies or our wider community.”

QUB and UU are part of the wider UK higher education system, which is third mission oriented. REF is used as a benchmark to allocate public funding to universities for research (Watermeyer & Chubb, 2019). These external pressures on universities directly influence institutional culture, as indicated by one of the entrepreneurial organisational unit managers. This has heightened the importance of entrepreneurship as more government research funding is coming through such programmes.

“Legitimate pathway for the research to get out and show impact in society. So that pathway is being pushed by the research directors and their heads of school, that when they write the case studies for REF that this is a legitimate pathway, and it's one of the best ways to show that the research means something society” CATA-ULUK-4.

5.6.5.2 Academic entrepreneurial culture

The study found that both institutions have entrepreneurship programmes to equip academics with entrepreneurial skills and competencies to spin-out companies from their research. QUB has Enterprise Team. Its focus is on supporting academics, scouting technologies and providing different interventions, including the Seedbed programme for EIT Food and accelerator initiative NxNW ICURe (Innovation-to-Commercialisation of University Research) programme, which is led by QUBIS and funded by Innovate UK focused on scaling technologies for applicability in the agri-food sector; Lean Launch which is an accelerator programme for research teams with potential commercial ideas funded by Innovate UK. These programmes are specifically aimed at postgraduates and academics to enhance and develop their entrepreneurial skills. Research and Enterprise at QUB provide wide-ranging support to academic staff, students, industry, and the community from the conception of an idea or technology to a range of knowledge exchange and commercialisation outcomes. Those who have undertaken those entrepreneurship enhancement programmes demonstrated how beneficial they are to academics and the impact on the wider community outside academia.

“There are really good ambassadors to help spread a positive message about, what, how you can, as a successful academics can also develop a successful spin-out company. The more stories and experiences and case studies that are shared then it just gives that next generation confidence that it can be done and the support programmes are there, through lean launch and iCure” CATC-QUUK-1

5.6.5.3 Societal culture

Societies coming out of conflict tend to be unentrepreneurial because they are often characterised by high levels of tolerance of risk-taking, financial obstacles, lack of institutional support and human capital (Williams & Vorley, 2017). Therefore, they essentially consider employment a stable, trouble-free way of earning a living. There is a predominance higher proportion of people in Northern Ireland employed in the public sector, than in the wider UK. This overreliance on public sector jobs inhibits people in engaging in entrepreneurial activities inside and outside academia associated with some level of risk-taking. The negative societal attitude towards entrepreneurship is reflected by the comments made by different research participants from both universities.

“There is a reluctance to go into risky environments, so there's a feeling that has held back entrepreneurialism in Northern Ireland for a long time with people. the idea of starting your own company, and not knowing would still be employed in a year time is not appealing to a lot of people in Northern Ireland” CATC-QUUK-1

The same sentiment and observations were shared across a wide spectrum of academic communities and actors. These included a manager who worked in an enterprise agency. The manager indicated that the culture in Northern Ireland is not very entrepreneurial and many people do not see entrepreneurship as a viable career option. Despite running numerous programmes in local communities he considered it difficult to get people to think more entrepreneurial and about setting up their own business because it was, in his view, very much a culture where people go and get a job.

“I think the culture in Northern Ireland isn't very entrepreneurial. So I think a lot of people and don't see entrepreneurship as a viable option, and even in my previous work in enterprise agencies.” CATC-QUUK-2

“I'm not necessarily sure that there is that much entrepreneurship in Northern Ireland. It's a big issue in Northern Ireland the lack of entrepreneurship” CATA-ULUK-3

5.7 Entrepreneurial university conditioning factors

The study found that QUB and UU are endowed with highly-skilled, capital and technological resources that enable them to contribute to their immediate regions significantly and beyond. Both universities have highly skilled human capital with the most advanced technologies, state-of-the-art buildings, diversified sources of revenues and seek to address the long-term needs of society and supply research-based knowledge, which is similar to other entrepreneurial universities in a developed economy. Internal resources and capabilities are used as levers for competitive advantages and an attraction to inward research investment.

5.7.1 Human capital

Human capital is the key contributor to the development of productive and sustainable EE in Northern Ireland as well as enabling universities to make considerable progress in achieving their third objectives and is regarded as one of the levers for sustainable competitive advantage because of its unique knowledge, the way that it is developed, nurtured, and disseminated. As human capital is the most critical source of institutional capabilities, the study reveals that both institutions appropriately leverage this asset to provide optimal value by executing institutional strategy and operational requirements.

Human capital positively contributed to knowledge production and research application performance to address social and economic challenges to the institutions and broader EE. This is evidenced by many patent applications, spin-out companies, and the creation and management of new degree programs to address current and forecasted social, environmental, and economic needs. The experienced and qualified human capital is also responsible for supporting third mission activities through multiple initiatives designed to spread scientific and entrepreneurial culture to support EE development and growth.

“I was part of what is called the Small Business Institute. The work I did there was between the university and the business practitioner community. So, I worked very much with small to medium-sized owner-managers. For example, I also run enterprise development modules on our MBA programme, and for certain that decades, between

1990 and 2000. we began to develop specialised programmes in business development, innovation, marketing, and entrepreneurship. So we're becoming more aware of the importance of focusing on bespoke programmes because, in many respects, the MBA, if you look at it as a programme, is not actually designed to accommodate small business development. It's actually a qualification for professional managers within large organisations.” CATB-ULUK-2

Human capital in both institutions is also credited for enhancing entrepreneurial intention among students by delivering effective entrepreneurship education that provides them with the necessary skills and knowledge needed to successfully engage in entrepreneurial activities as their entrepreneurship-related intellectual capacity allows them to successfully discover, identify, and exploit, and manage entrepreneurial opportunities. Entrepreneurship education is considered as an effective mechanism for linking new knowledge production to the application through venture projects

“People [academics] have leading-edge research skills for capacity building in finance, people management or leadership. Those are things that we teach our undergraduates and are applicable to any organisation” CATA-ULUK-1

“My colleague and I are managing probably about five or six programmes to support students and developing these entrepreneurial skills, by bringing in inspirational guest speakers share their journeys and how their career evolved.” CATA-QUUK-1

5.7.2 Technological capital

Technological capital has contributed immensely to the third mission objectives in innovation and technology-based start-up companies created. Both institutions are equipped with the latest technology and other digital infrastructure. For instance, UU has made a significant investment in MediaLab. This interdisciplinary research facility focuses on virtual production that will help drive R&D for the screen industries and upskill the local sector in Northern Ireland. QUB is explicit in its Strategy 2030 how it intends to enhance its digital infrastructure to support organisational objectives, including the third stream. QUB currently has other industry-standard research infrastructure with the latest technological tools, including Stable Isotope Facility, Architecture studios, Radiocarbon dating, GIS and Geomatics, Rheology Laboratory, and Heavy Structures Laboratory, among others. Some of those research facilities support several disciplines and range from the interactive mapping tools employed by the Centre for GIS and Geomatics (interdisciplinary research and teaching centre for Geographical Information Science and spatial data analysis) to the high precision radiocarbon analyses conducted by 14Chrono (a high precision radiocarbon dating and isotope analysis laboratory).

“We will develop an integrated digital strategy to maximise the organisational benefits of embracing leading-edge technology and enhance our digital infrastructure to ensure an outstanding student and staff experience and international connectivity. Our IT systems and processes will be agile and responsive and meet the needs of staff and students, including flexible working and learning and ensure we have the technology to

*support our role as a hub for innovation and entrepreneurship” QUB Strategy 2030
(QUB, 2020c)*

QUB rolled out Canvas, a Virtual Learning Environment that has been a key platform in supporting university move to online delivery in response to the challenges of COVID-19 and will play a key role in enhancing the student experience. QUB has a state-of-the-art High-Performance Computing facility developed with funding from The Engineering and Physical Sciences Research Council (EPSRC). QUB moved all University staff to cloud-based Office 365, funded; its campus connected to high-speed internet connectivity because of £1m investment for a new WiFi network which will provide a threefold increase in speed on our connected campus, and support for staff and students as they transitioned to study and work from home.

Having industry and state-of-the-art research facilities in various disciplines allows students and academic scientists to conduct leading-edge research. Both institutions are pledging to invest more money to develop ‘digital universities’ that exploit technologies. UU has set out in its FiveandFifty plan to achieve that ambition by creating “a world-class environment and support services on each campus; integrating physical and digital infrastructure so that it is flexible, user-centric and can adapt to a fast-paced changing world”. This will enable UU to achieve its third mission objectives and use technology-based innovation to promote peacebuilding and positive social change by addressing pressing societal issues that innovation could help ease.

5.7.3 Financial resources

The study has found that both universities have diversified sources of revenues, and revenues from research activities are increasing. However, Universities are under pressure imposed by the changing economic environment due to the limited amount of funds that universities receive from national governments, cutbacks in research funding systems resulting in funding gaps that hinder universities from effectively engaging in third mission activities. However, some external actors provide funding for potential research outcomes to help scientists and academic researchers further explore their ideas by providing financial incentives. Such provides a financial safety net for those involved in entrepreneurial activities, thus promoting academic entrepreneurship and overall entrepreneurial culture within the institutions and beyond. Such funding bodies include Invest Northern Ireland (Invest NI), Enterprise Northern Ireland (Enterprise NI), UK Research and Innovation (UKRI), business angels and financial institutions such as Santander.

“The proof of concept is locally funded by a local enterprise agency. It's called invest Northern Ireland. It's a programme that a lot of our academics to technically prove the advancement of their possible of their patent or their ID” CATA-ULUK-4

“We get a good bit of funding from Santander Bank, they fund us for proof of concept/prototyping grants...these grants are around £500 they help students take that idea one stage further” CATA-QUUK-2.

In 2019/20, total revenue for UU was £214.6m, with an 8 % increase in research revenue to £31.5m and 13.6m earned from other sources (UU, 2020a). The components of UU income include tuition fees and education contracts (£85,288m), funding body grants (£82,693m), research grants and contracts (£31,498m), other income (£13,596m), investment income (£943,000), and donations and endowments (£601,000). According to the Annual statement 2019/20, £27.6m was allocated to research grants and contracts, £35.4m was allocated academic services. Among UU expenditure include grants to Ulster Union Student's Union (£1,167m), research sub-contracting (£3,534m) and consumables and laboratory equipment (£2,665m).

QUB 2019/20 income was £377m from Tuition fees, support grants and education contracts (£126,651), Government grants (£99,318), Research grants and contracts (£88.7m), Other income (£54,335), Investment income and donations (£3,577), and donations and endowments (£4,434) (QUB, 2020a). During 2019/20, QUB allocated £10,043m to consumables and laboratory expenditure, £9,805m to equipment and equipment maintenance, £10,463m to collaborative research, and £ 34,532 research grants and contracts.

5.8 Chapter Summary

The chapter identified similar non-linear stages of the entrepreneurial ecosystem as in Rwanda; embryonic, destruction, formation, and capacity building. Those stages are aligned to the key historical events. The Troubles in Northern Ireland started in the late 1960s and ended with Belfast Peace Agreement in 1998 – referred to as the Belfast Agreement. However, the intensity and level of destruction to the structures of the universities and the broader political

and economic structures as Northern Ireland is part of the UK and benefited from the union economically and politically during the Troubles. Northern Ireland also greatly benefited from the USA and European Union in terms of peacebuilding and reconciliation projects.

The chapter explored the interpretation of entrepreneurship and entrepreneurial university from different key institutional actors that shape the provision for entrepreneurship education and the entrepreneurial architectural support for university-based entrepreneurs across four stages of entrepreneurship (latent, emergent, launch and growth). Finally, the study demonstrates institutional factors that enable entrepreneurial universities to develop their third mission objectives in the entrepreneurial ecosystem in developed and post-conflict environments, including leadership, structures, systems, strategies, culture, and internal capabilities with societal culture as a hindrance.

Chapter 6: Discussion

6.1 Introduction

This chapter discusses the findings of the study presented previously in Chapters 4 and 5. The purpose of this chapter is to discuss how the findings contribute to knowledge in relation to the existing literature. Whilst there is an increased interest in entrepreneurial universities, there is little focus on looking at them from a post-conflict context. Many empirical studies are based around well-established universities in a stable environment and well developed (Cunningham & Link, 2014; Guerrero & Urbano, 2012; Kirby et al., 2011; Martin et al., 2019; Sá et al., 2018; Urbano & Guerrero, 2013). Therefore, the contemporary body of the knowledge about the development of entrepreneurial universities is based around well-developed economies and well-established institutional environments that have well-established attributes and capabilities with less focus on less stable and post-conflict environments.

The chapter discusses the empirical findings and how they address the research questions, it contrasts major similarities and differences across the two case studies and contextualises the conceptual framework (see Fig 3-3) to analyse the conceptualisation and evolution of entrepreneurial universities in a post-conflict environment, organised around the research questions. Section 6.2 discusses how entrepreneurial university conceptualised and interpreted in post-conflict environments. Section 6.3 highlights factors encourage or hinder the dynamics of the process to become an entrepreneurial university in post-conflict environments. Section 6.4 demonstrates the role of entrepreneurial universities in the development of entrepreneurial

ecosystem development in post-conflict environments. Lastly, the chapter highlights the tension between university and government in the operationalisation of the third mission.

6.2 Understanding the development and the role of entrepreneurial university in post-conflict

The current understanding of entrepreneurial university is predominantly dominated by stable and well-developed countries' contexts in which universities have expanded their role beyond teaching and research to include the third mission - a contribution to regional and national economic development through commercialisation and knowledge transfer (Cunningham & Link, 2014; Guerrero et al., 2014; Martin & Turner, 2010; Trequattrini et al., 2018). However, the social cohesion element of the third mission is often taken for granted, as such societies have not experienced conflict in their recent history. It, therefore, does not provide a full picture of its evolution as it focuses more on economic output but places little emphasis on social cohesion that enables knowledge co-creation and transfers with the community and industry. The third mission in a post-conflict context is further developed to both explicitly and implicitly include the role of restoration of social connections (peacebuilding) and reconciliation in addition to the entrepreneurial agenda. Peacebuilding and reconciliation are a fundamental part of entrepreneurial university conceptualisation and implementation in a post-conflict environment that has not been considered before in the existing body of literature because it focuses on a well-developed country context. The study addresses the research questions in the following ways:

6.2.1 Conceptualisation of entrepreneurial university in post-conflict contexts

The conceptualisation of entrepreneurial university in post-conflict affirms what has already been posited in the existing body of literature with regard to the third mission focus of economic contribution (Abreu et al., 2016; Knudsen et al., 2021; Rinaldi et al., 2018; Rothaermel et al., 2007; Sá et al., 2018), culture (Lahikainen et al., 2019; Senelwa et al., 2016), structures (Bronstein & Reihlen, 2014; Cunningham et al., 2021; Etzkowitz, 2003; Li et al., 2020; Walsh et al., 2021), architectures (Martin et al., 2019; Nelles & Vorley, 2011). However, there is a lack of clarity of how entrepreneurial universities evolve and develop in less stable and post-conflict environments.

The study extends our understanding of the third mission in post-conflict contexts empirically by demonstrating that third mission has expanded (extended third mission) beyond the realm of entrepreneurship and entrepreneurial activities to include peacebuilding and reconciliation, which the study refers to as '*the extended third mission*'. Entrepreneurial universities use the extended third mission as a lever to nurture peacebuilding and social cohesion, at the same time contributing to the regional/national social and economic development (Abdullah et al., 2020; Delgado, 2008; Johnson, 2013; McLean Hilker, 2011). Such a dimension of the third mission is overlooked within the existing entrepreneurial university literature. The study demonstrates that the extended third mission pervades all missions (teaching, research and third mission).

The study contributes to the existing entrepreneurial university literature by bringing a new perspective and contextualised understanding of the conceptualisation of entrepreneurial universities in post-conflict. The existing conceptualisation of entrepreneurial university has

been solely around the third mission, knowledge transfer, technology transfer as well as internal organisation configuration (Audretsch & Belitski, 2022; Cunningham et al., 2021; Fayolle & Redford, 2014; Guerrero, Urbano, Fayolle, et al., 2016; Leih & Teece, 2016b; Link & Sarala, 2019; O'Reilly et al., 2019; Purcell & Chahine, 2019; Roncancio-Marin et al., 2022; Rubens et al., 2017; Senelwa et al., 2016). The study has found that, in post-conflict societies, the conceptualisation of entrepreneurial universities and the operationalisation of the extended third mission is shaped by non-market factors including the nature of the reconciliation pathway, the focus and competitive nature of the higher education sector, and economic factors.

The reconciliation pathway that a country chooses to undertake has a significant impact on how the entrepreneurial universities are conceptualised, and how the extended third mission will be operationalised. For universities that have not experienced or gone through conflict in their recent memories, the social cohesion element of the third mission is not on their radar or not emphasised. Novelli et al. (2015) argue that peacebuilding is not sustainable if there is no reconciliation between two warring factions in order to address historical and present tensions, grievances, and injustices to build a more sustainable and peaceful society. Various academics (Buckley-zistel, 2006; Dalporto, 2011; Friedman, 2012; Graybill, 2001; Reyntjens, 2015, 2016) expressed their concerns of the propagation of official history (singular narrative) particularly with regard to peacebuilding and reconciliation. The UNICEF Innocenti Research Centre indicates that 'authoritarian regimes do not just bypass the critical functions of the education system but they subvert them to their own ends' (Unicef, 2000, p. 12).

The study demonstrates that top-down approach to peacebuilding and reconciliation tend to stifle wide conceptualisation of entrepreneurial university and the operationalisation of the extended third mission. This is because the top-down approach is restrictive in nature and narrow in focus to the reconciliation process that directly and indirectly affect the development of organisational conditioning factors and entrepreneurial architectures that facilitate universities to pursue and achieve their missions (teaching, research, and extended third mission). When the reconciliation approach is inclusive (bottom-up), it supports and encourages wider interpretation and conceptualisation of the entrepreneurial university and the operationalisation of the extended third mission. The bottom-up approach involves the civil society, universities, and non-government organisations that actively participate in the reconciliation process and social cohesion, it also allows divergent thinking and compromises to achieve restorative justice by working beyond a coerced peace. This reconciliation pathway opens up the space for entrepreneurial universities to pursue their extended third mission with little or no restrictions, thus having a broader social (including peacebuilding and reconciliation) and economic contribution.

The study demonstrates that the level of economic development condition the conceptualisation of entrepreneurial university and the operationalisation of the (extended) third mission. Entrepreneurial universities need flourishing and supportive entrepreneurial ecosystem to support their evolution and development (Guerrero et al., 2019; Klofsten et al., 2019; Lahikainen et al., 2019; Link & Sarala, 2019; Rosa Lombardi et al., 2019; María José et al., 2020; Roncancio-Marin et al., 2022; Rubens et al., 2017; Sá et al., 2018). The presence of a large informal sector adversely impacts the conceptualisation and implementation of the

extended third mission because they cannot engage formally with the university in research collaboration, technology diffusion, knowledge transfer and supporting the third mission. The study further establishes that well developed entrepreneurial ecosystems are pivotal to further support the development of entrepreneurial universities and the operationalisation of the third mission. In post-conflict and well developed economies such as Northern Ireland, most businesses and a higher proportion of large companies are innovation active (NISRA, 2020) and this focus on innovation, together with pressure from businesses for universities to be responsive to the needs of the economy, emphasises with an emphasis the skills requirements of industry. Maximising the potential of research and development (R&D) and promoting knowledge transfer is pivotal in shaping the conceptualisation and further development of entrepreneurial universities as they have the capacity and capabilities to invest in and absorb university generated innovation and technology.

The study has also found that the maturity, level of competitiveness and the focus of the higher education sector are pivotal in shaping and enabling further development of entrepreneurial universities. When the higher education sector is comprised of new entrants in the market, such institutions are predominantly focused on the first mission (teaching) and less on the second mission (research). The predominant focus on the university's traditional missions (teaching and research) is primarily shaped by the narrow conceptualisation of entrepreneurial universities by institutional influential actors who are concerned with establishing legitimacy and survival of their institutions not on the entrepreneurial mission of their respective institutions. The study found that conflict-affected and fragile countries lack the capacity and resources to improve quality in terms of modernising teaching and learning facilities,

pedagogical approaches and research, exacerbated by the lack of sufficient resources, public and private research funding bodies, high dependence on tuition fees, insufficient supporting structures and entrepreneurial culture impede the development of the entrepreneurial universities and the third mission. The struggle for rebuilding physical and intellectual infrastructure also underpins the lack of qualified academics and regulatory frameworks that are the backbone of quality provision.

The study highlights that when the higher education sector is comprised of mature and well-developed institutions situated within well-developed entrepreneurial ecosystem, the focus and the nature of competitiveness of the higher education sector are primarily driven by the social and economic impact through engagement with external stakeholders (Jerome, 2020; McCowan, 2018). The study demonstrates that the conceptualisation of entrepreneurial universities in well-developed and post-conflict societies is on par with the other developed and well-established institutions in terms of their contribution to social and economic development with expected norms and culture that characterise entrepreneurial universities (Clark, 1998; Etzkowitz, 2013; Guerrero & Urbano, 2012; Kirby et al., 2011).

6.2.2 Enablers and constraints of entrepreneurial university development

Post-conflict conditions pose different challenges to the evolution and the development of entrepreneurial universities with expected norms and routines. To analyse factors that hinders or facilitate the development of entrepreneurial universities, the study adopted Guerrero and Urbano (2012) conditioning factors and assess to what extent entrepreneurial architectures (Nelles & Vorley, 2011) are embedded into the institutional structures. The expectations placed

on entrepreneurial universities are based upon the creation and dissemination of knowledge and technology to industry and their application which are fundamental for social and economic development (Cunningham & Link, 2014; Guerrero et al., 2015; Kirby et al., 2011; Trequattrini et al., 2018; Urbano & Guerrero, 2013). The study affirms that the level of development of conditioning factors (Guerrero & Urbano, 2012) and the extent to which multidimensional entrepreneurial architectures (Nelles & Vorley, 2011) are embedded in institutional structures to deliver more dynamic, proactive and responsive environment necessary for entrepreneurial action, either socially or economically motivated hold true in post-conflict context.

6.2.2.1 Conditioning factors

The entrepreneurial university conditioning factors in post-conflict contexts are similar to those posited by Guerrero and Urbano (2012) that include environmental (formal and informal) and internal factors (resources and capabilities) facilitate or constrain the evolution and the development of the entrepreneurial universities. Conditioning factors in post-conflict societies establish norms and routines required for the academic community to explore and exploit entrepreneurial opportunities depending on the level of development; the lesser they are developed the greater the challenges they pose to the development of entrepreneurial universities and vice versa.

The study affirms that highly-skilled human resources are one of the most critical elements in the entrepreneurial transformation process (Abreu & Grinevich, 2013; Berggren, 2017; D'Este & Perkmann, 2011; Kirby, 2006; Kirby et al., 2011; Meyers & Sarika, 2011; Rasmussen et al., 2011; Sá et al., 2018). The study found that embryonic stage of entrepreneurial university

development in post-conflict environment is associated with shortages of highly skilled human capital within universities who are key actors in shaping and driving the further development of entrepreneurial universities because of the conflict. At the embryonic stage, the concept of entrepreneurial university is well understood by the institution key actors who responsible to establish structures, strategies and culture to support the development and the evolution of the entrepreneurial university (Coyle, 2014; Leih & Teece, 2016b; Nelles & Vorley, 2011; Purcell & Chahine, 2019).

The study also demonstrates that narrow conceptualisation among key institutional actors poses significant challenges to the development of the third mission and subsequent development of entrepreneurial universities. The situation is exacerbated by the lack of effective structures, strategies, and systems that enable university-based entrepreneurs to explore further and exploit opportunities. Equally, in well-developed and post-conflict institutions, the study found that the presence of highly skilled human capital plays a central role in driving economic growth locally, regionally and nationally through joint/collaborative research, and commercialisation of the research among other academic entrepreneurship activities thereby shaping and steering the third mission (Nelles & Vorley, 2011). Not only do institutional actors actively contribute to social and economic development regionally, nationally and internationally, they have also contribute to social cohesion and peacebuilding in their region and beyond through various community engagement activities and knowledge exchange (Cooke et al., 1997; Gallagher, 2019b; Gallagher, 2016; UU, 2021f). These social and economic contributions complemented with civic agenda demonstrate how expansive the conceptualisation of entrepreneurial universities is beyond the entrepreneurial mission to include civic agenda.

The study affirms that financial dependency is one of key attributes of entrepreneurial universities (Bizri et al., 2019b; Clark, 1998; Guerrero & Urbano, 2012; Kirby et al., 2011; OECD, 2012). The operationalisation of the third mission and the development of entrepreneurial universities in post-conflict and less developed institutions are constrained by a lack of domestic funding to facilitate universities' engagement with external stakeholders effectively. The heavy reliance on tuition fees restricts institutions' financial base to engage in third mission activities or establish entrepreneurial organisational units (Cunningham et al., 2021), hence inhibiting further development of entrepreneurial universities and the operationalisation of the third mission. The study found that the lack of diversified financial sources is also a direct consequence of entrepreneurial ecosystem with weak supporting institutions (Acs et al., 2018; Acs et al., 2017; Cantner et al., 2021; Cohen, 2006; Mack & Mayer, 2016; Mazzarol, 2014; Roundy & Fayard, 2018; Spigel & Harrison, 2018) to encourage and support formally and informally entrepreneurial activities among academic community. The scarce and limited financial resources also adversely impact organisational culture as there are no perceived financial incentives for academic who engage in third mission activities.

Conversely, entrepreneurial universities in well-developed economies, have diversified revenue sources including research grant, research contract, education contract, funding body grants, other investment income that afford them financial autonomy (Clark, 1998; Etzkowitz, 2013; Guerrero & Urbano, 2012; OECD, 2012). The institutions financial dependence enables them to engage in numerous third mission activities, establish and develop entrepreneurial architectures to support academic community through various stages of entrepreneurship

(Cunningham et al., 2021). The availability of different revenue streams for universities is an illustration of a well-developed third mission and the central role entrepreneurial universities play in addressing social and economic challenges. Entrepreneurial universities in post conflict and well-developed contexts have the same financial freedom like their counterparts in stable and developed economies.

The study has found that technology and digital assets are other critical resources to facilitate the development of entrepreneurial universities and the operationalisation of the third mission. Technology and digital assets are used to produce applicable knowledge and foster innovation, train and retrain qualified professionals, conduct, appraise research and promote entrepreneurial projects or conduct territorial development projects in collaboration with other agents in the economic system (Knudsen et al., 2021; Sá et al., 2018; Trencher et al., 2013). However, the importance of technological and digital assets is largely ignored as one of key characteristics of entrepreneurial universities and a lever for competitive advantage. The lack of adequate technological and digital assets is holding back the evolution of entrepreneurial universities and the development of the third mission. However, well-developed and established entrepreneurial universities are endowed with the latest technologies and ICT infrastructure that enable them to conduct most complex research experiments that lead to innovation breakthroughs and spin out companies on the back of them. The presence of industry and state-of-the-art research facilities in various disciplines enable students and academic scientists to conduct leading-edge research – thus facilitating further development of entrepreneurial universities and the operationalisation of the third mission.

Entrepreneurship education increases the awareness of entrepreneurial opportunities and teaches the needed skills to explore and exploit those opportunities through collaboration with industry (Cunningham & Link, 2014; Giones, 2019a), helps the students to learn and identify new business opportunities (Commission, 2016; Cowdean et al., 2019; Lindh & Thorgren, 2016; Morland et al., 2021; Mukesh et al., 2020; Wadee & Padayachee, 2017; Zozimo et al., 2017). The development of entrepreneurial traits requires the presence of processes and mechanisms to overcome persistent pedagogical challenges. In less developed and post conflict contexts, entrepreneurship education pedagogical approach does not explicitly address the entrepreneurial needs or requirements of society at the time (Cope & Watts, 2000; Ratten, 2017; Shepherd, 2004).

Entrepreneurial education pedagogical approach is further constrained by lack of and inefficient structures to support the third mission and the development of entrepreneurial universities. Equally, in post-conflict and more established and mature higher education institutions, the study found the entrepreneurship education pedagogical approach is experiential and immersive (Cope & Watts, 2000; Corbett, 2005; Morland et al., 2021); they provide entrepreneurship programmes to equip students with entrepreneurial competencies to explore and exploit entrepreneurial opportunities and with dedicated enterprise centres in which business start-up spaces such as incubators and learning opportunities for students co-exist (Cunningham et al., 2021; Martin et al., 2019). The study also found a significant presence of successful entrepreneurs (role models) in curriculum delivery to alleviate the fear of engaging in entrepreneurial activities.

6.2.2.2 Entrepreneurial architectures

Post-conflict conditions pose different challenges to the evolution and development of entrepreneurial universities and the operationalisation of the third mission. The embeddedness of the third mission and realisation of institutional development is dependent on universities designing and building entrepreneurial architectures that are institutionally specific (Nelles & Vorley, 2010a, 2010b). This study extends our understanding of entrepreneurial architectures in a post-conflict context and affirms that entrepreneurial architectures including leadership, structures, strategies, strategic partnership and collaborations, and culture are critical components in the evolution and the development of the entrepreneurial university in post-conflict and there are different configurations to their entrepreneurial architectures. The study also confirms that elements of the architecture need to be mutually supportive, and the absence of one aspect may contribute to a weakness in, or failure of, the development of entrepreneurial universities. The implementation of organizational architectures requires the combination and orchestration of different organizational units to holistically support entrepreneurial endeavours and provide some of the appropriate conditions and supports for university-based entrepreneurs through different stages of entrepreneurship to further the development of entrepreneurial universities and the operationalisation of the third (See Fig 6-3 and 6-4) .

Leadership

The study demonstrates that the characteristics and the professional background of university leaders and senior managers play a significant role in the conceptualisation and implementation of the entrepreneurial university and third mission. Entrepreneurial universities' leadership,

directly and indirectly influence further development of entrepreneurial universities based on their interpretation of entrepreneurial university stemming from non-market factors (Doh et al., 2012).

In contexts where there is a significant lack of mixed professional background among senior institution leaders, there tend to be narrow conceptualisation of entrepreneurial universities in terms institutional configurations and social architectures to establish and support entrepreneurial culture, hence impeding further development and evolution of entrepreneurial university. Conversely, when there is a diversity of professional backgrounds among senior institutional leaders including administrators, board of directors, department heads and researchers, have broad interpretation and conceptualisation of entrepreneurial university and the third mission. This conceptualisation is shaped and driven by such institutional leaders are attuned to changes in the business environment, which provide them with cues of society and industry needs.

Figure 6-1: Rwanda Conceptualisation of entrepreneurial university

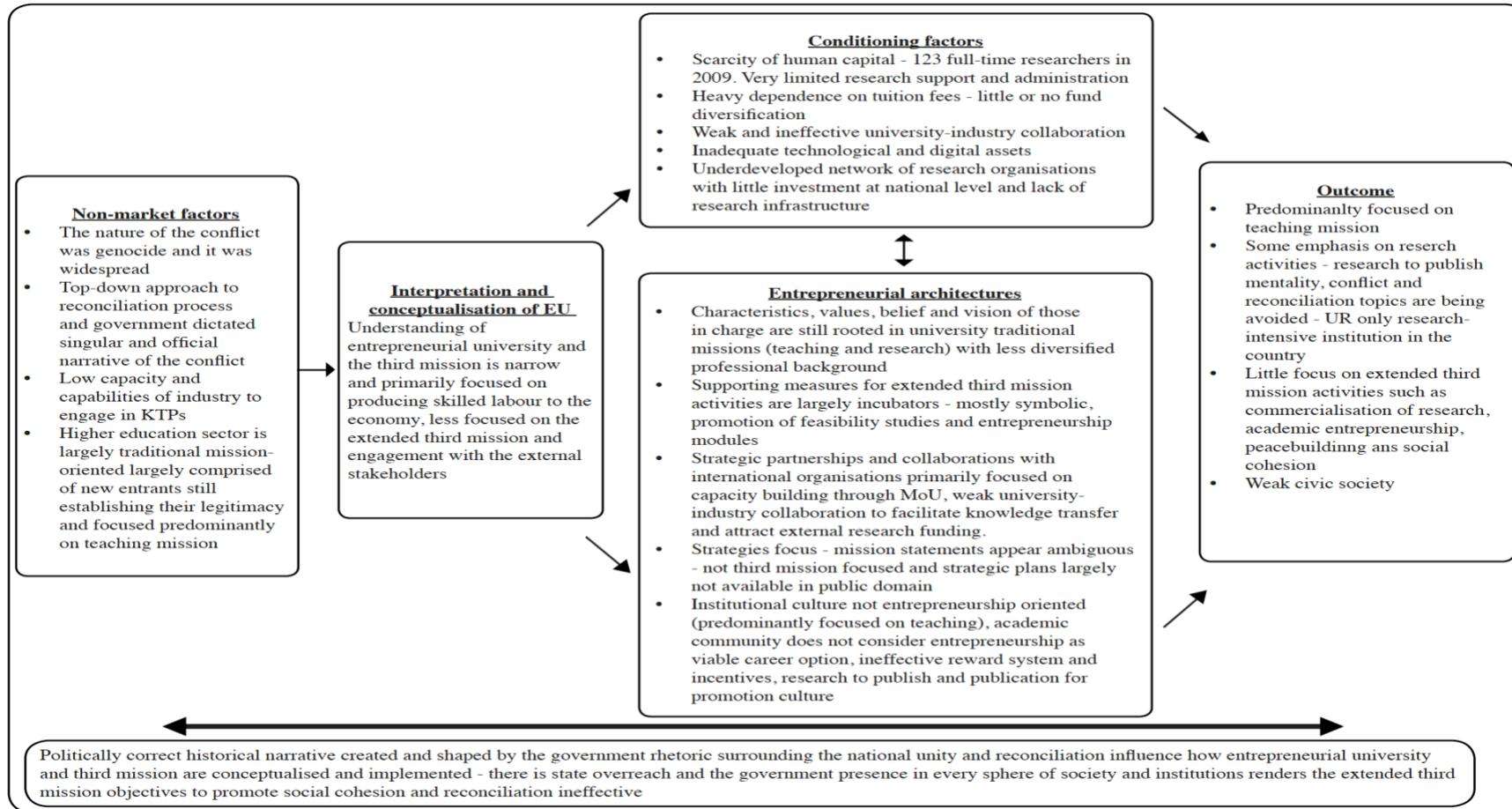
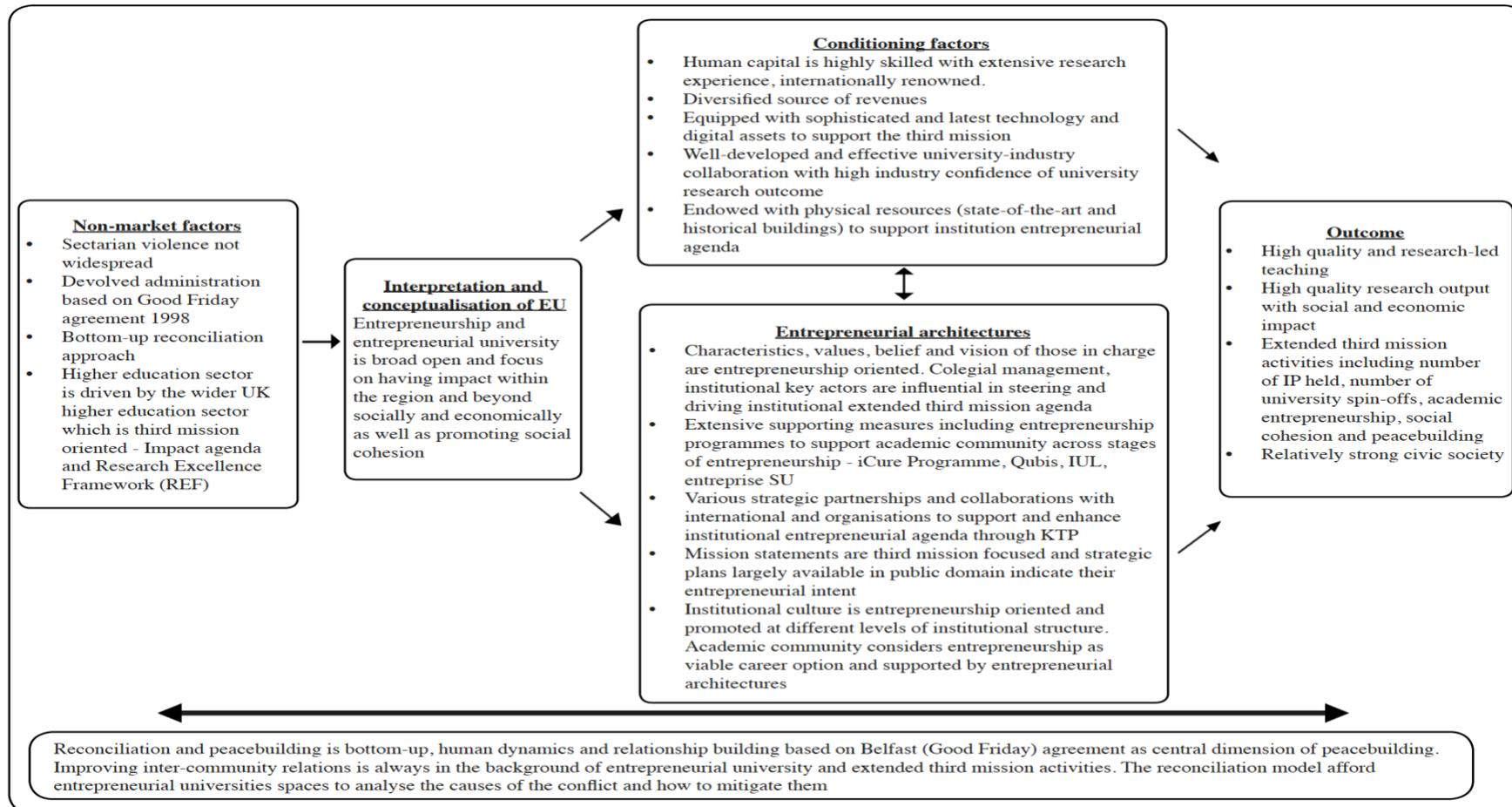


Figure 6-2: Northern Ireland entrepreneurial university conceptualisation



The study found leadership dimension to be positively influencing the development of entrepreneurial university and the operationalisation of the third mission including peacebuilding and reconciliation. In post-conflict and well-developed institutions, the study establishes that they have the expected norms, attributes and characteristics of entrepreneurial universities (Clark, 2001; Philpott et al., 2011; Uslu et al., 2019) and contribute in several ways to the regional or national economic development as Philpott et al. (2011) demonstrated through different forms of entrepreneurial activities.

The study found that with the broad interpretation of entrepreneurial university and third mission, university leaders, managers, and star scientists and key institutional key actors were instrumental in establishing effective entrepreneurial architectures to instil entrepreneurial culture, which is central to the development and evolution of entrepreneurial universities. This led to the creation and implementation of different programs aimed at improving entrepreneurial competencies and organisational capabilities to identify, explore and exploit entrepreneurial opportunities. In post-conflict and well-developed institutions, entrepreneurial universities have additional architectures structures with a primary focus on promoting social cohesion and reconciliation as an extended element of the third mission. The study highlights that their activities support and enhance peacebuilding and reconciliation through research outcomes that inform government policy formulation, community engagement programmes and other activities that foster and promote inter-community relations.

Structures

Entrepreneurial universities offer ideal start-up platforms for the academic community because they bring together existing networks of ambitious people while providing a stable foundation for collaborating on research, developing intellectual property, and supporting the invention of new products and services that can be commercialised (Audretsch & Belitski, 2022; Cunningham et al., 2021; María José et al., 2020; Martin et al., 2019; O'Reilly et al., 2019; Pugh et al., 2018). This requires effective organisational structures to support the academic community during entrepreneurship development stages and the development of the third mission.

The study contributes to the existing understanding of structures by re-affirming that the presence of specific organisational structures to support the third mission is one of the key indicators of entrepreneurial university development (Clark, 1998; Etzkowitz, 2004; Kirby, 2006). The study found that the presence of entrepreneurial organisational units to support the academic community across entrepreneurship stage is directly linked to the entrepreneurial university development level (Cunningham et al., 2021; Martin et al., 2019; Nelles & Vorley, 2010a). Institutions at the early stages of entrepreneurial university development are characterised by weak and modest organisational structures that support the potential development of the third mission activities. The lack of organizational structures to meet the actual needs of university-based entrepreneurs across the different stages of entrepreneurship is one of the significant barriers that prevent universities from becoming an entrepreneurial university (Kirby, 2006).

A conceptual framework posited by Cunningham et al. (2021) demonstrates different organisational structures to meet their actual needs across the stages of entrepreneurship required by university-based entrepreneurs including those that have a selective focus on exploration and exploitation stages of entrepreneurship, and those that have an overarching focus on all exploration and exploitation stages of entrepreneurship. The study provides empirical evidence of how critical such organisational structures are in the development of the third mission and entrepreneurial universities as their absences or inefficiencies constrain the development of entrepreneurial university (and vice versa) consequently leading to a disconnect between university, industry, and wider society (statist triple helix – see Sarpong et al. (2017) that precludes the contribution of the university to address social and economic challenges. this further demonstrates the narrow conceptualisation of entrepreneurial university.

The study extends our understanding of social capital in the entrepreneurial university evolution and development of the third mission by highlighting the gap between university and industry which adversely impacts institutional social capital that plays an important role in opportunity discovery by diffusing new ideas. Social capital provides a wider frame of reference for the academic community and allows them to complement their internal capabilities and competencies to assess and explore external opportunities to facilitate further development of entrepreneurial university and the third mission. The study demonstrates that there is a need to build adequate links with industry and a flexible organisational and governance structure that are critical requirements in the process of developing entrepreneurial

universities (Bizri et al., 2019b; Clark, 1998; Guerrero & Urbano, 2012; Kirby et al., 2011; Purcell & Chahine, 2019).

The study demonstrate that mature and well-established institutions have a well-developed third mission with organisational structures that are more advanced to meeting the needs of university-based entrepreneurs (Cunningham et al., 2021; Nelles & Vorley, 2010a). Such organisational structures include cooperative research centres, proof-of-concept centres, incubators, and accelerators. Organisational structures in well-developed and post-conflict societies are similar to those is stable environments and support further development of entrepreneurial universities and operationalisation of the third mission. Although in a post-conflict context, entrepreneurial universities establish additional organisational structures and architectures specifically to support their extended third mission to include civic agenda (peacebuilding and reconciliation) beyond their corporate social responsibility to promote social cohesion (Barbara & Walsh, 2018; Delgado, 2008; Johnson, 2013; Milton & Barakat, 2016b; Sahar & Kaunert, 2020) including community engagement and outreach programmes, absence of physical barriers between universities and outside communities, business clinics, etc.

Strategies, strategic collaboration, and partnerships

Institutional strategies are instrumental in shaping structures and systems. For universities to become more entrepreneurial, the effective interaction of university, industry, and government is crucial (Etzkowitz & Klofsten, 2005). The study re-affirms that entrepreneurial universities need to have clear and well-elaborated strategies, systems, and structures to influence the

culture and support the leadership team to pursue their entrepreneurial agenda (Coyle, 2014; Cunningham et al., 2021; Etzkowitz, 2014; Fayolle & Redford, 2014; Klofsten et al., 2019; Nelles & Vorley, 2011; Purcell & Chahine, 2019; Rinaldi et al., 2018). Empirical evidence shows that at embryonic stages of entrepreneurial universities development, strategies do not have supporting structures, and in many cases they are aspirational goals due to institutional constraints and environmental constraints.

The study further demonstrates that in mature and well established institutions, strategies are based on distinctive capabilities and skills owned by the institution, effectively organised and combined to help the institution achieve its peak performance (Pertusa-Ortega et al., 2010). Those strategies are found to fit the context (environment) and are supported by effective structures in order to achieve the intended outcomes (Burton et al., 2004; Scott et al., 2006). This is demonstrated by the presence of clear and well-elaborated strategies supported by entrepreneurial organisational structures to support their entrepreneurial agenda and their extended third mission and fulfil their social obligations beyond their corporate social responsibilities to harness social cohesion and reconciliation. The alignment between entrepreneurial strategies and structures enables further development and evolution of entrepreneurial universities whereby strategy, structure and systems complement one another. They reinforce each other, and this can result in a cycle of mutual cause and effect that tightens the relationship between them. Such is synonymous with established and well-developed institutions in which the concept of the entrepreneurial university is well understood.

The study further extends our current understanding of strategies in the following ways. In post-conflict and less developed institutions, the study found the presence of strategies outlined in corporate plans and other guiding documents, consisting of a list of third-stream goals and avenues through which these aims will be pursued, as highlighted in the existing literature (Nelles & Vorley, 2011). The study found that most entrepreneurial universities in post-conflict embody in their mission statements the words “enterprise” and “entrepreneurship”. The study extends our understanding of strategies, particularly at the early stages of entrepreneurial university development; although strategies elaborated in corporate plans bear the hallmarks of entrepreneurial universities, they are more of inspiration goals and have no effect to the wider conceptualisation of entrepreneurial university. The study further extends our understanding about strategies of entrepreneurial university in post conflict by demonstrating that third mission objectives need to be more than a reference but need to be supported by structures underpinned by supportive culture that effectively supports the stages of entrepreneurship and fits into the changing strategy-environment context (ADF, 2014; Fosci et al., 2019; Kamarudeen & Söderbom, 2013; Niyonkuru, 2005; Nsanzumuhire et al., 2021).

With regard to the pedagogical approach to stimulate entrepreneurial flair (John & Stephen, 2015) among students, the study demonstrates that internal mechanisms and strategies are still focused mainly on traditional missions; mostly teaching, and the links between regional engagement and core missions remain weak. The study finds such focus on traditional missions as a reflection of the challenges conflict-affected states face to regain lost capacities and innovate new approaches to address the impact of conflict. The prevalent focus on the first mission (teaching) is partly explained by the fact that there is less demand and opportunities to

initiate engagement activities and fewer potential partners as well as a high concentration of businesses in the informal sector. The other reason is that universities try to emulate the strategies of other leading universities regardless of institutional fit (Etzkowitz *et al.*, 2001). This phenomenon is commonly referred to as institutional isomorphism (Nelles & Vorley, 2010b) argue that the success of the third mission depends largely on how well it is integrated into the broader institutional strategy and promotes synergies between missions and maximisation of institutional gains. The study extends our understanding of the role pedagogical approach play as a barometer to measure the conceptualisation of entrepreneurial universities and the operationalisation of the third mission.

Strategic alliances, partnerships and collaborations are instrumental to the wider conceptualisation of entrepreneurial universities and development of the third mission (Cunningham & Link, 2014; Guerrero *et al.*, 2019; Lindh & Thorgren, 2016; Martin & Turner, 2010; Roncancio-Marin *et al.*, 2022). The study illuminates how such strategic collaborations and partnerships are critical in the post-conflict context by demonstrating that at emergent stages of entrepreneurial university development in post-conflict, strategic partnerships and collaborations are oriented towards capacity building in terms of human capital through skills development, training and exchange programs with international organisations and international universities. However, these strategic partnerships and collaborations have little focus on developing entrepreneurial architectures that will facilitate the transition from traditional to entrepreneurial universities as the involvement of industry is modest. They establish such collaborations through Memoranda of Understanding (MoU), partnerships,

collaboration, and membership with different teaching and research institutions both nationally and internationally, to help them explore and develop the third mission.

Conversely, in well-established and mature entrepreneurial universities, the study finds strategic partnerships and collaborations are predominantly with SMEs and multinational corporations to explore and exploit entrepreneurial opportunities which facilitate knowledge spillover, technology diffusion and the creation of spin-offs, hence enabling institutions to further develop their third mission. Similar to their counterpart in stable environments, the study finds entrepreneurial universities have numerous Knowledge Transfer Partnerships (KTP) and involved in numerous joint and collaborative research with various external actors including other higher education institutions (regional, national and international) to address the societal, economic, and other global challenges. They strategically collaborate with national and international organisations and businesses to design bespoke academic programmes, offer training to upskill the community and enhance their employability and entrepreneurial skills.

Culture

The study found entrepreneurial culture in organisations as critically dependent on their strategic leaders' characteristics, values, beliefs, and visions as already demonstrated in the existing literature (Guth & Ginsberg, 1990). The culture is fundamental in determining the nature of the (extended) third mission activities and also as a reflection of institutional, departmental and individual attitudes and norms towards the third-stream activities (Nelles & Vorley, 2011). The entrepreneurial culture among academic community is a crucial precondition and one of the key pillars of an entrepreneurial university (Berggren, 2017; Clark,

1998; Fuller & Pickernell, 2018; Guerrero & Urbano, 2012; Kirby et al., 2011; OECD, 2012; Rasmussen et al., 2011; Rothaermel et al., 2007). The study affirms that in post-conflict societies, academics are perceived as a bridge connecting the worlds of science and technology and natural world through commercialisation of research (Abreu & Grinevich, 2013; Berggren, 2017; D'Este & Perkmann, 2011; Guerrero & Urbano, 2014; Miller et al., 2018; Philpott et al., 2011; Sandip & Salve, 2016; Senelwa et al., 2016). they are also key players in promoting peacebuilding and reconciliation through their extended third-stream activities that facilitate the emergence of a common frame of reference that allows and encourages societies to share their experiences under safe conditions, validate the experienced pain and grief, restore broken relationships, develop inter-community peaceful relations (Johnson, 2013; Milton & Barakat, 2016b; Murphy, 2020; Sahar & Kaunert, 2020).

The study extends our understanding of the culture in well-established and mature in post conflict entrepreneurial universities by highlighting its similarity to their counterparts in stable and developed economies (Abreu et al., 2016; Berggren, 2017; Gianiodis & Meek, 2020; Guerrero et al., 2012; Guerrero, Urbano, & Fayolle, 2016; Klofsten et al., 2019; Rosa Lombardi et al., 2019; Pugh et al., 2018; Redondo & Camarero, 2019). This is evidenced by noticeable successes in a number of university-generated spin-outs, patents and licence applications. University leaders, managers and star scientists are spearheading the development of the third mission, taking a leading role in promoting entrepreneurship by adopting new governance structures, diversifying their funding, changing their organisational structures, and adopting an entrepreneurial culture to drive more innovative behaviour. This extends our understanding of Murphy (2020) that highlights the role of academics in post-conflict entrepreneurial

universities by demonstrating by their actions in fulfilling their professional duties at the same time acting as peacebuilders to support the third mission and extended the third mission

At early stages of entrepreneurial university development, the study found organisational culture not fully supporting and promoting entrepreneurship among academic community in their entrepreneurial and civic agenda endeavours. This is highlighted by little research commercialisation, lack of engagement of academics in entrepreneurial activities (Miller et al., 2018; Philpott et al., 2011) either formally (academic entrepreneurship) or informally (entrepreneurial academic) as a result of insufficient structures exacerbated by lack of research infrastructures, financial incentives, human capital, and external sources of funding.

The study found that institutional leaders, academics and professional supporting staff to drive and steer the development of the third mission have a narrow conceptualisation of entrepreneurial university and the third mission principally due institutional and environmental factors. The narrow perception of the entrepreneurial university and the third mission permeates other organisational units that regard engagement in entrepreneurial activities as additional to day-to-day responsibilities rather than an enhancement. To overcome such challenges, Coyle (2014, p. 265) suggests that universities need to “*devise a framework of entrepreneurial attributes that could be applied to all staff, not just those involved in university-industry interaction, as a basis for building an entrepreneurial culture that would permeate the entire university*”.

In the broader context, the research culture at earlier stages of entrepreneurial university development, the study demonstrates that it does not support third mission because the ‘research to publish’ culture is prevalent in universities, thus presenting an obstacle to the development and evolution of entrepreneurial universities. As entrepreneurial universities develop, the study demonstrates that the presence of effective structures, supportive leadership, strategies, strategic partnerships, and collaborations contribute to shaping and supporting academic entrepreneurship, entrepreneurial academic and overall organisation entrepreneurial culture that enables further development of entrepreneurial universities and operationalisation of the third mission and extended third mission.

6.3 Role of entrepreneurial universities in entrepreneurial ecosystem development

Entrepreneurial universities are expected to have a meaningful impact in their locality and areas beyond through interactions and relationship development with local businesses and other external stakeholders. Therefore, they are becoming significant players in developing a sustainable entrepreneurial ecosystem (Cohen, 2006; Mack & Mayer, 2016; Maribel et al., 2016; Mazzarol, 2014; Moore, 1996; Nyman, 2015). Such interconnections and interdependencies relate to universities’ entrepreneurial agenda and the third mission (Cunningham & Link, 2014; Etzkowitz, 2013; Guerrero & Urbano, 2012; Knudsen et al., 2021; Sá et al., 2018). In developed economies, Guerrero et al. (2014) argue that there are already the conditioning factors, well-developed and established norms, that enable entrepreneurial universities to participate and contribute to the development of entrepreneurial ecosystems. The study identified four distinct evolutionary stages of entrepreneurial ecosystem; embryonic

destruction, formation, and capacity building. Entrepreneurial universities play a significant role in the evolutionary process of entrepreneurial ecosystems (Cunningham, Guerrero, and Urbano, 2017; Cunningham, Menter, and Wirsching, 2017; Guerrero & Urbano, 2012; Guerrero et al., 2015; Urbano & Guerrero, 2013).

Embryonic stage

The first stage, the embryonic stage, covers the period prior to the onset of the conflict. This stage is characterised by underdeveloped core components of entrepreneurial ecosystem including culture, human capital, low numbers of firm births, and financial capital (Cohen, 2006; Mack & Mayer, 2016). In essence, the entrepreneurial support network of the ecosystem is underdeveloped and fragile as they are at their infancy stage of development. This early stage of entrepreneurial ecosystem development is reflected by the dominance of the government in the statist triple helix (Sarpong et al., 2017). The university's role is reduced mainly to teaching and research due institutional factors and resources constraints as already demonstrated. The potential to exploit knowledge generated by universities is fairly limited as university teaching and research tend to be far removed from industry needs and entrepreneurial architectures (Cunningham et al., 2021).

At this stage, universities themselves have little or no incentive to engage in the commercialisation of their research due to high concentration of businesses in informal sectors or lack of capabilities and capacity to engage with universities (Etzkowitz et al., 2000; Sarpong et al., 2017). During the embryonic stage of entrepreneurial ecosystem development, entrepreneurial universities gravitate toward rebuilding physical and intellectual infrastructure

and predominantly focused on institution traditional roles (teaching and research) rather than on third stream activities because they are limited in capacity to promote and enhance interactions with actors outside their perimeter fences. As the entrepreneurial ecosystem further develops, entrepreneurial universities build their competencies (Ikebuaku & Dinbabo, 2018; O'Reilly et al., 2019; Rasmussen et al., 2011; Teece, 2018; Tether & Tajar, 2008) and expand their research and technology transfer mission to meet the direct economic and social needs of their locality.

Destruction phase

The onset of conflict disrupts the evolution and further development of entrepreneurial ecosystem. The disruption of the further development of the entrepreneurial ecosystem depends on the severity of the conflict in terms of human loss and the level of destruction of social, political, and economic structures (Barbara & Walsh, 2018; Majaliwa et al., 2016; Pherali & Lewis, 2019). The study demonstrates that this stage of entrepreneurial ecosystem is characterised by disruption of economic activities due to violence, loss of human capital through deaths and migration (brain-drain), unstable political and economic structures that render the entrepreneurial environment uncondusive. The conflict adversely impacts entrepreneurship and entrepreneurial activities due to political and economic uncertainties (Brück et al., 2011).

The study extends our understanding the impact of conflict on university infrastructures and the existing system of provision (Pherali & Lewis, 2019) by highlighting a long-lasting debilitating impact on national capacities to recover from and reconstruct after conflict.

Consequently, the role of entrepreneurial universities during the destruction phase is significantly impacted by the conflict. The development of entrepreneurial university was significantly impacted, in some cases, annulling all the progress that had been made due to the destruction of university infrastructure and entrepreneurial ecosystem structures. Depending on the nature and intensity of the conflict, entrepreneurial universities focus mostly on traditional missions (teaching and research). The higher the level of the destruction of such structures and human costs, the higher the challenge to re-establish an entrepreneurial ecosystem and vice versa.

Formation stage

The formation stage consists of a process of rebuilding the idea of the entrepreneurial university in the aftermath of the conflict to contribute to the re-establishment or development of entrepreneurial ecosystem. During this period, the study highlights that if the destruction of entrepreneurial universities and ecosystem were severe, entrepreneurial universities focusing solely on their teaching mission to supply the economy with skilled labour to run public offices whilst rebuilding physical resources and knowledge infrastructure destroyed during the conflict (Nkusi et al., 2020). The study also highlights that when the destruction of physical structures of entrepreneurial universities and supporting elements of entrepreneurial ecosystem is less severe, entrepreneurial universities focus on prioritising interventions that favour the promotion of social cohesion and reconciliation (Fraser, 2005; Novelli et al., 2015; Novelli et al., 2019) and establishing structures through which university actors such as faculty, support staff, and students can network with actors outside the university in order to further develop the third mission and extended third mission. The study found this stage of entrepreneurial

ecosystem development characterised by high numbers of new entrants to the higher education sectors, enrolment numbers, and introductions of academic programmes that are sensitive to the conflict. Universities are seen as silos of knowledge that are oriented toward training highly skilled people and producing leading-edge scientific progress capable of being transformed into commercial value and academic researchers begin to interact with industry to commercialize their knowledge and engage in academic entrepreneurship.

Capacity building phase

During the capacity building stage, the study found that entrepreneurial universities begin to expand and enhance their traditional missions beyond the provision of teaching, conducting research to explore other, arguably more entrepreneurial missions such as research, and knowledge and technology transfer, necessary to re-establish and support the evolution of an entrepreneurial ecosystem. Furthermore, the study found that in the emergent stage of the ecosystem universities serve as anchor tenants that generate and disseminate knowledge within the ecosystems to facilitate its growth (Cantner et al., 2020). This prominent role of universities entailed producing, transferring, and applying knowledge to the industry as well as providing a skilful labour force and catalyse new businesses, like start-ups or spin-offs, supporting industry advancements through joint projects and research development. The collaboration between industry and universities emerges and intensifies as a driver of technological development and competitiveness that sustains the ecosystem development. Entrepreneurial universities stimulate a more favourable environment for students and academics to pursue entrepreneurship, create a more robust entrepreneurial climate, enhancing the desire to pursue entrepreneurial careers, contributing to the establishment of businesses.

6.4 Post-conflict Entrepreneurial University Outcomes

There is a strong sense of social and moral responsibility of entrepreneurial universities to address the legacies conflict, which includes exclusion (marginalisation), social stratification, and centralisation of knowledge as universities need to be reflective of the communities they serve and institutional contexts in which they find themselves (Johnson, 2013; Novelli et al., 2015; Power, 2012). The impact of entrepreneurial university in post-conflict is measured in terms of observable/tangible outcomes, including research output (number of publications), third mission-focused pedagogical approach, third mission infrastructural support, community engagement and outreach programmes, university research-led government policies etc. The impact is also intangible as it forms part of how they operate. In essence, the development entrepreneurial universities in a post-conflict context, restoration of social connection and reconciliation pervade all the three missions of the entrepreneurial university. Entrepreneurial universities additionally need to become entrepreneurial institutions and key players in the development of civic society, and their members need to become potential entrepreneurs, fulfilling their professional and civic duties (Murphy, 2020). Entrepreneurial universities graduates are perceived not only as future job-creators but also as responsible citizens and peacebuilders and the organisation and content of teaching activities reflects this conception.

6.5 The tension between university and government in the development of entrepreneurial university in post-conflict

As universities transition to become entrepreneurial, there will be tension between the third mission that of teaching and research with risks and challenges on top of that (Etzkowitz, 2013; Philpott et al., 2011). Such tension, risks and challenges are heightened by the post-conflict context, particularly at early stages of entrepreneurial university development as the university crosses traditional boundaries through linkages to industry and the wider community. Entrepreneurial universities in Rwanda operate within the strict institutional environment in which legal and economic systems and other systems are still developing and not well established – not well tried and tested in terms of knowledge and technology transfer. In terms of the third mission of the entrepreneurial university, there is significant political influence on the extended third mission (social cohesion and reconciliation), as universities need to be seen as partners and in line with the government and its political agenda with less friction in order to create a harmonious relationship between government and universities.

The tension between the extended third mission and the propagation of government mandate of the history of the conflict. Universities cannot actively engage in reconciliation debate or provide other well-researched narratives of the conflict (inclusive rather than exclusive) which can propagate negative peace (Galtung, 1974). As already discussed, entrepreneurial universities need to provide avenues for building social ties and facilitating social transformation. However, for entrepreneurial universities to achieve their extended third mission objectives (peacebuilding and reconciliation), as a function of education must be infused throughout the educational systems. In Rwanda for instance, entrepreneurial

universities still face challenges in implementing extended third-stream strategies as they need to follow and promote the government policy, which Reyntjens (2016) describes as “open to replication but closed to debate”. Scholars have criticised this singularity in narrative and international organisations (Amnesty-International, 2010; Buckley-zistel, 2006; Clark, 2010; Graybill, 2001; Melvin, 2013; Reyntjens, 2015, 2016) to stifle academic freedom, critical thinking, pluralism and counter-productive to bring about true and long-lasting reconciliation and peace. Buckley-zistel (2006) suggests that to reach the objectives of its national reconciliation strategies, the governments need to open up the public and political space because it allows the contentious issues of the conflict and reconciliation process brought into the open to allow for clarifying eventual misperceptions or addressing policies with a sense of equality being the primary basis for a collective identity.

During early stages of development, entrepreneurial universities try to pursue an entrepreneurial trajectory by aligning the third mission with the traditional academic missions of teaching’ and ‘research to harness the synergetic relationships and leverage the university capabilities to full potential (Etzkowitz & Leydesdorff, 2000b). However, this presents numerous challenges that create tension within institutions due limited or lack of human capital resources, insufficient financial capital with other various competing priorities. The other tension resides among academics who are deeply rooted in traditional mission who find it difficult to crossover and get involved in entrepreneurial and extended third mission, as they believe the third mission will erode the core principles of universities, or fear of persecution. Philpott et al. (2011, p. 164) contend that for entrepreneurial ideal is to be achieved within a

university *“the institution must convince its academic community of the validity and appropriateness of the third mission for their institution”*

The adoption of the entrepreneurial university model involves risks and challenges for the management of higher education institutions due to the need to strike a balance between teaching, research, and the marketing of its results (Helen, 2005). Faculty members must juggle between the amounts of time devoted to improve teaching, conduct research, and perform the required activities to comply with the third mission. However, this is more challenging in entrepreneurial universities at embryonic stage of development where there are limited resources to support the third mission. Consequently, there can be resistance among university faculty members to engage in third stream activities or oppose the merchandising and privatisation of knowledge for economic exploitation.

The third mission is not fully developed because of competing priorities on limited financial resources mainly depending on tuition fees, skilled human capital shortage, insufficient entrepreneurial organisational units to support academics and students to explore and exploit entrepreneurial opportunities as well as interact with industry, and organisational culture that does not fully support academic entrepreneurship. Such challenges were highlighted by Fosci et al. (2019), Rwanda lacks centralised repositories for research data and publications that could help with knowledge exchange and transfer between universities and industry and help research organisations; funding bodies establish collaborations nationally and internationally.

6.6 Chapter Summary

The study answers the research questions and contributes to the existing debate about the entrepreneurial university in the following ways. Firstly, regarding the interpretation and conceptualisation of entrepreneurial university, there is a very clear different conceptualisation of what is entrepreneurial university is and the third mission to what has been posited in the extant literature. This conceptualisation is dependent upon or linked to some degree of conflict resolution model, influenced by non-market factors including the nature of the conflict, reconciliation pathway, the nature and focus of the higher education sector, and the propensity of the industry to support the third mission driven by the characteristics and attributes of those in charge. Peaceful cohabiting and coexistence pervade all the three missions of entrepreneurial university but more so for the third mission that requires more interactions and engagements with external stakeholders. For that to happen, peaceful cohabitation needs to exist in some shape.

The conceptualisation of entrepreneurial universities in Northern Ireland is well developed with well-established and embedded entrepreneurial architecture, similar to what already posited in the extant literatures in terms of conceptualisation, norms and attributes (Cunningham & Link, 2014; Kirby et al., 2011; Mascarenhas et al., 2017a; Rothaermel et al., 2007; Urbano & Guerrero, 2013). Additionally, they established additional entrepreneurial architectures to support the extended third mission. Through the extended third mission, entrepreneurial universities' activities not only contribute to national economic growth (through knowledge and technology transfer and research commercialisation), but also support and promote peaceful coexistence and reconciliation. They do so through extended third mission activities

(such as community engagement and community outreach programmes that promote social mobility, representation, and intergroup relations), which are not necessarily entrepreneurship oriented but provide a solid foundation for entrepreneurial activities to flourish (Barbara & Walsh, 2018).

Secondly, in the post-conflict context, the level of destruction of entrepreneurial ecosystem structures and institutional infrastructure directly impacts the entrepreneurial university's evolution and development and evolution. The study re-affirms the conditioning factors posited by Guerrero and Urbano (2012) and entrepreneurial architecture (Nelles & Vorley, 2011) that influence the development of the entrepreneurial university in a post-conflict context. In Rwanda, the level of destruction of conditioning factors and entrepreneurial architecture was so significant, and there is still a long way behind to achieve the threshold in terms of physical infrastructure, human capital infrastructure, and financial autonomy as you would expect from an entrepreneurial university as posited in the extant literature. In Northern Ireland, however, some of the conditioning factors are already in place because they are well established, and developed universities, and the conflict indirectly affected them. They are still holding together the peaceful cohabitation.

Lastly, the study demonstrates that, in a post-conflict transitional economy, EE development is an evolutionary process and is identified through four distinct evolutionary stages of embryonic, destruction, formation, and capacity building aligned to the country's historical events. Post-conflict entrepreneurial universities are orientated toward rebuilding human capacity as a predominant focus, rather than on entrepreneurial activities such as developing

research and technology transfer missions. In essence, entrepreneurial universities in post-conflict transitional economies initially solely focus on rebuilding their teaching mission. Based on local needs, entrepreneurial universities then slowly expand their research and technology transfer mission to meet their locality's immediate economic and social needs. Whereas previous studies of entrepreneurial universities in developed contexts have demonstrated first (teaching) and second (research) mission capabilities and activities do exist that can therefore be enhanced for their third mission (technology and knowledge transfer) capacity building depending on the ambitions of the entrepreneurial universities, its strengths, the local industrial sectoral configuration, and regional or national needs (Guerrero et al., 2015).

Chapter 7: Conclusion

7.1 Introduction

This final chapter summarises the research findings regarding the conceptualisation of entrepreneurial universities and operationalisation of the third mission in post-conflict environments through the lens of developed and developing higher institutions. The chapter highlights the study's theoretical and practical contributions, also provides future research avenues and ends with research managerial implications.

7.2 The conceptualisation of entrepreneurial universities and the third mission

This study offers a new and contextualised perspective and advances our understanding of entrepreneurial universities' role in developing the entrepreneurial ecosystem in regions that emerged from conflict. Post-conflict environments that experienced significant disruption to their political and economic landscape, (entrepreneurial) universities not only play a significant role in the contribution of social, economic development, as already posited in current literature, but they are also pivotal to peacebuilding and conflict resolution which is invisible in current broader definitions of the entrepreneurial universities. The study affirms existing definitions of entrepreneurial universities and their social and economic impact expressed in the contemporary literature.

To understand the role of entrepreneurial universities in a post-conflict environment, the context matters and those in charge of understanding the concept matter. They matter because the causes of conflict, level of destruction, human cost are different and how that conflict came

to an end influence the politics that govern the universities in their fulfilment of their missions (teaching, research and entrepreneurship) including peacebuilding and reconciliation. The background of university leaders and senior managers is pivotal in promoting in the extended third mission within their respective institutions and beyond. The other factor to consider in the conceptualisation of entrepreneurial university and operationalisation of the third mission is the heterogeneity in the university's objectives. Mechanisms for knowledge creation and the dissemination results demonstrate that not all university managers perceive their organisations to be entrepreneurial. Their heterogeneous approaches to engage with external stakeholders, both commercially and non-commercially (Audretsch & Belitski, 2022), is evident in well-developed higher education sectors such as UK, where Russell Group universities are more research-intensive with strong focus on the third mission, when compared to their counterparts in the same sector.

The conceptualisation of entrepreneurial universities in post-conflict is restricted by the context in which universities operate. The extended third mission of peaceful cohabiting and reconciliation lays the foundation of and complement the third mission in which universities formally engage with the communities and industry to contribute to addressing and diffusing the tension that led to the conflict without being seen as a threat to state institutions as well as contributing to social and economic development (Milton & Barakat, 2016b; Sahar & Kaunert, 2020). From an entrepreneurial university point of view, the extended third mission requires additional architectures that may be separate and, in time, become their own mission as such or can become boundary spanning mission activity between the entrepreneurial university's missions.

The extended third mission activities have boundary spanning elements that are centrally located or nationally located within the third mission because of its natural mission, which is around external relationship building as it is for teaching and research missions that do not necessarily involve a lot of external stakeholders' involvement. This additional mission does not always prevail in entrepreneurial universities and forms part of the culture and way of thinking – it is continually operating in the background. There is wider recognition that entrepreneurial universities in post-conflict need to include in their third mission the role to address the social and economic challenges including building civic societies, and its contribution to peacebuilding and reconciliation.

In post-conflict environments, the conceptualisation and interpretation of entrepreneurial university and third mission is influenced by non-market factors, particularly depending on the nature of the conflict, the type of reconciliation (reconciliation pathway) and the focus of the higher education sector. The nature of the conflict and its reference in public discourse is critical to how entrepreneurial universities operationalise the third mission: peacebuilding and social coexistence. The terminology used to refer to the conflict also plays a significant role in implementing the third mission. If the language is neutral (does not condemn the other side) facilitates the transformation of conflict and is a big step towards reconciliation. Whereas if the terminology alludes to the condemnation of one side may be an obstacle to reconciliation. In Rwanda, the conflict is referred to as “the genocide against the Tutsi” perpetrated by the Hutu. In Northern Ireland, the conflict is referred to as The Troubles, which does not blame any of

the participants – this facilitated the restoration of social connection and the reconciliation process.

The type of reconciliation (negotiated or imposed) influences the implementation of the third mission, societal and civil society infrastructure that remains after the conflict affects the entrepreneurial universities missions. If the reconciliation process is imposed, as is the case for Rwanda, implementing the third mission is restricted by the confines of the official narrative. Whereas if negotiated, the implementation of the third mission has manoeuvrability as entrepreneurial universities are pivotal in the transformation of conflict because of their connections with government officials and other actors in the community, as Johnson (2013) demonstrated in her actors and approaches to peacebuilding framework. The focus of the higher education sector (third mission-oriented vs traditional focused) is influential in conceptualising and implementing the third mission.

The conceptualisation of entrepreneurial university and implementation of the third mission is directly influenced by non-market factors, including the government's economic ambitions, the focus of the higher education sector. In 2000 the Government of Rwanda launched Vision 2020 (MINECOFIN, 2000, 2012) as a roadmap that will steer the country's economy from agrarian to knowledge-based. Universities adapted and aligned their strategic plans with the government aspirations. Rwanda higher education sector is still developing with significant shortages in human, technological and financial resources, and a disconnect with external stakeholders to drive and support the extended third mission. In Northern Ireland, as it is for the rest of the UK, the higher education sector's focus is primarily driven by the impact agenda

(Jerome, 2020; McCowan, 2018). As a result, UK university funding is linked to an assessment of research impact added to the periodic national research audit (Laing et al., 2018). Research impact now forms a significant section of grant application processes for major UK funding councils, and the assessment of impact accounts for a 20% measure of research quality in the Research Excellence Framework (REF) (Chubb et al., 2017; Smith & Stewart, 2017; Watermeyer & Chubb, 2019).

The study establishes entrepreneurial universities in a post-conflict context need to support the country's immediate pressing economic and civil society's needs to be focused on re-establishing institutions and economic activities to prevent a reoccurrence of the original conflict. Therefore, post-conflict entrepreneurial universities are orientated toward rebuilding human capacity as a predominant focus, rather than on entrepreneurial activities such as developing research and technology transfer missions. In post-conflict transitional economies, entrepreneurial universities predominantly focus on their teaching mission. Other missions come into focus as institutions develop their organisational capacity and internal capabilities to further develop and engage in other missions. Entrepreneurial universities then slowly expand their research and third (including social cohesion and peacebuilding) mission to meet immediate economic and social needs of their locality.

7.3 Conditioning factors

The entrepreneurial university conditioning factors similar to those posited by Guerrero and Urbano (2012) that include environmental (formal and informal) and internal factors (resources and capabilities) enable or constraint the evolution and the development of the entrepreneurial

universities. Entrepreneurial university conditioning factors in post-conflict societies establish norms and routines required for the academic community to explore and exploit entrepreneurial opportunities, similarly to what had been posited before in the contemporary literature with a slight difference in focus as the third mission include peacebuilding and reconciliation. The study establishes the level of development of conditioning factors enable or constrain the evolution and development of the entrepreneurial universities in post-conflict societies based on the level of their development; the lesser they are developed the greater the challenges they pose to the development of entrepreneurial universities and vice versa.

7.4 Entrepreneurial architectures

The study establishes that conditioning factors directly influence entrepreneurial architectures. In situations where such conditioning factors and entrepreneurial architectures are well-developed such as Northern Ireland, entrepreneurial universities have the expected norms and as those in the UK higher education system and other well-established and developed institutions. When entrepreneurial architectures are less developed and loosed embedded into the institutional structures, as is the case for Rwanda universities, they present as constraints to the development and evolution of entrepreneurial universities and the operationalisation of the third mission. Entrepreneurial universities in Rwanda are still at early stages of development, with less diversified funding, poor research culture exacerbated by the ineffective reward system, an entrepreneurship education pedagogical approach that is inadequate due to insufficient financial support to explore and implement other approaches, scarce research funding, and also restricted by non-market factors. Universities entrepreneurial architectures are influenced by non-market factors including the nature of the conflict and reconciliation

pathway, economic factors and the nature of competitive environment for higher education sector.

7.5 The study contribution to theory

The study makes the following theoretical contribution. Firstly, this study offers a new contextualised understanding of entrepreneurial university that was not present in the current literature as it looks at entrepreneurial university from post-conflict and transitional economy lens. Therefore, it advances our understanding in the conceptualisation of entrepreneurial universities and operationalisation of the third mission in post-conflict environments. Secondly, the study posits a conceptual framework to analyse the development of entrepreneurial university in post-conflict context. The conceptual framework demonstrates that the conceptualisation of entrepreneurial university is shaped by non-market factors including the nature of the conflict, the reconciliation pathways, the focus and the level of competitiveness of the tertiary sector, and economic factors.

The conceptual framework also demonstrates how the conceptualisation of entrepreneurial university influences the operationalisation of the third mission by analysing internal capabilities (human, capital and technological) and structures designed to support the entrepreneurial agenda of the universities. The third mission is used as a lever to promote peacebuilding and social cohesion as it involves interactions with the external stakeholders as the first mission (teaching) and second mission (research) do not necessarily involve a lot of external stakeholders' involvement. This added focus of the third mission to include

peacebuilding and reconciliation always prevails in entrepreneurial universities and forms part of the culture and way of thinking – it is continually operating in the background.

Thirdly, the study establishes that, in post conflict environment, the third mission is expanded to include the civic agenda (peacebuilding and reconciliation) that pervades all entrepreneurial university missions (teaching, research and entrepreneurship). There is wider recognition that universities have additional roles than teaching and research; the third mission includes universities' role in peacebuilding and reconciliation (Milton & Barakat, 2016b; Murphy, 2020). The nature of the conflict and its reference in public discourse is critical to how entrepreneurial universities operationalise the extended third mission. The type of reconciliation (negotiated or imposed) influences the implementation of the extended third mission. The extended third mission of peaceful cohabiting and reconciliation lays the foundation of and complement the entrepreneurship mission in which universities formally engage with the communities and contribute to addressing and diffusing the tension that led to the conflict without being seen as a threat to state institutions (Milton & Barakat, 2016b; Sahar & Kaunert, 2020). The extended third mission requires additional architectures that may be separate and, in time, become their own mission as such or become boundary spanning mission activity between the entrepreneurial university's missions.

The study establishes that entrepreneurial universities in a post-conflict context need to support the country's immediate pressing economic and civil society's needs to be focused on re-establishing institutions and economic activities to prevent a reoccurrence of the original conflict. Therefore, post-conflict entrepreneurial universities are orientated toward rebuilding

human capacity as a predominant focus, rather than on entrepreneurial activities such as developing research and technology transfer missions. In post-conflict transitional economies, entrepreneurial universities predominantly focus on their teaching mission. Other missions come into focus as institutions develop their organisational capacity and internal capabilities to further develop and engage in other missions. Entrepreneurial universities then slowly expand their research and third (including social cohesion and peacebuilding) mission to meet immediate economic and social needs of their locality.

7.6 The study contribution to practice

In post-conflict societies, universities are significant players in peacebuilding and reconciliation based on the nature of the policies that universities and governments choose to implement (Unterhalter & Carpentier, 2010). To that effect, the study makes several practical contributions. Firstly, the study highlights the critical role of entrepreneurial universities in addressing social and economic challenges including building civic societies and its contribution to peacebuilding and social cohesion through the extended third mission. Entrepreneurial universities through the extended third mission are significant players in the promotion of social cohesion and peacebuilding by offering neutral and alternative arena where critical debates on national identity, peacebuilding, and reconciliation. Entrepreneurial universities, through the extended third mission, also serve connector to external communities by improving understanding among people, reducing internal and external violence, and enhancing the society's ability to reduce poverty.

The study reinforces Lederach (1997) point about the role of middle-range leadership category that include academics in peacebuilding. Entrepreneurial universities function as organizational, middle-range agents in peacebuilding given their connection to the government and industry/community (triple helix) through (extended) third stream activities. Entrepreneurial universities are well positioned to link high-level leadership, such as government officials, to grassroots efforts. Academics involved in activities can be influential actors to promote peacebuilding and reconciliation because of their ability to cut across conflict lines, have a greater degree of flexibility as they can be considered as neutral actors in the process, and may employ influence derived from formal and informal relationships to effect the outcomes. Entrepreneurial universities are therefore catalyst for stabilisation and securitisation, reconstruction, statebuilding and peacebuilding.

The study also demonstrates that is restrictive, forceful approach to institutionalising a singular national identity and government-imposed reconciliation pathway are counterproductive to the third mission. The dominance of government in the reconciliation process renders the role of entrepreneurial universities as just passive players or implementors of government policies that are rather politically motivated than informed by research. In this case, entrepreneurial universities operate in tightly controlled environments and the outcomes of the extended third mission objectives is modest in terms of building civic society and social cohesion and peacebuilding. The inflexible, top-down structure precludes analysis and open discussion, both of which are necessary for fostering trust between civilians and the state. A bottom-up – an inclusive approach to peacebuilding and reconciliation accommodates civic participation in developing the core principles of conflict resolution and peacebuilding. Policymakers and

university leaders need to be aware of the implications of the conflict resolution pathways to the reconciliation process and wider implications to entrepreneurial university missions as social cohesion and tolerance cannot flourish on campus while the local community is in conflict.

Universities are viewed as the incubators of a new breed of competent and professional leaders, who have developed a new consciousness through their critical engagement in learning, teaching and debating experience (Sahar & Kaunert, 2020). The university need to consider investing in cross-disciplinary approaches to addressing community problems to avoid potential conflict arising and build the foundation and sustainable infrastructures of statebuilding and peacebuilding through dismantling discriminatory institutions, empowering the communities, mitigating inequalities, and creating arenas for critical thinking and discussions on the past, as well as constructing a shared future. By also institutionalising norms and shaping actors' behaviours entrepreneurial universities can promote civic values, resilience, democratic ideas, shape policies and build democratic systems of governance by producing researchers, teachers, education practitioners, scientists, entrepreneurs, and other highly skilled professionals.

7.7 Managerial implications

Given the complex nature of the conflict and expanding universities' roles, this raises some relevant managerial implications. Firstly, in a post-conflict and transitional context, entrepreneurial universities play an anchor role in rebuilding the entrepreneurial ecosystem initially through first mission activities (teaching) to supply the economy with skilled human

capital. Whereas the anchor role of entrepreneurial universities in more developed economies is more on a mission to rebuild entrepreneurial ecosystem with a particular focus on supporting entrepreneurship and third mission activities. Essentially, their anchor roles differ in principle but are similar in objectives.

In post-conflict, entrepreneurial universities need to balance broader nationbuilding roles of peacebuilding, humanitarian, and social development rather than just creating entrepreneurial capacity through their three missions. Some of these activities are rudimentary but require entrepreneurial universities to cut across conflicting parties to address immediate societal and economic needs within their locality. Secondly, leaders of entrepreneurial universities should seek international collaborative, strategic partnerships and bilateral support to accelerate their capacity to build research and third mission activities essential for any entrepreneurial ecosystem to grow. Lastly, policymakers and investors in higher education need to take an incremental approach in investing in different missions of entrepreneurial universities as it takes more time and needs to be contextually aligned to meeting the needs of local stakeholders that are sensitive to but not constrained or defined by conflict.

In the current turbulent and ever-changing environment demands a different kind of leadership since analytics and past data alone are no longer helpful or sufficient for predicting the future. Instead, institutional leaders must be proactive in creating new opportunities by learning about a situation and using their understanding to guide future actions. Furthermore, they need to connect with and inspire others to co-create solutions to seemingly wicked problems. For universities in post-conflict and transition economies, such as Rwanda, to become

entrepreneurial, require leaders to overcome uncertain and ambiguous environments. Leaders need to deploy limited resources and develop the propensity to become more flexible within their strict and inflexible organisational settings. Increased flexibility will help them to explore opportunities, build strategic alliances for the benefit of their institutions, treat mistakes as learning opportunities to create this kind of entrepreneurial mindset which will help them steer the university towards the third mission.

7.8 Future research avenues

As demonstrated in the study, the role of entrepreneurial universities in post-conflict contexts extends beyond entrepreneurship to include the promotion of reconciliation and social cohesion as a vehicle for knowledge transfer and innovation diffusion (Audretsch & Moog, 2020). This element of the third mission is overlooked in the existing corpus of knowledge. The findings open up some opportunities for new research avenues with respect to the study of the entrepreneurial ecosystem and entrepreneurial universities in post-conflict economies. The study found some limited examples of specific formal institutional structures designed to focus on supporting entrepreneurs and that attempt to nurture “entrepreneurial potential” (Guerrero et al., 2014). This raises several interesting questions for entrepreneurial university agenda as summarised in the Table 7-1.

Table 7-1: Future research questions

Study Themes	Study Findings	Future research avenues
Conceptualisation and interpretation of	Non-market factors affect the conceptualisation and interpretation of the third mission and	<ul style="list-style-type: none"> • How can innovation management shape the organisational

entrepreneurial universities	<p>entrepreneurial universities. There are different conceptualisations among key EU stakeholders. Non-market factors include:</p> <ul style="list-style-type: none"> • The nature of the conflict and reconciliation pathway • Economic factors • The nature of the competitive environment for the higher education sector 	<p>conceptualisation of the third mission and facilitate entrepreneurial universities orchestrate their activities to develop their dynamic capabilities in the post-conflict</p> <ul style="list-style-type: none"> • How do economic factors impact the implementation of the third mission?
Enablers and constraints	<p>Conditioning factors</p> <ul style="list-style-type: none"> • Human capital • Financial autonomy • Technological capital <p>Entrepreneurial architectures</p> <ul style="list-style-type: none"> • Leadership • Structures • Strategic partnerships and collaboration • Strategies • Culture 	<ul style="list-style-type: none"> • To what extent do post-conflict transitional economy entrepreneurial universities need to adopt and imitate more developed economy entrepreneurial universities in pursuit of the extended third mission?
Entrepreneurial ecosystem evolution and entrepreneurial universities	<ul style="list-style-type: none"> • The entrepreneurial ecosystem in a post-conflict environment evolves through non-linear stages; embryonic, destruction, formation, and capacity building. The role that entrepreneurial universities play in contributing to EE development begins by focusing on the re-establishment of the institutions and economic activities to prevent a reoccurrence of the original conflict, rebuilding human capacity then slowly expanding their research and technology transfer mission to meet the direct economic and social needs of their locality 	<ul style="list-style-type: none"> • What are the elements that constitute entrepreneurial ecosystem in post-conflict and how do they influence the evolution of entrepreneurial universities? • How do non-market factors influence the different stages of entrepreneurial ecosystem? • To what extent have research funding mechanisms shape the development of entrepreneurial universities and how do they impact peacebuilding?

To further enhance our understanding of entrepreneurial university paradigm, there is a real and pressing need for more studies of entrepreneurial universities and entrepreneurial ecosystems in less developed and transitional economies. Future research could help making up for the limits previously mentioned. Similar methods could be applied to other post-conflict

entrepreneurial universities to determine whether this model is suited to analyse their development and evolution. It would also be worthwhile to study how universities at emergent stages of entrepreneurial university development through the lens of dynamic capabilities and how they contribute to the evolution and operationalisation of the third mission. To what extent do post-conflict transitional economy entrepreneurial universities need to adopt and imitate mature and more established entrepreneurial university's strategies in pursuit of the third mission. In addition, this research could be further extended to understand the evolution of the entrepreneurial university through quantitative studies to test the formulated hypotheses, identify good practices, and test the suggested recommendations.

7.9 Concluding remarks

In view of the results which have been presented and discussed in the preceding chapters, the findings of the study are context-specific, and as such, they are not necessarily generalisable. Acknowledging the exploratory nature of this study and its contextual limitation, the study advances our understanding of how entrepreneurial universities are conceptualised in post-conflict societies by highlighting how non-market factors shape their conceptualisation and the development of entrepreneurial universities. The study also advances our understanding of how the third mission in post-conflict entrepreneurial university is expanded to include peacebuilding and reconciliation, which was absent in the literature. The study also demonstrates that the re-establishment of the entrepreneurial ecosystem is dependent upon the level of destruction of its elements and the role of entrepreneurial universities in ecosystem development is constrained by institutional and environmental factors. It is hoped that the research undertaken and laid out here offers a worthwhile extension to the existing theory and

research and that it points the way towards future research that can further contribute to the understanding and evolution of entrepreneurial universities in less stable and emerging economies contexts.

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Chapter 8: Appendices

8.1 Appendix 1 - List of interview participants

Participant	Position	Category	institution
Participant 1	Leadership	Group 1	Institution 4
Participant 2	Leadership	Group 1	Institution 1
Participant 3	Leadership	Group 1	Institution 2
Participant 4	Leadership	Group 1	Institution 3
Participant 5	Academic	Group 2	Institution 2
Participant 6	Leadership	Group 1	Institution 1
Participant 7	Leadership	Group 1	Institution 2
Participant 8	Leadership	Group 1	Institution 3
Participant 9	Leadership	Group 1	Institution 3
Participant 10	Academic	Group 2	Institution 3
Participant 11 (group)	Students	Group 3	Institution 4
Participant 12 (group)	Students	Group 3	Institution 4
Participant 13	Student	Group 3	Institution 4
Participant 14 (group)	Student	Group 3	Institution 4
Participant 15	Academic	Group 2	Institution 5
Participant 16	Academic	Group 2	Institution 5
Participant 17	Supporting staff	Group 4	Institution 5
Participant 18	Supporting staff	Group 4	Institution 5
Participant 19	Academic	Group 2	Institution 5
Participant 20	Supporting staff	Group 4	Institution 5
Participant 21	Academic	Group 2	Institution 5
Participant 22	Supporting staff	Group 4	Institution 5
Participant 23	Academic	Group 2	Institution 5
Participant 24	Leadership	Group 1	Institution 5
Participant 25	Supporting staff	Group 4	Institution 5

Thesis title
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Participant 26	Supporting staff	Group 4	Institution 5
Participant 27	Academic	Group 2	Institution 6
Participant 28	Supporting staff	Group 4	Institution 6
Participant 29	Academic	Group 2	Institution 6
Participant 30	Academic	Group 2	Institution 6
Participant 31	Supporting staff	Group 4	Institution 6
Participant 32	Academic	Group 2	Institution 6
Participant 33	Supporting staff	Group 4	Institution 6

8.2 Appendix 2 - Interview Protocol (Northern Ireland)

Thank you for taking part in this research. the objective of the research is to analyse the role of entrepreneurial university in post-conflict societies in peacebuilding and reconciliation. Firstly, I would like to seek for your consent to audio record this interview. You have the right to stop the interview at any moment. You can also withdraw from the research after the interview, you need to email me at a.c.nkusi@northumbria.ac.uk and I will take appropriate action to get the data destroyed. All recordings will be treated with utmost security and confidentiality in line with Northumbria university Data Protection guidelines. This interview will take approximately 30min.

1. Could you tell us a brief description of your role in this institution?
2. How does your department fit in within the university's entrepreneurial agenda?
3. How do you as an academic (or how does your university/department) support entrepreneurship agenda of the university within and outside the campus?
4. What challenges are you facing as an academic/department/institution to effectively engage with key stakeholders (government and industry) in order to promote entrepreneurship agenda? How are those challenges being addressed or have been addressed?
5. In your own opinion/experience, how did the conflict impact university's entrepreneurial agenda? And how is it shaping university's current entrepreneurial orientation (give example)

6. What is the university role in promoting peacebuilding and how is that civic duty influencing university's entrepreneurship mission? For example if there are outreach programmes for underserved communities that offers entrepreneurship training as well as promoting social cohesion (give example).
7. In your opinion how can you make such programmes more effective or what improvements than can be made to the current university community engagement programmes

8.3 Appendix 3 - Interview protocol (Rwanda)

Semi-structured interview - Leadership (Chancellor / Vice Chancellor / Principals/ Vice Principals / Dean / HoD)

I'd like to thank you once again for being willing to participate in the interview aspect of my study. As I have mentioned to you before, my study seeks to understand the how university promotes entrepreneurial activities on the campus and its contribution to the building and development of the local, regional national economy and society. Our interview today will last approximately one hour during which I will be asking you about your understanding of entrepreneurship, the organisational culture that governs it, infrastructure that support it and lastly challenges that you face and how they can be overcome

1. What does entrepreneurship mean to you?
2. How is entrepreneurship being supported in this institution? How does this involve external agencies (Govt agencies /other universities/industry)?
3. What barriers have you encountered do you encounter in supporting third mission?
4. What structures are in place to facilitate external interaction and can you describe how they work in practice
5. In your role how do you support third mission/entrepreneurship activities and structures
6. What are the drivers for change in this institution?
7. What is your institution's aspirations towards entrepreneurship? How do you do it now and what are the future plans?

8. How is your institution funded and how are those funds allocated to support third mission in your departments – financial, human, professional development?
9. What is the research culture and expectations. and how is this research transferred to industry
10. How does your university encourage students and faculties to engage in entrepreneurial activities? (give example how this works)

Semi-structured interview - Lecturers / assistant lecturers

1. What does entrepreneurship mean to you?
2. How is entrepreneurship being supported in this institution? How does this involve external agencies (Govt agencies /other universities/industry)?
3. What barriers have you encountered do you encounter in supporting third mission?
4. What structures are in place to facilitate external interaction and can you describe how they work in practice
5. In your role how do you support third mission/entrepreneurship activities and structures
6. Can you tell me what really your department is focusing on?
7. Are you actively engaged in research? explain what partners they have, how they are funded etc. If no, then why not? What are the barriers or reasons for this
8. How supportive or what formal supports are in place at the departmental and or at the university level to support third mission activities.
9. How is your department contributing to the creation of new knowledge and how is that knowledge being shared – can you give examples?

10. What challenges/barriers are you facing as individual in your knowledge exchange process with other institutions or external agencies?

Semi-structured interview - Students

1. What does entrepreneurship mean to you?
2. How is entrepreneurship being supported in this institution? How does this involve external agencies (Govt agencies /other universities/industry)?
3. What barriers have you encountered do you encounter in supporting third mission?
4. What structures are in place to facilitate external interaction and can you describe how they work in practice
5. In your role how do you support third mission/entrepreneurship activities and structures
6. How would you describe the culture with regards to entrepreneurship or pursue entrepreneurial opportunities?
7. How do you understand or have experienced an engagement with industry more specifically with entrepreneurs
8. What do you want to do after you graduate?
9. What skills do you think you will need to achieve your career goal you've just mentioned?
10. Where do you see yourself in 5year

8.4 Appendix 4: Research Permit Application



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY (NCST)
Grand Pension Plaza, 13th Floor, KN 2 Roundabout, Kigali
PO Box: 8825 Kigali – Rwanda
E-MAIL: info@ncst.gov.rw , WEBSITE: www.ncst.gov.rw

APPLICATION FOR PERMISSION TO CONDUCT RESEARCH IN RWANDA	
PERSONAL INFORMATION	
1. Family Name:	<input type="text"/>
2. Other Names:	<input type="text"/>
3. Identification Document	
a. Passport / ID Number:	<input type="text"/>
b. Date of Issue:	<input type="text"/>
c. Expiry Date:	<input type="text"/>
4. Permanent Residential Address:	<input type="text"/>
5. Postal Address:	<input type="text"/>
6. Email Address:	<input type="text"/>
7. Address while in Rwanda:	<input type="text"/>
8. Phone Number while in Rwanda:	<input type="text"/>
9. Age:	<input type="text"/>
10. Sex: Male <input type="checkbox"/> Female <input type="checkbox"/>	
11. Nationality:	<input type="text"/>
12. Qualification (Highest Degree):	<input type="text" value="PhD"/>
➔ Please attach above details for other research staff and their Curriculum Vitae	

8.5 Appendix 5: Templates of emails sent

To seek research participation in Rwanda

Dear _____

I hope this email finds you well. My name is Alain Nkusi, Rwandan currently living in Newcastle England, I am undertaking a PhD research on entrepreneurial ecosystem in Rwanda, trying to understand how ecosystem emerge, vital elements that sustain it - one of which is Universities. I have done all my higher education in England, therefore, I have no experience on how Business studies in particular entrepreneurship it is taught (curriculum content and delivery) at higher levels, whether it involve other discipline (inter or multidisciplinary approach) or local/regional/national businesses and how entrepreneurship is promoted and supported within your institution. I would like to ask if you would like to take part in my research or you would know anyone within your institution that would help. Data collected will be treated as per Northumbria University research ethics guidelines.

I am planning to do a pilot field study in October 2019 for about 3 weeks and subsequent field studies will follow in the following year which will include a large sample size.

Best wishes,

To seek research participation from Northern Ireland universities

Dear _____

my name is Alain Nkusi, I am 2nd Year PhD student at Northumbria University and I am conducting interviews as part of doctoral research entitled: The Role of Entrepreneurial University in The Development of Entrepreneurial Ecosystem in Post-conflict Societies. Your contact details were given to me by _____, who participated in my research and recommended you that you are in an ideal position to provide high level view of the university's strategic orientation vis-a-vis entrepreneurial mission of the institution.

The interview will take approx. 30 minutes via Skype or Microsoft Team (whichever one is convenient for you). I would like to find out how your institution's entrepreneurial agenda has evolved in the last two decades and its impact on the entrepreneurial activities within and outside the campus. I have attached information sheet to give you an overview of my research, its aim, and objectives.

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If you are willing to participate please suggest a day and time that suits you and I'll do my best to be available. If you have any questions, please do not hesitate to ask.

Looking forward to hearing from you soon and thanking you for your kind co-operation.

Best wishes,

8.6 Appendix 6: Literature review articles

Journal title	Author(s)	SRL Theme
Academic Entrepreneurial Behavior: Birds of more than one feather	Castillo Holley, Alicia ; Watson, John	Culture
Academics' start-up intentions and knowledge filters: an individual perspective of the knowledge spillover theory of entrepreneurship	Guerrero, Maribel ; Urbano, David	
Entrepreneurial universities in two European regions: a case study comparison	Guerrero, M. ; Urbano, D. ; Cunningham, J. ; Organ, D.	
Entrepreneurship Unleashed: Understanding Entrepreneurial Education outside of the Business School	Turner, Tobin ; Gianiodis, Peter	
Entrepreneurship: What triggers it?	Morrison, A.	
Fear and Entrepreneurship: A Review and Research Agenda	Cacciotti, Gabriella ; Hayton, James C.	
Is there an entrepreneurial culture? A review of empirical research	Hayton, James C. ; Cacciotti, Gabriella	
Youth Employment in Sub-Saharan Africa: Challenges, Constraints and Opportunities	Fox, Louise ; Senbet, Lemma ; Simbanegavi, Witness	
Entrepreneurial intentions in an international university environment	Clara Gieure, Maria del Mar Benavides-Espinosa and Salvador Roig-Dobón	
Personality traits and theory of planned behavior comparison of entrepreneurial intentions between an emerging economy and a developing country	Hina Munir, Cai Jianfeng and Sidra Ramzan	
How entrepreneurial learning impacts one's intention towards entrepreneurship: A planned behavior approach	Feng Zhang, Liqun Wei, Hongyi Sun and Lo Choi Tung	
Entrepreneurial education, self-efficacy and intentions in Sub-Saharan Africa	Albert Puni, Alex Anlesinya and Patience Dzigbordi Akosua Korsorku	

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Entrepreneurial intentions: The role of personality traits in perspective of theory of planned behaviour	Muhammad Farrukh, Yazan Alzubi, Imran Ahmad Shahzad, Abdul Waheed and Nagina Kanwal	
Academic policy and entrepreneurship: a European perspective	Audretsch, David ; Lehmann, Erik ; Paleari, Stefano	Strategies
Breaking the Ivory Tower: Academic Entrepreneurship in the Life Sciences in UK and Germany	Haeussler, Carolin ; Colyvas, Jeannette A	
Closing the distance between academia and market: experimentation and user entrepreneurial processes	Baglieri, D ; Lorenzoni, G	
Conceptualizing academic entrepreneurship ecosystems: a review, analysis and extension of the literature	Hayter, Christopher ; Nelson, Andrew ; Zayed, Stephanie ; O'Connor, Alan	
Economic and political institutions and entry into formal and informal entrepreneurship	Autio, Erkkko ; Fu, Kun 2014	
Entrepreneurial ecosystem governance: a principal investigator-centered governance framework	Cunningham, James ; Menter, Matthias ; Wirsching, Katharine	
Entrepreneurship in Africa through the Eyes of GEDI	Ács, Zoltán J ; Szerb, László ; Jackson, Scott	
Entrepreneurship: Productive, Unproductive, and Destructive	Baumol, William	
From the ivory tower to the start-up garage: Organisational context and commercialisation processes	Nelson, Andrew J	
Inside the university technology transfer office: mission statement analysis	Fitzgerald, Ciara ; Cunningham, James	
National Systems of Entrepreneurship: Measurement issues and policy implications	Ács, Z.J. ; Autio, E. ; Szerb, L.	
The effects of university rules on spinoff creation: The case of academia in Italy	Muscio, Alessandro ; Quaglione, Davide ; Ramaciotti, Laura	
Which institutions encourage entrepreneurial growth aspirations?	Estrin, Saul ; Korosteleva, Julia ; Mickiewicz, Tomasz	
Strategic knowledge management within subsidised entrepreneurial university-industry partnerships	Maribel Guerrero, Fernando Herrera and David Urbano	

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University entrepreneurial push strategy and students' entrepreneurial intention	Douglas Wegner, Elisa Thomas, Eduardo Künzel Teixeira and Alisson Eduardo Maehler	
Entrepreneurial change in government-led development: Ethiopian universities	Huub L.M. Mudde, Meine Pieter van Dijk, Dugassa Tessema Gerba and Alemfrie Derese Chekole	
Entrepreneurship education knowledge transfer in a conflict Sub-Saharan African context	Paschal Anosike	
A relational perspective on entrepreneurial ecosystems: The role and sustenance of the entrepreneurship center	Pittz, T.G. ; Hertz, G.	Structure
Academic entrepreneurship, technology transfer and society: where next?	Wright, Mike	
Commercializing university research in transition economies: Technology transfer offices or direct industrial funding?	Belitski, Maksim ; Aginskaja, Anna ; Marozau, Radzivon	
Determinants of Graduates' Start-Ups Creation across a Multi-Campus Entrepreneurial University: The Case of Monterrey Institute of Technology and Higher Education	Guerrero, Maribel ; Urbano, David ; Cunningham, James A. ; Gajón, Eduardo	
How can universities facilitate academic spin-offs? An entrepreneurial competency perspective	Rasmussen, Einar ; Wright, Mike 2015	
How university spin-offs differ in composition and interaction: a qualitative approach	Kolb, Cornelia ; Wagner, Marcus	
Infrastructure and entrepreneurship	Audretsch, David ; Heger, Diana ; Veith, Tobias	
Public policy for academic entrepreneurship initiatives: a review and critical discussion	Sandström, Christian ; Wennberg, Karl ; Wallin, Martin ; Zherlygina, Yulia	
Re-thinking university spin-off: a critical literature review and a research agenda	Miranda, Francisco ; Chamorro, Antonio ; Rubio, Sergio	
Small business incubators: An emerging phenomenon in South Africa's SMME economy	Mukovhe Masutha ; Christian M. Rogerson	
Social Capital in University Business Incubators: dimensions, antecedents and outcomes	Redondo, María ; Camarero, Carmen	
Technology business incubation mechanisms and sustainable regional development	Lamine, Wadid ; Mian, Sarfraz ; Fayolle, Alain ; Wright, Mike ; Klofsten, Magnus ; Etzkowitz, Henry	

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The Emerging Properties of Business Accelerators: The Case of Botswana, Namibia and Uganda Global Business Labs	Ganamotse, Gaofetoge Ntshadi ; Samuelsson, Mikael ; Abankwah, Ruth, M. ; Anthony, Tibaingana ; Mphela, Thuso	
The impact of business-support services on firm performance: a meta-analysis	Cravo, Túlio ; Piza, Caio	
The influence of university departments on the evolution of entrepreneurial competencies in spin-off ventures	Rasmussen, Einar ; Mosey, Simon ; Wright, Mike 2014	
The technology transfer ecosystem in academia. An organisational design perspective	Good, Matthew ; Knockaert, Mirjam ; Soppe, Birthe ; Wright, Mike	
University capabilities in facilitating entrepreneurship: A longitudinal study of spin-off ventures at mid-range universities	Rasmussen, Einar ; Borch, Odd Jarl	
The role and function of cooperative research centers in entrepreneurial universities: A micro level perspective	Dolan, B., Cunningham, J.A., Menter, M., McGregor, C.	
Entrepreneurial architecture in UK universities: still a work in progress?	Lynn M. Martin, Izzy Warren-Smith and Gemma Lord	
Research groups as ‘quasi-firms’: the invention of the entrepreneurial university	Henry Etzkowitz	
Academic engagement and commercialisation: A review of the literature on university–industry relations	Perkmann, Markus ; Tartari, Valentina ; Mckelvey, Maureen ; Autio, Erko ; Broström, Anders ; D’este, Pablo ; Fini, Riccardo ; Geuna, Aldo ; Grimaldi, Rosa ; Hughes, Alan ; Krabel, Stefan ; Kitson, Michael ; Llerena, Patrick ; Lissoni, Francesco ; Salter, Ammon ; Sobrero, Maurizio	University-Industry Collaborations
Academics or entrepreneurs? Investigating role identity modification of university scientists involved in commercialisation activity	Jain, Sanjay ; George, Gerard ; Maltarich, Mark	
Becoming an entrepreneurial university? A case study of knowledge exchange relationships and faculty attitudes in a medium-sized, research-oriented university	Martinelli, Arianna ; Meyer, Martin ; Tunzelmann, Nick	
Entrepreneurship education: the role of local business	Lindh, Ida ; Thorgren, Sara	

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Fostering university-industry RandD collaborations in European union countries	Cunningham, James A. Link, Albert N	
Networking Behavior and Contracting Relationships Among Entrepreneurs in Business Incubators	Ebbers, Joris J.	
Performance Spill-over Effects in Entrepreneurial Networks: Assessing a Dyadic Theory of Social Capital	Aarstad, Jarle ; Haugland, Sven A ; Greve, Arent	
University-business-government collaboration: from institutes to platforms and ecosystems	Nyman, Göte	
What are the trade-offs of academic entrepreneurship? An investigation on the Italian case	Barbieri, Elisa ; Rubini, Laretta ; Pollio, Chiara ; Micozzi, Alessandra	
What drives scientists to start their own company?	Krabel, Stefan ; Mueller, Pamela	
Why do academics engage with industry? The entrepreneurial university and individual motivations	D'Este, Pablo ; Perkmann, Markus	
University–industry collaborations: an industry perspective	Ferran Giones	
The influence of researcher competence on university-industry collaboration: The mediating role of domain knowledge transfers and spillovers	Sew Huey Ting, Sofri Yahya and Cheng Ling Tan	
30 years after Bayh–Dole: Reassessing academic entrepreneurship	Grimaldi, Rosa ; Kenney, Martin ; Siegel, Donald S. ; Wright, Mike	EU impact
Economic impact of entrepreneurial universities' activities: an exploratory study of the united kingdom	Guerrero, Maribel; Cunningham, James A. Urbano, David (2015).	
Entrepreneurial universities in the region: the force awakens?	Culkin, Nigel	
Entrepreneurial universities: emerging models in the new social and economic landscape	Guerrero, Maribel ; Urbano, David ; Fayolle, Alain ; Klofsten, Magnus ; Mian, Sarfraz	
Entrepreneurial Universities: Socioeconomic Impacts of Academic Entrepreneurship in a European Region	Urbano, David ; Guerrero, Maribel Audretsch, David B (Editor) ; Link, Albert N (Editor) ; Peña-Legazkue, Iñaki (Editor)	
Entrepreneurial universities: the role of communities, people and places	Ratten, Vanessa	

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One size does not fit all! New perspectives on the university in the social knowledge economy	Benneworth, P ; Pinheiro, R ; Sanchez-Barrioluengo, M	
The Impact of Entrepreneurial Universities on Regional Growth: A local Intellectual Capital Perspective	Trequattrini, Raffaele ; Lombardi, Rosa ; Lardo, Alessandra ; Cuzzo, Benedetta	
Who is the academic entrepreneur? The role of graduate students in the development of university spinoffs	Hayter, Christopher ; Lubynsky, Roman ; Maroulis, Spiro	
The entrepreneurial university as driver for economic growth and social change - Key strategic challenges	Magnus Klofsten, Alain Fayolle, Maribel Guerrero, Sarfraz Mian, Mike Wright	
Towards an “Entrepreneurial University” Model to Support Knowledge-Based Economic Development: The Case of the National University of Singapore	Poh-Kam Wong, Yuen-Ping Ho, Annette Singh	
“To have and have not”: founders’ human capital and university start-up survival	Criaco, Giuseppe ; Minola, Tommaso ; Migliorini, Pablo ; Serarols-Tarrés, Christian	EU development
A critical review of entrepreneurial ecosystems research: towards a future research agenda	Alvedalen, Janna ; Boschma, Ron	
Anatomy of the entrepreneurial university	Etzkowitz, H	
Entrepreneurial education for the entrepreneurial university: a stakeholder perspective	Gianiodis, P.T. ; Meek, W.R.	
Expanding entrepreneurship education ecosystems	Belitski, Maksim ; Heron, Keith	
From the entrepreneurial university to the university for the entrepreneurial society	Audretsch, David	
Innovation and entrepreneurship in the academic setting: a systematic literature review	Schmitz, Ademar ; Urbano, David ; Dandolini, Gertrudes ; Souza, João ; Guerrero, Maribel	
Learning by doing – An exploration of experience, critical incidents and reflection in entrepreneurial learning	Cope, J. ; Watts, G.	
Making Universities More Entrepreneurial: Development of a Model	Kirby, David A. ; Guerrero, Maribel ; Urbano, David Neubert, 1. Mitchell J. ; Soriano, 2. Domingo Ribeiro ; Montoro-Sánchez, Ángeles	
Regional transformation through technological entrepreneurship	Venkataraman, Sankaran	

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The development of an entrepreneurial university	Guerrero, Maribel ; Urbano, David	
The entrepreneurial university: Examining the underlying academic tensions	Philpott, Kevin ; Dooley, Lawrence ; O'Reilly, Caroline ; Lupton, Gary	
The entrepreneurial university: Examining the underlying academic tensions	Philpott, Kevin ; Dooley, Lawrence ; O'Reilly, Caroline ; Lupton, Gary	
The third mission of universities: An investigation of the espoused values	Loi, Michela ; Di Guardo, Maria Chiara	
Triple helix and its evolution: a systematic literature review	Anderson Galvao, Carla Mascarenhas, Carla Marques, João Ferreira and Vanessa Ratten	
The entrepreneurial university: a proposed model for developing nations	Rima Bizri, Jamil Hammoud, Marwa Stouhi and Manar Hammoud	
The emerging role of university spin-off companies in developing regional entrepreneurial university ecosystems: The case of Andalusia	Elena Fuster, Antonio Padilla-Meléndez, Nigel Lockett, Ana Rosa del-Águila-Obra	
Universities' third mission and the entrepreneurial university and the challenges they bring to Universities	Arthur Rubens, Francesca Spigarelli, Alessio Cavicchi, Chiara Rinaldi	
Entrepreneurial Architecture: A Blueprint for Entrepreneurial Universities	Nelles, Jen ; Vorley, Tim	
An entrepreneurial flair development: the role of an ecosystem	John Amolo ; Stephen. O Migiro	E E development
Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique	Stam, Erik	
Entrepreneurial ecosystems: a systematic review	Maroufkhani, Parisa ; Wagner, Ralf ; Wan Ismail, Wan Khairuzzaman	
Entrepreneurial ecosystems: economic, technological, and societal impacts	Audretsch, D.B. ; Cunningham, J.A. ; Kuratko, D.F. ; Lehmann, E.E. ; Menter, M.	
Entrepreneurship Education: A Systematic Review of the Evidence	Pittaway, Luke ; Cope, Jason	
Entrepreneurship paradigm and economic renaissance in Africa	Edoho, Felix	

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How entrepreneurial ecosystems take form: Evidence from social impact initiatives in Seattle	Thompson, Tracy A. ; Purdy, Jill M. ; Ventresca, Marc J.	
Looking inside the spiky bits: a critical review and conceptualisation of entrepreneurial ecosystems	Brown, Ross ; Mason, Colin	
Regional Innovation Systems, Clusters, and the Knowledge Economy	Cooke, Philip	
Regional innovation systems: Institutional and organisational dimensions	Cooke, Philip ; Gomez Uranga, Mikel ; Etxebarria, Goio	
The Relational Organisation of Entrepreneurial Ecosystems	Spigel, Ben	
Understanding the concept of the entrepreneurial university from the perspective of higher education models	Sam, Chanphirun ; Sijde, Peter	
Unlocking Productive Entrepreneurship in Africa's Least Developed Countries	Brixiova, Zuzana	
Who is left out: exploring social boundaries in entrepreneurial ecosystems	Neumeyer, X. ; Santos, S.C. ; Morris, M.H.	

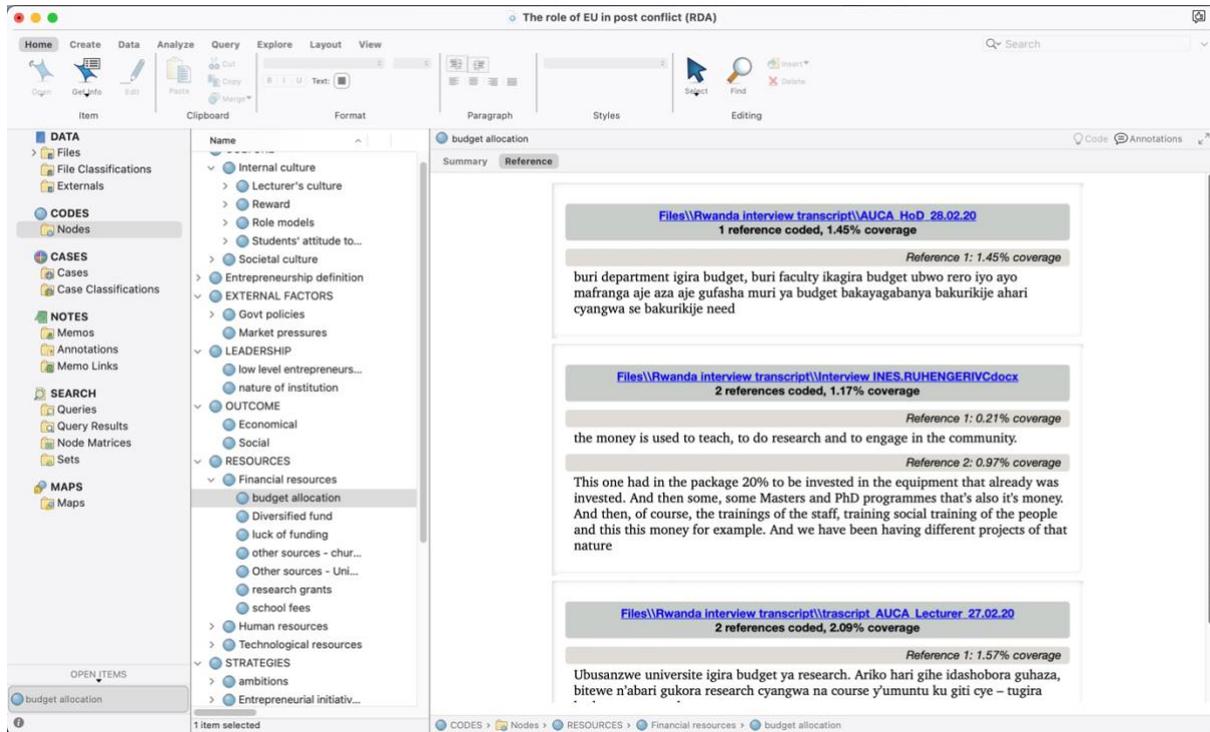
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8.7 Appendix 7: Academic journal

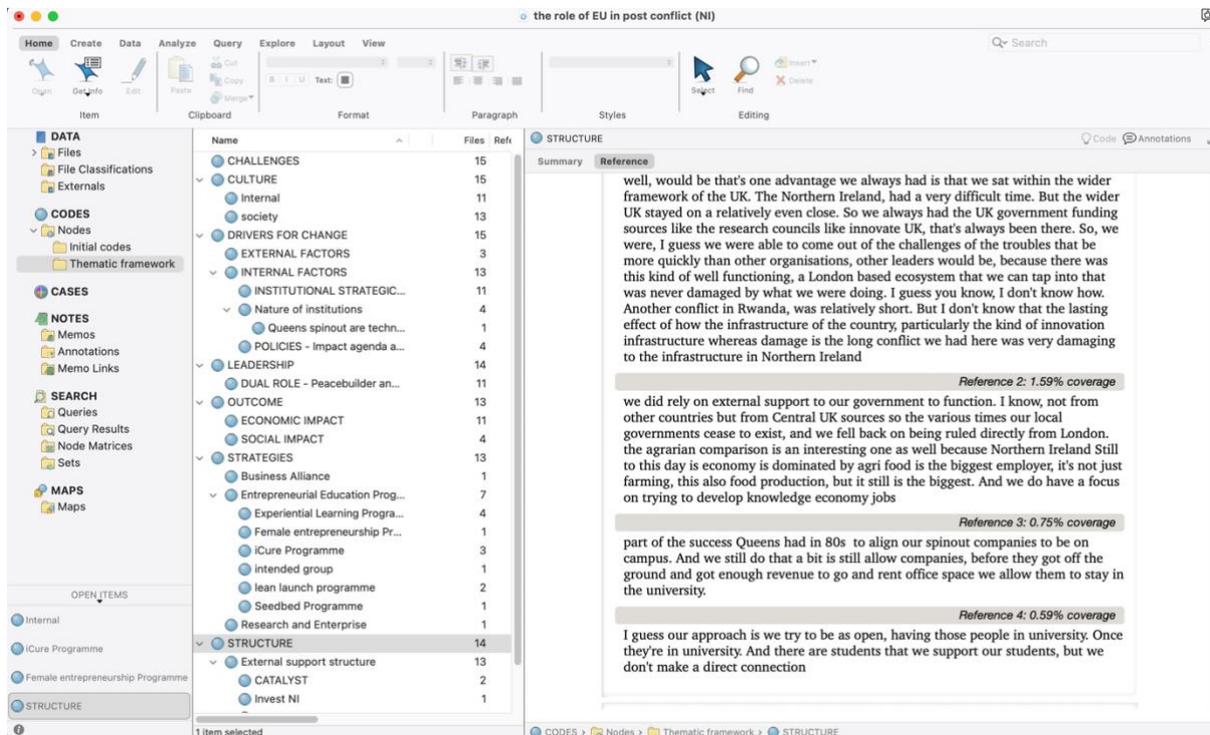
The role of the entrepreneurial university in building an entrepreneurial ecosystem in a post-conflict economy: An exploratory study of Rwanda

8.8 Appendix 8: NVivo 12 thematic analysis

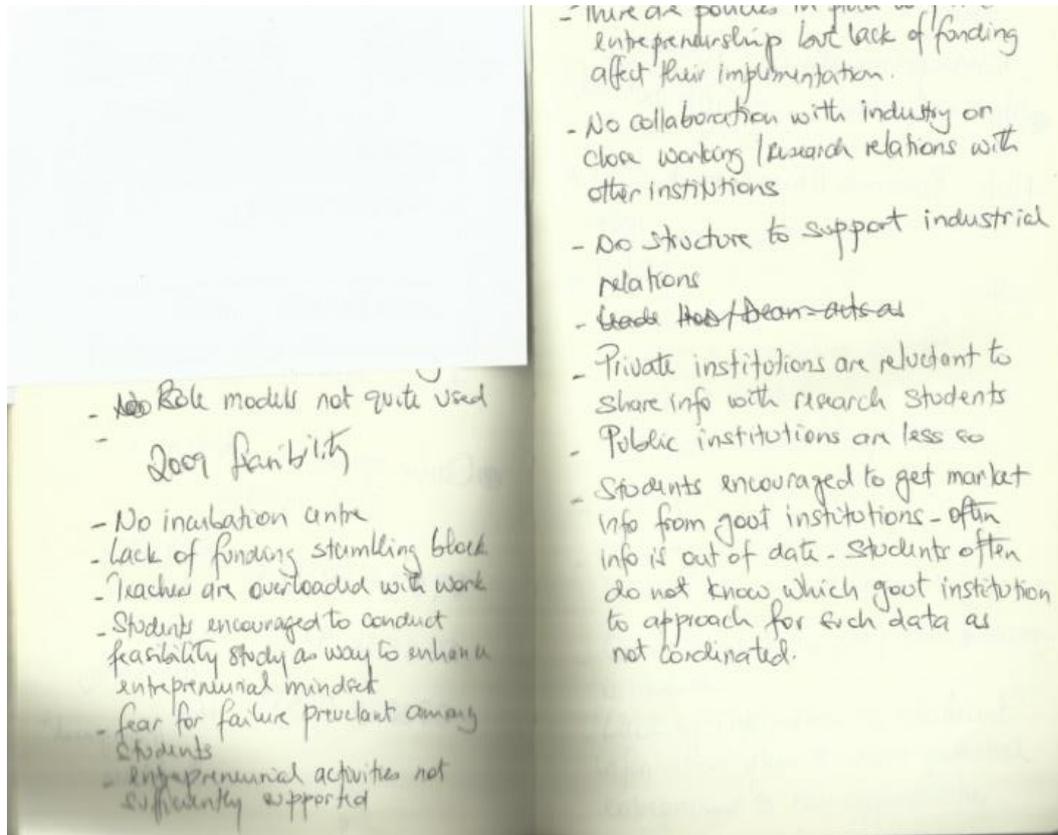
Rwanda case study



Northern Ireland case study



8.9 Appendix 8: Field notes

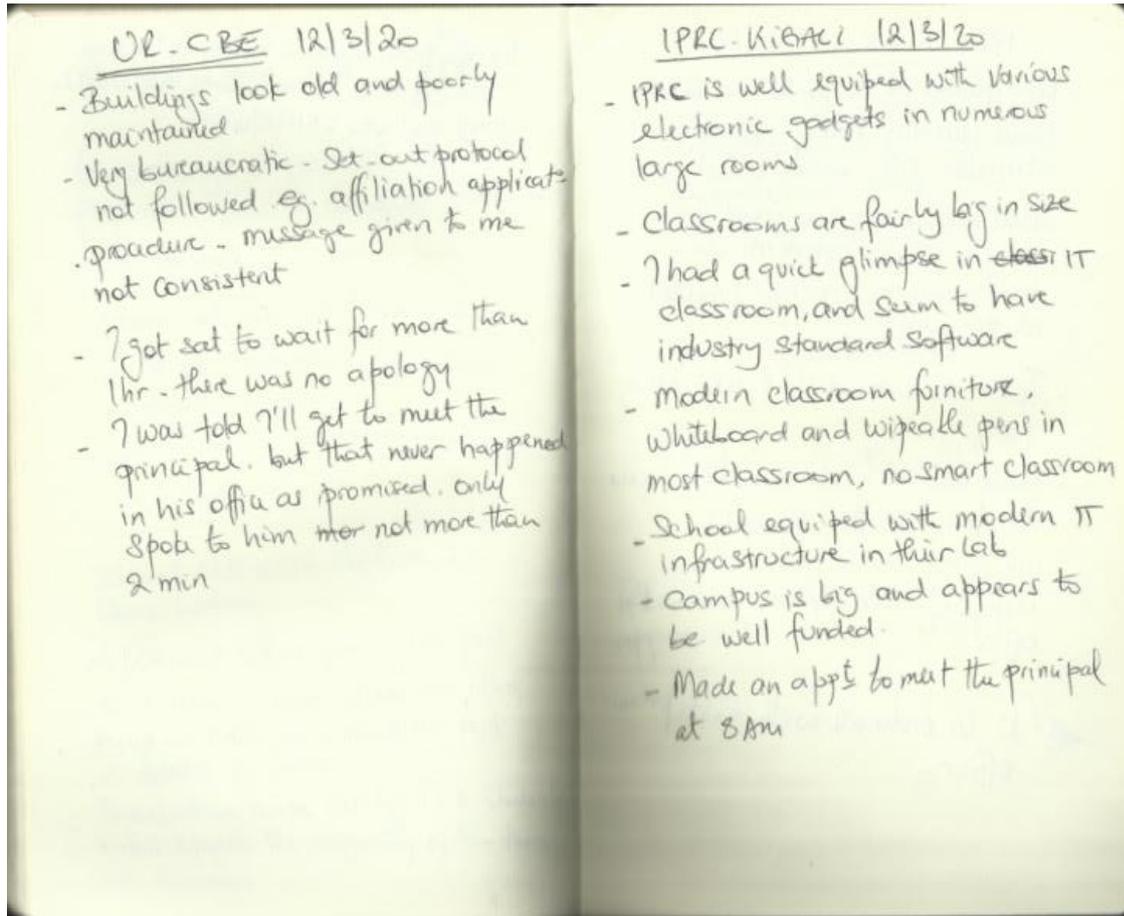


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- Lack of hands-on experience impede their learning - practical skills
 - All participants think access to financial capital is key issue to their entrepreneurial success
 - lack of business concept/idea development support.
 - Entrepreneurial facilities/incubation centre not appropriately promoted.
 - change in education teaching language had a negative impact on students
 - ▲ Email James about focus group using questionnaire as a way to gather more info efficiently and quickly ✓
 - ~~the~~ fear of failure still rampant
 - Graduate entrepreneurs, especially those who divert from their academic background not appreciated by the society
- 10/3/20
- Observations
- Classroom poorly equipped
 - No access to ICT
 - No Smart board / interactive board
 - Still practice didactic teaching
 - New Buildings appear new and well-maintained.
 - Access to learning resources is limited. Students rely on google scholar for articles but some of the articles are restricted
 - Library has internet facilities but machines are few compared to the number of students

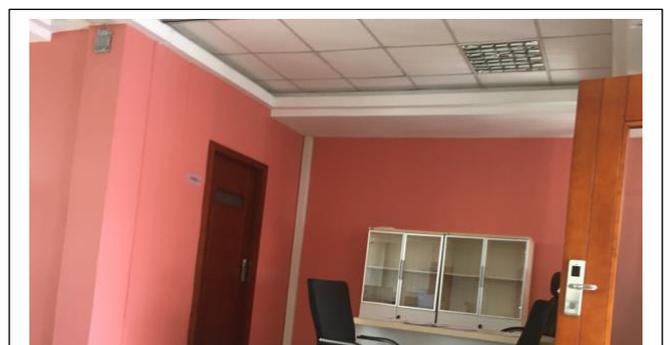
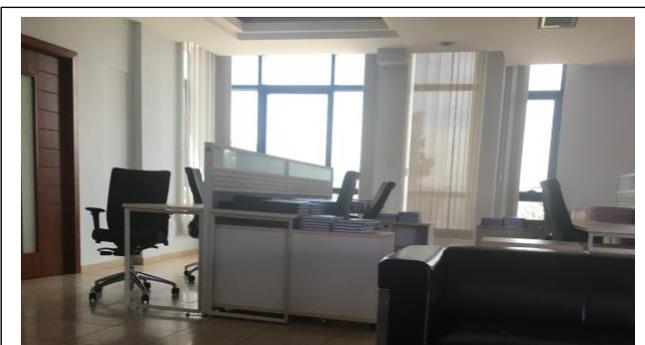
- Interview 3 - 2 Year Civil Engineering.
- 4 Students
- Students look for their placement
 - Some do have positive experience, depends who give you the opportunity
 - Entrepreneurial mindset is prevalent
 - All students aspire to be entrepreneurs
 - Lack of role models or Alumni to inspire them
 - Career day gives students chance to expose their talents.
 - Wednesday afternoon - 11-2 pm talk mainly focusing on civic education and occasionally subject-related topics are discussed
 - Lack of / insufficient resources to explore entrepreneurial ideas.
- IVES KUHENGERI - 11/03/20
- Incubation centre situated within the campus.
 - Ask to a student to give me direction where incubation centre is and he didn't know where it was.
 - Contact telephone number of each HoD or leader of particular office is displayed on the door of the office.
 - Wednesday talk is about RPF and its politics. "Civic education" mandatory to all staff and students from 11-1 pm.
 - School starts at 8 am - 2 pm and afternoon is for revision and school work
 - Spoken to Dean of School of Business Economics - very approachable
 - office with a secretary

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8.10 Appendix 9: Photos

AUCA



Gishushu Campus – Office



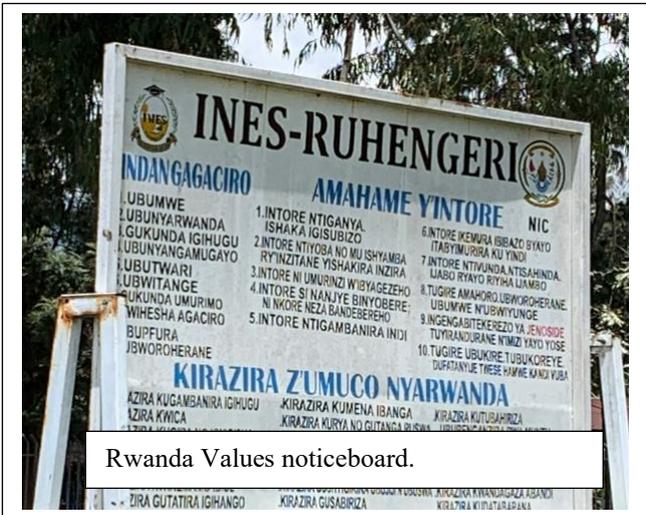
Gishushu Campus – Classroom corridor

Gishushu Campus – Office



Gishushu Campus – Classroom corridor (2)

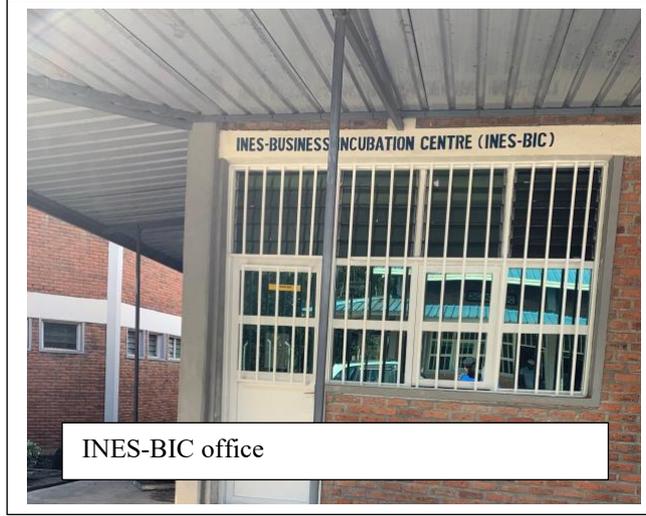
INES-Ruhengeri



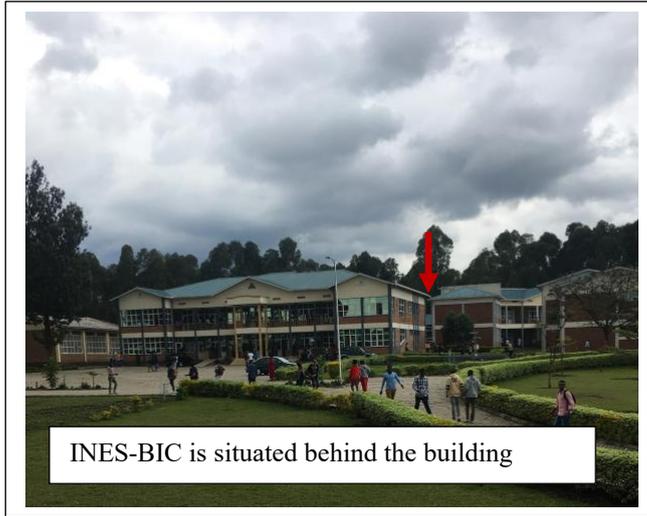
Rwanda Values noticeboard.



Entrance is controlled by security guards 24/7



INES-BIC office



INES-BIC is situated behind the building

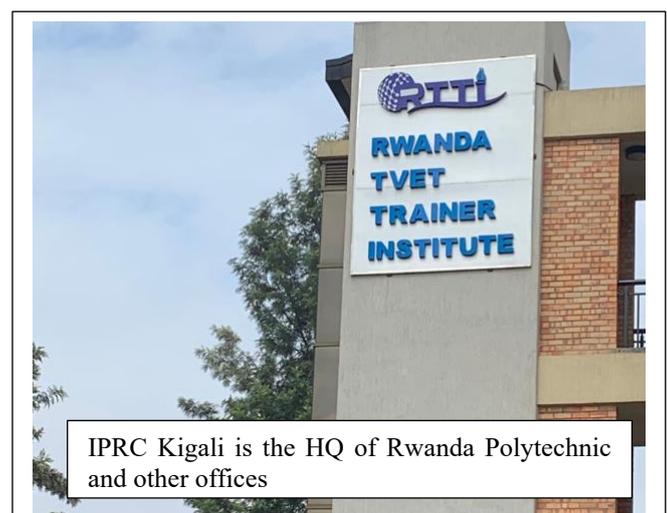
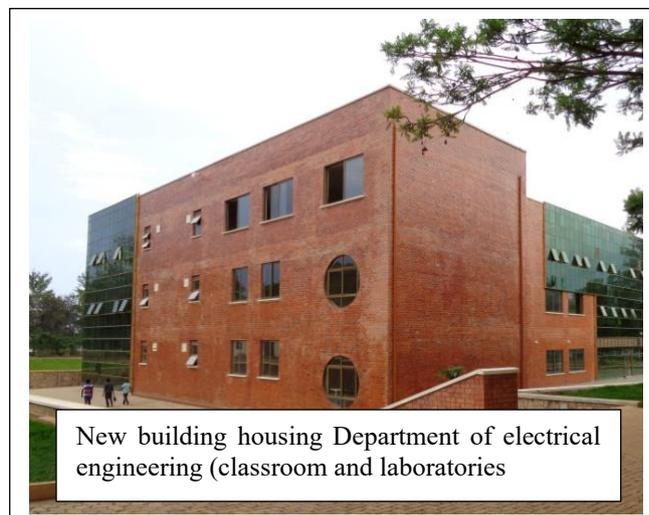


Classroom lacks modern in-class technologies



Office of HoD and department filing storage

Rwanda Polytechnic – IPRC Kigali



University of Rwanda – Main Office and College of Business and Economics



University of Rwanda HQ



Entrance to UR manned by security



Commemoration stone bearing the names of UR staff killed during the genocide in 1994



Smart classroom