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EMBRACING THE SECOND ACADEMIC REVOLUTION: AN ENTREPRENEURIAL UNIVERSITY MODEL FOR MALAWIAN UNIVERSITIES

BY

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DECLARATION

I hereby declare that this thesis titled **"Embracing the Second Academic Revolution: An Entrepreneurial University Model for Malawian Universities"** is based on the original research work of Ella Kangaude and is submitted for the Degree of Doctor of Philosophy at the University of Lusaka. Indebtedness to other research works has been duly acknowledged at the relevant places. It is also declared that this work has not been submitted for the award of PhD or any other degree in this or any other University.

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DEDICATION

This work is dedicated to my three wonderful children: Sharon, Vitumbiko and Wongani for their patience and understanding during the time I was doing my PhD.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF DIAGRAMS

LIST OF ABBREVIATIONS

AAU	Association of African Universities
AD	Anno Domini
AIDS	Acquired Immune Deficiency Syndrome
AUTM	Association of University Technology Managers
CRADAs	Cooperative Research and Development Agreements
DESTE	Department of Education, Science and Technology
DCU	Dublin City University
EO	Entrepreneurial Orientation
EU	European Union
HE	Higher Education
HEIs	Higher Education Institution
HIPC	Highly Indebted Poor Country
ICEIDA	Icelandic International Development Agency
IGAs	Income Generating Activities
IGU	Industry, Government and University
IP	Intellectual Property
LDCs	Least Developed Countries
LUANAR	Lilongwe University of Agriculture and Natural Resources
MoEST	Ministry of Education Science and Technology
MGDS	Malawi Growth and Development Strategy
MIT	Massachusetts Institute of Technology
MUST	Malawi University of Science and Technology

NCHE	National Council for Higher Education
NCST	National Commission for Science and Technology
NESP	National Education Sector Plan
NIS	National Innovation System
NZVCC	New Zealand Vice Chancellor's Committee
OECD	Organization of Economic Cooperation and Development
PhD	Doctor of Philosophy Degree
R&D	Research and Development
SARIMA	Southern Africa Research and Innovation Management Association
SARUA	Southern Africa Regional University Association
SBIR	Small Business Innovation and Research
SFIG	Strategic Framework for Income Generation
SMEs	Small and Medium Enterprises
SPSS	Statistical Package for Social Sciences
STI	Science technology and innovation
TTO	Technology Transfer Office
TU4D	Technological University for Dublin
UCB	University of California Berkeley
UCONZ	University Commercialization Offices of New Zealand
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNILUS	University of Lusaka
UNIMA	University of Malawi

UK	United Kingdom
URBS	University Research Based Spin-Offs
US	United States
USD	United States Dollar
USO	University Spin-Offs

ABSTRACT

The emergence of an entrepreneurial university in the United States and its consequent adoption in mostly developed and developing economies has made governments virtually all over the world to recognize the potential of the university as a resource to enhance innovation environments and create a regime of science-based economic development. In addition to addressing gaps in the National Innovation System, an entrepreneurial university provides solutions to myriad challenges faced by higher education institutions eminent across the world. Despite such popularity, little is known about the adoption of an entrepreneurial university in least developed economies. This study was, therefore, carried out to explore a model of an entrepreneurial university that would be adopted by countries in least developed economies, Malawi in particular.

The study used a multi case studies holistic approach where a structured questionnaire was used to collect both quantitative and qualitative data. Data collection was informed extensively by theoretical perspectives on an entrepreneurial university and management tools. The analysis of quantitative data using Statistical Package for Social Sciences and Microsoft Excel, and open coding of qualitative data resulted into three major components of an entrepreneurial university model to be adopted by Malawian universities namely: the transforming strategies, the transforming elements and the entrepreneurial paradigm outputs. The three transforming strategies include establishment of offices to advance entrepreneurship, development of a clear and deliberate policy on entrepreneurship and development of an entrepreneurial mindset in the university. The six transforming elements are: committed university leadership, an integrated entrepreneurial culture in teaching and research missions, faculty motivation, supportive financial strategy, impact assessment of entrepreneurial university activities and internal and external collaborations. The major outputs of the adopted entrepreneurial university in Malawian universities in the short term are consultancies and research contracts with focus on patent licensing, start-ups and spin-offs in the longer term.

The study provides a critical insight on the multi-dimensional view of an entrepreneurial university from the context of universities in least developed countries in Africa. Although the

study focuses on Malawi, the results could also reflect on the multiplicity of models of an entrepreneurial university in higher education institutions in least developed countries.

Adoption of an entrepreneurial university in Malawi entails complete mental revolution to foster an entrepreneurial mindset development and incorporation of economic development in the delivery of teaching and research missions.

CHAPTER 1: INTRODUCTION TO THE STUDY

1.1 Introduction

The advent of the second academic revolution and the subsequent emergence of the concept of an entrepreneurial university have made governments recognize the importance of involving universities in economic growth and development plans of their nations and regions (Tyler, 2009; Arnaut, 2010; Collier & Gray, 2012; Gibb, 2013). The real and potential contributions of universities to economic development have thus been discussed and much has been written about how economies have benefited from the entrepreneurial paradigm in universities (Arnaut, 2010; Cai & Liu, 2014).

In recognition of the importance of universities towards knowledge creation and contribution to social-economic development, the Government of Malawi has put efforts to increase equitable access to national higher education and improve quality of teaching and research in Malawian universities (Government of Malawi, 2008; Hahn & Bruggen, 2010). Inevitably, increasing access and improving quality of higher education, requires sufficient resources and a stronger financial base (Bok, 2003; Valeta, Sefasi & Kalizangóma, 2016; Government of Malawi, 2018). Meanwhile, reports (World Bank, 2010; Dunga, 2013; Shawa, 2014; Msiska, 2015; Mambo, Meky, Tanaka & Salmi, 2016) indicate that Malawian universities continue to face numerous challenges the most significant being inadequate government funding in public universities and insufficient income from tuition fees in both public and private universities.

Unless Malawian universities address the numerous challenges faced by adopting the concept of an entrepreneurial university that has taken centre stage in the 21st Century, efforts by the

Government of Malawi and other stakeholders in higher education institutions (HEIs) to improve quality, access and relevance of higher education in Malawi will hardly be achieved. The purpose of the study, therefore, was to explore a model that can be adopted by Malawian universities to facilitate the transformation of Malawian universities into entrepreneurial universities.

This Chapter provides the background to the study, the statement of the problem and the objectives of the study. The Chapter further provides the significance, scope and limitations of the study. At the end of the Chapter, the layout of the thesis has been provided.

1.2 Background to the Study

The financial restrictions and other challenges faced by the Malawian universities are not unique. Studies (Etzkowitz, Webster, Gebhardt & Terra, 2000; Arnaut, 2010; Association of African Universities {AAU}, 2010; Altbach, 2013; Gibb, 2014) have reported of similar challenges in several other universities across continents. The advent of the second academic revolution and subsequent emergence of an entrepreneurial university has provided solutions to most of the challenges faced by such HEIs (Etzkowitz *et al.*, 2000; Castells, 2000).

The first academic revolution took off in the late 19th Century where research was introduced as an academic mission into the university system, in addition to the teaching and archiving missions (Storr, 1952; Metzger, 1955; Veysey, 1965; Jencks & Reisman, 1968; Etzkowitz, 2003a). The second academic revolution which started in early 1960's at Massachusetts Institute of Technology (MIT) and University of California Berkeley (UCB) facilitated the incorporation of entrepreneurship in the traditional missions of teaching and research (Etzkowitz *et al*., 2000). Thus the second academic revolution brought in the concept of an entrepreneurial university.

An entrepreneurial university emerged in the United States (US) in the early 1980's (Etzkowitz & Leydesdorff, 1998; Etzkowitz et *al.*, 2000; Etzkowitz, 2002; Rhines, 2005; Allen, 2012). At that time, the US universities had to find means of addressing stringent financial conditions they were facing. The reduction of government funding and consequent financial inadequacy, at that time, was slowing down their research work and other university operations (Etzkowitz & Leydesdorff, 1999; Etzkowitz *et al*., 2000; Libecap, 2005). The US universities, with support from legal practitioners and industry partners, lobbied government on commercialization of university research results mainly through licensing of university generated patents (Etzkowitz *et al*., 2000; Rhines, 2005). The result was the passage of the Bayh-Dole Act (1980) which gave permission to universities in US together with other institutions using federal funds to retain title on any patent issued for their research based inventions, technologies and other discoveries for commercial gains (Bayh-Dole Act, 1980; Libecap, 2005; Rhines, 2005).

Evidently, the US universities did not only generate the needed income from their research work but also found themselves contributing towards innovation in the so called knowledge-based economy (Etzkowitz, Gulbrandsen & Levitt, 2001; Etzkowitz, 2003a; Mowery, Nelson, Sampat & Zeidonis, 2004). The industries benefited from university research discoveries and the nation became competitive in science, technology and innovation (STI) (Libecap, 2005). Subsequent reports (Arnaut, 2010; Etzkowitz *et al*., 2000, Gibb, 2014) indicate that recent adopters of an entrepreneurial university do not only focus on income generation and diversification in universities but also consider other multiple benefits that come alongside the transition like promotion of STI, motivation of staff members, relevance of HEIs in the society, increasing competence in graduates, among other benefits.

In Continental Europe and Asia, the aim of adopting an entrepreneurial university, in addition to addressing the financial inadequacy in universities, was to facilitate university autonomy and strengthen ties between university and industry in order to boost productivity and attain competitiveness of their industries and economies (Etzkowitz *et al*., 2000; Etzkowitz, 2003b). In China, the adoption of an entrepreneurial university in their higher education sector aimed at bringing economic changes to facilitate the shift from labour-intensive production to capital and technology-intensive production (Organization of Economic Cooperation and Development {OECD}, 2007; Cai & Liu, 2014).

In least developed economies, the governments have recognized the role played by an entrepreneurial university in addressing socio-economic woes rampant in their countries. For instance, the entrepreneurial paradigm in Latin American universities initiated by government, as was the case in Europe, focused on reducing poverty, reducing unemployment and providing solutions to most of the social-economic issues affecting their economies (Etzkowitz *et al*., 2000; Thorn & Soo, 2006). A number of Latin American universities, therefore, developed programs that prepared and stimulated faculty (academic members of staff) and students towards orienting residents of poor neighborhoods (favelas) towards entrepreneurship (Etzkowitz *et al*., 2000; Thorn & Soo, 2006).

Additionally, governments in Latin America offered incentives for companies and industries to collaborate with universities in order to revise the so called rigid academic structures to make graduate education more interdisciplinary and more responsive to needs of industry with much emphasis on research and entrepreneurship (Etzkowitz *et al*., 2000; Thorn & Soo, 2006). Etzkowitz *et al.* (2000) observed that universities in Latin America were simultaneously undergoing the first and second academic revolutions as they were still in the teaching and

archiving mode. However, the primary benefit of the entrepreneurial paradigm in Latin American universities and across the world has been diversification of income sources to curb financial crisis in HEIs (Etzkowitz *et al*., 2000; Mowery *et al.,* 2004).

Although the concept of an entrepreneurial university has gained popularity around the globe, it is relatively new in Africa especially in the Sub-Saharan region (Nafukho & Wawire, 2006; Sawahel, 2014; Alessandrini, 2015) with indeed most reports of its success coming from developed and emerging economies. Studies (Nafukho & Wawire, 2006; Collier & Gray, 2010; Mutambi, 2011; Owolabi, Olumuyiwa, Adeleke & Abubakar, 2012; Adebayo & Kolawole, 2013; Alessandrini, 2015; Rorwana & Tengeh, 2015) indicate that some universities in South Africa, Kenya, Uganda, Nigeria, Tunisia among other countries have adopted and customized the entrepreneurial university concept to suit their internal needs and other factors. The reasons for adopting the entrepreneurial university concept in these African universities include income generation for the university; the need to take a pivotal role in national development agendas; addressing socio-economic and technological challenges in their countries and regions, among other needs (AAU, 2010; Omidyar Network Africa, 2014; Alessandrini, Klose & Pepper, 2015).

Other than economic crisis and subsequent severe financial constraints, African universities continuously face the following challenges: critical shortage of quality faculty; limited capacity of governance, leadership and management; inadequate facilities and infrastructure; problems of quality and relevance of teaching and research; limited capacity of research, knowledge generation and adaptation capabilities; and problems in meeting increasing demand for equitable access (Bloom, Canning & Chan, 2006; Lumumba, 2006; Yizengaw, 2008; AAU, 2010).

In addition to the aforementioned internal challenges, there is pressure on African universities to transform, decolonize and play a major role in changing the lives of Africans and futures of their countries by addressing issues of poverty, famine, genocide, epidemic diseases like Acquired Immune Deficiency Syndrome (AIDS), high infant mortality, unemployment, environmental degradation and climate change, high illiteracy level (Bloom *et al.*, 2006; AAU, 2010; Valeta *et al*., 2016) among other social issues. The adoption of an entrepreneurial university in African HEIs, therefore, stems, to a large extent, from the implicit need for economic development and increased attention to the above cited internal challenges and social responsibilities (Nafukho & Wawire, 2006; Alessandrin *et al*., 2015).

The concept of an entrepreneurial university, although a recent phenomenon in Africa, has since been considered a panacea for many challenges facing HEIs not only in Africa but across the globe (Barnett, 2005; 2012; Todorovic, McNaughton & Guild, 2011; Svensson & Bold, 2016). As developed nations focus on an entrepreneurial university that contributes towards leadership in innovation and technological advancements, least developed countries (LDCs) are focusing their entrepreneurial universities on addressing current societal and economic issues.

It is reported that the advent of the fourth industrial revolution, emerging in the developed economies, will increase demand and pressure on HEIs across the globe as universities will be expected to shape future technology by being test-beds for innovation and educate future generations to enable them acquire the right set of skills and knowledge (Jules, 2017; Xu, David & Kim, 2018). It has been established that the fourth industrial revolution is powered by artificial intelligence and will transform the workplace from task based characteristics to human centred characteristics (Prisecaru, 2016; Xu *et al*., 2018; Peters, 2017). This, therefore, calls for a powered entrepreneurial university with more interdisciplinary teaching, research and innovation

(Xu *et al*., 2018). Globalization will demand that universities in all continents including Africa, Malawi inclusive, will have to join the entrepreneurial paradigm by all means (Prisecaru, 2016).

1.3 State and Challenges of Malawian Universities

Malawi is a landlocked country located in the South-East part of Africa with Zambia, Tanzania and Mozambique as neighboring countries. Located in the Sub-Saharan region, Malawi is considered one of the poorest countries in the world and is also listed on highly indebted poor countries (HIPC) (Booth, Cammack, Harrigan, Mataure & Ngwira, 2006; Mapemba, 2009; Icelandic International Development Agency (ICEIDA), 2012; Mwanakwate, 2015; Bertelsmann Stiftung, 2016). The higher education sector in Malawi comprises three types of institutions: universities, polytechnics and colleges (Hahn & Bruggen, 2010). However, universities in Malawi remain the core of the higher education system with by far the largest numbers of enrollments and graduations (World Bank, 2014).

Despite considerable progress made in the past five years or so, it has been observed that higher education in Malawi is far from achieving expected results (Government of Malawi, 2014). Firstly, the supply of graduates by the current four public and twenty one private universities (National Council for Higher Education {NCHE}, 2015) is not adequate both in terms of quality and absolute numbers (World Bank, 2010; Mambo *et al.*, 2016; Government of Malawi, 2018). Malawi's tertiary gross enrollment rate is 0.8% of the total population, which is the lowest in Africa (Malawi Government, 2018) as shown in Table 1.1 on the next page.

Table 1.1 Gross Enrolment Ratio in Tertiary Education

Country	2010	2011	2012	2013	2014
Malawi	0.7	0.8	N/A	N/A	N/A
Rwanda	5.6	6.7	6.6	7.7	N/A
South Africa	N/A	N/A	19.0	19.7	19.4
Uganda	4.0	4.5	N/A	N/A	N/A
Tanzania	2.1	N/A	3.9	3.7	N/A
Sub-Saharan Africa	7.9	8.1	8.3	8.5	8.6

Source: Government of Malawi (2018)

Secondly, reports (Msiska & Chulu, 2006; United Nations Educational, Scientific and Cultural Organization {UNESCO}, 2014; Msiska, 2015; Government of Malawi, 2018) indicate that the quality and relevance of programmes offered in the Malawian universities is not aligned towards the needs of the labour market. UNESCO (2014) relates the irrelevance of the university programmes to the weak link between the academia and the industry. Thirdly, there are reports of poor infrastructure to support quality higher education in Malawian universities and the country (Shawa, 2014; Mambo *et al*., 2016). Fourthly, the number of academic staff holding senior degrees in Malawian universities is small and this has negative effects on research quality, research output as well as the provision of postgraduate programmes (World Bank, 2010; Government of Malawi, 2018).

At the centre of all the challenges faced by Malawian universities are financial restrictions stemming from the poor economic situation in Malawi (Mambo *et al*., 2016). Despite the large share of the Malawian budget allocated to higher education, funding still remains inadequate to support the financial needs of the Malawian higher education system (Dunga, 2013; World Bank, 2014; Mambo *et al*., 2016; Government of Malawi, 2018). On average, 80 percent of the government subvention to public universities goes to staff remuneration and the remaining 20 percent has not been sufficient to adequately cover teaching requirements, research work,

outreach services and other demands placed on the institutions (World Bank, 2014; Mambo *et al*., 2016). Meanwhile, the education sector in Malawi is believed to have been receiving the biggest share of the national budget with the higher education sector getting a higher proportion (World Bank, 2014). In terms of total government expenditure, Malawi has been known to spend more on higher education than other African countries as depicted in Table 1.2 below.

Table 1.2: Expenditure on Higher Education as Percentage of Total Government Expenditure

Country	2011	2012	2013	2014	2015
Malawi	4.02	N/A	5.79	3.52	5.22
Kenya	2.46	3.51	2.72	2.34	2.15
Rwanda	2.84	2.11	2.33	N/A	N/A
South Africa	2.22	2.46	2.38	2.33	N/A
Uganda	1.22	1.29	1.30	1.46	N/A
Tanzania	N/A	N/A	N/A	3.70	N/A

Source: Government of Malawi (2018)

Despite the large share of the Malawian education budget allocated to higher education, funding remains inadequate to support the needs of the higher learning institutions (Mambo *et al*., 2016). Reports (Dunga, 2013; World Bank, 2014; Mambo *et al*., 2016) reveal that some public universities have been running on a deficit. In the financial year 2011/2012, an allocation of about MK 7 billion (£7.2 Million) was given to the then three public universities with only about MK70 million (£73,000) of that allocation to be spent on research, publications, conferences and workshops for the whole year (Mambo *et al*., 2016). This allocation was considered inadequate (Ibid).

In addition to funding inadequacy, public universities in Malawi have not been spared of budget cuts. In the financial year 1994/95, the budget allocation to the higher education sector was reduced from 27 percent of total national budget to about 14 percent in 2007/08 and was further reduced to about 12 percent in 2008/09 financial year (World Bank, 2014). Ever since, there has

been no guarantee on steady and timely supply of finances from government to public universities in Malawi (UNESCO, 2014). Conclusively, a report by Government of Malawi (2018) mentions that government subvention to higher education in Malawi, both absolute and relative terms, seems to have reached the limit such that any increase in government expenditure for the sector is very unlikely.

Higher education in Malawi was initially perceived as a luxury where upon access was open to a limited group of elite students (Hahn & Bruggen, 2010). Of recent, and despite all the challenges faced by HEIs, the Government of Malawi and other stakeholders have recognized higher education as another key sector that can contribute towards the nation's development agenda laid down in the third Malawi Growth and Development Strategy (MGDS III) (World Bank, 2014; UNESCO, 2016).

MGDS III is the medium-term strategy for the Malawi nation designed to contribute to Malawi's long-term development aspirations. The strategy covers a period of five years, from 2017 to 2022 and it is a successor to the MGDS II that was implemented between 2011 and 2016 (Government of Malawi, 2017). The overall objective of the strategy is to move Malawi to a productive, competitive and resilient nation through sustainable economic growth, energy, industrial and infrastructure development while addressing water, climate change and environmental management and population challenges (Government of Malawi, 2017a). As a precursor to MGDS III, the vision laid out in the National Education Sector Plan (NESP) of 2008-2016 considered the higher education sector to be a catalyst for socio-economic development and industrial growth of the country (Hahn & Bruggen, 2010; Government of Malawi, 2008; Government of Malawi, 2010). The liberalization of the higher education sector and the establishment of research and technologically focused public universities such as the Malawi

University of Science and Technology (MUST) and the Lilongwe University of Agriculture and Natural Resources (LUANAR) have been geared towards addressing socio-economic issues affecting the country (Hahn & Bruggen, 2010; UNESCO, 2014; Mambo *et al*., 2016).

1.4 Statement of the Problem

It has been established that the creation of an entrepreneurial university represents a transformational opportunity to develop a relevant and innovative higher education institution capable of responding flexibly to the needs of stakeholders and society in ways that have real and lasting impact while enhancing the graduate attributes and student experience (Higher Education Innovate {HEInnovate}, 2012; Gibb, 2013). Universities that have embraced the second academic revolution and transformed into entrepreneurial universities have in the process secured additional funding to supplement the inadequate funds from government and tuition fees. Outcomes of an entrepreneurial university have included addressing other internal challenges as well as playing a pivotal role in boosting their industries and economies. Unless Malawian universities embrace the concept of an entrepreneurial university, challenges that hinder delivery of quality education, quality research and service to the nation will hardly be overcome. The adoption of an entrepreneurial university by both the public and private universities in Malawi is, therefore, desirable in light of the financial restrictions and other demands placed on the higher education sector.

It has been noted that calls for Malawian universities to find other sources of income have rarely been directed towards the second academic revolution or the entrepreneurial paradigm in universities. As a result, Malawian universities are still trapped in the conventional and traditional methods of resource mobilization such as lobbying for more government funding, increasing tuition fees, enrolling more economic fee paying students in public universities,

philanthropy, organizing fundraising events, hiring out facilities, some of which have proven futile or unsustainable. Even the Ministry of Education, Science and Technology (MoEST) has emphasized on some of these conventional resource mobilization methods. For instance, the MoEST, through the Directorate of Higher Education, took the initiative to develop a Strategic Framework for Income Generation (SFIG) to guide government and public universities in resource mobilization (Government of Malawi, 2018). Among the various proposals in the SFIG is an increase in tuition fees in public universities. However, an attempt to increase income in the Malawian public universities by increasing tuition fees from MK51,145 (£53) to MK1,930,000 (£2000) per year in the year 2010 failed due to economic hardships of the citizenry (World Bank, 2010). On another note, the Higher Education Loans Board (HELB) managed to recover only MK155 million (£16,063) out of the seed money of MK 1.8 billion (£1,865,285) which was paid to public universities as loaned tuition fees for needy students between 1985 and 2012 (World Bank, 2014). The low recovery rate of the funds further crippled the revolving fund which only catered for 4670 (67%) of the needy students out of 7000 eligible applications. Increase in tuition fees in Malawian universities to end the financial crisis in the institutions is, therefore, ineffective.

In contrast, resource mobilization mechanisms in an entrepreneurial university are not only innovative and stable but they are focused on fulfilling teaching and research missions of the university simultaneously (Etzkowitz, 2004) consequently contributing to social development and economic growth (Schulte, 2004). Thus, the traditional roles of teaching and research do not in any way suffer as traditional universities transform into entrepreneurial institutions of higher learning.

On another note, private universities in Malawi have been sidelined in the SFIG despite facing similar financial and other challenges that are continuously affecting the provision of quality higher education. The liberalization of the higher education sector in Malawi to have private universities was to address a gap as public universities could not satisfy the demand for the higher education (Mambo *et al.*, 2015). Therefore, efforts to increase access and improve quality of education and relevance of Malawian private universities for socio-economic development are equally paramount. Unless Malawian universities, both public and private, adopt the concept of an entrepreneurial university, multiple benefits associated with the phenomenon which includes sustainable income generation for university teaching and research missions will not be fully realized.

The need, therefore, for Malawian universities to transform into entrepreneurial universities and open up to the external environment especially the industry and the community for a symbiotic and synergetic relationship is obvious. The benefits of such economic relationships between the universities and the external environment have not only included diversified sources of income for university operations, but have led to staff attraction and motivation, infrastructure development, quality teaching and research services, pursuance of both applied and basic research, commercial exploitation of research results, enhanced university and faculty image and reputation, enhanced network with the industry, close link with society and other stakeholders among other benefits.

The industry, the society and the economy have equally benefited from the enterprising university in many ways. Evidently, it is envisaged that the adoption of the concept of an entrepreneurial university in Malawi shall provide a long-term and sustainable solution to financial restrictions and other challenges faced by Malawian universities. The income generated

and the manner in which it will be generated is a fundamental step towards addressing demands on internal reorganization of universities as well as the recent demands on the HEIs by government and the Malawian society.

In view of the above, the focus of the study was to find out how Malawian universities can progress into successful entrepreneurial universities in order to address both the internal and external demands the institutions are facing.

1.5 General Objective

In view of the background and statement of the problem above, the general objective of the study was to develop an entrepreneurial university model that can be adopted by universities in least developed economies, Malawi in particular, to guide the transformation of traditional universities into successful entrepreneurial universities.

In line with this general objective, the research question is: "*What entrepreneurial university model can guide the progression of universities in least developed countries, like Malawi, from traditional into entrepreneurial universities?"*

1.5.1 Specific Objectives

The specific objectives of the study, drawn from the general objective above, were as follows:

1. To establish the extent to which Malawian universities have progressed from teaching and research universities to entrepreneurial universities;
2. To identify strategies considered crucial in the adoption of the concept of an entrepreneurial university in Malawian universities;

3. To determine elements of an entrepreneurial university which are considered important in facilitating the entrepreneurial paradigm in Malawian universities;

4. To find out the major outputs realized from adopting the concept of an entrepreneurial university in Malawi.

1.5.2 Research Questions

The specific research questions guiding the study are as follows:

1. To what extent have Malawian universities progressed from teaching and research universities to entrepreneurial universities?

2. What strategies are crucial in the adoption of an entrepreneurial university in Malawian universities?

3. What elements of an entrepreneurial university are critical in the entrepreneurial paradigm in Malawian universities?

4. What are the major outputs realized from the entrepreneurial paradigm in the Malawian universities?

1.6 Significance of the Study

The study aims at developing a model of an entrepreneurial university to be adopted by the public and private universities in Malawi. The model aims at guiding the adoption of an entrepreneurial university and facilitating the entrepreneurial paradigm in Malawian universities for income generation, quality and relevant education, quality research for socio-economic development of the country. The study provides a critical insight on the multi-dimensional view

of an entrepreneurial university from the context of universities in LDCs in Africa. Although the study focuses on Malawi, the results could also reflect on the multiplicity of models of an entrepreneurial university in HEIs in LDCs.

A number of countries in North and South America, Europe, Asia, Oceania and even in Africa like South Africa, Tunisia, Kenya, Uganda, have developed own models of an entrepreneurial university (Clark, 1998; Etzkowitz *et al.*, 2001; OECD, 2012; Jameson & O'Donnell, 2015; Williams, Bedney & Teryga, 2015) to guide the processes involved in the transition of teaching and research intensive universities into entrepreneurial universities. This study, similarly aims at developing an entrepreneurial university model to be adopted by Malawian universities and countries with similar characteristics. The model provides elements that are crucial in the entrepreneurial paradigm. This study provides an insight into elements of an entrepreneurial university in an economically and technologically challenged nation like Malawi.

It is anticipated that the model will stimulate policy formulation at both national and institutional levels. The Government of Malawi, through MoEST will partner with Malawian universities and facilitate university interaction with the industry (both public and private) to promote interface required in the entrepreneurial paradigm. The model will induce development of policies, national strategies and legal frameworks that recognize Malawian universities as key in improving the socio-economic and technological state of the country.

At the institutional level, the model will provide university management and staff with insights into elements and processes to be incorporated in the strategic planning, performance management to ensure progression into the entrepreneurial status. Further, the model will lead Malawian universities towards decolonization and customized teaching and learning with focus

on providing solutions towards challenges faced in the country. The model will guide on an appropriate economic extension of their teaching, research and outreach functions for income diversification, quality education and contribution towards socio-economic development in the country.

1.7 Scope of the Study

The main focus of this study was to develop a model to guide the progression of Malawian universities in the entrepreneurial paradigm intended to serve as a guiding theory to university leadership and their faculties and policy makers involved in the higher education sector.

In exploring elements of the entrepreneurial university model relevant for Malawi, existing models and frameworks developed in other countries were thoroughly examined. Attention was paid to institutional, national and environmental factors of such existing models and frameworks.

The study primarily focused on both the public and private universities in Malawi. However, research findings are applicable to other institutions in the higher education sector in Malawi such as technical colleges, vocational training institutions and other colleges. The findings can also guide entrepreneurship endeavors in the other educational institutions at different levels like the primary and secondary levels that are willing to diversify sources of their income among other things.

1.8 Limitations and Delimitations of the Study

The study used the mixed-method research approach where both quantitative and qualitative data were collected to answer the research question and achieve the research objective. However, in using a case study research strategy, six (6) Malawian universities participated in the study. This was considered a limitation as collecting data from all universities in Malawi could have

provided rich information and generalization of research findings. However, in using an appropriate sampling procedure, the universities that participated in the study were representative of the universities in Malawi and provided the required information. In addition to the case study approach, the longitudinal approach to the study provided empirical evidence on the transitional processes of universities from their current status to an entrepreneurial state after testing the entrepreneurial university model in the Malawian universities. This therefore did not necessarily require all Malawian universities to participate in the study.

A second limitation concerns the differences in public and private universities that participated in the study. Public universities in Malawi operate differently from private universities. Despite having the MoEST as the overall regulatory authority and policy maker in higher education sector, private universities are given more autonomy over their operations. Unlike public universities, private universities also generate own income without receiving any financial support from government. The challenge was generalizing results on the two different types of universities which have different stature, principles and systems. Nevertheless, critical aspects of both private and public universities in the entrepreneurial paradigm have been captured. The study therefore provides rich information on general outlook of entrepreneurship in a Malawian university set up and elements that need consideration in both public and private universities of Malawi for the transition into the second academic revolution.

1.9 Structure of the Thesis

The thesis has seven Chapters. Chapter one introduces the study by presenting the background to the second academic revolution and emergence of an entrepreneurial university in the world. Chapter one also introduces the state of affairs in Malawi and its universities and outlines the

challenges for and demands from universities which have pointed to the need for the transition of Malawian university from teaching and research to entrepreneurial universities. Following the background, the problem to be investigated together with the related research objectives and questions have been presented. Chapter one ends by providing the significance, scope and limitations of the study.

Chapter two presents a review of literature in the study area. Firstly, the Chapter provides the background to the second academic revolution and an entrepreneurial university. Secondly, literature on characteristics of an entrepreneurial university is presented. Later in the Chapter, incorporation of entrepreneurship in the teaching and research functions in universities is highlighted. Scholarly views on perceptions of an entrepreneurial university have also been presented.

Chapter three discusses the theoretical and conceptual frameworks that guided the study. The two popular theoretical frameworks explaining the elements of an entrepreneurial university have been discussed in this Chapter. It is from the discussion of the theoretical concept that leads to the development of the conceptual framework presented at the end of this Chapter.

Chapter four details the research philosophy and research design used to collect the required data to answer the research question and meet the research objective. The approaches used in analyzing both quantitative and qualitative data have also been highlighted. Further, validity issues that concern reliability and credibility of the study and ethical considerations have been presented.

Chapter five presents the findings from the data collected. Findings on the status of the Malawian universities in relation to the first and second academic revolutions as well as elements

considered important in the adoption of an entrepreneurial university in Malawi have been presented. Components forming the entrepreneurial university model to be adopted by Malawian universities have been presented where critical elements in the three transformation phases have been hinted.

Chapter six is a discussion of the findings presented in Chapter five. The discussion centres on the extent to which Malawian universities have undergone the first and second academic revolution and how far they have embraced the concept of an entrepreneurial university. Further, the discussions centre around critical components and respective elements in the three phases of the entrepreneurial university considered relevant for the adoption of the entrepreneurial paradigm in Malawian universities.

Chapter seven, the last Chapter in the thesis, presents a summary of the study. In the Chapter, conclusions drawn from the findings and discussion have been highlighted. Further, recommendations to universities and policy makers for urgent consideration in the adoption of an entrepreneurial university have been provided.

1.10 Summary of the Chapter

This Chapter has introduced the study's main research area by presenting the background to the second academic revolution and emergence of an entrepreneurial university. Further, challenges faced by Malawian universities necessitating the adoption of the concept of an entrepreneurial university have been highlighted. The statement of the problem follows this background. The main research objective and specific objectives together with the respective research questions centered on the entrepreneurial paradigm in Malawian universities have been presented. The significance, scope and structure of the study have also been provided in the Chapter.

The next Chapter presents a review of literature relating to the second academic revolution and the adoption of the concept of an entrepreneurial university worldwide.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This Chapter reviews literature concerning role change in universities over time with focus on the emergence of an entrepreneurial university. Thus, the Chapter presents scholarly reports on the advent of the first and second academic revolutions which brought about role change in universities.

In line with the first and second academic revolutions, the Chapter presents some studies on universities that have transformed into entrepreneurial universities, their characteristics, their different types of entrepreneurial activities, their adaptation processes and organizational changes, their internal and external strategies, opportunities and challenges.

2.2 Role Change in the University: The First and Second Academic Revolutions

The phenomenon of an entrepreneurial university emerged in the 1980's during the second academic revolution and has made an impact on HEIs (Etzkowitz *et al*., 2000; Mets, 2009). The first academic revolution, which occurred in the mid 19th Century, involves the introduction of the research mission in a university in addition to the teaching and archiving (Storr, 1952; Metzger, 1955; Veysey, 1965; Jencks & Riesman, 1968; Etzkowitz, 2003a). In contrast, the second academic revolution introduces entrepreneurship in the teaching and research missions of the university as its distinctive characteristic (Etzkowitz, 2003a). This section discusses the emergence of an entrepreneurial university by focusing on how it has evolved during the first and second academic revolutions of the higher education (HE) sector.

2.2.1 The Historical Role of a university and the First Academic Revolution

Historically, the first role of the university, with teaching as the core mandate, dates back to around 1100 AD, long before the first academic revolution (Castells, 2001; Kerr, 2001). Besides teaching, emphasis in this first role was on archiving and dissemination of knowledge which was observed in ideological apparatuses and elite universities (Castells, 2001; Cloete, Bailey, Pillay, Bunting & Maasen, 2011). The ideological apparatuses were rooted in the European tradition of church-based theology schools with Bologna, Cambridge, Oxford, Harvard and Salamanca Universities as examples (Cloete *et al*., 2011). By contrast, elite universities, to which Oxford and Cambridge universities in the United Kingdom (UK) also belonged but included the Ivy League institutions in the US, the grandes écoles in France, aimed at forming elite networks and establishment of distinction codes (Cloete *et al*., 2011; Castells, 2001; Kerr, 2001). Etzkowitz *et al*. (2001) believe that most universities across the globe have progressed from this first medieval role of teaching and archiving to other new roles of the university. Thus, a merely teaching and archiving university is one that has not yet undergone the first academic revolution (Etzkowitz *et al*. 2000; Castells, 2001).

The second role of the university is believed to have emerged in Germany in the 1850's when emphasis was placed on systematic discoveries and production of new scientific knowledge in addition to the hitherto existing role of teaching and archiving (Kerr, 2001). Scholars (Etzkowitz *et al*., 2000; Kerr, 2001; Castells, 2009; Altbach 2013) referred to a university with this emerging role as a science or a research university. This marked the beginning of a new era which has been considered as the first revolution in the academic arena (Etzkowitz *et al*., 2000; Kerr, 2001). While Etzkowitz (2003a) has argued that being in the first academic revolution provides more opportunities for universities to progress into entrepreneurial universities, transforming into an

entrepreneurial university is possible whether the university is in the first academic revolution or not. Specifically, Etzkowitz *et al*. (2000) proclaim that, "*the entrepreneurial paradigm is by no means confined to newly invented technologies or research intensive universities*" (ibid, p. 314.). Indeed, an example provided by Etzkowitz *et al*. (2000) and Etzkowitz (2003a), reveals Latin American universities undergoing the first and second academic revolutions simultaneously as the universities were still in the teaching and archiving stage at the time of the advent of their entrepreneurial paradigm.

The research university model was later copied by the US from Europe after the World War II as it proved to be a success and a requirement considering the knowledge gap that existed in the country (Etzkowitz *et al*., 2000; Kerr, 2001). Reports (Castells, 2009; Cloete *et al*., 2011; Altbach 2013) indicate that the US university system combined the classic German research university model with the so called 'Land-Grant' university model. The later had a specific focus on application of science to society and was originally introduced to develop and apply knowledge for improving the productivity of US agriculture, solve specific problems resulting from the rapid urbanization of the US and support the development of specific industries of regional or national importance (Douglass 2007; Gornitzka & Maassen 2007; Cloete *et al*., 2011). The Land-Grant universities were established under the Morrill Act of 1862 (amended in 1890) and MIT and the UCB started as such (Gornitzka & Maassen 2007; Cloete *et al*., 2011). The combination of the two university models led to the production of valuable technology that called for protection in a form of patents among other routes (Rhines, 2005). Subsequently, universities in America and Europe progressed into research intensive entities and, in the process developed competences; provided resources for quality research; and started generating knowledge and, technologies from their research work resulting in increase in patent applications

and acquisition of university intellectual property (IP) in this era (Etzkowitz *et al*., 2001; Rhines, 2005).

The research component in universities in the first academic revolution thus targets problems in the society and provides the necessary solutions. Etzkowitz *et al*. (2000) refers to the opening up of university to the public and its linkage with external environment as "*evolution of the ivory tower*" where scientific discoveries in universities are no longer confined to the academic circles. Rather, such innovations and knowledge generated are shared with the public. It has been noted from various studies (Brooks, 1993; Agrawal & Henderson, 2002; Arnaut, 2013; Bladley, 2013) that transformation into an entrepreneurial university is expedited when such interface with the external environment is created especially when focus of university research output is directed towards providing solutions required in the economy. These accounts in the literature provide a basis for understanding the progression of universities in developing countries such as Malawi into entrepreneurial universities by unraveling whether or not they possess characteristics consistent with universities that are in the first academic revolution such as the extent to which their research outputs are put to public use.

2.2.2 The Second Academic Revolution vis-à-vis Emergence of an Entrepreneurial University

The second academic revolution is believed to have started in US and later spilled over to other advanced economies in Europe, Asia, Oceania and then to the rest of the world (Etzkowitz et al., 2000; Etzkowitz 2003a). Studies (Etzkowitz et al., 2000; Ropke, 2000; Arnaut, 2010) show that the second academic revolution emerged in US universities as a result of the financial restrictions mainly due to inadequate government funding. As the

universities had made advancements in the first academic revolution, mostly in accumulation of patents, an opportunity to license the patents arose in the national innovation system (NIS) in the US economy. The NIS has been defined by Metcalfe (1995) as:

"…*That set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies"* (Metcalfe, 1995:38).

It is thus, very apt that the NIS has also been depicted in a model developed by Etzkowitz and Leydesdorff (Etzkowitz & Leydesdorff, 1995; 1997; 1998; 1999; 2001) known as *'Triple Helix'* to place emphasis on the interactions of the three main actors in an economy; the industry, government and university (IGU).

Studies (Etzkowitz *et al*., 2000; Etzkowitz, 2000; Rhines, 2005; Libecap, 2005) confirm that the first academic revolution which occurred between the 1960's and 70's led to an increase in scientific discoveries, inventions and other technologies by academic members in US universities and other advanced economies. Most of the research work in US universities was funded by the government and the policy then was for government to retain ownership of all patents thereof and hence the right to license out such patents to the industry on non-exclusive basis (Rhines, 2005; Libecap, 2005).

However, Rhines (2005) and Mowery *et al*. (2004), among other scholars, report of little demand for the university patents as companies were reluctant to purchase patents with non-exclusive terms. As a result, the university system had a backlog of valuable technology which was not

being transferred to the industry due to the existing government policy on licensing of university generated patents (Rhines, 2005; Libecap, 2005).

The building up of research results in academia, without mechanisms to transfer practical outcomes to the industry was not seen as a problem at first until an innovation gap in the US industry became apparent due to the rising competition on the international front (Etzkowitz *et al*., 2000; Rhines, 2005; Tyler, 2009). Coupled with insufficient funds and a reduction of government funding to support research in the US universities, faculty members had to either give up their research plans or find alternative means of generating own income to proceed with research work (Etzkowitz & Leydesdorff, 1998, 1999; Etzkowitz *et al*., 2000).

A thorough assessment of the situation made the universities realize an opportunity in commercial exploitation of the accumulated research results to generate extra income for their research work. Studies (Etzkowitz *et al*., 2000; Etzkowitz, 2000; Tyler, 2009) report that Frederick Cottrell, a professor of Chemistry at UCB, is the one who proposed and introduced the principle of utilizing income generated by patents to seed-fund new research (Etzkowitz *et al*., 2000; Rhines, 2005; Tyler, 2009).

Correspondingly, Professor Vannevar Bush and his academic colleagues at MIT presented an idea on establishment of direct links between the university and the industry for ease of technology transfer negotiations amongst other issues (Etzkowitz *et al*., 2000). There was, therefore, need to lobby government for ownership of patents and proceeds from university research work for successful exploitation (Etzkowitz *et al*., 2000; Rhines, 2005; Libecap, 2005). Reports (Etzkowitz & Leydesdorff, 1999; Thursby & Thursby, 2003; Rhines & Levenson, 2005) show that after a successful lobby that involved academics, attorneys and prominent industry

players, the US government passed a legislation known as the Bayh-Dole Act on 12th December, 1980.

The Bayh-Dole Act (1980) is arguably one of the most influential pieces of legislation to impact the field of IP law in the twentieth century (Thursby & Thursby, 2003; Thursby, Thursby & Gupta-Mukherjee, 2007; Mowery, 2004; Libecap, 2005; Rhines, 2005). The Act gave permission to universities in US together with other institutions using federal funds to retain title on any patent issued for their research based inventions, technologies and other discoveries (Bayh-Dole Act, 1980; Libecap, 2005; Rhines, 2005). Consequently reports indicate that university patenting and licensing to industry increased tremendously as a result of the passing of the Act (Etzkowitz *et al*., 2000; Thursby & Thursby, 2003; Thursby *et al*., 2007; Mowery, 2004; Mowery *et al*., 2004; Rhines, 2005; Libecap, 2005). Other countries such as Canada, Japan, Australia have copied the Bayh-Dole Act (1980) by developing own laws to facilitate commercialization and entrepreneurship in their universities (Allen, 2012).

The universities in US gradually extended their activities into other technology transfer processes and; identified and filled gaps in the technology-push process. They also established incubators to assist the formation of firms from campus research and venture capital firms to fill gaps in the availability of seed-funding (Australian Government-Department of Education, Science and Technology {DEST} 2003; Libecap, 2005; Bradley, Hayter & Link., 2013). Government programs, such as the Small Business Innovation Research (SBIR) and Cooperative Research and Development Agreements (CRADAs) played a role by financing new firms emanating from the universities (Rogers et al., 1998; Etzkowitz *et al*., 2000). All in all, the passage of the Bayh-Dole Act (1980), the ability of universities to license their patents, the formation of university firms and other university technology transfer processes marked the beginning of the second

academic revolution in higher education (Etzkowitz & Leydesdorff, 1998, 1999; Etzkowitz *et al*., 2000; Mets, 2009; Mets, 2009; Arnaut, 2010). An entrepreneurial university emerged out of these processes emanating from the second academic revolution.

As the literature reviewed herein reveals, an entrepreneurial university originated in US as academic members pushed for ownership and commercial exploitation of self-generated technologies to support their research endeavors. This entrepreneurial paradigm in US universities is known to follow a '*bottom-up approach'* (Etzkowitz, 2003b) as the initiative was from faculty to university leadership and then to government.

The evolution of the entrepreneurial university paradigm in Europe was different from that of US. Whereas the entrepreneurial paradigm in US universities was an extension of the research mission, the European entrepreneurial university was grounded in the teaching mission as focus was on equipping students with entrepreneurial skills (Clark, 1998; Etzkowitz, 2003b). Furthermore, the entrepreneurial university paradigm in UK and other European states emerged through a '*top-down*' approach unlike in the US where, as stated above, the entrepreneurial university concept emerged through the '*bottom-up'* (Etzkowitz, 2003b). The entrepreneurial paradigm in European universities was an initiative from government and the intention was to propel universities into advancing STI in response to the innovation gap between the US and Europe (Soete, 1999; Etzkowitz, 2001).

The European entrepreneurial university focusing on students university–industry relationships in Europe developed in several formats (Etzkowitz, 2003b). Students established firms out of supervised research assignments with the foundation of chemical and optical firms in Germany as typical examples (Rothblatt & Wittrock, 1993; Etzkowitz, 2003b). Students also served as

professors' agents in assisting low-tech Small and Medium Enterprises (SMEs) and this has been significant in most European countries (Martin & Etzkowitz, 2000; Etzkowitz, 2003b). Students further played a key role in university–industry relations as an aspect of their training, especially through internships in firms (Etzkowitz, 2003b).

In conclusion, the second academic revolution has different trajectories although it yields the same effects (Etzkowitz, 2001). South African universities seem to have adopted more of the US entrepreneurial university pathway where emphasis is generation of IP through faculty research resulting into patent licensing (Rorwana & Tengeh, 2015; Alessandrini *et al*., 2015). In contrast, universities in Tunisia seem to deliver an entrepreneurial university which is more oriented towards the European phenomenon as emphasis is on creation of student firms known as start-ups (Collier & Gray, 2012). Other universities have placed emphasis on academic entrepreneurship where faculty is encouraged to start firms from their research discoveries and patents (Gabrielsson, Diamanto & Joakim, 2009). These firms are known as university spin-offs (USOs) (DEST, 2003; DCU, 2015).

In view of the US and European entrepreneurial university models, a study of the emergence of an entrepreneurial university in developing countries such as Malawi needs to attend to an understanding of where the universities are in relation to the two academic revolutions as well as where they stand in terms of the entrepreneurial university processes. In the case of Malawi, such understanding is cardinal as it provides a base from which the entrepreneurial university model for Malawian universities can be developed and ensures inclusion of all necessary elements required for a successful entrepreneurial paradigm in the targeted and interested universities.

Role change in the university system captured from literature presented in Sections 2.2.1 and 2.2.2 is summarized in Table 2.1 below.

Table 2.1: Role Change in the University System

Role	**First Role**	**Second Role**	**Third Role**
Period label	First Historical Role	First Academic Revolution	Second Academic Revolution
Roles performed	Teaching (knowledge dissemination) and archiving (knowledge preservation). "The traditional university"	1. Teaching and archiving; **and** 2. Emphasis on scientific discoveries and knowledge generation "The rise of a research university"	1. Teaching; 2. Scientific discoveries and knowledge generation; **and** 3. Commercialization and translation of knowledge into practice. Economic and social development in teaching and research missions "The creation of an entrepreneurial university"

Source: Author (2017), based on Etzkowitz (2003a) and Lynch (2012)

2.3 Understanding an Entrepreneurial University

An entrepreneurial university emerged in the second academic revolution with a different stature from that of a traditional university (Etzkowitz *et al.,* 2000). A traditional university is one charged with transmitting knowledge from one generation to another and the measure of success is the number of enrolments and students graduated (Mansfield, 1995; Kirby, 2006; Williams *et al*., 2015; MacGregor, 2015). Traditional missions of a university lie within the realms of teaching and/or research (Razak & Afendras, 2012). Such traditional universities are absorbed with teaching and archiving functions (the first historical role) and research mission for academic

purposes (Etzkowitz et *al.*, 2000). Unlike the traditional university, the entrepreneurial university encompasses a 'third-mission' of economic development as an extension to teaching and research missions (Etzkowitz *et al*., 2000).

The term 'entrepreneurial university' was introduced simultaneously by two influential scholars across the Atlantic, Henry Etzkowitz and Burton Clark (Arnaut, 2010; Gibb, 2013). On one side, Etzkowitz (1998) emphasized on the economic role the entrepreneurial university plays by engaging with industry and business so as to transfer and commercialize its technologies via licensing and spin-off companies. On the other side, Clark (1998) considered an entrepreneurial university as one that actively seeks to innovate how it goes about its business and considers institutional entrepreneurship as both a process and an outcome.

Despite the two different perspectives of an entrepreneurial university by the two scholars, the concept of an entrepreneurial university has been adopted worldwide by different universities, with different backgrounds, traditions and isomorphic trajectories (Etzkowitz *et al*., 2001; Mets, 2009). Combining the two perspectives, an entrepreneurial university is not only a promoter of multiple support measures for entrepreneurship but is also a developer of administrative techniques, strategies and competitive postures (Antoncic & Hisrich, 2001; Leydesdorff & Meyer, 2003).

2.3.1 Entrepreneurship Education in an Entrepreneurial University

A major step towards an entrepreneurial university is entrepreneurship education where universities undertake initiatives to introduce programmes aimed at nurturing entrepreneurship among students, faculty members and its community (Etzkowitz, 2003b). In agreement to this, Ropke (1998) says that an entrepreneurial university is critical in building entrepreneurial

competences in academic staff and graduates. Along the same line, Clark (1998) says that an entrepreneurial university operates in an entrepreneurial manner and fosters entrepreneurship in its faculty and students.

Reports (OECD, 2009; US Department of Commerce, 2013; Williams *et al*., 2015) show that universities design, develop and offer short and long-term entrepreneurship programmes that have a practical orientation with the aim of developing entrepreneurial competence and mindset in the target groups. Long-term educational programmes are formal and academic mostly offered under the faculty of business management. These programmes are offered at different levels from certificate, diploma to graduate depending on the decisions made by the university. Several reports indicate that universities in advanced economies such as US (US Department of Commerce, 2013); UK (Gibb, 2014; Gibb & Hannon, 2015), Canada (Downie & Herder, 2007); Germany (Ropke, 2000) and Russia (Williams *et al*., 2015) among others have, over the years, invested heavily in such academic programmes mostly at undergraduate and postgraduate levels.

Universities in Russia and the UK among others have incorporated a module on entrepreneurship in the curricula for non-business programmes (Downie & Herder, 2007; Williams *et al*., 2015). In Africa, universities in countries such as Kenya (Nafukho & Wawire, 2006), Ghana (United Nation {UN}, 2013), Tanzania and other countries have equally introduced such entrepreneurship programmes and modules in their institutions. However, the primary objective not only graduating students who know about entrepreneurship but the major learning objective is for the students to engage in entrepreneurship and consider venturing into businesses as a career (Gibb, 2014).

Apart from the long-term training programmes, OECD (2009) and Williams *et al*. (2015) report that universities in European countries and some parts of Asia also offer practical and tailor-made short-term training programmes in entrepreneurship to their students, faculty members and other target participants outside the university. Most of the training for students are optional and are offered outside class work with the aim of delivering a pedagogical value of entrepreneurship as a set of skills that can be applied across professional environments and as activities to supplement the student's classroom experience (US Department of Commerce, 2013; Gibb, 2014).

Apparently, US Department of Commerce (2013) notes that students willing to start their own firms like Facebook®, Google® and Twitter® register for the training. For faculty members and other outsiders, the universities in Europe and America offer short-term training programmes in form of short courses, workshops and seminars with the aim of developing and enhancing entrepreneurial skills and know-how in the participants (Downie & Herder, 2007; OECD, 2009; US Department of Commerce, 2013; Jameson & O'Donnell, 2015). Such short courses are a step towards the making of entrepreneurs and, this must be the explicit aim of the programme.

In support of training programmes in entrepreneurship, Grundling & Steynberg (2009) and Ngozika, Dominic & Akpam (2013) argue that it is critical to develop an educational system with curricula and courses that encourage candidates to be open to innovation and entrepreneurship. Along with this thinking, Etzkowitz *et al*. (2000) report of some universities in Japan, Brazil and Italy that have redesigned their curricula to include delivery methods that stimulate creativity, innovation and entrepreneurship.

In Japan, and as part of enhancing entrepreneurship practice and approach, some universities no longer focus on traditional curricula that were designed to fit graduates into existing, large bureaucratic organizations (Etzkowitz *et al*.,2000). Gibb (2015) also argues that courses must be delivered in a way that stimulates creative and analytical thinking in students in order to increase systematic innovation and entrepreneurship in different academic areas. Ropke (2000), Forrester (2008) and Pope (2005) equally support learning that nurtures creativity and develops critical thinking.

Entrepreneurship courses should be offered as an integrated suite that delivers the skills needed at each phase of the entrepreneurship process. It is also important to deliver entrepreneurship education with 'real' entrepreneurs as much as possible and use a variety of teaching methods. However, reports on universities in African countries such as Kenya, Nigeria and Tanzania (World Bank, 2013; Omidyar Network Africa, 2014; Rorwana & Tengeh, 2014) indicate that there are such courses in entrepreneurship but little is explained on the curricula design and delivery. Some studies (Thorn & Soo, 2006; Grundling & Steynberg, 2009; Sawahel, 2014) note that entrepreneurship education in some universities in Africa is still built on general management theories.

The aim in entrepreneurship training, as alluded to, is not only for knowledge but practical use. The entrepreneurial training given to students is specialized to ensure that students acquire skills, ideas and managerial abilities and capabilities for self-employment as opposed to being employed by others (Ayeduso, 2004). It is, therefore, not enough to introduce programmes in entrepreneurship. Rather, the outcome of such programmes must create student entrepreneurs in their respective fields.

Apart from creating new business ventures known as start-ups, entrepreneurship in teaching includes outreach services where university students have played a key role. In most European and Latin American universities, students have served as agents on behalf of faculty in assisting SMEs in low-technology firms to advance into modern technology (Etzkowitz, 2003b). Faculty in different disciplines, through course work and class assignments, attached students to such SMEs and this has been a significant method of technology transfer. Technology transfer is defined by Karlsson (2004, p78) as *"the movement of an idea, practice or object resulting from research, into a setting where it can improve a product, service or process in any way"*. Students in an entrepreneurial university, through internship, have thus played a role in university-industry relations in their training capacity (Etzkowitz *et al.*, 2000; Thorn & Soo, 2006).

Thus, establishing the extent to which universities in LDCs such as Malawi practice entrepreneurship through education and the so-called teaching mission, would inform observations regarding emergence of the entrepreneurial paradigm in these settings. Such effort would also provide evidence of progression in the entrepreneurial paradigm and the development of an entrepreneurial model that aims at introducing or enhancing entrepreneurial activities in teaching commensurate with the established status.

2.3.2 Entrepreneurship in the Research Mission

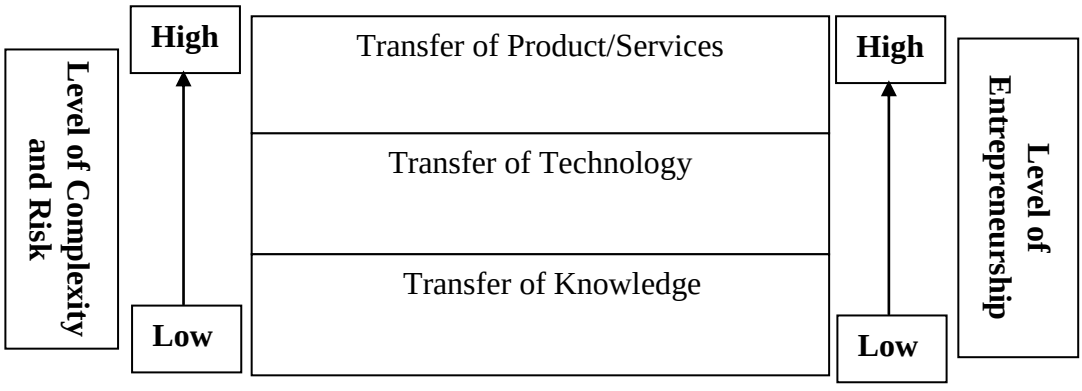
Entrepreneurial activities in research are more typical of the US entrepreneurial university model than the European counterpart although scholars predicted that the two continents will adopt each other's entrepreneurial university sooner or later (Etzkowitz, 2003b). The importance of entrepreneurship in university research and development (R&D), often referred to as technology

commercialization, has been widely recognized (Candell & Jaffe, 1999; Ndonzuau, Pirnay & Surlemont, 2002; Karlsson, 2006; Djokovic & Souitaris, 2008).

Tijssen (2006) simplifies and distinguishes such entrepreneurship activities in university research based on three types of transfers: the transfer of products (and services), the transfer of technology; and the transfer of knowledge. According to Tijssen (2006) and Karlsson (2006), the transfer of products involves the university forming new ventures in order to sell their research based products while the transfer of technology concerns licensing, sale of patents or outright sale of the technology. By contrast, the transfer of knowledge includes consultancy services and contract research (Tijssen 2006; Karlsson, 2006).

Tijssen (2006) argues that progressing from the transfer of knowledge to transfer of technology and then to transfer of products requires the incorporation of new functional units in the university. This, Tijssen (2006) says, increases both the complexity of the activity as well as the risk associated with failure of the venture. Tijssen (2006) asserts further, that increasing complexity in the activity correlates with increasing levels of entrepreneurship in the university. Diagram 2.1 below depicts this association.

Diagram 2.1: Level and Complexity of Entrepreneurship in the University



Source: Author (2017) based on Tijssen (2006)

Creation of new firms by university academic staff in different fields is considered in literature, a major type of entrepreneurship in a university system and also an optimal entrepreneurship practice (Roberts & Malone, 1996; Bray & Lee, 2000; Rogers, Caryannis, Kulihara & Allbriton, 2001; Gupta, 2004; Wright, Clayrysse & Lockett, 2007; Collier & Gray, 2010; Aziz, Harris & Norhashim, 2011).

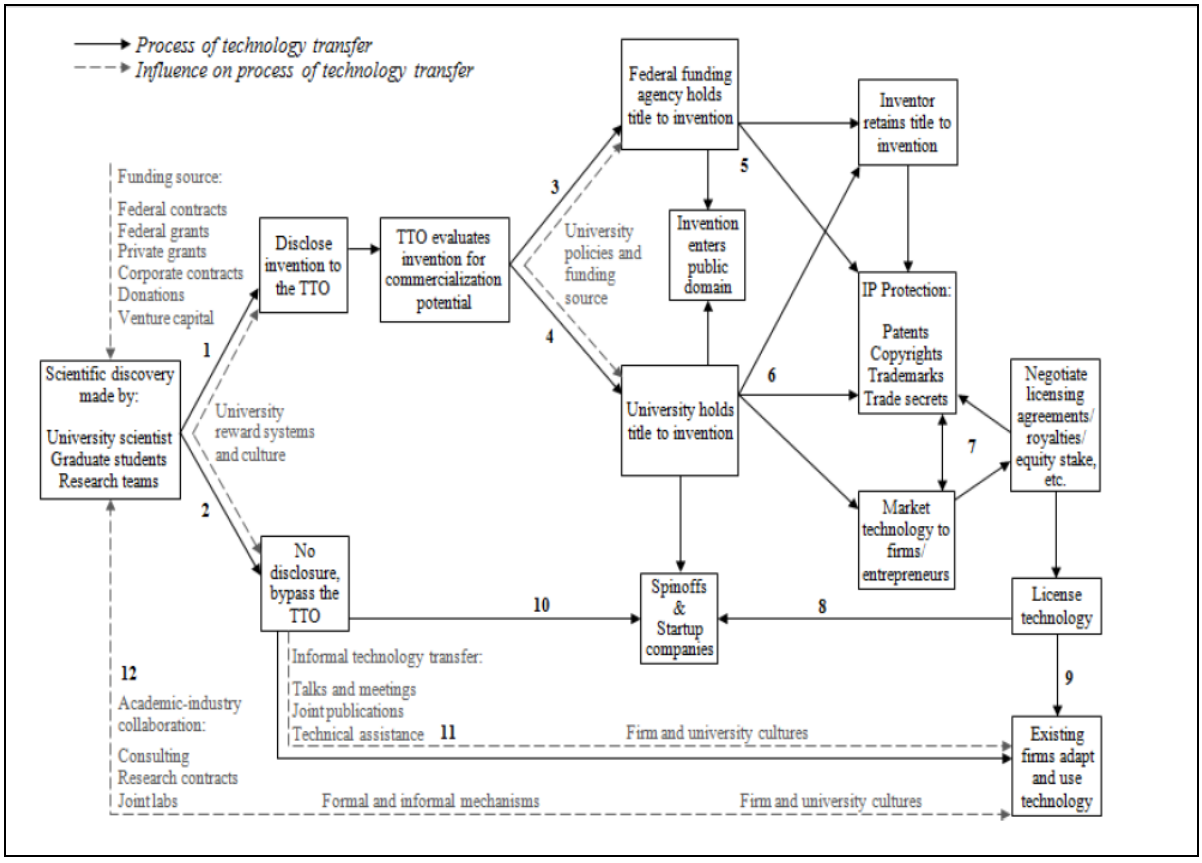
Universities that have been rated as top models in entrepreneurship, and are also among the top in World University Rankings (2018) like MIT, Yale, Harvard, UCB, Twente, Warwick, Chalmers, Strathclyde and many others, have registered high numbers of university created firms from research and other related projects (Clark, 1998; Collier & Gray, 2010; Leisyte, 2011; Saad & Alalwany, 2015). These new firms propelled, by a university, have been labeled as USOs, as earlier stated (see Section 2.2.2) or sometimes referred to as university research based spin-offs (URBS) and start-ups. What distinguishes USOs from start-ups is that while the former is initiated within a university based on technology from faculty members, a start-up refers to a new firm associated to the university through a student project or engagement with outsiders (Rasmussen, 2006; Boadu & Metla, 2008; Allen, 2012). USOs are rated highly because they are said to prove universities intellectual eminence (Di Gregorio & Shane, 2003; Rasmussen, 2006), faculty quality (Powers & McDougall, 2005), or scientific productivity (Van Looy *et al*., 2011).

USOs are created when faculty members, mostly academic researchers or scientists, take the initiative in transforming their research into a marketable product (Melendez & Moreno, 2012). This is the reason for USOs being commonly referred to as academic or faculty entrepreneurship (Louis, Blumenthal, Gluck & Stoto, 1989; Boadu & Metla, 2008).

Thus, establishment of the level of entrepreneurship in the research activities in universities such as those in Malawi or elsewhere provides useful lens for informing the development of a model that guides the entrepreneurial paradigm in universities.

Typical processes involved in commercialization of university results are shown in Diagram 2.2 below.

Diagram 2.2: Processes in Commercialization of Research Results



Source: Bradley *et al.* (2013)

Diagram 2.2 above outlines several processes involved in commercialization of research results from both students and faculty. According to Bradley *et al*. (2013), stages 10 and 8 in the figure lead to USOs or start-ups while stages 9 and 11 lead to technology transfer through licensing of

patents and sale option. However, Bradley *et al*. (2013) in Diagram 2.2 argue that not all scientific discoveries will end up in USOs, creation of start-ups, or the resultant technology being sold or licensed to a firm since, as may be seen from processes 3 and 4, some of the technology ends up in public domain.

2.4 Initiatives to Facilitate Entrepreneurial Paradigm in Universities

Universities that have made strides in the entrepreneurial paradigm put in place a number of initiatives to support and advance the entrepreneurship mission in their institutions. Through university strategic plans and policies, such universities have established offices, facilities and networks specifically for entrepreneurship function in teaching and research.

2.4.1 Offices in Support of Entrepreneurship in Universities

Along with strategic plans and policy documents guiding the entrepreneurship functionality in universities, studies (Mian, 1997; Henrekson & Rosenberg, 2001; Jensen & Thursby, 2001; Feldman, Feller, Bercovitz & Burton, 2002; Siegel, Waldman & Link, 2003; Shane, 2004; Link & Scott, 2005; Lockett & Wright, 2005; Powers & McDougal, 2005; Rasmussen, Moen & Gulbrandsen, 2006; Downie & Herder, 2007) indicate that universities transforming into entrepreneurial universities have established offices such as Technology Transfer Office (TTO), Technology Licensing Office, Commercialization Office, Project's Office, Business Development Office or their equivalent to facilitate and support entrepreneurship practices. Some known positions in these offices include commercialization or innovation managers, lawyers specializing in contracts and intellectual property (IP), business liaison or development officers, incubation officers among others (Rasmussen *et al*., 2006; Downie & Herder, 2007). Most of the offices have developed as a result of policy documents formulated in the universities like the IP policy, Commercialization policy and Research and Consultancy policy among others

(Litan, Mitchell & Reedy, 2008). Universities that have transformed into entrepreneurial universities report of benefitting from these offices deliberately established to promote entrepreneurship (Arnaut, 2010).

The most known office is that of the TTO (Allen, 2012, Bradley *et al.,* 2013). TTOs serve as educators to potential university entrepreneurs (staff and students) and as information brokers to the industry mostly investors and customers (Lerner, 2005; Allen, 2012; Bradley *et al*., 2013; Aziz, Harris, Zahid & Aziz, 2013). The primary motive of such offices has been to safeguard and promote the creation of the university's IP while marketing the same to the industry (Siegel, Waldman, Atwater & Link, 2004; Bradley *et al*., 2013). The hierarchy of the TTOs and other offices depend on the decision by the university. Some universities have TTOs in their various faculties; some have placed it as a central office while others have placed in top management offices. For instance, in Australia, Canada and the US, such positions have been placed in higher positions such as Pro or Deputy Vice Chancellor, Research and Innovation; Pro Vice Chancellor, Research and Development; Deputy Vice Chancellor, Research and Commercialization; Deputy Vice Chancellor, Research & Enterprise and Vice-President of Research and Innovation (Pries & Guild, 2004; Downie & Herder, 2007; Collier & Gray, 2010; Galushko & Sagynbekov, 2014).

Studies (Downie & Herder, 2007; Collier & Gray, 2010; Leisyte, 2011) have shown that some universities prefer to use external firms to carry out the work of TTO's. For instance, New Zealand Vice Chancellor's Committee (NZVCC) and University Commercialization Offices of New Zealand (UCONZ) report about universities in New Zealand that established UCONZ which was serving the eight public universities and was reporting to the NZVCC (NZVCC& UCONZ, 2008; Collier & Gray, 2012). Allen (2012) commends the task done by TTO's while Downie & Herder (2007) indicate bottlenecks, delays and red tapes where such offices are

placed within the university. Regardless of such reports, the TTO's and other related offices in a university set-up provide initial guidance and promote entrepreneurship activities in the university as not all faculty members and students specialize in entrepreneurship.

Presence, within the organizational structures of universities in Malawi and other developing countries would thus, be a good indicator of movement towards an entrepreneurial university as would intentions of setting up of such offices as an explicit strategy for propelling Malawian universities into successful entrepreneurial universities.

2.4.2 Facilities in Support of Entrepreneurship in Universities

Universities that have scored highly in the practice of entrepreneurship are known to have established or linked up with technology incubators, science and technology parks, proof of concept centers, entrepreneurship centers (Henrekson & Rosenberg, 2001; Aziz *et al*., 2011; Allen, 2012; Rasmussen, Benneworth & Gulbrandsen, 2013; US Department of Commerce, 2013). Reports (Link & Scott, 2005; Bradley & Metla, 2008) indicate that the creation of USOs and start-ups has increased due to support structures such as incubators or science/research parks within or close to the university. The incubators and science parks aim at laying the ground for development of the USOs and start-ups and facilitate the commercialization of university research outputs and achievements (Lofsten & Lindelof, 2005; Hackett & Dilts, 2008; Tanha, Salamzadeh, Allahian & Salamzadeh, 2011; Link & Scott, 2007; Sooreh, Salamzadeh, Safarzadeh & Salamzadeh, 2011). Prospects of entrepreneurship have, therefore, increased with connections to technology facilities like incubators and science and technology parks, any equivalent facility or institution.

Proof of concept and entrepreneurship centres aim at identifying potential business ideas that students and other staff members may come up with which can result in successful start-ups (OECD, 2009). Such centres allow the university to strategically invest resources to assist students who are likely to succeed as entrepreneurs (OECD, 2009; US Department of Commerce, 2013) and also provide a platform where the university can collaborate with the business community to showcase the best work of top students for possible funding and other engagements. The centres also organize programmes that aim at developing entrepreneurial skills in students, their supervising teams and other outsiders with potential business ideas for incubation, workshops and seminars (OECD, 2009; US Department of Commerce, 2013). These facilities have, therefore, proved to enhance success of entrepreneurship practices in education, research and outreach whether established within the university or accessed by university from external sources (Downie & Herder, 2007; OECD, 2009; Tanha *et al*., 2011; Aziz *et al*., 2013; Rasmussen *et al*., 2013). The facilities provide the members with the opportunity to test both their technical (prototype) and market feasibility as they prepare for entrepreneurship (Grundling & Steynberg, 2009). Universities with such kind of facilities or anything providing similar services would have many chances of engaging in entrepreneurship.

Thus, establishment and connections with such facilities as technology incubators, science and technology parks, proof of concept centers, entrepreneurship centers among others would provide universities in Malawi and other universities that are still traditional more chances of progressing into entrepreneurial universities.

2.4.3 Networking for Entrepreneurship in Universities

Establishing and strengthening links with the industry has been regarded paramount in advancing entrepreneurship practices in universities (Aldridge & Audretsch, 2010; Collier & Gray, 2010;

Williams *et al*., 2015; Allen, 2012). Most studies (Kenny & Goe, 2004; Boadu & Metla, 2008; Aldridge & Audretsch, 2010) report that without networks and partnerships, universities would find it challenging to engage in the entrepreneurship activities such as USO's, start-ups, licensing, research contracts and consultancies; establishment of the centres, incubators and science parks; provision of equipment, materials and other facilities (laboratory, ICT and library) and support in the different entrepreneurship endeavors (Kenny & Goe, 2004; Aldridge & Audretsch, 2010). Downie & Herder (2007) report of universities partnerships with the private sector in Canada, where the relationship permeated into officials on either side holding positions at the Board of Director level on the other.

Networking with SMEs has also facilitated entrepreneurship in the universities in Latin America where USOs and start-ups are a challenge (Etzkowitz *et al*., 2001). Networking with banks and other financial institutions helps in times when universities are in need of financial support for the development and launch of their businesses (Mowery, 2004; Mutambi, 2011). As finances have been identified as one of the challenges in establishing SME's and other entrepreneurship actions especially in Africa (Adebayo & Kolawole, 2013; Omidyar Network, 2014), getting connected with the banks and other financial institutions that can provide financial relief would provide an advantage to a university. Collaborating with alumni presents a starting point in the establishment of networks with companies who are potential clients in the industry. Alumni follow-ups and engagement have proved to facilitate a stronger network with the industry (Jameson & O'Donnell, 2015).

Networking with government ministries and agencies has also been recommended in advancing entrepreneurship in universities (Etzkowitz *et al*., 2000; Cai & Liu, 2015). In European countries and Latin America, academic institutions were traditionally controlled by the state and to

facilitate entrepreneurship endeavors in universities, the state had to let academic institutions attain a significant degree of independence and relate to them as a partner in economic development (Gebhardt, 1997; Etzkowitz *et al*., 2000). Leisyte (2011) and Link & Siegel (2007) provide scenarios where government has developed and promoted national instruments and frameworks to foster private-public partnerships by increasing cooperation between universities and industry. This link between the government, university and industry has been referred to as the Triple Helix (Etzkowitz *et al*., 2000; Etzkowitz & Leydesdorff, 2000; Collier & Gray, 2012; Cai & Liu, 2014). The network with government has also been seen to harmonize policies with university plans and programmes (Collier & Gray, 2012; Rasmussen *et al*., 2013), and also provision of grants, funds and incentives to support entrepreneurship in universities (Pries & Guild, 2004; Downie & Herder, 2007; Aziz *et al*., 2011; Allen, 2012; Galushko & Sagynbekov, 2014). In some countries like the UK, funding from government for university research depends on whether or not the results will contribute to the economy (Etzkowitz *et al*., 2000; Masudian, Fahadpoor & Ghashgayizadeh, 2013).

Networking must not be limited to the industry and government but must be extended to other research institutions including other universities, international organizations and internal faculties. Networking with other research institutions and universities has equally been advised by Williams *et al*. (2015) and Rasmussen *et al*. (2013). Some of the networking has led to establishment of collaborations and joint ventures for instance the formation of the Association of University Technology Managers (AUTM) for purposes of sharing knowledge and experiences that can facilitate and advance technology transfer processes in the OECD member countries. Apparently, the AUTM includes government officials and industry scouts (Etzkowitz *et al*., 2000; Aziz *et al*., 2013). For universities in Africa, a similar organization known as

Southern African Research and Innovation Management Association (SARIMA) has also been established to serve the same purpose as AUTM. Williams *et al*. (2015) hail support by international relations in university entrepreneurship in universities in Russia. Networking has, therefore, not been limited to national boundaries.

In summary, most of the strategies and initiatives in entrepreneurial universities can be depicted in Diagram 2.2 on page 39. In this Diagram 2.2, Bradley *et al*. (2013) show that the first stage in commercialization of research results in a university leading to entrepreneurship is scientific discovery from faculty and/or students. However, for this stage to be successful there is need for the universities to network and collaborate with external entities mostly for finances and other support necessary for research work and discoveries. As indicated in Diagram 2.2 on page 39, funding can be sourced from government, the private sector and corporate world, from donations as well as venture capital from financial institutions. This is part of the element of diversified funding base in Clark's model of an entrepreneurial university (Clark, 1998). However, apart from the above sources of funding, Bradley *et al*. (2013) consider, income generated from lower level entrepreneurship in universities like contract research, consultancies as well as from commercial use of university facilities to support higher level entrepreneurship like creating USOs, start-ups and filing for patents as presented in Diagram 2.2 on page 39.

Bradley *et al.* (2013) in Diagram 2.2 also mention of the TTO stated in Section 2.4.1 earlier that plays a big role in handling entrepreneurial processes with and on behalf of the researcher (faculty or students). This emphasizes the importance of establishing such an office to facilitate the entrepreneurial paradigm in a university.

Bradley *et al.* (2013) as show in Diagram 2.2 on page 39 indicate that policies, reward systems and culture support entrepreneurial activities in the universities. The need for an appropriate reward system, a clear university policy on entrepreneurship and an entrepreneurial culture has been equally emphasized in both Clark's and OECD models (Clark, 1998; 2004; OECD, 2012). The need for a clear university policy to guide entrepreneurial activities has equally been hinted.

Bradley *et al.* (2013) in Diagram 2.2 thus provide a summary of some initiatives and strategies that would facilitate entrepreneurship in traditional universities that will to progress into entrepreneurial universities.

2.5 Entrepreneurial Orientation in the Universities

Entrepreneurial orientation (EO) is one of the concepts in entrepreneurship literature which refers to the configuration of institutional practices, policies and processes in order to provide insights into the creation of entrepreneurial actions and decisions (Lumpkin & Dess, 1996). By adopting the entrepreneurial university model, the universities are thus embracing the concept of EO thereby incorporating entrepreneurship in their practices, policies and processes as discussed in Sections 2.3 and 2.4 earlier.

EO emerges from a strategic choice which asserts that opportunities can be successfully undertaken by proper planning and execution (Lumpkin *et al*., 2009; Covin & Wales, 2012; Gupta & Gupta, 2015). Therefore, the entrepreneurial paradigm and the successful adoption of an entrepreneurial university model in HEIs require candid attention to their plans, policies and processes. If there is no proper intention and actions on such matters in the entrepreneurial paradigm (Lumpkin & Dess, 1996), universities cannot successfully embrace the second academic revolution which ushers them into an entrepreneurial university status.

Further, Lumpkin & Dess (1996) state that EO is characterized by autonomy, willingness to innovate, taking risks and being aggressive towards competitors in addition to being proactive to market place opportunities. The EO concept challenges the universities to engage in entrepreneurial activities that are within their mandate and mission in bringing innovation to the society while simultaneously addressing their needs like own income generation, increasing relevance in the society and improving quality education (Arnaut, 2010; Gibb, 2013; Gibb, 2014). Furthermore, EO encourages universities to spot opportunities and be proactive in the market place as emulated by MIT and UCB in the passage of the Bayh-Dole Act (1980) which eventually culminated into the emergence of the entrepreneurial university in US (Etzkowitz *et al.*, 2001; Rhines, 2005, Libecap, 2005). It is pertinent that universities in LDCs like Malawi should embrace the concept of EO or else the adoption of the entrepreneurial university model will remain a daunting challenge.

However, in adopting the concept of EO, Gupta & Gupta (2015) suggest that autonomy, innovativeness, risk taking, proactiveness and competitive aggressiveness varies depending on the environmental and organizational context. Therefore, the incorporation of entrepreneurship in the research and teaching missions of the universities in LCDs could differ from the university entrepreneurship practiced in developed and developing countries. Nonetheless, the achievement of all levels of university entrepreneurship put forward by Tijssen (2006) presented in Diagram 2.1 on page 37 would be perceived favourably.

2.6 Summary of the Chapter

The Chapter has presented a review of literature on role change in the university in line with the occurrence of the first and second academic revolution. The Chapter has also explored the nature of an entrepreneurial university that has emerged as a result of the second academic revolution.

Further to this, the Chapter has presented entrepreneurial activities that have come along with the concept of an entrepreneurial university.

The next Chapter presents the theoretical and conceptual frameworks that guided the study in order to achieve the research objectives.

CHAPTER 3: THEORETICAL AND CONCEPTUAL FRAMEWORKS

3.1 Introduction

A number of universities, especially in developed and emerging economies, have developed models and frameworks to support the creation of an entrepreneurial university and analyze entrepreneurial university behaviors in their institutions (Guerrero & Urbano, 2012; OECD, 2012). This Chapter discusses two known theoretical frameworks that have been used in this study namely: Clark's Entrepreneurial Pathways of University Transformation (Clark, 1998) and OECD's Guiding Framework for Entrepreneurial Universities (OECD, 2012). The Chapter also presents the transformation model which is used by management in making decisions concerning transformation processes. Lastly, this Chapter presents the conceptual framework developed from the two theoretical frameworks and the transformation model.

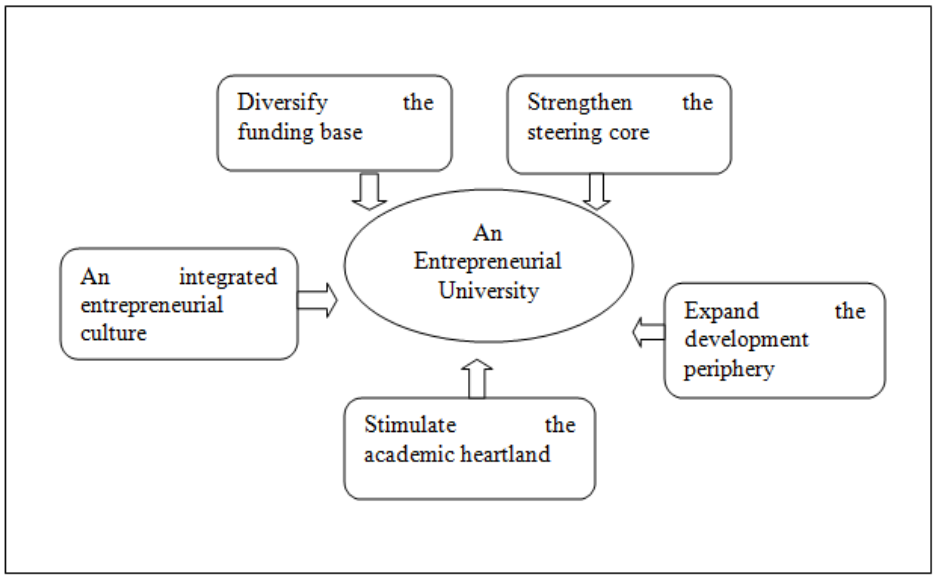
3.2 Burton Clark: Entrepreneurial Pathways of University Transformation

Burton Clark regarded the transformation of traditional universities into entrepreneurial universities as the creation of enterprise universities and organizational ways of transformation which result into the development of modern management in HEIs (Clark, 1998; 2004). According to Clark (1998), an entrepreneurial university seeks to bring innovation in how it does its business. Gibbs (2014) and Clark (1998; 2004) believe that institutional entrepreneurship is both a process and an outcome and this has been portrayed in Clark's theory of an entrepreneurial university (Clark, 1998).

Clark (1998) based his theory on five Western European universities following their deemed success in the transformation from traditional into entrepreneurial universities. Clark (1998;

2004) identified five elements that were common in the entrepreneurial paradigm of the five universities. These five elements form Clark's (1998) entrepreneurial university theory that has guided entrepreneurial paradigm in a number of universities (Clark, 2004; Arnaut, 2010). The five elements are depicted in Figure 3.1 below:

Figure 3.1: Pathways to an Entrepreneurial University



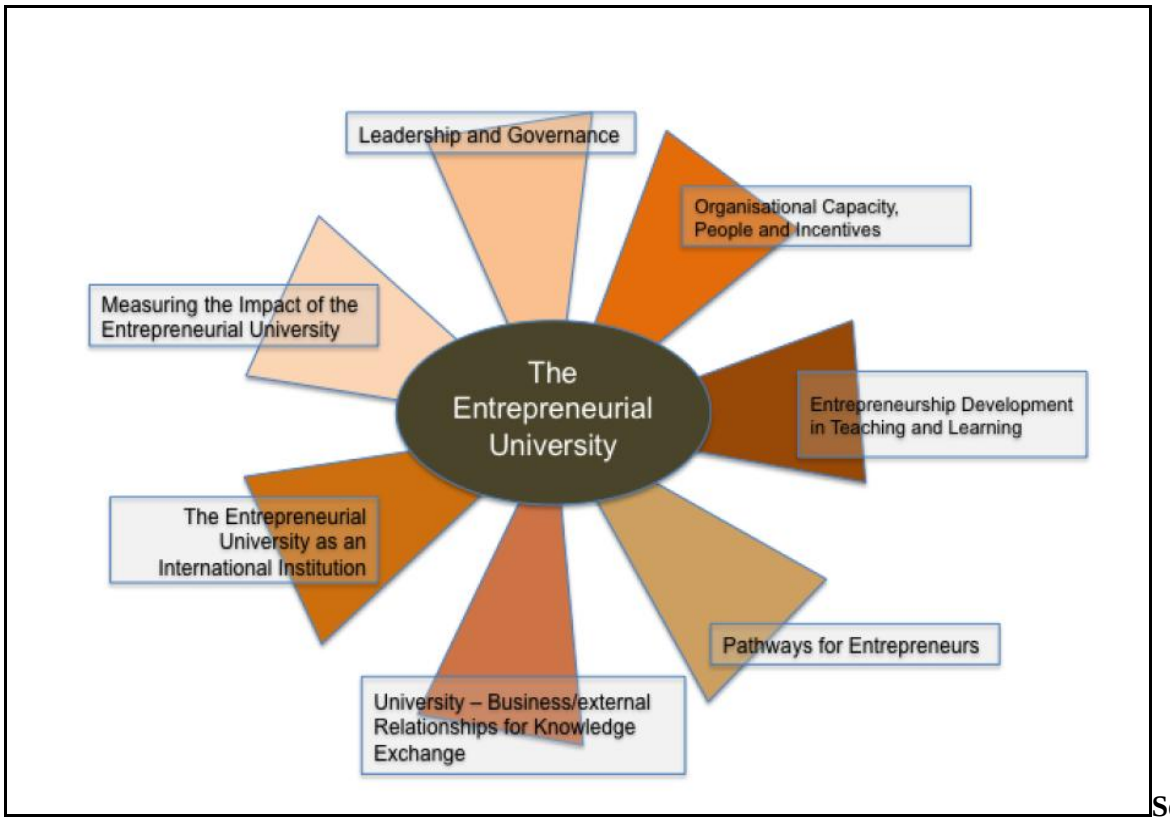
Source: Author (2017) based on Clark (1998)

3.3 OECD: A Guiding Framework for Entrepreneurial Universities

OECD (2012) defines an entrepreneurial university as one optimized by innovation throughout its research, knowledge exchange, teaching and learning, governance and external relations. OECD (2012) developed a framework to guide the progression of universities for its member states into entrepreneurial universities. The entrepreneurial university framework was designed to help interested universities assess themselves against seven elements of an entrepreneurial university for improvement and effectiveness (OECD, 2012). The seven elements are said to describe an entrepreneurial university and are indicated in Figure 3.2 on the next page. OECD (2012) states that the framework has the simple purpose of helping universities identify their

current situation and potential areas of action in light of their institutional and national environment.

Figure 3.2: OECD Guiding Framework for Entrepreneurial Universities



Source: OECD (2012)

3.4 A Combination of Burton Clark and OECD Entrepreneurial University Frameworks

Clark's theory has five elements and OECD's framework has seven elements as depicted in Figures 3.1 (page 51) and 3.2 (page 52 above) respectively. However, the two theoretical frameworks have some common elements and were combined for a comprehensive theoretical background to the study. The elements and similarities are presented in the subsequent paragraphs.

One of the elements in Clark's theory is 'a strengthened steering core' (Clark, 1998). Clark (ibid) noted that that the universities in their traditional university state had weak capacity to steer themselves. But during the transformation, actors in leadership positions in the five successful entrepreneurial universities became quicker, more flexible and more focused in their reactions to expanding and changing societal demands (Clark, 1998; 2004). As argued by Clark (2003), there is need for a strong administrative backbone that runs from the top of the university hierarchy, through faculties and ultimately to departments, institutes or academic units. Likewise, Etzkowitz *et al*. (2000) consider university leadership to be at the centre of the core processes of the entrepreneurial paradigm in a university setting.

Similar to the 'strengthened steering core' element in Clark's theory, OECD's entrepreneurial university framework includes an element of 'leadership and governance' in its framework (OECD, 2012). OECD (2012) noted that for a traditional university to become a successful entrepreneurial university, there is need for strong leadership and good governance to spearhead the development of an entrepreneurial culture within the institution. Important aspects of this element include: leadership to develop a strategy that focuses on entrepreneurship; leadership regarding commitment towards the entrepreneurial paradigm; the need for top management in the university to be the first in embracing the culture of entrepreneurship; action by university leadership to give faculties the autonomy to interact with the community; and an external environment with fewer bureaucratic barriers (OECD, 2012). Having considered Clark's element of 'strengthened steering core' and OCED's 'leadership and governance', a common label of 'committed leadership' would best represent the combination.

Thus leadership has been considered in the two theories as an essential element in an entrepreneurial university model that can facilitate progression of universities like those in Malawi from being traditional to entrepreneurial universities.

A second element in Clark's theory of an entrepreneurial university is 'expanding the development periphery' (Clark, 1998). Clark (1998; 2004) noted that the entrepreneurial universities exhibited a strong link with the outside organizations and other stakeholders. The universities were active in seeking connections and networks with the government, industry and also engaged with its community at various levels (Clark, 1998). Clark's element of 'extending development periphery' did not just focus on external relationships but also internal collaborations whereby entrepreneurial universities encouraged interdisciplinary project-oriented research alongside departments as an additional approach to group academic work (Clark, 1998; Arnaut, 2010). This element of 'expanding development periphery' thus emphasizes the need for an entrepreneurial university to enhance networking within the institution as well as with the external environment. A corresponding element in the OECD (2012) entrepreneurial university framework is the 'university and business/external relationships for knowledge exchange'.

OECD (2012) professes that in response to the element of 'university and business/external relationships for knowledge exchange' an entrepreneurial university has to be actively involved with a range of stakeholders like the public sector, geographic regions, businesses, alumni and professional bodies among others with the view to create value for the society. Therefore, in line with the element of 'extending the development periphery' in Clark's (1998) entrepreneurial university model, building and sustaining a relationship with key partners and collaborators was considered essential in an entrepreneurial university. The only difference is that OECD (2012) is

skewed towards external relationship while Clark (1998) considers both internal and external networks.

It seems imperative that internal and external networks form an important aspect in a model that would drive universities that have been focusing on teaching and research alone to progress into entrepreneurial universities.

Another element in Clark's theory of an entrepreneurial university is 'diversified funding base' (Clark, 1998; 2004). Clark (1998) noted that widening the financial base in an entrepreneurial university was essential and is the main purpose for the entrepreneurial paradigm in HEIs. He says:

> *"Entrepreneurial universities step up their efforts to raise money from a second major source, research councils, by more vigorously competing for grants and contracts. They set out to construct a widening and deepening portfolio of 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. Third- stream sources represent true financial diversification."*(Clark, 1998, pp 2).

Noting from the diverse sources of income in Clark's theory, it can be noted that diversification of income sources in this case can serve two purposes: as an input into the entrepreneurial paradigm and as an outcome of the process. In this case, regardless of the third-stream income source the university employs, the funds can be used as an input to finance entrepreneurial activities. As an outcome, entrepreneurial universities generate income from teaching, research and outreach missions through product/service transfer, technology transfer and technology transfer processes presented in Diagram 2.1 on page 37 and Sections 2.3.1 and 2.3.2 presented in Chapter two earlier. The later excludes income sources like philanthropy, student fees, alumni fundraising and other general income generating activities (IGAs). On the other hand, OECD

captures the element of finance within a broader one referred to as 'organizational capacity, people and incentives' (OECD, 2012).

The element of 'organizational capacity, people and incentives' contains three aspects: the need to have a financial strategy on entrepreneurship mission; the need to attract and retain the right people and incentivizing entrepreneurial behaviour in individuals. On financial strategy, OECD (2012) says:

> *"It is crucial for the university to invest in its entrepreneurial activities through a sustainable financial strategy, but it is not good to be over reliant on limited sources of public funding. Universities are entrepreneurial when they are not afraid to maximize their potential, diversify funding sources and reduce their dependency on state/public funding. Universities could score highly if they bring in additional external funding from or through services in kind such as sharing space and facilities. They may use revenue generated from entrepreneurship activities to reinvest (self-funding activities)"* (OECD, 2012, pp6).

OECD (2012) is, therefore, particular about diversification of income sources as an input into the entrepreneurial paradigm by putting in place a supportive financial strategy. As an outcome, OECD (2012) affirms that an entrepreneurial university generates revenue which may be reinvested into the entrepreneurial activities.

Thus having a financial strategy in support of entrepreneurship in universities is an important element in a model that would drive a traditional university into an entrepreneurial university status.

Apart from organization capacity as an aspect in OECD (2012), the same element in carries two other aspects: people and incentives. These two aspects concern attracting and retaining the right people and incentivizing entrepreneurial behavior in individuals respectively (OECD, 2012; Gibb, 2014). OECD (2012) asserts that faculty is a key resource in strategy delivery,

entrepreneurship education, support for business start-ups and all entrepreneurial activities the university wants to develop. There is, therefore, need to recruit, support and incentivize staff that have a strong entrepreneurship background as well as train others to develop an entrepreneurial mindset (Tyler, 2009; OECD, 2012). As described, this element can be labeled as 'faculty motivation' where both content and process theories (Cole, 2010; Griffin, 2010; Armstrong, 2012) have to be considered in order to achieve results. Clark has a similar element in his theory labeled 'stimulated academic heartland' (Clark, 1998).

According to Clark (1998), an academic heartland is found in the traditional academic departments formed around disciplines, new and old, and some interdisciplinary fields of study. Clark (1998) noted that keeping academic departments and units vibrant, dynamic and motivated was cardinal in the university's entrepreneurial paradigm. Actors, in university leadership in the five universities that were studied by Clark (1998), involved the academic heartland (the faculty) and made sure that those who were positioned to generate revenues for their university were strongly encouraged and incentivized to do so. As the entrepreneurial university realizes monetary and non-monetary benefits from the entrepreneurship mission, Clark's theory (1998) suggests that academic members at the heart of the processes must be rewarded accordingly. A number of studies (Di Gregorio & Shane, 2003; Cassar, 2007; Hayter, 2011; Lam, 2011; Padilla-Melendez & Garrido-Moreno, 2012) noted that effective motivation of academic members in commercialization processes is through both intrinsic and extrinsic rewards and must be clearly stated in the university policies. Lam (2011) noted that academics are stimulated by the "gold" in reference to financial rewards, the "ribbon" in reference to reputational rewards, and the "puzzle" in reference to satisfaction rewards. Lam (2011) and Locket & Wright (2005) found that the vast majority of scientists find their motivation in reputational rewards, even in their

commercial pursuits which include recognition in the scientific and academic community. Apart from research and publishing being the criteria for promotion, most universities are including issuance of a patent as having almost the weight of publishing a book and are, thus, encouraging faculty to engage in such commercialization endeavors that promote the entrepreneurial status of the university (Litan *et al*., 2008; Tyler, 2009; Leisyste, 2011).

It has thus, been shown that, motivating 'the academic heartland' is an important factor in the model that has stimulated the progression of universities in the entrepreneurial paradigm. Having a stimulated and motivated faculty is hence considered essential in the adoption of the concept of an entrepreneurial university.

The fifth and last element in Clark's entrepreneurial university model is 'creating an integrated entrepreneurial culture' (Clark, 1998; Clark, 2004). Clark (1998) noted that the entrepreneurial universities developed a work culture that embraced change. Indeed, Clark (004) argues further that strong entrepreneurial cultures were rooted in strong entrepreneurship practices (Clark, 2004). Clark (1998) observed in the targeted universities that sustained calls for collective action led to new practices and beliefs, with steps that were entrepreneurial in character coupled with much risk-taking and flexible adjustments. As a precaution, studies (Ropke, 2000; Downie & Herder, 2007; US Department of Commerce, 2013; Gibb, 2014; Gibb & Hannon, 2015; Williams *et al.*, 2015; Jameson & O'Donnell, 2015) indicate that building a strong entrepreneurial culture does not only rest in incorporating entrepreneurship in the curricula but entails mindset change. It also entails entrepreneurship practice by both faculty and students supported by university leadership. Apart from entrepreneurship practices, Clark (1998) observed that there was significant innovation in the character of the entrepreneurial universities where some core tasks and deep structures were altered to the point where the long-term course of the organization

changed. Indeed, universities that have made strides in the entrepreneurial paradigm have established technology transfer offices (TTOs) (Henrekson & Rosenberg, 2001; Aziz *et al*., 2011; Allen, 2012; Rasmussen *et al*., 2013; US Department of Commerce, 2013), incubators and science parks (Link & Scott, 2005; Bradley & Metla, 2008), proof of concept and entrepreneurial centres (Lofsten & Lindelof, 2005; Hackett & Dilts, 2008; Tanha *et al*., 2011; Link & Scott, 2007; Sooreh *et al*., 2011) to foster the entrepreneurial culture in teaching and research. In the OECD (2012) framework there are two elements that correspond to this element of 'creating an integrated entrepreneurial culture' and these are: 'entrepreneurship development in teaching and learning' and 'pathways for entrepreneurs'.

The element of 'entrepreneurship development in teaching and learning' in OECD (2012) emphasizes the need for an entrepreneurial university to expand entrepreneurship and entrepreneurial education offers to the institution as a whole, including all staff and students. This reflects on the need for the university's structure to support entrepreneurial development as well as provide the right tools to deliver education and training opportunities both internally and via the external environment (OECD, 2012; Gibb, 2014). As alluded to, it is not enough to develop academic and training programmes in entrepreneurship as practicing entrepreneurship is paramount.

With respect to the element of 'pathways for entrepreneurs', the OECD (2012) asserts that an entrepreneurial university needs to support the pathways taken by prospective university entrepreneurs (be it faculty and/or students) from ideas to market growth or into employment creation. This element of supporting academic and student entrepreneurs is certainly captured by the integration of entrepreneurial culture in the university reported by Clark (1998). It is therefore noted that supporting would-be entrepreneurs in the university would be an extension

of the element of incorporating entrepreneurship in teaching and learning explained above also espoused by OECD (2012). Combined with Clark's element, this element can equally be labeled as 'integrated entrepreneurial culture in teaching and research'.

Integrating an entrepreneurial culture has therefore been shown to be an important element that needs to be incorporated in universities willing to progress from traditional into an entrepreneurial university.

The remaining two elements from OECD (2012) framework are: internationalization and measuring impact of an entrepreneurial university. These two elements are not explicit in Clark's theory. 'Internationalization' is the sixth element in the OECD (2012) entrepreneurial university framework which recognizes an entrepreneurial university as 'an internationalized institution'. OECD (2012) noted that integration of internationalization into strategic process for informed decisions and institutional direction in an entrepreneurial university is essential. OECD (2012, pp 12) says, *"It is not possible for a university to be entrepreneurial without being international but the university can be international without being entrepreneurial".* According to OECD (2012), internationalization in this case means the process of integrating an international, inter-cultural or global dimension into the purposes, functions or delivery of higher education. Apart from attracting international staff and students, an internationalized university also actively encourages and supports mobility of their staff and students (ibid). This, therefore, raises questions as to how important internationalization is considered as an important aspect in the entrepreneurial paradigm of Malawian universities.

The last element in OECD (2012) framework of an entrepreneurial university is 'measuring the impact of an entrepreneurial university'. OECD (2012) states that an entrepreneurial university

should understand the impact of the changes it has made on the institution, local, international and in the global arena. OECD (2012) further guides that the majority of impact measurement should relate to USO's, IP and research outcomes rather than graduate entrepreneurship, retained talent, local economic development or the impacts of the broader entrepreneurial strategy. Therefore, OECD (2012) shades light on areas that a university requires to measure rather than what to measure in the process. As agreed by some scholars (Allen, 2012; Collier & Gray, 2012), every task and process in the university entrepreneurial paradigm needs to be evaluated. It is thus poignant to measure the impact of Malawian universities if one is to assess the extent to which they have embraced the entrepreneurial paradigm.

In summary, the elements drawn from the two theoretical frameworks by Clark (1998) and OECD (2012) are presented in Table 3.1 on the next page.

Table 3.1: Elements of an Entrepreneurial University

	Entrepreneurial University Elements/Characteristics		
No	**Clark's Theory**	**OECD's Framework**	**Researcher's View**
1	Strengthen steering core	Leadership and governance	Committed university leadership
2	Expand the development periphery	University-Business/external relationships for knowledge exchange	Enhanced internal and external collaborations
3	Diversify funding base	Organizational Capacity (Organizational capacity, people and incentives)	Supportive financial strategy
4	Stimulate the academic heartland	-(Incentives) Organizational capacity, people and incentives -Pathways for entrepreneurs	Faculty motivation
5	Integrate an entrepreneurial culture	Entrepreneurship development in teaching and research	Integrated entrepreneurial culture in teaching and research
6	-	Internationalization	International orientation
7	-	Measuring the impact of an entrepreneurial university	Impact assessment of university entrepreneurial activities

Source: Author (2017), Clark (1998) and OECD (2012)

Evidence shows that several universities in Europe, America, Oceania and Asia have adopted Clark's (1998) model of an entrepreneurial university and OECD's entrepreneurial university framework with successful results (Arnaut, 2010; Gibb, 2013). In Africa, reports (Collier & Gray, 2010; Nafukho & Wawire, 2012; Mutambi, 2011; Alessandrini *et al*., 2015; Rorwana & Tengeh, 2015) indicate that several universities in South Africa, Tunisia, Kenya and Uganda have made strides in the second academic revolution and are transforming into entrepreneurial

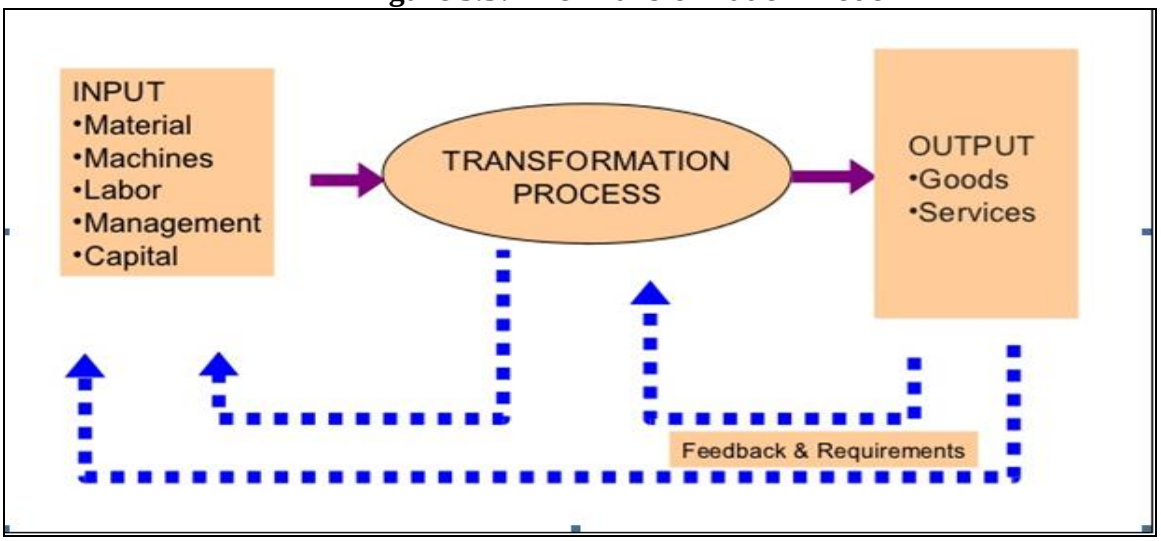
universities but it is not clear whether Clark (1998) and OECD (2012) models have been utilized in the process.

It was important in this study to find out if the elements in the two known and popular models of Clark (1998) and OECD (2012) can be adopted by universities in LDCs like Malawi to guide their transition into entrepreneurial universities and the second academic revolution. This is upon the thinking that the environment in which universities in Europe and America operate, where Clark (1998) and OECD (2012) based their studies, is different from the Malawian environment. Furthermore, the two entrepreneurial theoretical frameworks (Burton Clark and OECD models) based their studies on European universities that had already transformed into entrepreneurial universities. In the case of Malawian universities, the phenomenon of an entrepreneurial university and the second academic revolution are relatively new as is the case in most LDCs (Alessandrini *et al*., 2015). Coupled with this, it could be noted that the transformation process of traditional universities that are new to the phenomenon require a complete framework comprising a starting point deemed as input stage, then the process stage and finally an output stage. The transformation model popular in operations and production management can be used as a guide.

A transformation model is used as a tool in operations management in the production of goods and services to ensure delivery of the right quantity and quality at the right price and place to the customers (Burke, 2008). In this study, the transformation model can be adopted to guide the entrepreneurial paradigm in universities willing to progress into entrepreneurial universities.

As indicated above, the transformation model has three components: inputs, transformation or conversion process and outputs as shown in Figure 3.3 on the next page.

Figure 3.3: The Transformation Model



Source: Burke (2008)

Apart from the three components (inputs, transformation and outputs), a further component of the transformation model, as shown in Figure 3.3 above, is the feedback loop. Feedback provides information which is used to control the operations system either by adjusting the inputs and/or the transformation processes that are used to achieve desired outputs (Burke, 2008). Feedback can come from both internal and external sources.

It is believed that this transformation model can guide the steps in an entrepreneurial paradigm in a university to successfully transform itself into an entrepreneurial university. The input stage would focus on institutional strategies and initiatives that need to take place as the traditional universities prepare for the transition. The process stage would involve the elements proposed by Clark (1998) and OECD (2012) in their frameworks to lead the transformation processes. The output concerns the results from an entrepreneurial university which mostly would be the transfer of products or services, the transfer of technology and the transfer of knowledge as stated by Tijssen (2006). At each stage, feedback is important to ensure achievement of the entrepreneurial status of the university.

It is considered imperative that the transition from a teaching and research university into an entrepreneurial university requires attention to the three phases and the feedback element presented in the transformation model.

3.5 The Conceptual Framework

The development of the conceptual framework presented in this section was based on the literature presented in the previous sections of this Chapter. The transformation model enabled presentation of the conceptual framework in a manner that would depict the inputs, elements and outputs of an entrepreneurial university to guide this study.

According to the transformation model, the first step in the entrepreneurial paradigm is the input stage. This stage, as alluded to, focuses on initiatives that aim at facilitating internal transformation which, with respect to the Malawian university entrepreneurship paradigm, requires university management to consider for the transition to take place. Initiatives such as establishing relevant offices, setting up entrepreneurial facilities, and establishing networks to support entrepreneurial activities would be undertaken during this first stage of the entrepreneurial university model for the Malawian universities.

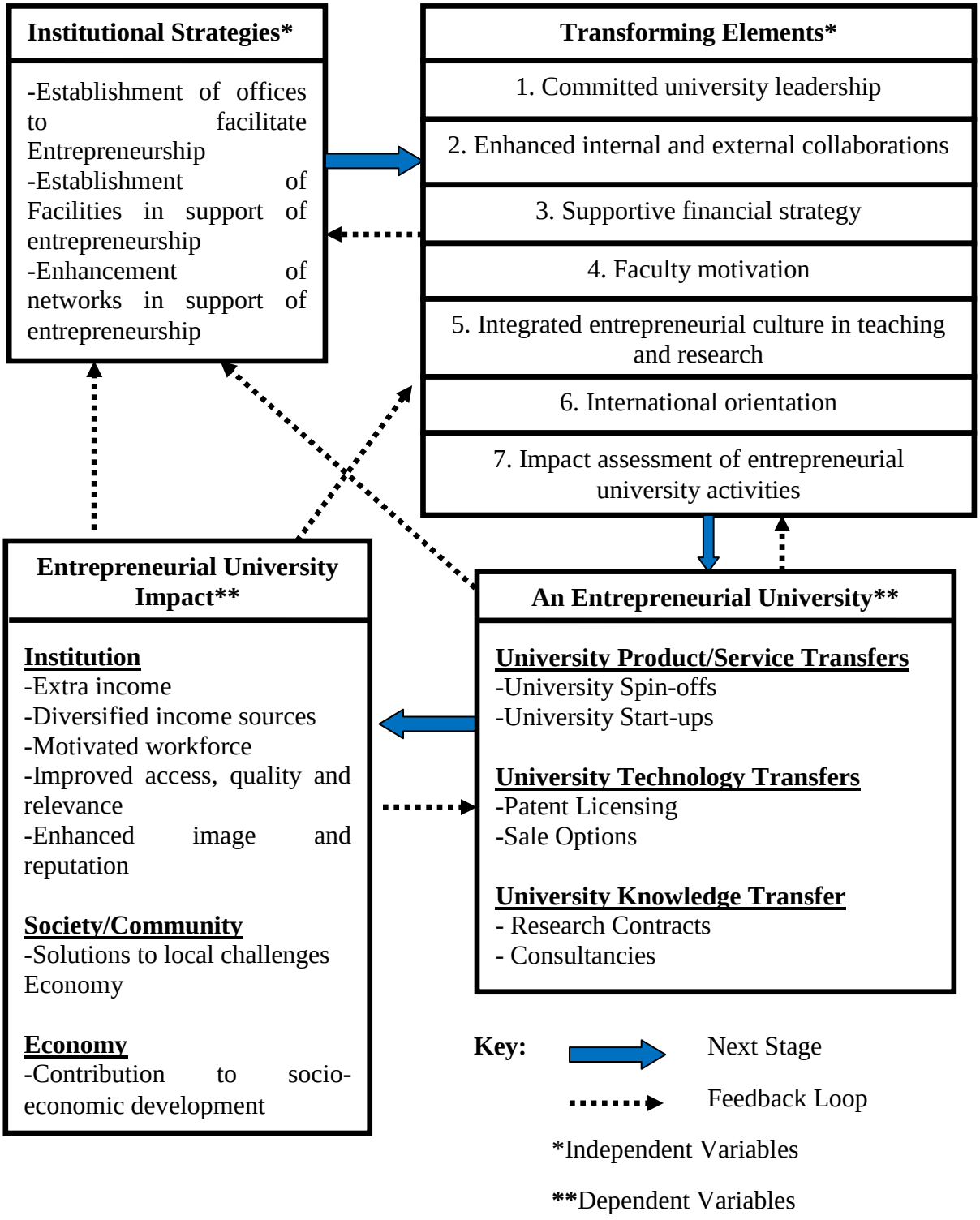
The second stage of the conceptual model guiding the study is the transformation process. In transitioning from a traditional university to an entrepreneurial university, focus has to be upon elements that are cardinal in the entrepreneurial paradigm to be spearheaded by university management and faculty among other stakeholders. The respective elements are drawn from Clark (1998) and OECD (2012) theoretical frameworks presented earlier in this Chapter and as summarized Table 3.1 on page 62.

The third stage in the conceptual framework for an entrepreneurial paradigm in universities is the output stage. This stage implies giving attention to the results of entrepreneurship in the core functions of teaching, research and outreach. The outcomes include creation of USOs, start-ups, sale options, licensing of patents, research contracts and consultancies in levels presented in Diagram 2.1 on page 37 and as guided by Tijssen (2006).

At each of the three stages, there is need for monitoring and evaluation processes where feedback can be obtained and provided in order to employ corrective measures for successful results. According to Burke (2008), feedback ensures there is control at each stage in order to bring out the desired outcomes.

The conceptual framework developed is shown in Figure 3.4 on the next page.

Figure 3.4: The Conceptual Framework



Source: Author (2018)

3.6 Summary of the Chapter

The Chapter has presented the two entrepreneurial university theoretical frameworks developed by Burton Clark (Clark, 1998) and OECD (2012). These two theoretical frameworks provided elements of an entrepreneurial university that have been adopted in the conceptual framework developed in the study. The Chapter has also presented the transformation model which provided guidance on the major components of the entrepreneurial university model to be adopted by universities in LDCs like Malawi.

The next Chapter presents the methodology that was used to gather the relevant data in order to achieve the research objectives.

CHAPTER 4: METHODOLOGY

4.1 Introduction

The previous Chapter presented the theoretical and conceptual frameworks of an entrepreneurial university that guided the study. This Chapter will attend to research methodology covering the research philosophy, approach and design employed in the study. The research design describes the research strategy, method, time horizon and data collection procedures. Beginning with background information about the study, Chapter four also presents data analysis procedures, research reliability and validity; and research ethics.

4.2 Research Background

The study aimed at developing an entrepreneurial university model from existing theories which could be adopted by universities in LDCs like Malawi. In order to achieve this aim, the researcher explored insights into the entrepreneurial paradigm in universities and the concept of an entrepreneurial university in global and Malawian contexts. The study was thus exploratory and explanatory in nature.

Robson (2002) considers an exploratory study to be a valuable means of finding out what is happening; to seek new insights; to ask questions and to assess phenomena in a new light. Therefore, apart from understanding what is happening in other universities across the world, there was need to understand what exactly was happening in Malawian universities in terms of the second academic revolution and the extent to which Malawian universities have adopted the concept of an entrepreneurial university. Such adoption is desirable considering that the second

academic revolution has been recognized as a global phenomenon and a panacea to challenges in HEIs.

The study further explored elements of an entrepreneurial university model suitable for Malawian universities as most of the existing models arise out of studies in developed and emerging economies (Arnaut, 2010; Cai & Liu, 2014; Alessandrini *et al*., 2015). Malawi is one of the LDCs in Sub-Saharan Africa. The exploratory study was purposeful due to the need to establish a clear understanding of the situation thereby ascertain, in particular, the precise status of Malawian universities with respect to the entrepreneurial paradigm (Saunders, Lewis & Thornhill, 2009). There was general curiosity and a desire for better understanding of how the concept of an entrepreneurial university and related theories would work in developing countries such as Malawi.

Babbie & Mouton (2007) advise that exploratory approach is necessary where the subject of study itself is relatively new. Since its emergence, the concept of an entrepreneurial university has aroused a lot of interest but with little being known about its adoption and success in the context of LDCs like Malawi. In keeping with the research process, the review of literature undertaken in Chapter two and the theoretical frameworks presented in Chapter three identified, among others, two known and popular models of an entrepreneurial university developed by Burton Clark (Clark, 1998) and OECD (OECD, 2012). The review provided bases for developing and adopting an entrepreneurial university model for universities in LDCs, in general, and by Malawian universities, in particular.

This study was also explanatory. Studies that establish causal relationships between variables are considered as explanatory in nature (Saunders *et al*., 2009; Howells & Cramer, 2013). From this

perspective and in tandem with the purpose of the study namely: development of an entrepreneurial university model that would guide Malawian universities in the transformation of traditional universities into entrepreneurial universities, use was made of the two known entrepreneurial university theories (Clark, 1998; OECD, 2012) in order to find out which elements are important in the entrepreneurial paradigm for countries such as Malawi considering that the contextual environment is different from developed economies where the two models were first developed and adopted. Thus, propositions based on the elements in the entrepreneurial university outlined in the conceptual framework for this study (see Figure 3.4 on page 67) have been considered as variables that had to be confirmed with respect to data from Malawian universities. Consequently, a control had to be included in the study in order to ensure validation and reliability of results (Babbie & Mouton, 2007). The major proposition was that: '*elements of an entrepreneurial university in the conceptual framework can stimulate and bring about the needed change in Malawian universities.*'

4.3 The Research Philosophy

A research entails the process underpinning detailed study of a subject in order to discover new knowledge or reach new understanding of phenomena (Gillham, 2000; Maxwell & Loomis, 2003). A research philosophy relates to the development of that knowledge and the nature of the knowledge thus created (Dawson, 2007; Saunders *et al*., 2009). The debate in the scholarly world is often framed in terms of the choice between positivist and interpretivist research philosophies (Christensen, Johnson & Turner, 2015). In line with the argument by Guba & Lincoln (1994), questions of method are secondary to questions of epistemology, ontology and axiology; and in this study, the researcher was neither for a positivist nor an interpretivist perspective. Consequently, a pragmatist perspective was adopted for this study.

Pragmatism argues that the most important determinant of the epistemology, ontology and axiology a researcher adopts is the research question where one philosophical view may not be more appropriate than another for answering particular questions (Dawson, 2007; Saunders *et al*., 2009). Moreover, if the research question does not suggest unambiguously that either a positivist or interpretivist philosophy is adopted, it confirms the pragmatist's view that it is perfectly possible to work with variations in the epistemology, ontology and axiology (Tashakkori & Teddlie, 1998). As a result, a mixed method approach was used in this study where both qualitative and quantitative data collection and analysis were considered as being appropriate.

Ontology is concerned with nature of reality (Saunders *et al*., 2009). This raises questions of the assumptions researchers have about the way the world operates and the commitment held to particular views (Dawson, 2007). The two aspects of ontology put forth by Saunders *et al*. (2009) are objectivism and subjectivism.

Objectivism portrays the position that social entities exist in reality external to social actors concerned with their existence whilst subjectivism holds that social phenomena are created from the perceptions and consequent actions of those social actors concerned with their existence (Dawson, 2007; Saunders *et al*., 2009). In this study, the pragmatism position was adopted because the entrepreneurial model developed universities considered elements from existing theories but also perceptions of participants for contextualization (Saunders *et al.*, 2009).

Epistemology concerns what constitutes acceptable knowledge in a field of study (Saunders *et al*., 2009; Creswell, 2012). The study had to establish the extent of entrepreneurship in the Malawian universities which was followed by perceptions of the participants on transition

elements necessary in the entrepreneurial paradigm in their context. This entails a combination of positivism and interpretivism thus making pragmatism an appropriate philosophical perspective for the study.

4.4 Research Approach

Saunders *et al.* (2009) mention of two main research approaches: deduction and induction. Trochim (2006) defines deduction as moving from general to specific while induction begins from specific to general. Creswell & Clark (2007) say that the deductive researcher works from theory to hypothesis to data in order to add or contradict a theory. In contrast, Creswell & Clark (ibid) define the inductive researcher as someone who uses participants' views to build broader themes and generate a theory interconnecting the themes.

In answering the research question, the researcher used both deductive and inductive approaches. The researcher used entrepreneurial university theories developed by Clark (1998) and OECD (2012) as a starting point in building the model for Malawian universities. A combination of the two existing theories was tested in the initial stages of the study to specifically answer research objective 2. Later in the study, the researcher solicited views of the participants on elements used in the study in order to build an appropriate model suitable for Malawian universities to facilitate the entrepreneurial paradigm.

To satisfy one of the requirements for the deduction approach, the researcher deduced a number of propositions from theories (Robson, 2002) to answer research questions 1, 3 and 4 as follows:

Research question 1: *To what extent have Malawian universities progressed from teaching and research universities into entrepreneurial universities?*

This question aimed at establishing exactly where Malawian universities are in terms of the role changes that have occurred in the academic arena. This was exploratory and formed a baseline from where the theory to be adopted would be built. There are three known levels of roles performed by universities over the years. The first one being the historical role of teaching and archiving (Chapter 2, Section 2.2.1); the second role being a research intensive university in the first academic revolution (Chapter 2, Section 2.2.1); and the third being the entrepreneurial university in the second academic revolution (Chapter 2, Section 2.2.2). Universities that are still performing the historical role and are in the first academic revolution are considered traditional universities whilst universities that have progressed into the second academic revolution are considered to be entrepreneurial universities. Thus, sub-questions drawn from research question 1 to be answered in the study were as follows:

Sub-question 1.1: Are Malawian universities still operating as traditional universities?

Sub-question 1.2: Have Malawian universities progressed into the first academic revolution?

Sub-question 1.3: Have Malawian universities progressed into the second academic revolution?

Upon establishing the extent to which Malawian universities have progressed into the first and second academic revolutions, the researcher had to fully understand strategies that participants considered necessary in order to advance the entrepreneurial status of Malawian universities. The researcher used the inductive approach in answering research question number 2 and the question was:

Research question 2: *What strategies are crucial in the adoption of an entrepreneurial university in Malawian universities?*

The result of the analysis in question 2 above formed part of the entrepreneurial university model to be adopted by Malawian universities developed in this study.

Related to research question 2 is research question 3 which focuses on elements that would facilitate the progression of traditional universities into successful entrepreneurial universities in the Malawian context:

Research question 3: *What elements are necessary to facilitate entrepreneurial paradigm in Malawian universities?*

The first phase of data collection undertaken to answer this research question 3 involved assessing the importance of entrepreneurial university elements/characteristics adopted from Burton Clark (Clark, 1998) and OECD (OECD, 2012) (see Table 3.1 on page 62) in the Malawian universities. Later, there was need to confirm the elements in a second phase of data. This then completely answers research question number 3.

A summary of sub-questions drawn from elements from Clark (1998) and OECD (2012) theories to answer research question number 3 above is as follows:

Sub-question 3.1: is 'committed leadership' an important element in the model for entrepreneurial paradigm in Malawian universities?

Sub-question 3.2: is 'internal and external collaborations for entrepreneurship' a crucial element in the model for the entrepreneurial paradigm in Malawian universities?

Sub-question 3.3: is 'financial strategy' is an essential element in the model to guide Malawian universities into entrepreneurial universities?

Sub-question 3.4: is 'motivation of faculty' an important element in the model aimed at guiding Malawian universities into entrepreneurial universities?

Sub-question 3.5: is an 'integration of entrepreneurial culture in teaching and research' a crucial element in the model for the entrepreneurial paradigm in Malawian universities?

Sub-question 3.6: is 'internationalization' considered as an important element in the model that aims at guiding Malawian universities in the entrepreneurial paradigm?

Sub-question 3.7: is 'impact assessment of university entrepreneurial activities' an important element to be included in the model that aims at guiding Malawian universities in the transition into entrepreneurial universities?

Research question number 4 equally employed the deduction approach where results from entrepreneurial universities explained by Tijssen (2006) involving business and economic development in teaching and research missions were used.

Research question 4: *What major outputs are realized from the adoption of the concept of an entrepreneurial university in Malawi?*

The sub-research questions drawn from research question 4 above were as follows:

Sub-question 4.1: is a university spin-off a major output from the entrepreneurial paradigm in Malawian universities?

Sub-question 4.2: is a university start-up a major output from the entrepreneurial paradigm in Malawian universities?

Sub-question 4.3: is patent acquisition and licensing a major output from the entrepreneurial paradigm in Malawian universities?

Sub-question 4.4: is an outright technology sale option a major output from the entrepreneurial paradigm in Malawian universities?

Sub-question 4.5: are consultancy services a major output from the entrepreneurial paradigm in Malawian universities?

Sub-question 4.6: are research contracts a major output from the entrepreneurial paradigm in Malawian universities?

Another requirement of the deductive approach states that the derived model must be tested and confirmed (Robson, 2002) and this was done in the study to arrive at the elements suitable for the entrepreneurial university model for Malawian universities. The outcome of the inquiry enabled the researcher to refine the model and make the necessary changes.

The researcher further employed a control as another characteristic of deduction approach (Saunders *et al*., 2009; Howitt & Cramer, 2013). One university, was therefore, selected for this particular purpose. The control helps to ensure that any change in the entrepreneurial paradigm was a result of operationalization of the conceptual framework in testing the proposed elements of an entrepreneurial university (Robson, 2002). The researcher used structured methodology to facilitate replication important in ensuring reliability (Gill & Johnson 2008).

However, the deduction approach alone could not comprehensively answer the research question and meet the research objective. To offset the weaknesses of the deductive approach in the study, the inductive approach was also employed. One of the major weaknesses of a deductive approach is the tendency to construct a rigid methodology that does not permit alternative explanations of what is going on (Thordy, 2006; Howitt & Cramer, 2013). In validating the elements of an entrepreneurial university model in research question 3, the researcher sought views of the participants in order to provide rich information on the quantitative results obtained. Similarly, to understand the major outputs of the entrepreneurial paradigm in Malawian universities in research question 4, there was need to get corresponding explanations from participants. The inductive approach to the research questions provided the context in which events were taking place (Saunders *et al*., 2009).

4.5 The Research Design

A research design provides a general plan a researcher uses to answer the study questions (Howitt & Cramer, 2013). At this stage, the research question is turned into a research project (Robson 2002). The research design in this study was influenced by the research philosophy and approach adopted in accordance with the research question. At this point, the researcher wishes to clarify the distinction between research design and research tactics. A research design is concerned with an overall plan for the research while research tactics describe details of data collection and analysis (Saunders *et al*., 2009). Consequently, decisions about research tactics involve clarification about different quantitative and qualitative data collection techniques (e.g. questionnaires, interviews, and secondary data). Such research tactics have been elaborated in subsequent sections. Therefore, the following sections concerning research design cover the research strategy, research method and time horizon.

4.5.1 The Research Strategy: Case Study Approach

The research strategy was guided by the research questions and objectives, the extent of existing knowledge, the amount of time and other resources available, as well as the philosophical underpinnings (Saunders *et al*., 2009). Out of the seven research strategies (experiment, case study, survey, archival research, action research, ethnography and grounded theory) outlined in Saunders *et al*. (2009: 141), the researcher opted for a case study approach.

Robson (2002:178) defines a case study as:

> '*a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence'*.

The case study strategy was of particular interest in this study as there was need to gain a rich understanding of the context and the processes involved in the transition of Malawian universities from traditional to entrepreneurial universities (Morris & Wood 1991). The case study strategy enabled the researcher to answer questions such as 'what was the entrepreneurial status of Malawian universities before testing the model?' 'How can Malawian universities enter the second academic revolution?' What elements of the existing entrepreneurial university models could work in the Malawian situation?' 'What strategies are crucial to facilitate the entrepreneurial paradigm in the Malawian universities?' 'What outputs will be achieved at the end of entrepreneurial processes in Malawian universities? Case studies have substantial capability to not only answer the 'why' questions but also 'what' and 'how' questions (Saunders *et al*., 2009). Further to this, the case study strategy is often advocated as a suitable method for research in organizational and management studies (Yin, 2002; Creswell, 2012) and, therefore, deemed appropriate for this study.

In using a case study strategy, multiple data collection methods were employed in order to achieve the research objective. This is in line with Yin (2003) who stated that a case study approach does not only aim at exploring certain phenomena, but also to understand them within a particular context and hence the use of multiple methods for collecting data which may be both qualitative and quantitative. In using the case study approach, the researcher had an opportunity to gather data through a survey, interviews and document analysis.

Four main designs can be located in case study methodology: single case study, holistic single case study embedded, multiple case studies holistic and multiple case studies embedded (Yin, 2002). In a single case study, a single case is examined holistically. This type is more suitable when the case under consideration is rare or an extreme case (Saunders *et al*, 2009). In a holistic

single case study embedded, multiple numbers of units of analysis can be used within a single study (Yin, 2002). In a multiple case studies holistic, multiple cases are considered when the researcher intends to improve the reliability, credibility, trustworthiness and generalizability of the study (Yin, 2003). In this type each case study is considered as one unit of analysis. In the multiple case studies embedded, there would be more than one unit of analysis for each case thus providing rich data for the subject under study (Yin, 2002). For the purpose of this study, multiple case studies holistic design was adopted. In adopting the multiple case studies holistic, the researcher gathered data from multiple universities thereby achieving optimum and reliable results (Gillham, 2000).

This research aimed at exploring the best elements for an entrepreneurial university model for Malawian universities. An entrepreneurial university phenomenon is not only a complex phenomenon as confirmed by Boadu (2008), Gibb (2014) and Cai & Liu (2015) but is also a relatively new phenomenon in HEIs in LDCs and Africa (Nafukho & Wawire, 2006; Aziz *et al*., 2011; Alessandrini *et al*., 2015). Therefore, using one case organization would not provide the adequate information to enhance validity and generalizability of the results. Therefore, using the multiple case studies holistic enabled the researcher to gather adequately rich information about the entrepreneurial status of Malawian universities and identify specific elements required in the entrepreneurial paradigm.

4.5.2 The Research Method Choice

The researcher employed both the quantitative and qualitative research methods following the case study strategy with pragmatism philosophical perspective underpinning the deductive and inductive research approaches adopted.

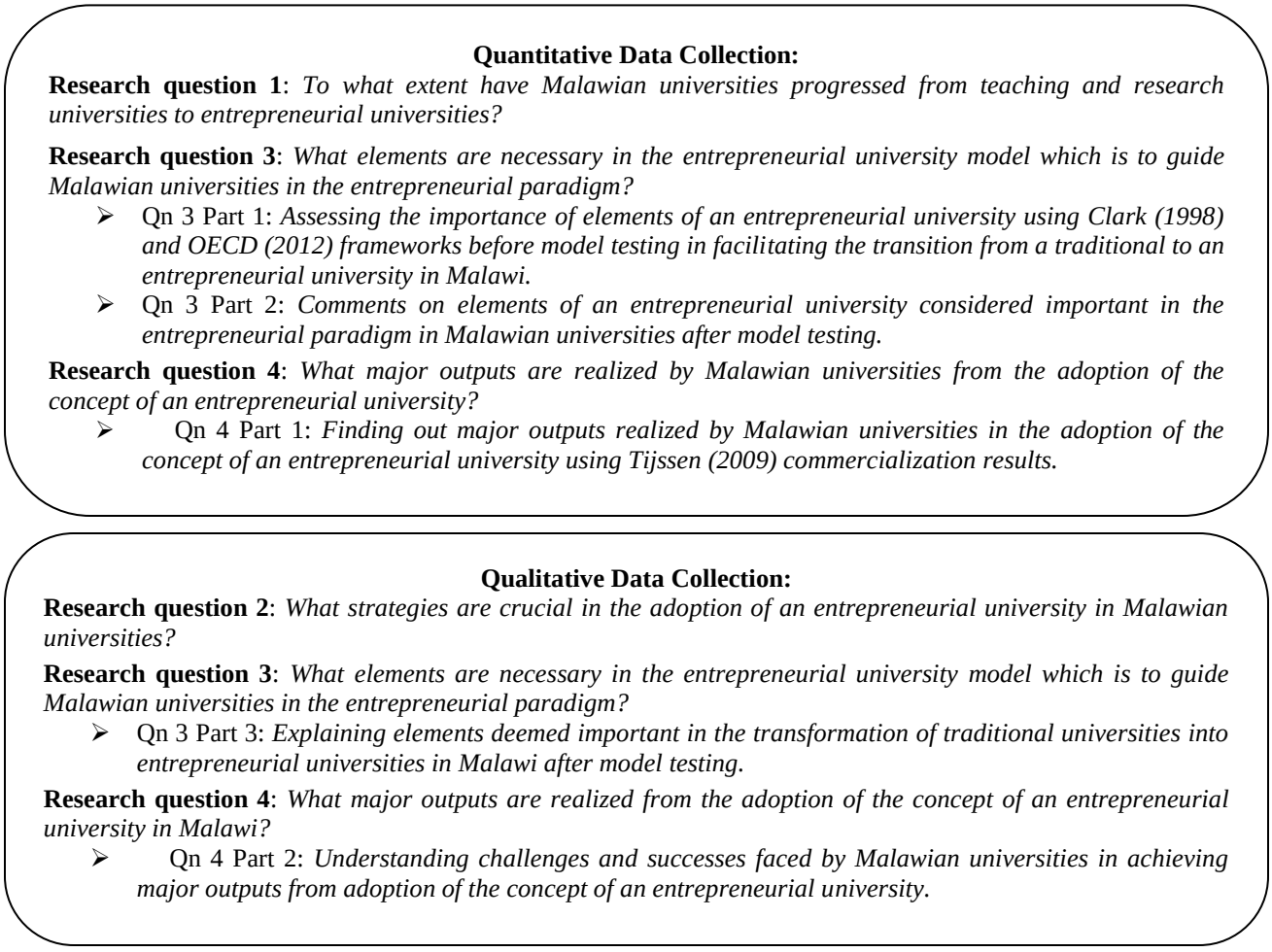
On one hand, quantitative research approach is based on the logical positivism philosophical approach which is common in natural sciences (Babbie & Mouton, 2007; Saunders *et al*., 2009). The positivist approach underlies the natural scientific method in human research and holds that research must be limited to what one can observe and measure objectively – that which exists independently of the feelings and opinions of the participants (Yin, 2002). In this case, the researcher had to first establish the status of Malawian universities in light of the role changes that have taken place in HEIs globally as a baseline line for the development of the entrepreneurial university model. Within the framework of the social sciences, quantitative research commences with research questions or hypotheses about a particular phenomenon and theories, gathers data from a real-world setting and then analyses that data statistically to support or reject the stated research questions or hypotheses (Ryan, Scapens & Theobold, 2002; Welman, Kruger & Mitchell, 2005; Field, 2009). This has been highlighted in Section 4.4 earlier. The researcher believes that the quantitative research method was ideal where the deductive approach was applied as assigning numbers at different university transition points would allow for a comparative analysis. Quantitative data was thus collected through a structured questionnaire and the data collected was analyzed using quantitative analysis procedures.

On the other hand, the qualitative research method is associated with interpretive social sciences where forms of investigation are based on the significance of the subjective, experiential realm of human beings (Babbie & Mouton, 2007). Qualitative research provided avenues that led to the deeper meaning and understanding of the results from quantitative research approach. It also allowed the researcher to generate deeper understanding from the strategies that Malawian universities consider using to promote entrepreneurial paradigm in their institutions. Thus, the qualitative research aspect enabled the researcher to comprehend the events and processes that

took place from the participants' perspective as the model was being tested. Qualitative data, in this study, was collected through open-ended questions embedded in the questionnaire. The qualitative data obtained was analyzed using both quantitative and qualitative data analysis techniques.

In summary, the mixed-method research choice was used in the study. Mixed methods approach is when both quantitative and qualitative data collection techniques and analysis procedures are used in a research design (Saunders *et al*., 2009). The sequential mixed-method research choice used is depicted in Figure 4.1 below:

Figure 4.1: Sequential Mixed-method Research Design



Source: Author (2017)

4.5.3 Time Horizon

There are two types of time horizons used in a research work: cross-sectional and longitudinal (Saunders *et al*., 2009). A research will be cross-sectional when it concerns a study of a particular phenomenon (or phenomena) at a particular time (Babbie & Mouton, 2007). In contrast, longitudinal studies are designed to permit the researcher to observe constructs over an extended period (Welman *et al*., 2005). A longitudinal research design involves examining the same group at different time intervals (ibid). In this study, a longitudinal study was relevant as the researcher was interested to capture changes after testing the entrepreneurial university model developed from elements of Clark (1998) and OECD (2012) theories. Welman *et al*. (2005) argue that a longitudinal study extends from weeks to years of events under review depending on nature of the objective. In this case, the study took a period of six to twelve months which was adequate considering the research objective, processes involved in the study, time and budgetary constraints. The research process used is depicted in Table 4.1 on the next page.

Table 4.1: The Research Process

Phase	Duration	Goal/Aim	Activity
Phase 1	1 month	Answering Research Question 1: sub-questions 1.1 and 1.2; Answering Research Question 3 (part 1) as indicated in Figure 4.1 on page 82.	Deductive approach used where quantitative data was collected using a structured questionnaire
Phase 2	6 months	Intervention: Testing the elements of an entrepreneurial university adopted from Clark (1998) and OECD (2012) Frameworks as indicated in the conceptual framework	Presentation of the entrepreneurial university by Clark (1998) and OECD (2012) to the participating universities.
Phase 3	1 month	Completing the entrepreneurial university model for Malawian universities by: Addressing Research Question 3 (part 2) Addressing Research Question 2; Addressing Research Question 4 (part 1) Addressing Research Question Part 4 (part 2)	A combination of deductive and inductive approaches. Collecting both quantitative and qualitative data using a questionnaire comprising both Likert-scale and open-ended questions.
Phase 4	2 months	Finalizing the study and developing the Entrepreneurial University Model for Malawian universities.	Data analysis, findings, discussion and conclusion**.**

Source: Author (2017)

4.6 Target Population and Sampling plan

A target population is a full set of cases from which a sample is taken (Saunders *et al.*, 2009). The target population in this study was academic members of staff in Malawian universities at different levels: top management (Deans of Faculties), middle management (Heads of Departments) and other academic members of staff. The target population was located from Malawian universities established and registered in Malawi and within the Malawian boundary.

There were twenty (20) registered Malawian universities (NCHE, 2015) at the time the researcher was collecting data; seven (7) public universities and thirteen (13) private universities[1].

Considering the research questions, the research strategy, the research choice and the time horizon adopted in this study, it was impractical to collect data from the 20 Malawian universities and entire target population. Furthermore, the researcher agrees with Saunders *et al.* (2009) that it is improper to assume that a census would provide more useful results than collecting a sample that represents the entire population. Use of a representative sample was, therefore, appropriate in this case study situation.

In the multiple case study holistic approach adopted (see Section 4.5.1), a sample of Malawian universities had to be identified and the sampled universities have been referred to as units of analysis (Yin, 2003). A unit of analysis refers to the actual case to be studied as part of the research (Gillham, 2000). The process of selecting a unit of analysis is an important aspect of the research design that directly determines the quality and relevance of empirical data to be collected and ultimately shape the conclusions (Kandadi, 2006). Yin (2003) advises that selection of appropriate units of analysis will start to occur when the researcher accurately specifies the primary research questions. In this study, the four research questions guided the researcher regarding the Malawian universities that were to participate in it.

[1] At the time of study, there were 4 public universities in Malawi. However, the University of Malawi (UNIMA) had 4 constituent colleges independent of each other (Hahn & Bruggen, 2010; UNESCO, 2014) and therefore these were considered separately making a total of 7 public universities.

In determining the units of analysis for the study, it was cardinal to use the most appropriate sampling technique. Hussey & Hussey (1997) supported by Yin (2003) recommend that developing a clear criteria for selecting case organizations in a case study is essential. There are a number of sampling techniques which fall either in the probability or non-probability categories (Saunders *et al*., 2009). A non-probability sampling technique known as judgmental or purposive sampling was used for this study.

A judgmental or purposive sampling enables the researcher to use judgment to select cases that will best enable him/her to answer the research questions and meet the research objectives (Saunders *et al.,* 2009). Yin (2009), Neuman (2005) and Saunders *et al*. (2009) propose that it is ideal to have very small samples in case studies which are informative and explanatory. Therefore, a sample of 6 cases (units of analysis) was considered and selected for the study based on credibility, willingness to participate in the study and year of establishment. As stated earlier, one of the 6 cases was a control as a requirement for the deductive approach to the study (Robson, 2002).

To ensure credibility, the six (6) units of analysis selected had to be those recognized, registered and accredited by the Government of Malawi through NCHE (NCHE, 2015). This was an important aspect as data collected would be credible and reliable. The twenty (20) Malawian universities qualified in this first selection stage (NCHE, 2015). However, there was need for the twenty (20) universities to show willingness to participate in the study.

The researcher had to write letters to all qualifying universities addressed to their Vice Chancellors requesting the institution to indicate willingness to participate in the study (Letter on Request to participate in the study Appendix A). Willingness to participate in the study was an

important factor as this minimized institutional resistance in granting access to the data required (Saunders *et al*., 2009). Out of the twenty (20) universities, eleven (11) universities responded positively indicating interest to participate in the study. The universities that responded positively are indicated in Table 4.2 below.

Table 4.2: Universities that Responded to Participate in the Study

Year of Establishment	**Number of Universities**	**Public Universities**	**Private Universities**
1960-1979	2	2	0
1980-1999	3	2	1
2000-2009	1	0	1
2010-2015	5	2	3
Total	**11**	**6**	**5**

Source: Author (2017)

Year of establishment was another factor that was considered in selecting the units of analysis in addition to credibility and willingness of the institution to participate in the study. It was considered that long-lived institutions possess adequate institutional memory that is of value to the study (Yin, 2003). Furthermore, participants who have worked longer in the institution would provide rich information on the status of the university as well as give robust perceptions of changes taking place after introducing the concept of an entrepreneurial university (Clark, 1998). New universities would not have such institutional knowledge and experience to meet the research objectives as required in the case study design (Robson, 2002; Yin, 2003). In this study, four (4) public universities and two (2) private universities established between 1960 and 2009 were identified as targets from where participants were drawn. This means that the range of age of the universities that participated in the study was between nine (9) and fifty-eight (58) years. The institutions with ages in this range were considered to situate adequate depth and variety of data needed for the study.

Data collection from selected units of analysis commenced in August, 2017 and ended initially in October 2017. However, some additional data were collected from July, 2018 to December, 2018. A total number of 266 respondents (academic members of staff) from the selected five (5) universities participated in the study as shown in Table 4.3 below. In comparative and correlation studies, an analysis of 100 respondents is considered ideal (Bryman &Bell, 2007; Field, 2009). This sample size from the five (5) universities, which represented 57% of target population, was considered not only adequate and representative but also exceeded the response rate of 45% reported in similar studies (Etzkowitz *et al*., 2000; Nafukho & Wawire, 2006; Arnaut, 2010).

Table 4.3: Number of Participants

Serial No	**University Label**	**Student Enrollment in 2012**	**Number of Full Time Academic staff in 2012**	**Number of respondents**
1	A	2732	216	114
2	B	518	63	39
3	C	878	119	69
4	D	285	26	17
5	E	884	46	27
Totals		**5297**	**470**	**266 (57%)**

Source: UNESCO (2014); Author (2018)

Information in Table 4.3 above further reveals that the size of the units of analysis in terms of student enrollment in a year and number of full time academic members was considered ideal to provide rich data (Robson, 2002).

The target population was strictly academic members of staff considering that Clark (1998) refers to this category as being at the center of the entrepreneurial paradigm in a university. Therefore, it was important to collect data from academic members of staff as entrepreneurship in the university system is in the teaching, research and outreach engagements (Clark, 1998; Etzkowitz *et al.,* 2000, Tijssen, 2006; Arnaut, 2010).

The researcher made sure there was a representation of academics at all levels starting with executive management comprising Deans of Faculties; middle management comprising Heads of Departments; and the rest comprising senior academic members, lecturers and associate lecturers. To reach out to the target group in the different categories, convenience sampling was used where those that were available to participate in the study were approached. The researcher had to go through the highest office to get to the other levels. For instance, the Vice Chancellor or his/her representative directed the researcher to the Dean of Faculty who then led the researcher to the Heads of Departments in the faculty who in turn reached out to academic members of staff that were available to participate in the study. Collecting data from all the academic levels with different backgrounds, experiences and viewpoints provided rich information.

4.7 Data Collection Methods and Procedures

The researcher collected both primary and secondary data to answer the research questions. The procedures that were followed in collecting data are detailed below.

4.7.1 Primary Data Collection

Primary data collection methods involved administration of a questionnaire at two intervals through a survey.

4.7.1.1 Collecting Primary Data – Questionnaire Design

A structured questionnaire was designed on the basis of the research problem, research objectives and questions, literature review and the sub-research questions. A structured questionnaire allows all participants to respond to the same set of questions in a predetermined

order (deVaus, 2002; Hofstee, 2006). Data were collected at intervals considering that this study was longitudinal and involved 4 phases (see Table 4.1, page 91).

In phase 1 of quantitative data collection, the researcher used mostly Likert-scale style in designing the questionnaire (see Questionnaire for Phase 1: Appendix B). The Likert-scale design is popularly used in most quantitative studies and was equally used in OECD's Entrepreneurial University Framework in assessing behavior and characteristics of an entrepreneurial university (OECD, 2012).

A Likert-scale provides a measurement technique based on standardized categories (Babbie & Mouton, 2007). In this study, the Likert-scale provided perceptions of participants on perspectives surrounding issues such as the roles performed by academic members of staff to determine if Malawian universities are traditional, in the first academic revolution or the second academic revolution. In order to get required results, the researcher also formulated statements to which the participants responded by using nominal settings (Yes/No) and interval settings, based on the Likert style rating scales with the rankings signifying the degree of agreement ranging from 'strongly disagree' to 'strongly agree'. The statements were framed in such a way as to encourage respondents to pay attention to all questions and avoid automatic responses mostly by breaking the monotony of statements in the different sections (Dawson, 2007). The Likert-scale provided a valid basis for adequate comparative analysis of the data collected from different units of analysis at same time and at different time intervals (Babbie & Mouton, 2007; Dawson, 2007).

Similar Likert-scale statements were used to collect data in Phase 3 in order to compare results of the before and after theory testing. This time, the questionnaire included both Likert-scale and

open-ended questions in order to understand the responses provided by the participants in the Likert-scale statements. At this stage, qualitative data were also collected to understand responses to quantitative data collected. Quantitative data were collected from the Likert-scale statement responses while qualitative data were collected from the open-ended questions (refer to Questionnaire for Phase 3: Appendix C). All participants completed the same questionnaire.

The design of the questionnaire passed through three main stages. The first stage was the initial development of the questionnaire. The second stage was the pre-testing and the final stage was the production of the final questionnaire for data collection. The three stages were important to ensure validity and reliability of the questionnaire. A valid questionnaire enables accurate data to be collected while a reliable questionnaire will lead to collection of data that is consistent (Saunders *et al*., 2009).

In the first stage of questionnaire development, the researcher followed the basic procedures employed in developing questions. The main step was careful review of the literature on role changes in universities which included the first and second academic revolutions, the concept of an entrepreneurial university, a review of the two theories used in the study namely; Clark (1998) and OECD (2012) frameworks and other related publications. A few Likert-scale statements in the questionnaire were adapted and edited from the OECD (2012) framework of an entrepreneurial university. The literature review, theoretical and conceptual frameworks facilitated the formulation of questions in the questionnaire for Phases 1 and 3. The intention in the initial stage of questionnaire design was to make sure that the questions covered the content to answer the research questions and meet the research objectives. Therefore, in the first stage, internal and content validity in accordance with Saunders *et al*. (2009) were confirmed.

Internal validity in relation to questionnaires refers to the ability of your questionnaire to measure what is intended while content validity refers to the extent to which the measurement device, in this case the measurement questions in the questionnaire, provides adequate coverage of the investigative questions (Saunders *et al.*, 2009)

The second stage in the questionnaire development was pre-testing. Pre-testing was done to iron out any errors, ensure clarity of the questions and also estimate length of time likely to be required for participants to complete the questionnaire. Pre-testing was done by the researcher, in person, to a conveniently selected sample of thirteen (13) individuals which comprised of ten (10) initial respondents (academic members of staff in one of the participating universities) at one of the units of analysis, 2 PhD peers and one professor at the University of Lusaka (UNILUS) where the researcher was doing her PhD studies. The researcher informed the respondents of the intention and administered the questionnaire for immediate feedback. The thirteen (13) respondents provided feedback and the researcher made the necessary changes.

The feedback from pre-testing included the need to rephrase some questions mostly in terms of shortening the length of the statement. The researcher noted that the shorter and more precise the statement/question, the clearer and less ambiguous it became for the respondent. Some of the questions were rephrased and reworded to remove unnecessary technical jargon, inconsistencies or leading questions. Some Likert-scale statements were removed from the list of questions as they sounded similar to other statements and likely to lead to the same data.

The estimated time for completion of the first questionnaire for phase 1 was approximately 15 minutes and the completion time for questionnaire for Phase 3 was approximately 21 minutes. In both circumstances, the duration was considered reasonable. The difference in the duration

between phase 1 and phase 3 was due to the additional open-ended questions to answer question 2, question 3 part 2 and question 4 part 2. According to Dawson (2007), a questionnaire must not be too long to put off respondents as this reduces response rate and encourages fake responses. However, the questions must be enough to cover required content (ibid).

The third stage, after pre-testing and incorporating comments from the respondents, was development of the final questionnaire. The questionnaire consisted of 3 parts: The first part was an introduction to the study and a note seeking consent to participate in the study. The second part labeled Section A was general information about the institution and the respondent. The last part, labeled Section B covered questions which included Likert-scale statements to provide data relevant to the research questions. The last section was thus divided so as to attend to roles and academic revolutions that have occurred in the university system; the individual elements of an entrepreneurial university as attributed to Clark (1998) and OECD (2012); strategies considered useful in the entrepreneurial paradigm and; output from the testing of the entrepreneurial university model in the Malawian universities. This last section was designed in accordance with the conceptual framework developed in the study (Figure 3.4 on page 67).

4.7.1.2 Collecting Primary Data – Survey Method

The survey design methodology was used to collect data in Phases 1 and 3 using the piloted questionnaires developed. A survey is usually associated with deductive approach (Saunders *et al*., 2009). Surveys are popular as they allow collection of large amounts of data from sizeable population in a highly economical way (Dawson, 2007). The survey method of data collection in both phase 1and 3 targeted academic members of staff at different levels in the participating universities.

The questionnaires were administered to 266 respondents in both hard copy and electronic form. It was convenient to email the questionnaire to academic members of staff who were not in any administrative position as mostly these were not on campus. However, the researcher made it a point to meet the Deans of faculties and Heads of departments in person to obtain email addressed for their staff members and also provide them a face-to-face briefing before data collection.

Upon visiting the individual unit of analysis, the researcher requested for an audience with the head of the institution who mostly was the Vice Chancellor. In 2 of the participating universities, the researcher was referred to the University Registrar as the Vice Chancellors were away on duty. The meeting was for the researcher to introduce herself and inform the head of the institution or the representative about the study and processes involved. This was done to arouse interest, gain access to data and testing of the model. The researcher gave chance to the head of institution or the representative to ask questions where clarification was needed or make comments on the study objectives and study design. At the end of the meeting, the researcher presented a letter (Appendix D) requesting for a formal access to the institution to collect data and confirmation of the theory developed. Thereafter, the researcher asked for a meeting with Deans of faculties, Heads of departments and other academic members of staff willing to participate in the study in order to give them a brief about the study and data collection procedures. The researcher collected e-mail addresses of all those who showed interest to participate in the study after giving each one of them a hard copy of the questionnaire for phase 1 which also had a cover letter.

The researcher sent a copy of the questionnaire for phase 1 through email to the all who provided their email addresses. The researcher sent the email to the participants on the same day of the

meeting. Participants were encouraged to respond to the questionnaire at their earliest convenient time. The response was good as 42 percent of the participants responded and returned the questionnaire the next day after the meeting, another 36 percent returned within the same week visited while the remaining 22 percent was reminded more than once to respond and return the questionnaire. By the end of third week, 266 participants had returned the completed questionnaire. Most participants returned the questionnaire through email (243) and the rest sent hard copies to the researcher (23). This proved that sending an email was an effective way of getting response from participants. Some emails were received late in the night indicating convenience of self-administered questionnaire through email as alluded to by Saunders *et al. (*2009).

Data from the questionnaire for phase 1 was analyzed and kept safe in a hard drive and copied to Google Drive for security purposes (Howitt & Cramer, 2013). Data analysis for phase 1 took a period of 1 month which involved coding, data entry and cleaning.

The researcher, thereafter, arranged for another meeting with the participants and included executive management comprising the Vice Chancellor, the University Registrar, the Director of Finance or their representatives in order to accomplish phase 2 of the study. During this phase which took almost 6 months, the researcher first visited the individual universities and made a Power-Point presentation on the concept of an entrepreneurial university (Appendix E) to prepare the participants and institution for model testing. The invitation to attend the presentation was extend to other staff members who did not participate in Phase 1 of the study. However, these were invited to enable them gain knowledge on the concept of an entrepreneurial university which has become popular and a solution to the many challenges facing higher educational institutions across the globe. Nevertheless, the nature of the study could not allow those that did

not participate in phase 1 to join in at this time. Such was the case as the profile of the participants who completed the questionnaire in phase 1 would change affecting the comparability of the results. An electronic copy of the presentation was shared with all who attended the presentation as well as all those who participated in phase 1 but for one reason or another were not available and missed the presentation. The presentation of the concept of an entrepreneurial university was an intervention aimed at introducing and increasing knowledge of the concept for implementation in the selected 5 Malawian universities.

Phase 2 of the study lasted for 7 months from the day the presentation was made to the university and respective participants. The researcher encouraged participants to contact her whenever they needed clarification or direction. The researcher also took an initiative to visit the participating universities to encourage them as well as monitor implementation of the entrepreneurial university concept presented. Two of the universities invited the researcher again for consultation on areas of an entrepreneurial university the members were not clear on. This was in the second month into phase two. Mostly, the clarification sought were on how to design their curriculum to bring in entrepreneurship in the different subjects; the processes involved in patenting, understanding of the relationship between income generation and entrepreneurship as well as how new companies can be created from teaching and well as research functions. The researcher, using literature presented in Chapter two and theoretical frameworks presented in Chapter three, provided the clarification that was sought. Various trajectories and adoption of an entrepreneurial university in US, Europe and Latin America was shared with the members for their knowledge and use. However, no particular formal data was collected from the participants at this stage.

Phase 3 involved administration of another questionnaire after 5 to 6 months of phase 2 in order to accomplish the study objective. This phase, as pointed out, was to confirm on elements of an entrepreneurial university to facilitate the entrepreneurial paradigm in Malawian universities, confirm on out of the transition into entrepreneurial universities in Malawi as well as find out strategies that would also enhance adoption of the concept of an entrepreneurial university in Malawi.

The questionnaire in Phase 3 was sent through email to all the participants. Follow-ups were made through the same email correspondence. The response was a bit challenging than in phase 1 as 23 percent of the participants responded the same day (compared to 42 percent in phase 1), another 17 percent responded within the week (compared to 36 percent in phase 1) and the remaining 60 percent returned the questionnaires after two to three reminders (compared to 22 percent in phase 1). Nevertheless, the response was 100 as all participants responded.

4.7.2 Data Collection from Control Unit

One of the universities that qualified to participate in the study was used as a control unit. A control unit in this study aimed at confirming if changes in responses from the 5 participating Malawian universities were as a result of the intervention in Phase 2. The control unit is a requirement in deductive approach as indicated by Robson (2002), Saunders *et al.* (2009) and Howitt & Cramer (2013). The particulars of the control unit are presented in Table 4.4 below.

Table 4.4: Particulars of the Control Unit

Serial No	University Label	Student Enrollment in 2012	Number of Full Time Academic staff in 2012	Number of respondents	Response rate
1	CO	1962	164	32	19%

Source: Author (2018)

A target of 50 percent of all academic members of staff in the control university was approached but the response rate was 19 percent. Although the sample was below the target, the data collected still served the purpose.

4.7.3 Secondary Data Collection

Secondary data is data which the researcher did not collect directly from respondents or subjects (Greener, 2008). Apart from primary data that was collected through questionnaire, various documents from the participating universities were examined and analyzed. Thomas (2000) emphasizes the need to find and read the right documents answering to a study. The documents included budgets, strategic plans, curricula, website pages, newsletters and magazines, publications: and policies. The data collected from such documents provided an insight into what thoughts and decisions pertaining to elements of an entrepreneurial university have been discussed, planned, organized and put on paper and other media. Secondary data was helpful in proving data on plans and operations of the participating universities that are aligned towards an entrepreneurial university. This was crucial in the case study approached approach adopted in the study where multiple data sources are required (Yin, 2002; Greener, 2008).

4.8 Triangulation

Triangulation refers to the use of two or more independent sources of data or data-collection methods within one study in order to help ensure that the data is telling you what you think it is telling you (Gill & Johnson, 2008; Howitt & Cramer, 2013). The researcher identified traits of entrepreneurship practices and related considerations in the Malawian universities from the other sources of data. In addition to the survey and secondary data collection, government officials from relevant ministries and government agencies were interviewed. The government officials

provided insights into the status and prospects of entrepreneurship in the Malawian universities for income generation, increasing student access, relevance, quality education, contribution to the economy from the policy perspective.

This triangulation provided a multi-perspective analysis of ideas from different participants and the contextual relationship between them was also examined. The reflections and ideas from university participants and policy makers were collated to develop a range of perspectives on the adoption and integration of entrepreneurship for socio-economic development in Malawi.

4.9 Data Analysis

Data entry from the questionnaire commenced immediately and was done at the end of each day. Quantitative data was analyzed separately from qualitative data.

4.9.1 Quantitative Data Analysis

Analysis of quantitative data was done using two software packages: Statistical Package for Social Sciences (SPSS) version 20.0 and Microsoft Excel. The two software packages were used to generate descriptive statistics.

Descriptive statistics are concerned with the description or summary of data obtained from a group or individual units of analysis (Saunders *et al.*, 2009). If only one variable is involved, it is called univariate; if there are two variables, it is called bivariate analysis; and if more than two variables are involved, it is called multivariate analysis. In this study, the univariate and bivariate analysis were done by producing Pearson Chi-square tables, frequency tables, bar charts and pie charts.

Data from closed-ended questions and Likert-Scale statements were prepared for entry into SSPS data entry sheet where variables from the questionnaire were coded and the responses were given unique numbers. In total, 119 variables were entered in the SPSS for analysis and SPSS was also used to generate descriptive statistics; mostly, frequency tables. The frequency tables provided number of respondents and the corresponding percentage of each of the categories for the variable under consideration (Bryman & Bell, 2007).

Microsoft Excel was used to generate the pie charts and bar charts from frequency tables generated in the SPSS. The researcher employed colour coding while producing the pie charts and bar graphs. The presentation of findings using such different colours provided visual significance to highest or lowest values (Saunders *et al*., 2009). This facilitated comparison of the frequencies attached to variables.

The bar graphs were mostly used to compare data from different variables as well as interval data collected in phase 1 and phase 3 of the study. This made the difference between the two data values easily noticeable. Pearson Chi-square tables were used to determine the significance of association of variables in the adoption of an entrepreneurial university in the Malawian universities.

4.9.2 Qualitative Data Analysis

Qualitative data were collected to answer research question 2 and also to complement quantitative data collected in Phase 3 of the study. Figure 4.1 on page 84 explains areas that required qualitative data collection during the study.

To analyze qualitative data relating to research question 2; where the universities had to explain strategies considered important in the adoption of an entrepreneurial university, a technique

called open coding was employed. Open coding is the process of identifying, analyzing and categorizing raw data (Saunders *et al*., 2009). It involves developing categories of concepts and the themes emerging from data (Kandadi, 2006). This step involves a number of processes.

First, the researcher breaks down and labels the individual elements, making the data more easily recognizable and less complicated to manage (Yin, 2002). Secondly, the codes are categorized into a pattern of concepts and categories, together with their properties. This was accomplished by classifying the different elements into distinct ideas and grouping similar concepts into categories and sub-categories. Open coding led to a number of strategies that emerged from data collected and the categorization produced frequencies in similar responses provided.

The qualitative data that was collected in relation to research questions 3 and 4 were meant to complement responses in the Likert-scale statements. The analysis did not employ open coding but rather common statements were put together and a few comments representing the rest were captured. Thus, quotes that represented the other similar statements were put together and one main comment was selected and included in the findings as presented in the next Chapter.

4.10 Data Validity and Reliability

Data validity and reliability ensure credibility of the research findings. Data validity is concerned with whether the research findings are really what they appear to be about while data reliability refers to the extent to which data collection techniques or analysis procedures yield consistent findings (Howitt & Cramer, 2013). Appropriate measures were taken to ensure the validity and reliability of data collected in this study as elaborated in the sections below.

4.10.1 Data Validity

Data validity can be undermined by research errors such as poor samples, faulty research procedures and inaccurate or misleading measurements on the instrument (Belk, 2006; Babbie & Mouton, 2007; Creswell, 2012). The following steps were taken to ensure that the data collected in this study were valid.

Firstly, the construction of the instrument for data collection commenced with an extensive literature review on entrepreneurial universities mostly from Clark (1998) and OECD (2012). The formulation of questionnaire statements was adopted from the OECD (2012) entrepreneurial university framework in consultation with allocated supervisors who are experts in quantitative and qualitative research. The pre-testing that was done ensured understanding and clarity of the questions and further confirmed the content and construct validity of the instrument.

Secondly, the purpose, topic and design of the study were explained to the participants to ensure understanding of the data to be collected. Respondents were further accorded an opportunity to ask where they were not clear. The intervention in Phase 2 where participants were introduced to the elements of an entrepreneurial university by Clark (1998) and OECD (2012) enhanced the understanding of the study and the knowledge of participants in the area.

Thirdly, the statement of anonymity and confidentiality in the data collection encouraged respondents to complete the questionnaire openly and with honesty. Self-administration of the questionnaire also reduced any type of influence from the researcher.

Fourthly, the researcher had to follow criteria to select units of analysis that participated in the study by ensuring that; they were credible; willing to participate in the study and; had adequate

experience. Participants were also faculty from different departments, fields of expertise and levels in the university system.

Fifthly, triangulation was also undertaken to ensure validity. Triangulation is a procedure where the researcher uses two or more independent sources of data or data-collection methods within one study in order to ensure validity (Saunders *et al*., 2009). In this study, apart from collecting quantitative and qualitative data from Malawian universities at different levels and in different disciplines, secondary sources of data from the universities and the responsible government ministry were also used. Additionally, relevant government officials were interviewed to provide perspectives and insights about the progression and adoption of an entrepreneurial university in Malawi.

Lastly, peer debriefing, supervisor's feedback and presentation of reports to fellow Doctor of Philosophy (PhD) students during the UNILUS seminars for Postgraduate students further helped to check on the validity of the study.

4.10.2 Data Reliability

Reliability of data signifies the degree to which an instrument consistently measures whatever it is measuring (Welman *et al*., 2005). In order to reduce common threats to research reliability the researcher employed a number of measures.

Firstly, anonymity and confidentiality of the data and respondents; briefing of objectives of the study and; self-administration of the questionnaire allowed respondents to provide information honestly enhancing the trustworthiness of results.

Secondly, reliability of the questionnaire was achieved through consistency of the construct. Use of a standardized questionnaire ensured uniformity. Furthermore, the adoption of statements from Clark (1998) and OECD (2012) entrepreneurial university framework ensured a theoretical backing of the data instrument used and the data collected. Pre-testing of the questionnaire equally enhanced credibility of the research instrument used.

Lastly, data collection, data entry and data analysis were personally done by the researcher which provides assurance on the data collected. Personal involvement of the researcher reduced errors that normally occur when a researcher engages other individuals who intentionally can falsify responses.

4.11 Ethical Considerations

Ethics refers to the appropriateness of the researcher's behavior in relation to the rights of those who participate in the study or are affected by it (Saunders *et al*., 2009). In order to adhere to research ethics, the researcher did the following:

Firstly, the survey had to go through normal clearance procedures. The researcher had to seek approval from the UNILUS Ethics Committee (Appendix F) to proceed with the study and ensure that ethically the study is checked. Thereafter, the researcher had to go through the normal clearance by the Ethics Committee housed in the National Commission for Science and Technology (NCST) in Malawi as data were collected in Malawi. A letter of approval from NCST is in presented in Appendix G.

Secondly, a letter requesting for participation (Appendix A) was sent to selected units of analysis to ensure that participation was not forced. In addition, a letter addressed to the head of the institution requesting for access (Appendix D) was sent to all participating institutions to grant

the researcher the right to collect data in the institution. Furthermore, the first section of the questionnaire was an introduction to the study which also carried a statement of consent. Therefore, participation was voluntary and participants were informed of their right to withdraw at any time of the study without giving reasons.

Lastly, the questionnaire was constructed in a way that it did not transgress against any ethical requirements. For instance, participants could not be identified during data analysis as the survey was anonymous.

4.12 Summary of the Chapter

The Chapter has discussed the research design and methodology used in the study. The research design and methodology was based on the conceptual framework that identified elements of an entrepreneurial university as well as critical success factors that will facilitate the adoption of an entrepreneurial university Malawian. Issues surrounding both quantitative and qualitative research of the study have been detailed. Based on the attributes of the study, 4 phases were involved and a case study approach was considered appropriate. The design of the data collection instrument was adapted from theoretical frameworks with mostly Likert-scale statements. Finally, the Chapter has discussed the sampling method; target population; data collection; data analysis; data validity and data reliability; and ethical considerations.

The next Chapter presents the findings of the study based on the data collected.

CHAPTER 5: FINDINGS

5.1 Introduction

The previous Chapter provided the methodology employed in collecting and analysing relevant data to answer the research questions of the study. This Chapter presents findings from data collected. The Chapter has presented findings on the extent to which Malawian universities have progressed into the second academic revolution thereby adopting the concept of an entrepreneurial university. The Chapter has also presented findings on strategies that were considered effective in order to successfully progress into entrepreneurial universities with respect to the environment in countries like Malawi. At the end, the Chapter has presented findings on elements considered important in the adoption of an entrepreneurial university and also outputs of an entrepreneurial university in the Malawian context. The results and the details of the analysis presented formed critical inputs for the development of an entrepreneurial university model for universities in LDCs particularly Malawi.

5.2 Socio-Demographic Attributes of Respondents

In Section A of the questionnaire, respondents were requested to provide their particulars pertaining to their type of university, current position, length of service, field of expertise, highest level of academic qualification and their gender. The following sections presents the distribution of the respondents' socio- demographics attributes of the respondents.

5.2.1 Respondents attributes by types of the University in Malawi

As is indicated in the previous Chapter, the study collected information from the five (5) universities in Malawi which comprised three (3) public and two (2) private universities. Out of

266 respondents that took part in the study, the most responsive (42.9%) were from University A and the least responsive (10.2%) were from University E. Figure 5.1 below illustrates more details.

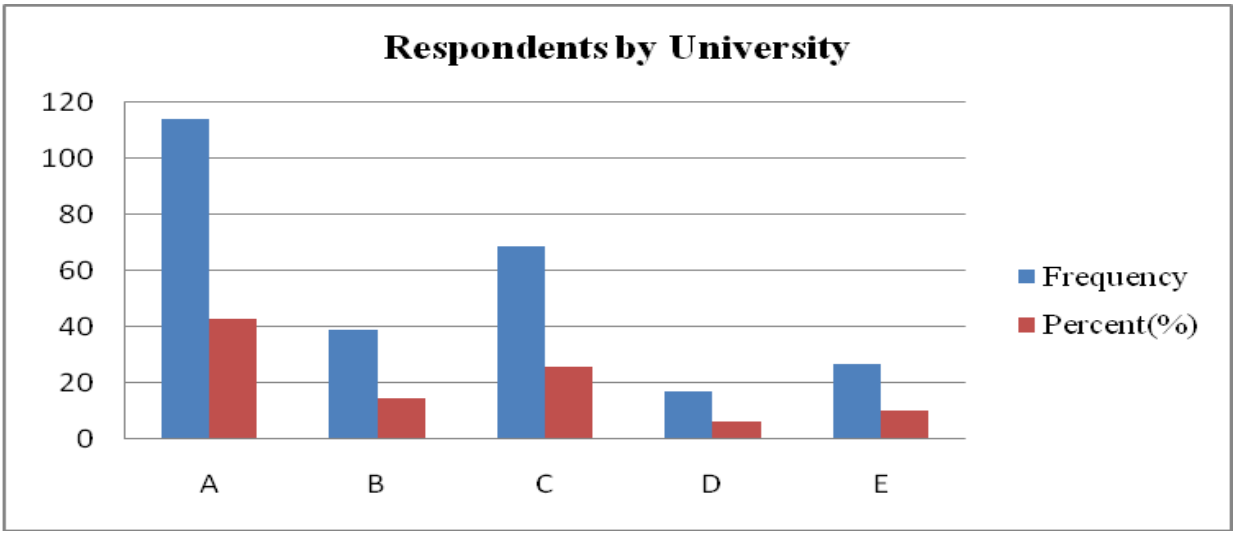


Figure 5.1: Respondents by Participating University

Furthermore, in terms of the public and private university divide, 83.5% of the respondents were from public universities and 16.5% of their counterparts from private universities. Figure 5.2 below presents more detail.

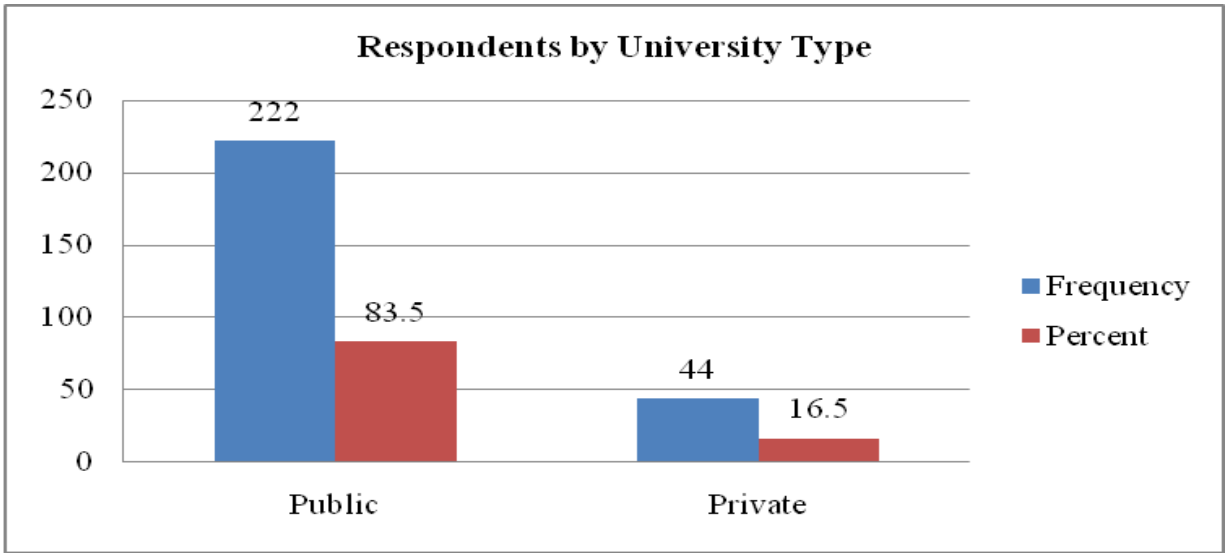


Figure 5.2: Respondents by University Type

5.2.2 Current Position and Qualification of the respondents

Furthermore, the study targeted academic members (faculty) drawn from different departments, positions and levels, in the universities. This diversity in respondents allowed for the collection of rich data from all levels and fields in the academic circles. Deans of faculties (7.2%), Heads of Departments (12.4%), Senior Lecturers (23.3%), Lecturers (51.5%) and Associate Lecturers (5.5%) participated in the study as shown in Figure 5.3 below.

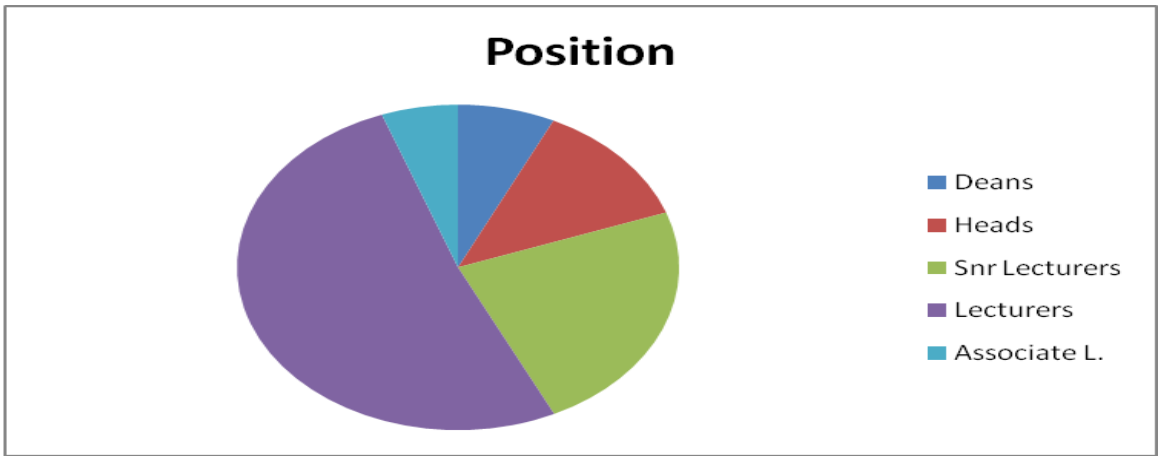


Figure 5.3: Respondents by Current Position

In terms of the highest level of qualifications, 25.2% of the respondents had Doctorate Degree (PhD), 59.8% had Masters Degrees and about 15% had Bachelor Degrees as shown in Figure 5.4 below.

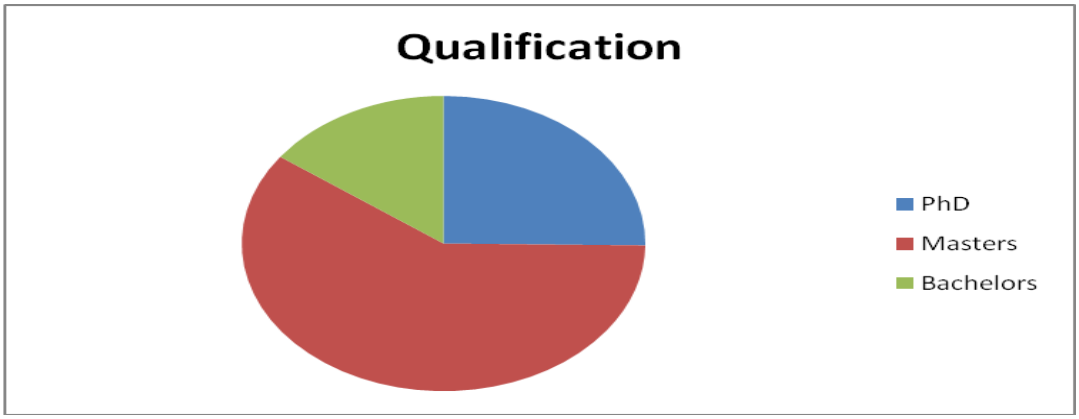


Figure 5.4: Respondents by Highest Academic Qualification

5.2.3 Respondents by Length of Service and Field of Expertise

To collect relevant and rich data in the area of study, the targeted respondents were academic members in different fields with adequate experience in their profession. A majority of the respondents (65.1%) had served in their respective university for 6 or more years while the minority of the respondents (7.9%) had served for less than 1 year as shown in Table 5.1 below. This signifies a highly experienced team of respondents.

Table 5.1: Respondents by Length of Service

		Frequency	Percent	Cumulative Percent
	less than 1 yr	21	7.9	7.9
	2 to 5 yrs	72	27.0	35.0
	6 to 9 yrs	113	42.5	77.4
	10 yrs over	60	22.6	100.0
	Total	**266**	**100.0**	

In terms of respondents by academic field, Business or Commerce had the highest proportion of respondents (38%) followed by Engineering (10.9%) and Sciences (9.9%). The remaining 41.2% of the respondents were from the other fields as summarized in Table 5.2 below.

Table 5.2: Respondents by Field of Expertise

		Frequency	Percent
	Business/ Commerce	101	38.0
	Engineering	29	10.9
	Medicine &Health	24	9.0
	Language &Communication	16	6.0
	Mathematics	19	7.1
	ICT	16	6.0
	Theology	7	2.6
	Agriculture	21	7.9
	Sciences	26	9.9
	Law	7	2.6
	Total	**266**	**100.0**

5.2.4 Respondents by Gender

The respondents were both male and female hence the survey covered both genders. Out of 266 respondents, 189 were male while 77 were female which translates into 71.1% and 28.9% male and female representation respectively shown in Figure 5.5 below.

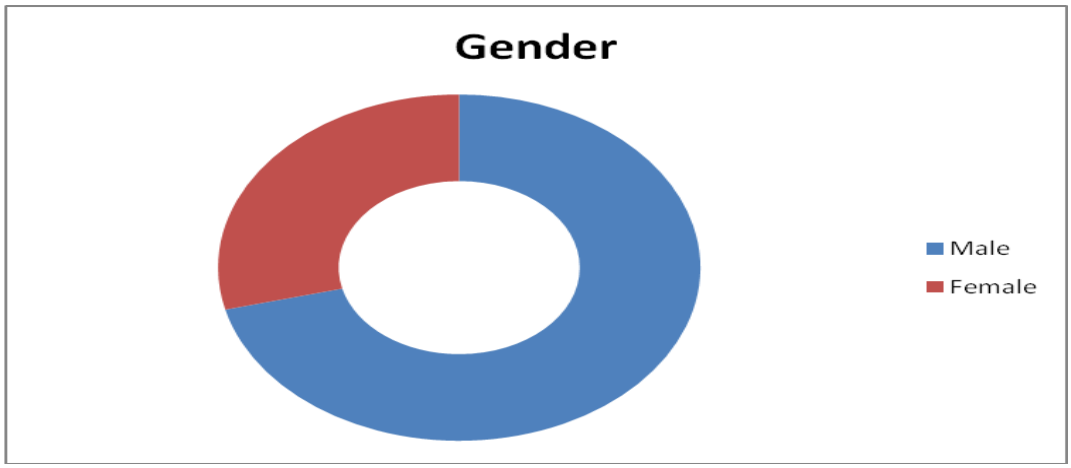


Figure 5.5: Respondents by Gender

5.3 Extent to which Malawian Universities have Progressed into the First and Second Academic Revolutions

To explore the extent to which Malawian universities have embraced the concept of an entrepreneurial university, data were collected from both primary and secondary sources. The findings are presented in Sections 5.3.1 to 5.3.5 below.

5.3.1 Work Responsibilities of Faculty

To ascertain the status of Malawian universities in terms of their progression from traditional universities (with focus on teaching and archiving), through the first academic revolution (which introduced an additional mission of research), to the second academic revolution (which led to the emergence of an entrepreneurial university), the respondents were asked to rate their work responsibilities in their teaching, research, consultancy, outreach and administrative areas. Using

a scale of 0-20%, 21-40%, 41-60%, 61-80% and 81-100%, the results (see Figure 5.6 below) indicate that 74% of the respondents rated their teaching responsibilities to be 61% to 100% of their workload responsibilities. On a different note, the results indicate a low rating in their research responsibilities as 61% of the respondents rated their research responsibilities to be 0 to 20% of their workload responsibilities. The findings also indicate low ratings in consultancy where 66% of the respondents gave a low rating of their consultancy work of 0 to 20% out of their work responsibilities.

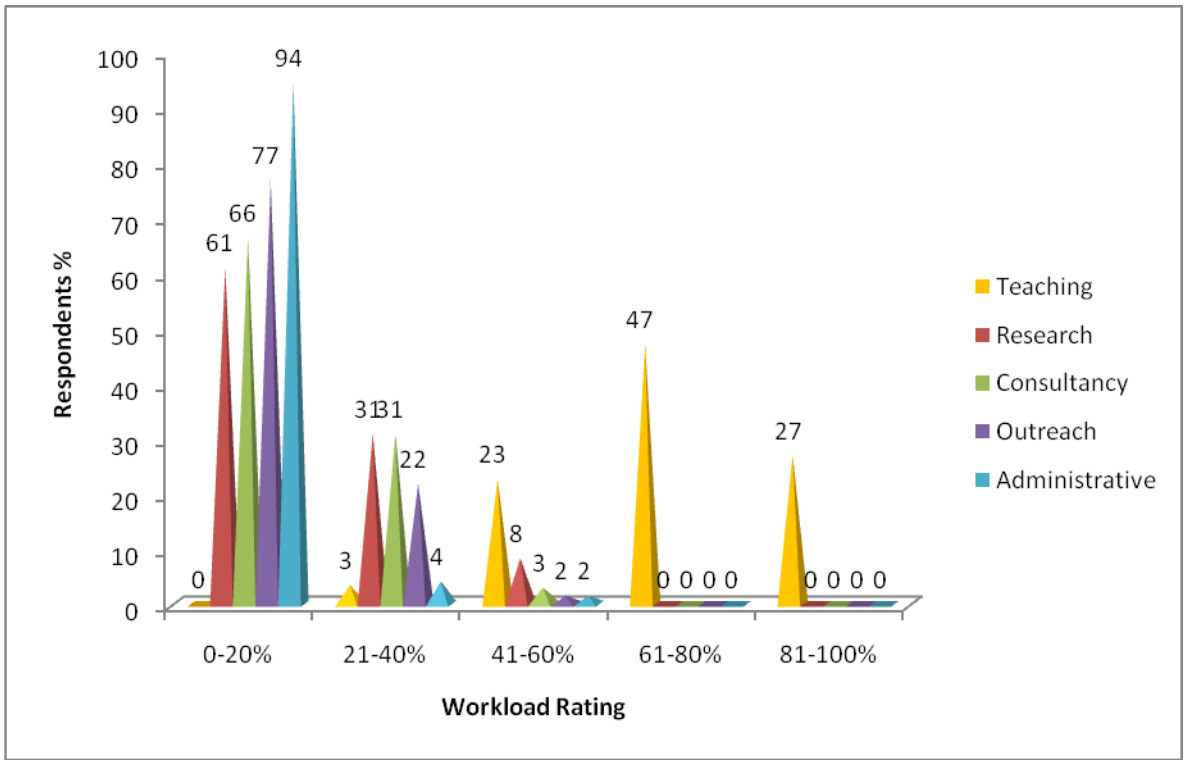


Figure 5.6: Work Responsibilities of Faculty

To further explore on how effective the respondents carry out their work responsibilities, which signifies the extent to which universities have progressed into entrepreneurial universities, respondents were asked to assess themselves using the Likert-scale ratings of 1 to 5 where 1 is poor and 5 is excellent. The findings presented in Figure 5.7 on the next page indicate that 99% of the respondents felt that their teaching responsibilities were effective (80% excellent and 19%

good) while their assessment on research was rated not effective as 55% of the respondents considered their research responsibilities to be poor. Similar to the rating of respondents in their research responsibilities, the personal assessment of their consultancy work was also rated poor by 49% of the respondents.

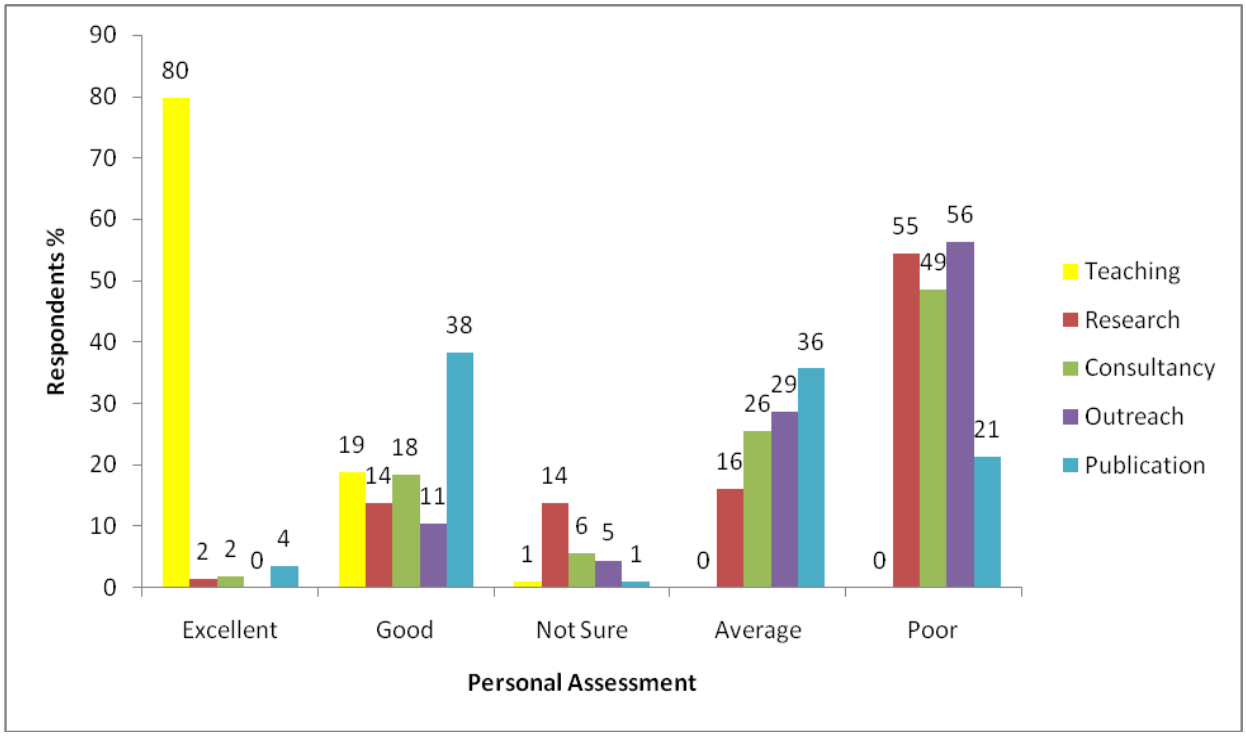


Figure 5.7: Personal Assessment of Work Responsibilities

To ensure in-depth analysis of the status of Malawian universities in the academic revolutions and entrepreneurial paradigm, respondents were asked to indicate amount of output in their work responsibilities mostly; publications, research contracts, consultancy work, outreach services, faculty products marketed by the university, patents acquired, student products marketed by the university under the supervision of faculty, and company creation by faculty and students referred to as spin-offs and start-ups in this study respectively.

The results presented in Figure 5.8 on the next page indicate that 99% of the respondents had not acquired any patent from their research work and 98% of the respondents had not marketed their

research products to the industry at the time the study was conducted. Further, 93% of the respondents had not marketed products of their students work under their supervision. The results further indicate that 77 % of the respondents had not done more than 2 research contracts (22% indicating 0 research contracts undertaken and 55 indicating 1 to 2 research contracts undertaken) and 79% of the respondents had not been engaged in more than 2 consultancies (27% indicating 0 consultancies done and 52% indicating 1 to 2 consultancies done).

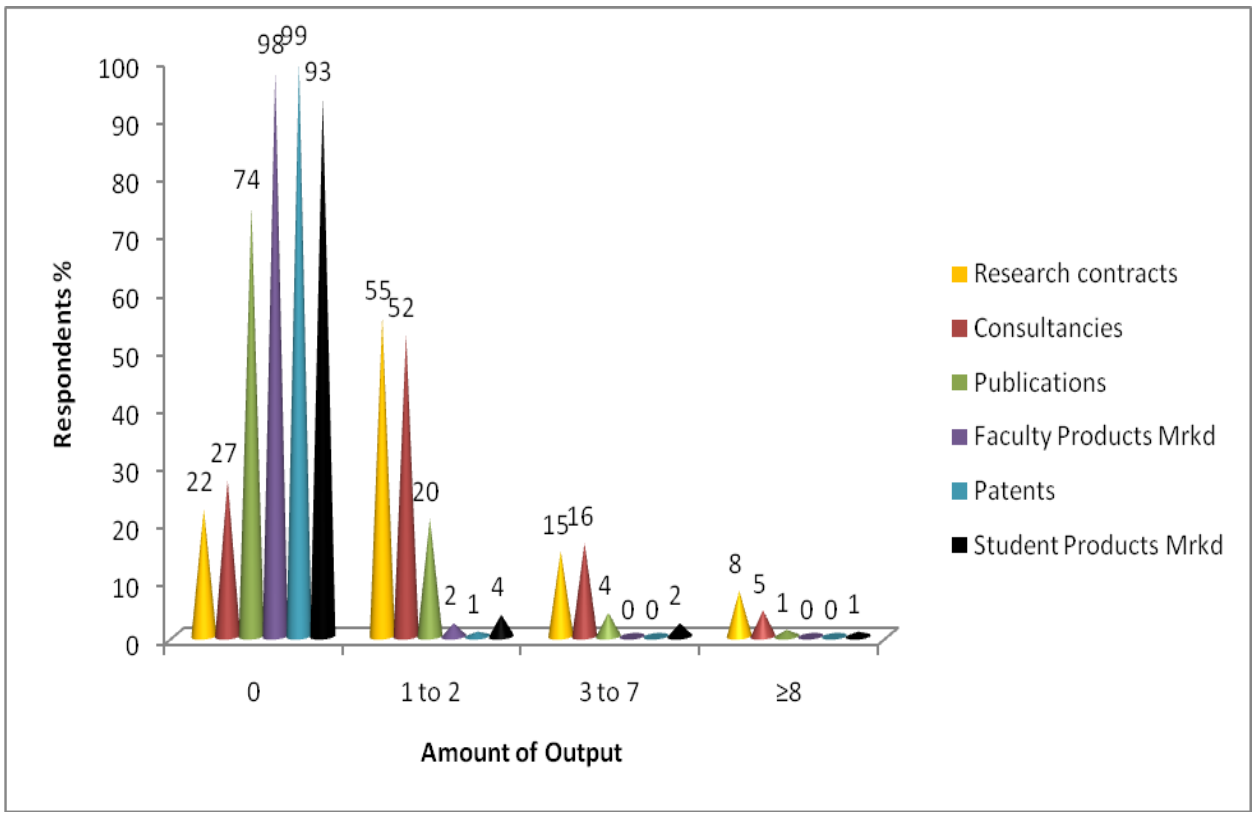


Figure 5.8: Output from Work Responsibilities

The results indicate that no company had been created by faculty and students as 100% of the respondents indicated 0 (zero) on companies created from faculty research work or student's supervised projects. This indicates no spin-offs and start-ups experience at the time of study.

To further explore the extent of progression in the academic revolution of the Malawian universities, there was need to understand the university's position on the work responsibilities

carried out by faculty. Respondents were, therefore, asked to rate the perceived emphasis of the university on their work responsibilities on a Likert-scale of 1 to 5 where 1 represented 'no emphasis' and 5 represented 'high emphasis'. The results in Figure 5.9 below show that the universities placed more emphasis on teaching responsibilities as 100% of the respondents indicated that emphasis of university on their teaching responsibility was high. The results indicate that universities also emphasized on research although the emphasis is not as high as the teaching mission since only 49% of the respondents felt the university emphasis is high and 31% of the respondents believed the university emphasis to be medium. However, the perception on university emphasis on consultancies was mild as 40% of the respondents felt that university emphasis on consultancies was medium.

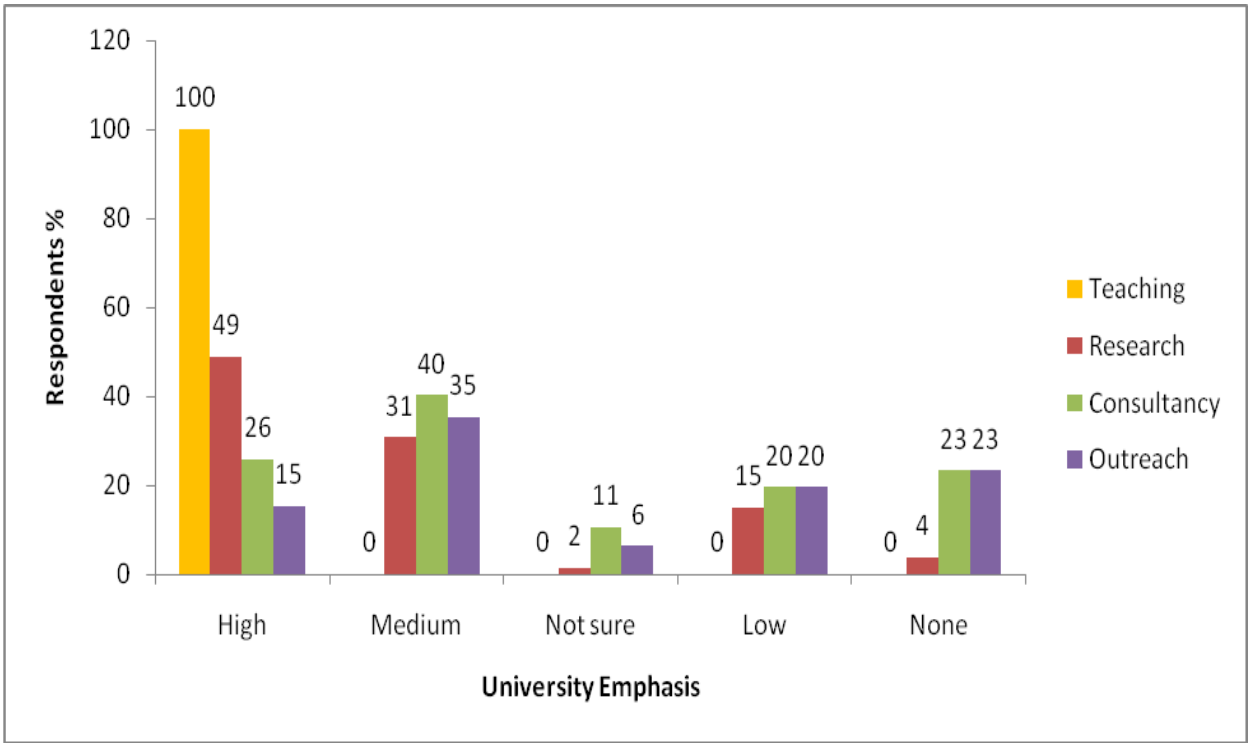


Figure 5.9: University Emphasis on Work Responsibilities

In order to establish the position and status of the universities in the entrepreneurial paradigm, respondents were asked to use the same Likert-scale of 1 to 5 used to obtain results. According to results presented in Figure 5.10 below , most of the respondents (74%) indicated that universities placed much emphasis on publications. However, there was less emphasis in other areas. For instance, only 6% (1% high and 5% medium) of the respondents indicated that university emphasized on patent application and acquisition. Additionally, 84% of the respondents (61% low emphasis and 23% zero emphasis) indicated that university emphasis on marketing of faculty products was also low. Further, 74% of the respondents (42% zero emphasis and 32% low emphasis) indicated that university emphasis on marketing student products was low.

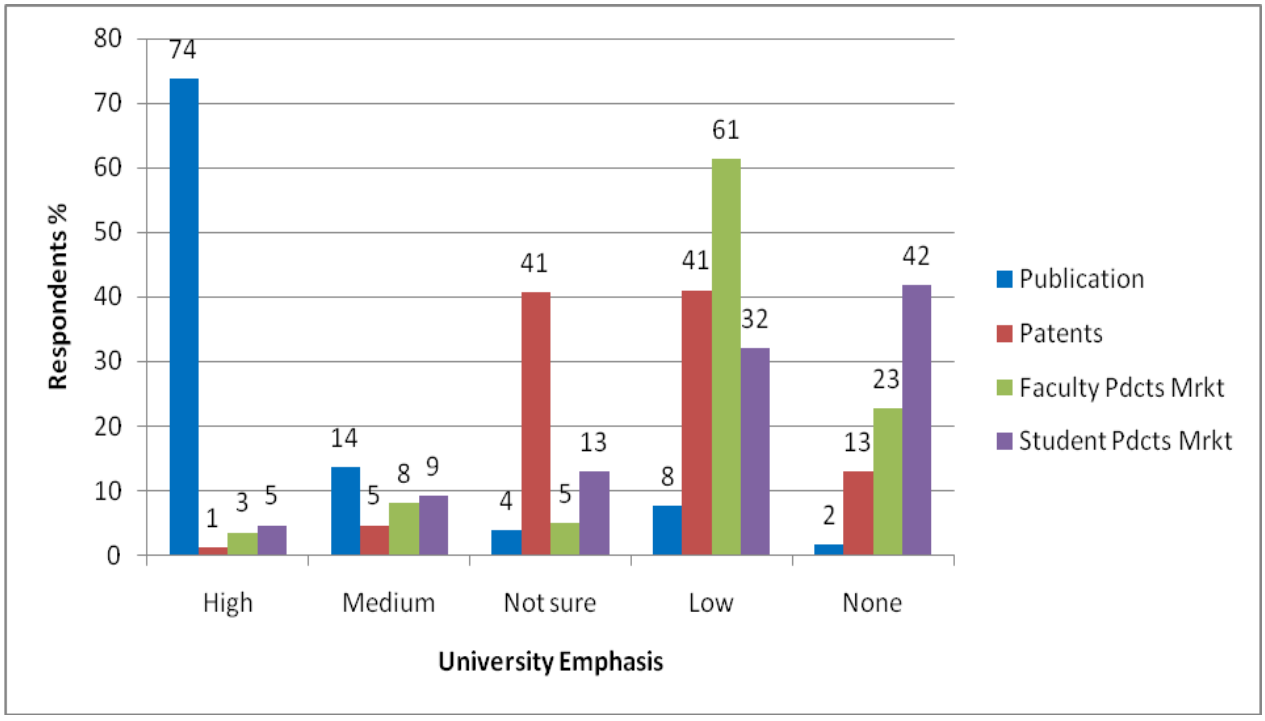


Figure 5.10: Emphasis of University on Outputs from Teaching and Research

5.3.2 Entrepreneurial Status of Malawian Universities from Secondary Sources

Results from secondary data show that Malawian universities incorporated issues evident in an entrepreneurial university. The sources of secondary data included websites, budget documents and strategic plans from the participating universities and the government mostly from the MoEST.

Mission statements in the strategic plans of 4 universities (80% of the participating universities), indicated elements associated with an entrepreneurial university such as; research, consultancies, outreach services, entrepreneurship education and training. The mission statements carrying such elements are presented below:

> "To provide high quality education, training, research and complementary services to *meet the technological, social and economic needs* of individuals and communities in Malawi and the World" (University A);
>
> "To provide a conducive environment for quality education, training, *research, entrepreneurship and outreach to facilitate economic growth* in Malawi and beyond" (University B);
>
> "To advance knowledge and to promote wisdom and understanding by engaging in teaching, *research, consultancy, public and community engagement* and by making provision for the dissemination, promotion and preservation of learning responsive to the needs of Malawi and global trends" (University C);
>
> "To advance knowledge and produce relevant graduates with *entrepreneurship skills* for agricultural growth, food security, wealth creation and sustainable natural

resources management, through teaching, training, research, outreach, consultancy and sound management" (University D).

Other than the mission statements, the strategic objectives of the 4 universities were aligned towards an entrepreneurial university. The strategic objectives aimed at promoting research, innovation, entrepreneurship and commercialization of research output. The objectives further aimed at enhancing partnership with the industry and community engagement as well as increasing generation of resources. The selected strategic objectives have been presented in Table 5.3 below.

Table 5.3: Strategic Objectives in Line with an Entrepreneurial University

Strategic Objectives			
University A	**University B**	**University C**	**University D**
• To improve quality and access to tertiary education as well as promote *innovation and entrepreneurship*. • To promote *research and consultancy and engage with local communities to address challenges facing society*. • To efficiently and effectively manage resources and *increase self-generation of resources.*	• To advance *research and promote commercialization of research output* • To *create partnerships with the industry, communities* and internationalize the university	• To *expand the productive and competitive knowledge generation, and transfer by5% annually*	• *To promote relevant research* while playing an influential role in developing public policy *through extension, public and community engagement services*

The results in Table 5.4 on the next page further indicate that 4 of the 5 universities (80%) observed that their universities had an institutional policy on R&D while a similar number of universities (4 of the 5) noted that their university did not have a policy on intellectual property.

Further, 3 of the universities (60%) observed that their university had a policy on consultancy and/outreach services.

Table 5.4: Availability of Relevant Policies for the Adoption of an Entrepreneurial University

No	Policy Title	Yes	No	Total Universities
1	Research and Development	4	1	5
2	Intellectual Property	1	4	5
3	Consultancy and/or Outreach	3	2	5

5.3.3 Income Generating Activities in Malawian Universities

To further establish the extent to which Malawian universities had adopted the concept of an entrepreneurial university, it was cardinal to identify sources of income for the institutions. Results in Table 5.5 on the next page (extracted from Table 8.1 in Appendix H) indicate that Malawian universities heavily relied on tuition fees as 91% of the respondents identified commercial fees as their source of income. Out of these respondents, 83% were from public universities while 100% were from private universities. Further, 100% of the respondents from the public universities indicated reliance on government subvention as a source of income.

Income from consultancy services was mentioned as another source of income by 55% of the respondents with the majority (67%) from public universities and the minority (20%) from private universities.

Table 5.5 Sources of Income in Malawian Universities

No	Income Sources/IGAs/Entrepreneurship	Entrepreneurial Element(s)	Frequency %	% by University Type	
1	Tuition/fees through commercial fee paying students	x	91	Public	83
				Private	100
2	Subsidized tuition/fees (students on government scholarship)	x	55	Public	100
				Private	0
3	Government funding/subvention	x	55	Public	100
				Private	0
4	Consultancies	✓	45	Public	67
				Private	20

5.3.4 Entrepreneurship Education in Malawian Universities

Results on entrepreneurship education in Malawian universities show that entrepreneurship was being offered at both undergraduate and postgraduate levels at one of the five Malawian universities.

However, results also indicate that 3 of the 5 universities had entrepreneurship being offered as a subject in their commerce related programmes. One of the five universities had further introduced entrepreneurship in the other non-commerce related programmes. Qualitative data complementing the quantitative data on entrepreneurship education and indicating that Malawian universities were keen to incorporate entrepreneurship in all programmes is presented in Table 5.6 on the next page.

Table 5.6: Comments on Entrepreneurship Education in Malawian Universities

No	Quote on Entrepreneurship Education
1	"…*entrepreneurship as a course is taught in all commerce related programmes and it has been introduced to engineering students but not sure whether it has been introduced in other science related disciplines*…" (Participant 16: University A)
2	"…*the latest review of curriculum review we have included entrepreneurship in all courses….we have mainstreamed entrepreneurship so that our students should not only be trained to be employed*…" (Participant 86: University B)
3	"…*in all our programmes, we have introduced entrepreneurship as a module for the students. There is marketing, there is management which are courses related to running of business and are entrepreneurial related*…" (Participant 102: University E)
4	"…*we have introduced entrepreneurship as a subject across all disciplines...it is compulsory now they have to go through an entrepreneurship module*…" (Participant 134: University A)
5	"…*what we have done is to revise our curriculum and we have included entrepreneurship*…" (Participant 211: University A)

The results indicate that none of the participating universities had organized tailor mode training programmes for faculty or students. Nonetheless, 16.5% of the respondents indicated that they had formal knowledge in entrepreneurship obtained through their undergraduate training where entrepreneurship was offered as a subject.

The results show that all the five Malawian universities did not have a dedicated office for entrepreneurship and 3 of the 5 universities indicated that they did not have a member of staff responsible for teaching entrepreneurship.

5.3.5 Comments on Entrepreneurship in Malawian Universities by Policy Makers

To further explore the extent to which Malawian universities have progressed into entrepreneurial universities, relevant government officials in the MoEST were asked to comment

on entrepreneurship endeavours in the universities. The results indicate that policy makers considered entrepreneurship levels in Malawian universities to be low but with much potential. Selected comments in the interviews are presented in Table 5.7 below.

Table 5.7: Comments from Policy Makers on Entrepreneurship Levels in Malawian Universities

Comment
.....in terms of entrepreneurship in the Malawian universities in general, the perception is that these universities are not at the level to embark into entrepreneurship... There are a few Malawian universities that are into serious business. For example University A, a public university owns and runs a gas station, has a seed multiplication enterprise of some sort.....some universities operate restaurants (Respondent 1)
Malawian universities and patent applications…..they are not there yet…the time I have been here, I have not heard of such… *But here in Malawi I understand this university A, a public university…owns a gas station…and they also do farm products*…(Respondent 2)
We can say that there are some IGAs taking place in the Malawian universities…the universities are generating their income but they are not at the level where they can be independent...where they can no longer rely on other income other than tuition and government subvention...(Respondent 3)
They (Malawian universities) have the capacity but they are very constrained by regulations in the public service and also Malawian universities have limited thinking…(respondent 4)
Universities in Malawi are not doing much of entrepreneurship or say income generating activities....with time and awareness, we are hoping for a change...(respondent 5)

5.3.6 Faculty and Student Connection with the Industry

Literature has shown that the adoption of an entrepreneurial university in UK and US as well as in some African countries where the concept of an entrepreneurial university has been introduced was facilitated by university and industry linkage. Therefore, to obtain more insight into the extent to which Malawian universities have progressed in the entrepreneurial paradigm, participants were asked to comment on their relationship with the industry using a Likert-scale of 1 to 5 ratings, where 1 represented ‘poor linkage’ and 5 represented ‘excellent linkage’. The

results in Figure 5.11 below show that the linkage between Malawian universities and the industry at the time of study was weak. Only 17% of the respondents (1% excellent and 16% good) indicated that the faculty linkage with the industry was good. Further, 16% of the respondents (15% good and 1% excellent) indicated that the linkage with industry at student level was also weak.

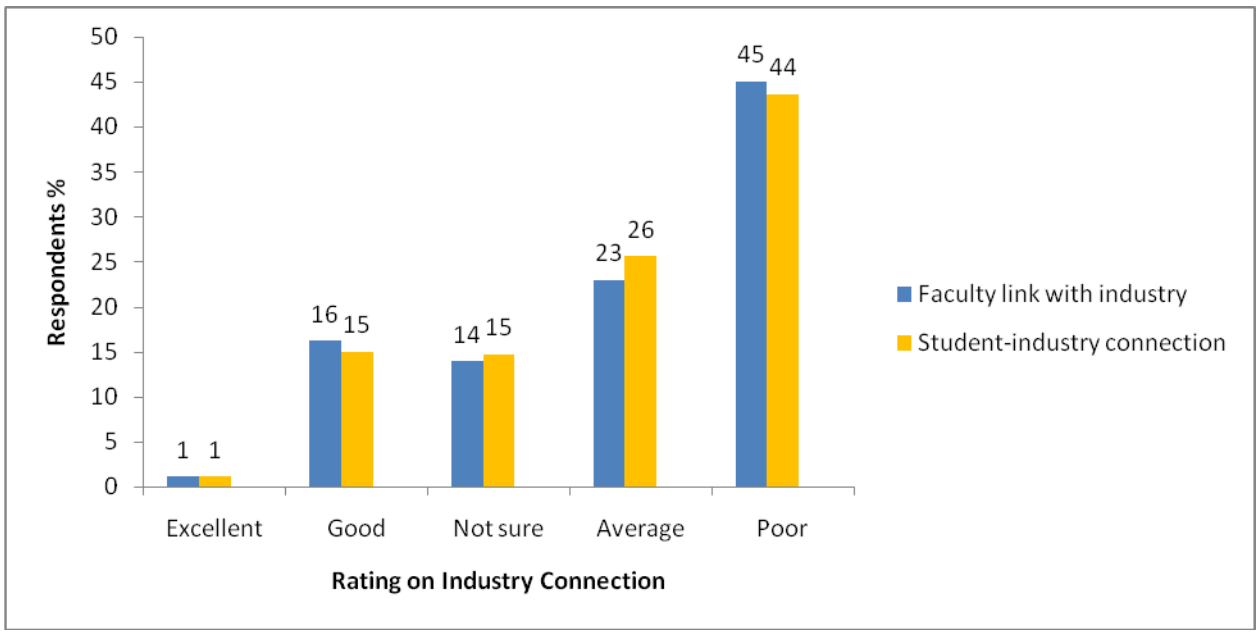


Figure 5.11: Faculty and Student - Industry Interaction

5.3.7 Pearson Chi-square Test on Association of Demographic Characteristics and extent of the adoption of an Entrepreneurial University Concept

To measure the association of demographic variables with the outcome variables which in this case is the adoption of university entrepreneurship leading to the progression into an entrepreneurial university, the study used the Pearson Chi-square to test the significance of the association. The results indicate that from the public universities; field of expertise that members have (Chi-square=16.5, $p<0.05$), gender of the respondents (Chi-square=3.61, $p<0.1$) and current

position of respondents (Chi-square 59.3, p<0.001), were significantly related to entrepreneurial university.

Considering all university measure of association, the current study found that academic qualification (Chi-square=4.92, p<0.1), field of expertise (Chi-square=19.6, P<0.05), gender of the respondents (Chi-square=63.8, p<0.001) were the major socio-economic factors that explain the significant linkages to spur entrepreneurship across universities in Malawi. Table 5.8 below presents these findings.

Table 5.8: Pearsons Measure of association of the Demographic Variables and University Entrepreneurship

Factors	**Entrepreneurship Willingness**		
	Public Universities	**Private University**	**All universities**
Academic Qualification	1.6954	0.0554	4.92*
Field Expertise	16.5***	0.502	19.6**
Length of Services	3.25	2.97	2.48
Gender	3.61*	0.94	4.05**

5.4 Strategies to Facilitate Adoption of an Entrepreneurial University

To initiate the adoption of an entrepreneurial university in LDCs with reference to Malawi, respondents were asked to state strategies that are considered critical in the progression of a Malawian university into an entrepreneurial university. The results from an open-ended question indicate that the respondents considered seven (7) strategies in the adoption of an entrepreneurial university model. However, 3 of these 7 strategies were rated highly as the frequency of mentioning these strategies were above 50%. These 3 strategies that were rated highly are establishing offices to coordinate entrepreneurship, developing a university policy on

entrepreneurship and developing an entrepreneurial mindset in university leadership and faculty. The results on strategies mentioned by the respondents are shown in Figure 5.12 below.

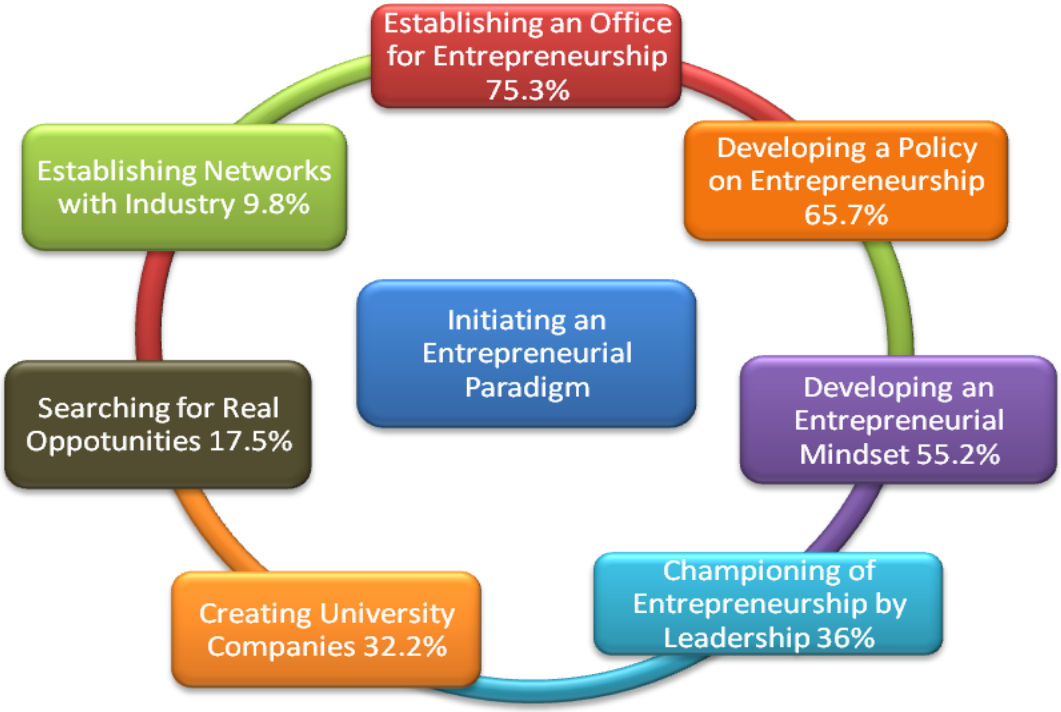


Figure 5.12: Strategies to Facilitate the in the adoption of an Entrepreneurial University in Malawian Universities

5.5 Elements of an Entrepreneurial University in Malawian Universities

To explore on elements that are essential in an entrepreneurial university model to be adopted by Malawian universities, respondents were asked to rate the elements adopted from Clark (1998) and OECD (2012) theoretical frameworks models using a Likert-scale of five elements where 1 represented 'strongly disagree' and 5 represented 'strongly agree'. The results on the following elements: leadership, financial management, motivation of faculty, integration of entrepreneurship in teaching and research, impact assessment of entrepreneurial activities and collaboration with internal and external stakeholders are presented in the sub-sections 5.5.1 to 5.5.7 in the next pages.

5.5.1 Element 1: Leadership Commitment towards the Adoption of an Entrepreneurial University Concept

Results in Figure 5.13 below indicate that the element of 'committed leadership' was considered important in the adoption of an entrepreneurial university in Malawi. Before testing the model, 100% of the respondents (95.1% 'Strongly Agree', 4.9% 'Agree') considered the element of 'committed leadership' to be important in adopting the entrepreneurial university concept. After model testing, 100% of the respondents strongly agreed that the element of 'committed leadership' was important in the entrepreneurial paradigm. This represents a positive change of 5% to 'Strongly Agree' from the 'Agree' rating.

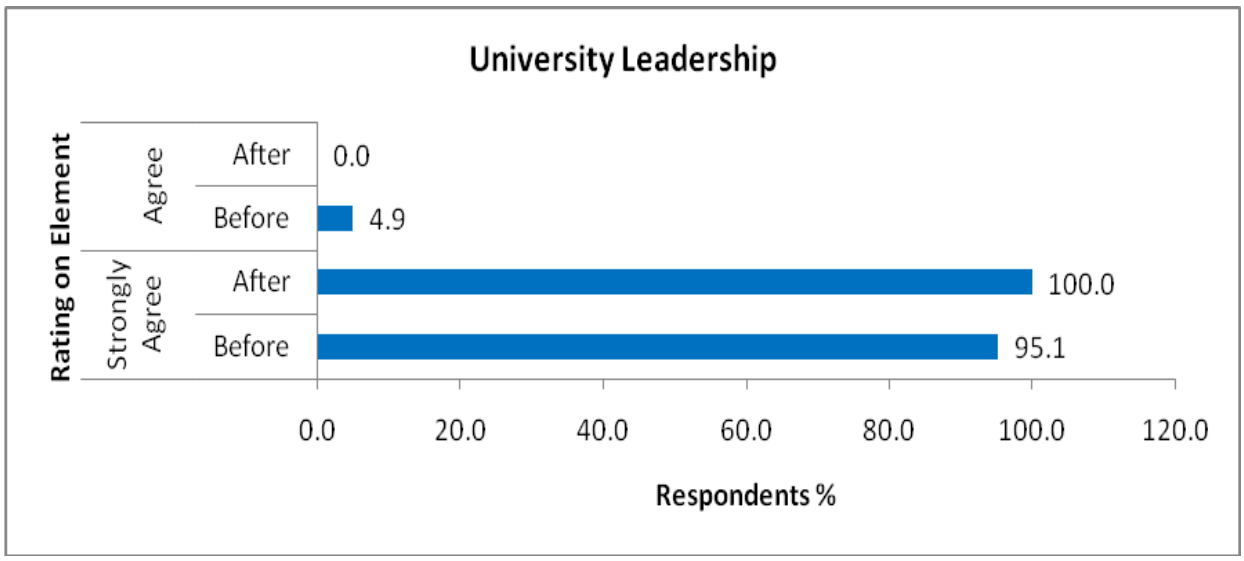


Figure 5.13: Importance of 'Committed Leadership' in the adoption of an Entrepreneurial University in Malawian Universities

5.5.2 Element 2: Funding and Financial Management

The element of 'funding and financial management' was considered important in the adoption of an entrepreneurial university in Malawi. Before model testing, 71.1% of the respondents strongly agreed while the remaining 28.6% of the respondents simply agreed that funding and

financial management is important in the progression into an entrepreneurial university. After model testing, 96.2% of the respondents strongly agreed while 3.8% agreed that funding and financial management is essential in the entrepreneurial paradigm representing a positive change of 25% in favour of the 'Strongly Agree' rating. These results are presented in Figure 5.14 below.

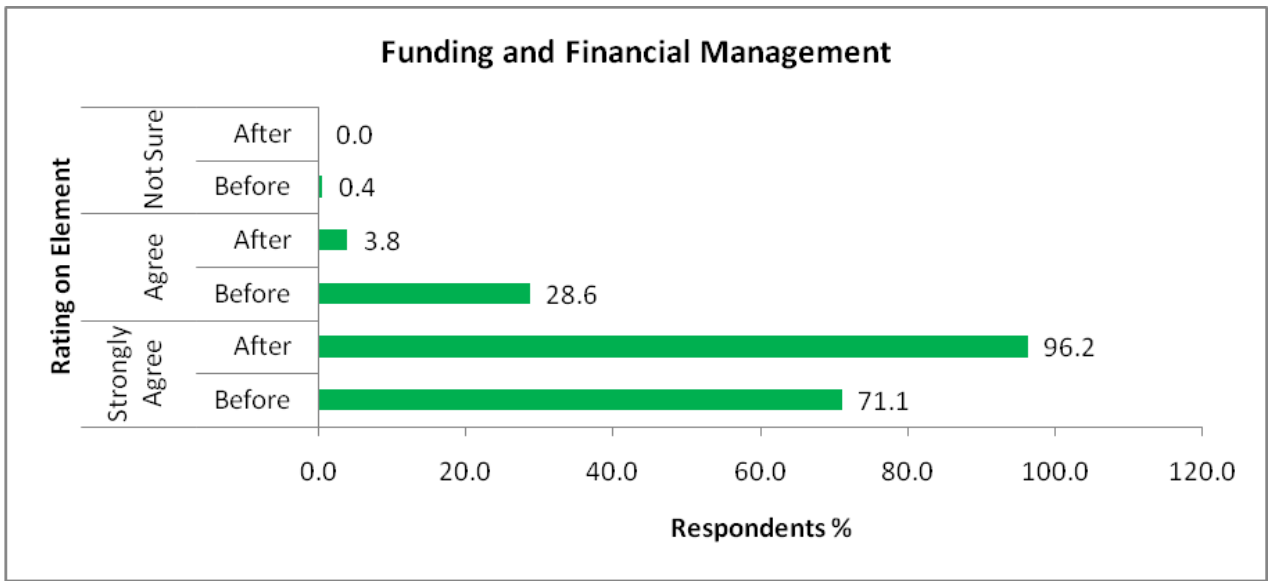


Figure 5.14: Importance of 'Funding and Financial Management' in the adoption of an Entrepreneurial University in Malawian Universities

5.5.3 Element 3: Motivation and Support of Faculty

Results in Figure 5.15 on the next page indicate that the element of 'motivating and supporting faculty' was considered important in the progression of Malawian universities from traditional to successful entrepreneurial universities. Before model testing, 92.5% of the respondents had strongly agreed and about 7.5% of the respondents agreed on the importance of this element of supporting and motivating faculty. After model testing, there was a positive change of 7.5% from those who agreed to those who had strongly agreed. Therefore, 100% of the respondents strongly agreed that motivation and support of faculty as essential in the adoption of an entrepreneurial university concept.

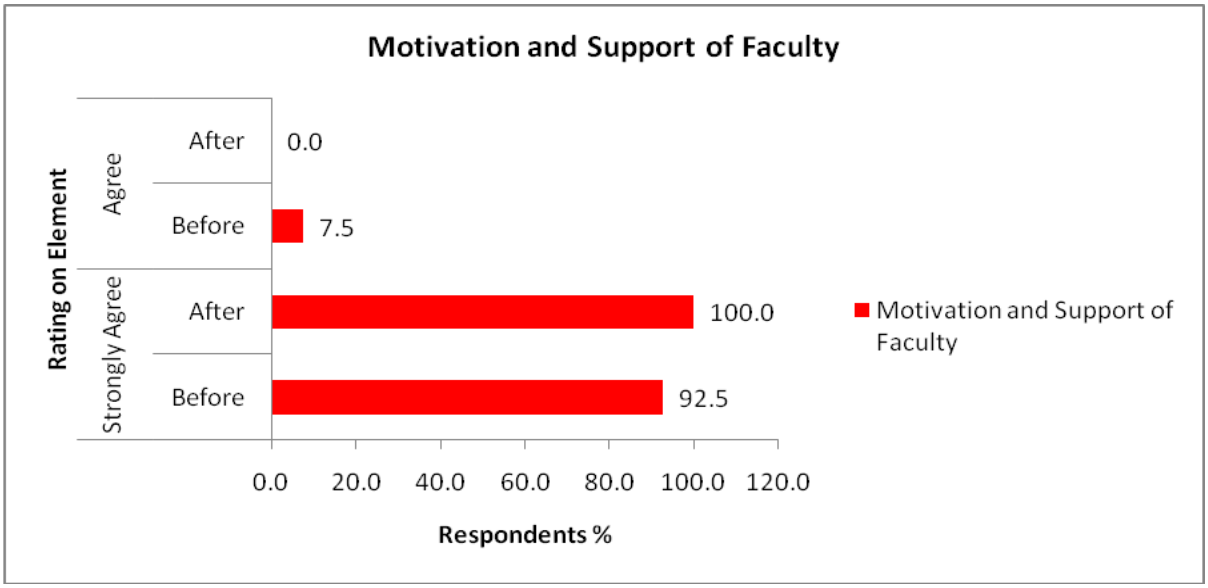


Figure 5.15: Importance of 'Motivating and Supporting Faculty' in the adoption of an Entrepreneurial University in Malawian Universities

5.5.4 Element 4: Integration of Entrepreneurship in Teaching and Research

Results in Figure 5.16 on the next page indicate that the element of 'integrating entrepreneurship in teaching and research' was also considered important in the progression of Malawian universities into successful entrepreneurial ones as 95.1% of respondents strongly agreed and remaining 4.9% agreed before model testing. After model testing, 100% of the respondents strongly agreed that integrating entrepreneurship in the core functions of teaching and research was an important element in transforming the universities into entrepreneurial universities. This represents a positive change of 5% from respondents who agreed to those who strongly agreed.

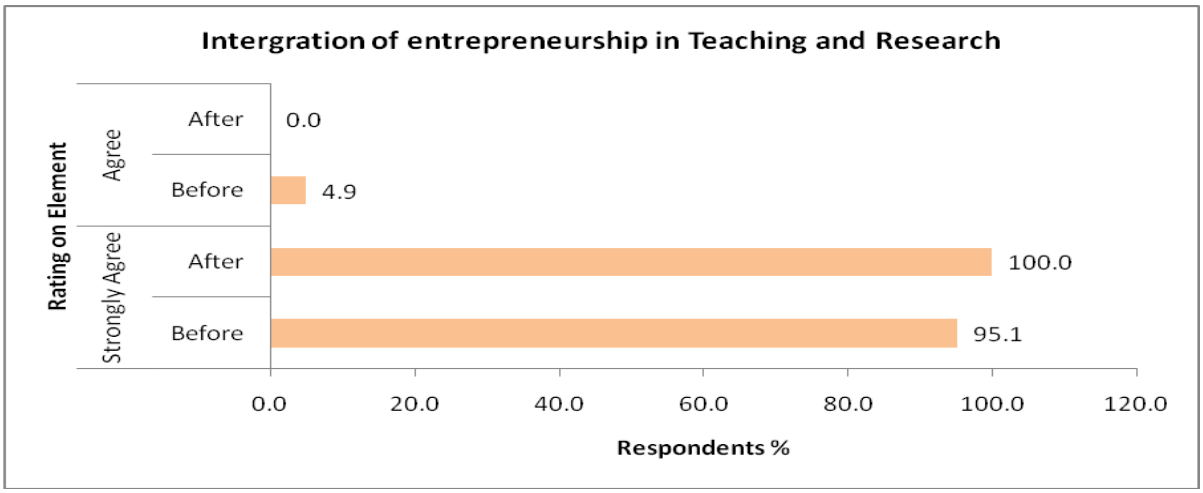


Figure 5.16: Importance of 'Integrating Entrepreneurship in Teaching and Research' in the adoption of an Entrepreneurial University in Malawian Universities

5.5.5 Element 5: Impact Assessment of Entrepreneurship Activities

Results in Figure 5.17 below indicate that the element of 'impact assessment of entrepreneurial activities' was also considered important in the transformation of traditional Malawian universities into entrepreneurial universities as 75.6% of the respondents strongly agreed to this while 23.7% simply agreed to this.

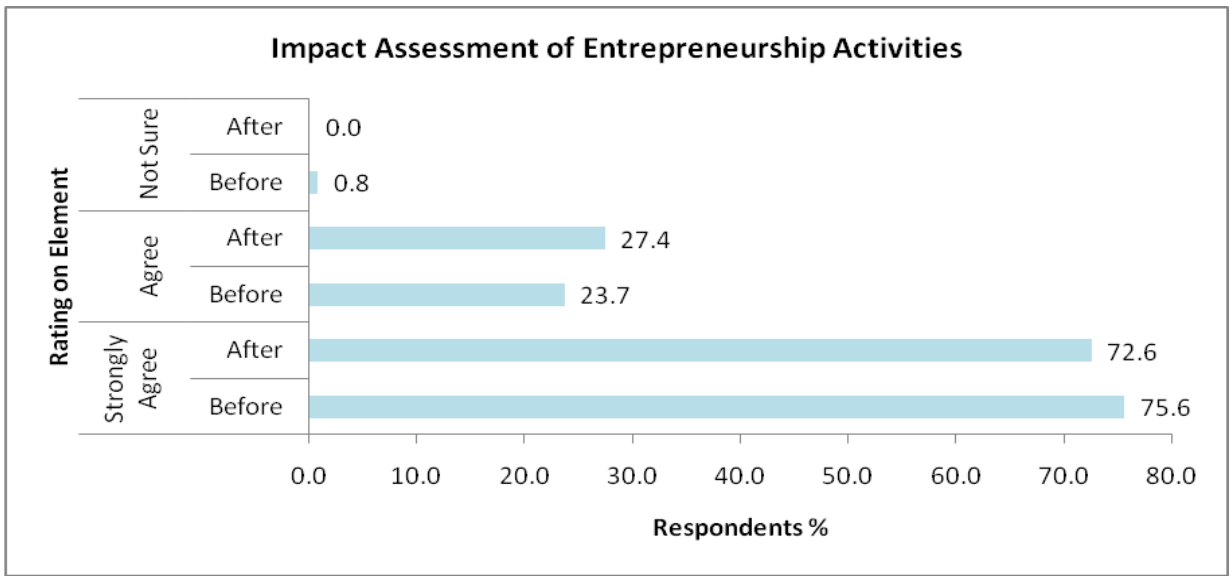


Figure 5.17: Importance of 'Impact Assessment of Entrepreneurial Activities' in the adoption of an Entrepreneurial University in Malawian Universities

Further, results in Figure 5.17 indicate that on aggregate 99.3% of the respondents considered impact assessment of entrepreneurship to be important in the adoption of an entrepreneurial university concept. After model testing, 72.6% of the respondents strongly agreed (a reduction of 3% from before model testing) while 27.4% of the respondents agreed (a positive change of 3.7% from before model testing) to this element being important in the entrepreneurial paradigm. On aggregate, this indicates that 100% of the respondents agreed after model testing that this particular element is important in the adoption of an entrepreneurial university representing a positive change of 0.7% from before the model was tested.

5.5.6 Element 6: International Orientation of Universities

The element of 'international orientation of universities' was considered of less importance in the entrepreneurial paradigm in Malawian universities. Before model testing, 62.8% of the respondents were not sure whether this element was important or not. However, after model testing, there was positive change of 6.4% in respondents that were not sure (from 62.8% to 56.4%), and another positive change of 10.1% in respondents that disagreed (from 10.5% to 0.4%) and yet another positive change of 34.5% of respondents who strongly agreed (from 2.3% to 36.8%). Figure 5.18 on the next page presents these details.

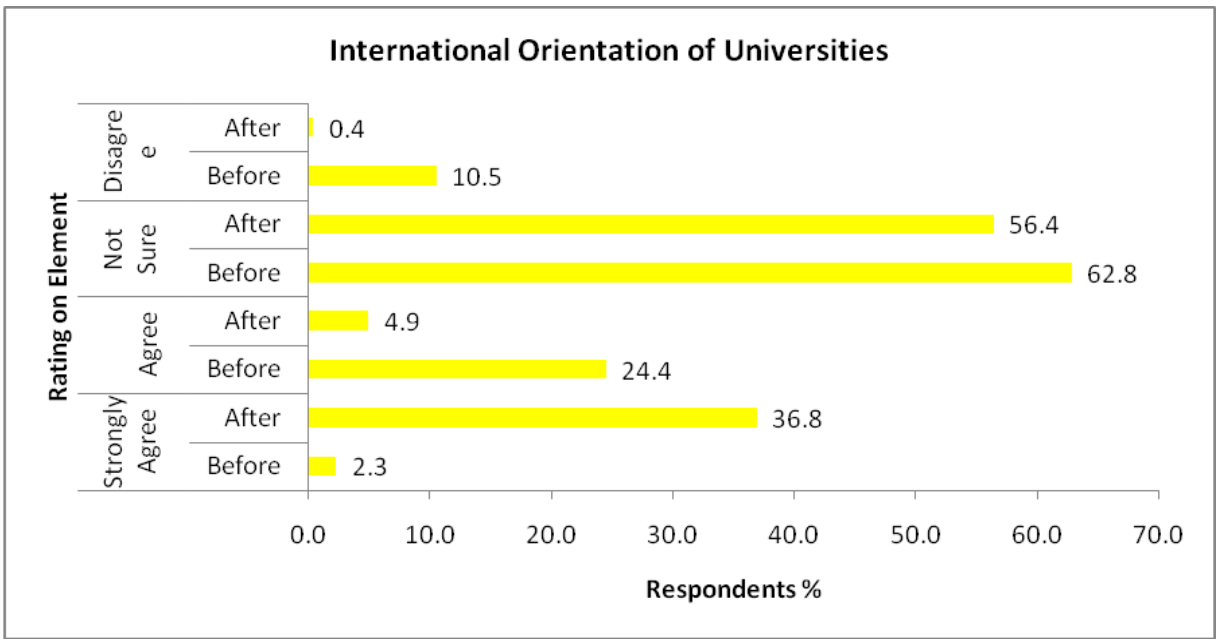


Figure 5.18: Importance of 'International Orientation' in the adoption of an Entrepreneurial University in Malawian Universities

The summary of results presented in Figures 5.13 on page 125 to 5.18 above detailing the consideration of the 6 of the 7 elements of an entrepreneurial university model to be adopted by Malawian universities have been summarized in Figure 5.19 on the next page. The results presented in Figure 5.19 clearly indicate that commitment of university leadership, integration of entrepreneurship in teaching and research and motivation and support of faculty were highly considered as important elements in the entrepreneurial university model for Malawian universities. Further, funding and financial management as well as impact assessment of entrepreneurship activities were also considered important elements in the entrepreneurial university model. However, results in Figure 5.19 clearly indicate that international orientation of universities was less considered as an important element in the entrepreneurial university model to be adopted by Malawian universities.

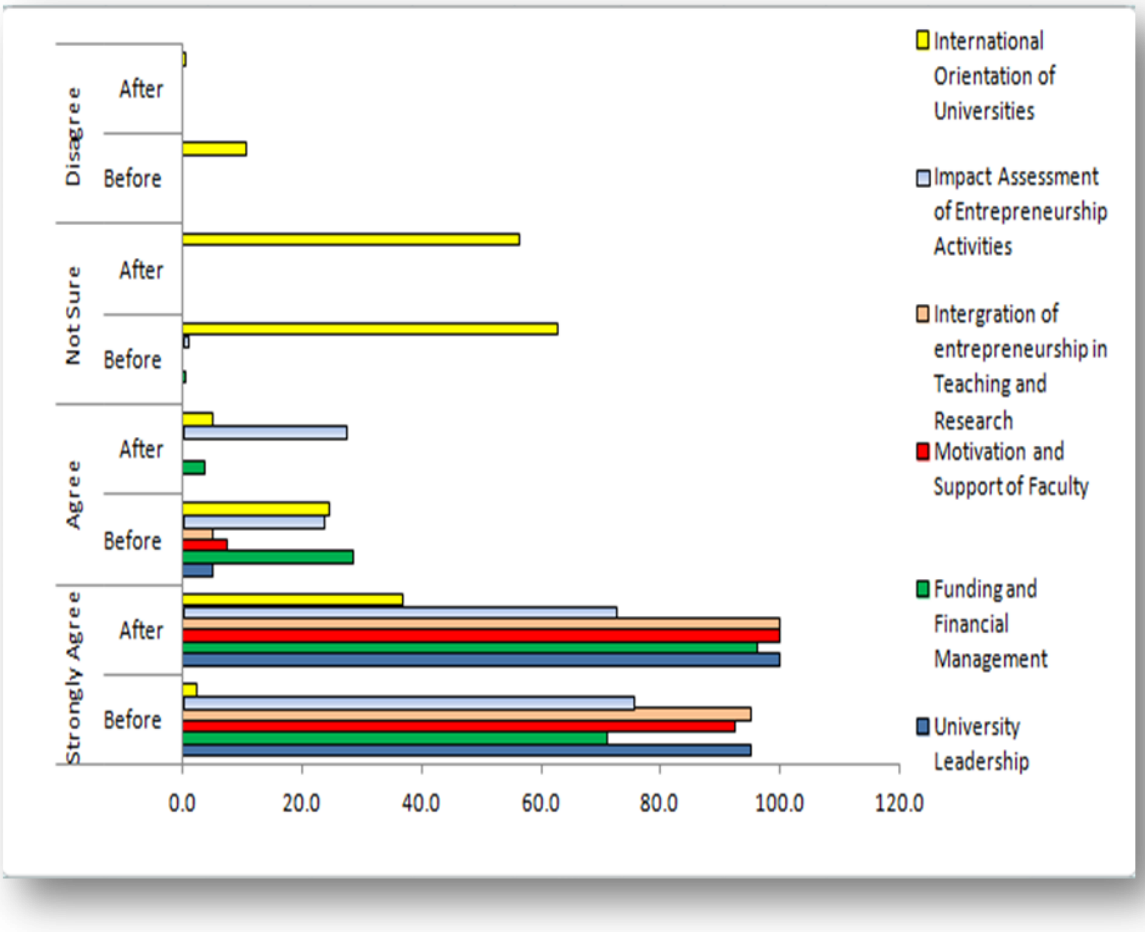


Figure 5.19: A Summary of Six Transforming Elements considered important in an Entrepreneurial University Model for Malawian Universities

5.5.7 Assessment of Internal and External Networks in the Adoption of an Entrepreneurial University

One other element of an entrepreneurial university adopted from Clark (1998) and OECD (2012) examined in the study is internal and external collaboration.

Firstly, in using the Likert-scale of point 5 to 1 (where 5 was standing for 'Strongly Agree' and 1 was standing for 'Strongly Disagree'), respondents were asked to rate the importance of

internal collaboration in facilitating the adoption of an entrepreneurial university. The results in Figure 5.20 below indicate that internal networking was considered an important element as indicated by 75.6% of respondents who strongly agreed after model testing. Before model testing, 47% did strongly agree that this element was important. This represents a positive change of 28.6% from those who merely agreed before model testing to those who strongly agreed after model testing that internal networking was an important element in the entrepreneurial university model to be adopted by Malawian universities.

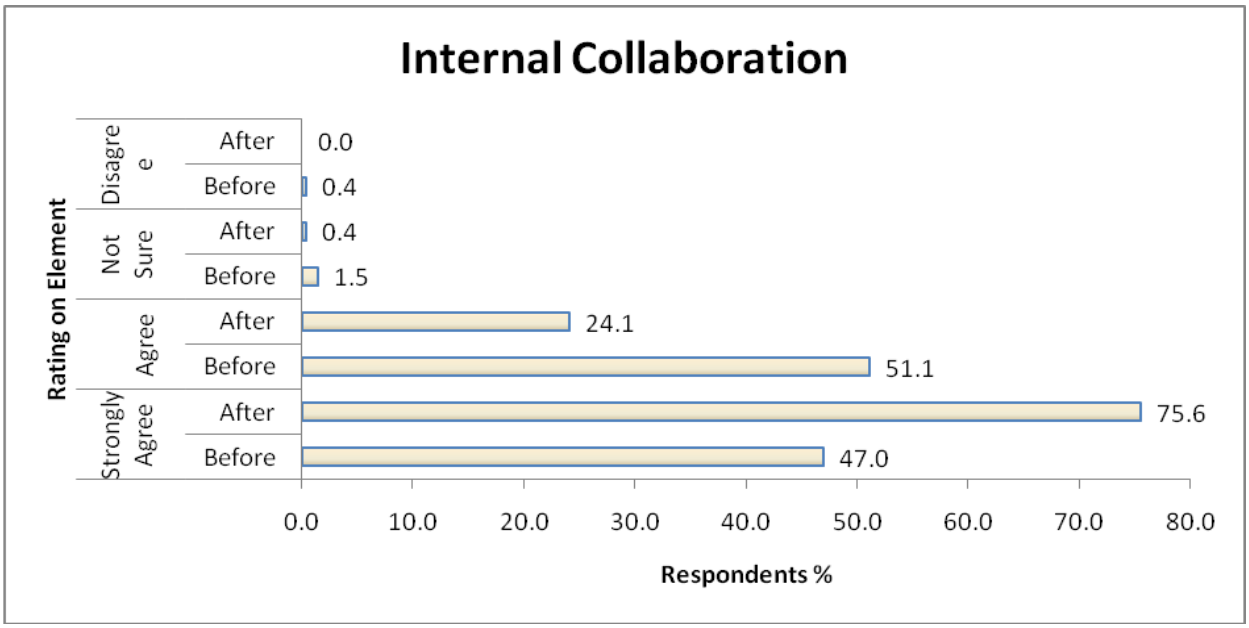


Figure 5.20: Importance of Internal Collaborations in the adoption of an Entrepreneurial University in Malawian Universities

Secondly, respondents were asked to use the same rating scale of 5 to 1 with 5 standing for 'Strongly Agree' and 1 standing for 'Strongly Disagree' to evaluate the importance of several external collaborations in the adoption of an entrepreneurial university. An average of 51.5% respondents (62% interaction with industry, 67.3% collaboration with financial institutions, 55.5% link with alumni, and then 49.2% collaboration with research and technology institution, 38.3% link with government and 36.8% collaboration with other universities) strongly agreed

that external collaboration is important in adopting the entrepreneurial university concept before model testing while an average of 77.8% strongly agreed after the model was tested representing an average positive change of 26.32% in the rating. The results are presented in Table 5.9 below.

No	Elements	Strongly Agree			Agree			Not Sure		
		Before%	After%	%Change	Before%	After%	%Change	Before%	After%	%Change
1	Interaction with industry	62.0	77.1	15.0	38.0	22.9	-15.0	0.0	0.0	0.0
2	Collaboration with Financial Institution	67.3	76.3	9.0	31.2	23.7	-7.5	1.5	0.0	-1.5
3	Collaboration with other Universities	36.8	77.1	40.2	65.4	22.9	-42.5	3.0	0.0	-3.0
4	Collaboration with research and Technology Institutions	49.2	86.5	37.2	50.4	13.5	-36.8	0.4	0.0	-0.4
5	Link with Alumni	55.3	74.4	19.2	44.4	25.6	-18.8	0.4	0.0	-0.4
6	Link with Government	38.3	75.6	37.2	59.8	24.4	-35.3	1.9	0.0	-1.9
	Average %	**51.50**	**77.82**	**26.32**	**48.18**	**22.18**	**-26.00**	**1.19**	**0.00**	**-1.19**

Table 5.9: Importance of External Collaborations in the adoption of an Entrepreneurial University in Malawian Universities

Further, results in Table 5.9 above show that much change was noted in the need to collaborate with other universities before and after model testing as there was a positive change of 40.2% to those who strongly agreed (from 36.8% to 77.1%). However, there was a higher agreement in the need to collaborate with research and technology institutions as 86.5% of the respondents strongly agreed to this after model testing.

Initially, collaboration with other universities (36.8%), link with government (38.3%) and collaboration with research and technology institutions were not favourably rated as strong elements of an entrepreneurial university model to be adopted by the Malawian universities but

later after model testing, there was a positive change (40.2%, 37.2% and another 37.2% respectively) in the three areas of external collaboration.

5.6 Adoption of an Entrepreneurial University Concept and its Association with other Factors

Findings in Table 5.10 below present varying results comparing public, private universities and aggregately all universities in the country.

Table 5.10: Pearsons Measure of Association of the Elements of an Entrepreneurial University and the adoption of the Entrepreneurial University Concept

Factors	**Adoption of Entrepreneurship practices**		
	Public University	**Private University**	**All Universities**
Work responsibility levels	60.15***	-	72.7***
Consultations	60.4***	0.31	64.4***
Collaboration	0.58	0.01	3.25
Networking	41.34***	-	45.4***
Funding and financing	35.3***	0.15	39.4***
International Orientations	0.39**	0.61	10.01***
Impact assessment	13.4	0.54	14.9***
Interdisciplinary	19.4***	0.40	23.5***
Motivation	-	1.1	0.21
Linking with government	13.4***	-	14.13***

As presented in Table 5.10 above, the study found that work responsibilities of faculty in the public universities is significantly related to adoption of the entrepreneurship university practices (Chi-square=60.15, $p<0.001$) compared to the work responsibilities of the respondents from the private university's counterpart. Furthermore, in terms of the networking of the university members and the entire work environment, the current study found that public university

networking strategies were significant in the adoption of an entrepreneurial university model (Chi-square=41.34, $p<0.001$) relative to their counterparts from the private universities.

In the same manner, it was also noted that funding and financing strategy in support of an entrepreneurial university (Chi-square=35.3, $p<0.001$), internationalization of universities in light of the adoption of an entrepreneurial university concept (Chi-Square=0.39, $p<0.05$), impact assessment of the entrepreneurial university activities (Chi-square=13.4, $p<0.001$), interdisciplinary collaborations of faculty in relation to the adoption of the entrepreneurial university concept (Chi-square=19.37, $p<0.001$), linkages that the public universities have with the government on the adoption of the entrepreneurial university concept (Chi-square= 13.4, $p<0.001$) were found to have a significant association to influence adoption of the entrepreneurship practices among the members within the public universities.

5.7 Output of an Entrepreneurial University in Malawian Universities

To gain an insight into results of adopting an entrepreneurial university in LDCs and specifically in Malawi, data on output of an entrepreneurial university in the Malawian context were collected in 2 phases; before model testing in phase 1 and after model testing in phase 3. Respondents were asked in both periods to indicate output in different areas. The results obtained from the 5 participating universities on the output of an entrepreneurial paradigm in Malawian universities were compared with results obtained from a control unit (CO) where phase 2 of the study (presentation of the entrepreneurial university concept and frameworks) was skipped. Data from the control unit were collected at the same time of collecting data in phases 1 and 3 in the 5 participating universities. The results are presented in the sections below.

5.7.1 Output in Consultancy

Results in Table 5.11 below indicate a positive change on the number of consultancies pursued before and after the model testing. Initially, 27.1% of the respondents indicated that they were not engaged in any consultancy work but after model testing, the percentage of respondents who had not done any consultancy reduced from 27.1% to 4.1% representing a positive change of 23%. Reference is made to the results in the control unit in the same Table 5.11 below where there was a minimal change of 2% as compared to the 23% change in participating universities. Further, results in Table 5.11 indicate a change (12.4%) in respondents who in Phase 1 of the study indicated that they had done 3 to 8 consultancies (16.2%) compared to the response in Phase 3 of the study (28.6%).

Table 5.11: Number of Consultancies Done

Consultancies	Participating Universities			Control University		
	Frequency (%)		% Change	Frequency (%)		% Change
	Before	After		Before	After	
None	27.1	4.1	23.0	32	30	2
1 to 2	52.3	60.2	7.9	46	47	1
3 to 8	16.2	28.6	12.4	19	20	1
8 or more	4.5	7.1	2.6	3	3	0
Total	**100.0**	**100.0**		**100.0**	**100**	

5.7.2 Output in Research Contracts

Results in Table 5.12 on the next page indicate an improvement in research contracts after model testing. Initially, 74.4% of the respondents indicated that they had not been involved in any

research contract in Phase 1 of the study. After model testing, the number of respondents who had not done any research contract reduced to 36.1% from 74.4% signifying a positive 38.3% change towards engaging in a research contract. However, there was minimal change of 7.6% in the control unit in terms of those who had not done any research contract in Phase 1 of the study (67.1%) to those who had not done any research contract in Phase 3 of the study (59.5%).

Table 5.12: Number of Research Contracts Undertaken

Research Contracts	Participating Universities			Control University		
	Frequency (%)		% Change	Frequency (%)		% Change
	Before	After		Before	After	
None	74.4	36.1	38.3	67.1	59.5	7.6
1 to 2	20.3	39.5	19.2	26.8	31.1	4.3
3 to 8	4.1	20.7	16.6	4.1	6.4	2.3
8 or more	1.1	3.8	2.7	2.0	3.0	1.0
Total	**100.0**	**100.0**		**100.0**	**100**	

5.7.3 Patent Acquisition

Results in Table 5.13 on the next page indicate an improvement in patent acquisition after Phase 2 of the study. Initially, 99.2% of the respondents had not made any attempt to file for a patent in Phase 1 of the study while in Phase 3 of the study the figure had reduced to 86.8% representing a positive change of 12.4% in respondents who had made attempts to file for patents after Phase 2 of the study.

Further, results in Table 5.13 show a similar positive change of 11.2% which was noted from respondents who had attempted to file 1 or 2 patents (from 0.8% to 12.0%).

Table 5.13: Patent Acquisition

Patents Acquired	Participating Universities			Control Unit		
	Frequency (%)		% Change	Frequency (%)		% Change
	Before	After		Before	After	
None	99.2	86.8	12.4	100	98.2	1.8
1 to 2	0.8	12.0	11.2	0.0	1.8	1.8
3 to 8	0.0	1.1	1.1	0.0	0.0	0.0
8 or more	0.0	0.0	0.0	0.0	0.0	0.0
Total	**100.0**	**100.0**		**100.0**	**100.0**	

A few respondents (38%) expressed scepticism on patent acquisition in Malawian universities. The comments indicated that patenting in Malawian universities is still a challenge. Two of the comments that were like other were as follows:

> *"….patenting will not be so easy from the look of things….firstly I hear the process is expensive and takes time…..secondly….as a third world country like Malawi, is there anything new we can discover…I doubt…but it's worth trying…"*(Respondent 67, University B).

> *"…Our promotion criteria has to go by that if we are to become entrepreneurial university…mostly its publish or no promotion….may be it is time we included patenting as another criteria for promotion otherwise that will never work…."*(Respondent 106, University D).

5.7.4 Faculty Products Marketed

Results in Table 5.14 on the next page indicate an improvement in marketing of faculty products from 97.7% of respondents indicating that they had not marketed any product from their research work 69.2% respondents. This represents a positive change on those who had not marketed any

of their research based products 28.5%. Corresponding to this change is an increase in faculty that marketed 1 to 2 of their research based products from 2.3% to 28.9% representing a positive change of 26.6%. However, results in the control unit indicate minimal changes of 5.2% in both movements.

Table 5.14: Faculty Products Marketed

Faculty Products Marketed	Participating Universities			Control University		
	Frequency (%)		% Change	Frequency (%)		% Change
	Before	After		Before	After	
None	97.7	69.2	28.5	98.7	93.5	5.2
1 to 2	2.3	28.9	26.6	1.3	6.5	5.2
3 to 8	0.0	1.9	1.9	0.0	0.0	0.0
8 or more	0.0	0.0	0.0	0.0	0.0	0.0
Total	**100.0**	**100.0**		**100.0**	**100**	

5.7.5 Student Products Marketed

Results in Table 5.15 below indicate that initiatives were done to start marketing student products under the supervision of faculty. In Phase 1 of the study, 93.2% of the respondents had not taken steps to market the student products under their supervision. In Phase 3 of the study, the respondents who had not marketed any of their student products reduced to 46.6% from the 93.2% representing a positive change of 46.6%.

Table 5.15: Student Products Marketed

Student Products Marketed	Participating Universities			Control University		
	Frequency (%)		% Change	Frequency (%)		% Change
	Before	After		Before	After	
None	93.2	46.6	46.6	98.2	96.5	1.7
1 to 2	3.8	41.7	37.9	1.2	2.1	0.9
3 to 8	2.3	8.6	6.3	0.6	1.3	0.7
8 or more	0.8	3.0	2.2	0.0	1.1	1.1
Total	**100.0**	**100.0**		**100.0**	**100**	

5.7.6 Company Creation

Results in Table 5.16 below indicate changes in creation of companies by faculty (USOs) and students (start-ups).

Table 5.16: Spinoffs and Start-ups Creation

Firms created	Participating Universities				Control Unit			
	Spinoffs		Start-ups		Spinoffs		Start-ups	
	Before	After	Before	After	Before	After	Before	After
None	100.0	99.2	100.0	96.2	100.0	0.0	100.0	100.0
1 to 2	0.0	0.8	0.0	3.8	0.0	0.0	0.0	0.0
3 to 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 or more	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

However, the changes are not significant as there is a change of 0.8% in companies created by faculty from research work from 100% of respondents to 99.8% of respondents; and a change of 3.8% in companies created by students under the supervision of faculty from 100% of respondents to 96.2% of respondents. The results from the control unit indicated no change in both USOs and start-ups.

Some respondents (26%) made comments that reveal challenges in creation of firms by faculty from research work or projects. Three selected comments are presented below.

> *"…this idea of creating companies from faculty research….. I don't think it will be easy…at least we have heard about patents which is something we can pursue…I guess…."* (Respondent 56, University A).

"Do we have the money and expertise to start university companies in Malawi….? I doubt…This is for rich countries…." (Respondent 113, University D).

"…we need mentoring on firm creation….we need practicing entrepreneurs to help create such companies….I am an expert in my field;….chemistry....but I know nothing about how to start a company….someone has to come in and help…."(Respondent 206, University B).

Another 12% of the respondents anticipated an opportunity in creation of student firms. One of the comments is presented below.

"…there is potential in students starting companies or marketing the products from their projects….as a university we have participated in national trade fairs...., displaying the projects [by students] *...but thereafter we have not been aggressive enough to market them* [the products displayed at the trade fairs]*…."* (Respondent 72, University A).

5.7.7 Pearson Chi-square Test on Association of Output and Adoption of the Entrepreneurial University Concept

The study used the Pearson chi-square to test the significance of output variables in the adoption of an entrepreneurial university concept. Results in Table 5.17 below indicate that marketing university products created by faculty and students, consultancies, research contracts and patent acquisition are significant outputs of the entrepreneurial paradigm in the Malawian universities.

Table 5.17: Pearson Measure of Association of Outputs and University Entrepreneurship

Factors	**University Entrepreneurship**		
	Public	**Private**	**All universities**
Marketing students products	20.36***	0.55	24.6***
Marketing faculty products	30.3***	-	34.3***
Consultancies	48.9***	0.79	48.4***
Research Contracts	60.4***	0.31	64.4***
Patents	66.64***	1.08	68.5***

The results indicate a high significance ($p<0.001$) in marketing of staff and student products, consultancies, research contracts and patents in the public universities unlike in the private universities. The results in the public universities were of the same perspective with the national overall results.

5.8 Summary of the Chapter

This Chapter reported the findings of the study where the extent of adopting the entrepreneurial university in the Malawian universities has been presented. Findings on strategies that have been considered by Malawian universities to facilitate the entrepreneurial paradigm have also been presented. Further, findings on the importance of the 7 elements of an entrepreneurial university framework adopted from Clark (1998) and OECD (2012) have also been presented. Lastly, findings on outputs that can be realized from adopting the entrepreneurial university model in the Malawian universities have been presented. The next Chapter discusses the findings in line with the objectives of the study.

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CHAPTER 6: DISCUSSION OF FINDINGS

6.1 Introduction

Chapter five has presented findings of the study from data collected. In this Chapter, the researcher discusses the findings focusing on main issues of the study. The discussions are on characteristics of respondents; the extent to which Malawian universities have progressed into the first and second academic revolutions; and critical components of an entrepreneurial model to be adopted by the Malawian universities. Finally, the Chapter presents the model developed from the findings of the study including its relevance and application.

6.2 Characteristics of the Respondents

The majority of respondents (83.5%) and mostly male (71.1%) were from public universities. The findings, therefore, could be skewed towards public universities that receive monthly funding from government unlike private universities that rely on other income sources other than government subvention. Nevertheless, both the public and private universities in Malawi are facing similar challenges of inadequate financing, need to increase access and relevance as well as improve quality of education.

The respondents comprised faculty from different fields and levels. This diversity in knowledge and experiences allowed for the collection of rich data on the subject. Incorporating entrepreneurship alongside the teaching and research missions of the university is for all academic members of staff regardless of discipline as pointed out by US Department of Commerce (2013) and Gibb (2014). Hence the need and call for redesigning of curricula to incorporate practical entrepreneurship education in all academic disciplines.

The majority of respondents had postgraduate qualifications (85%) indicating adequate experience in research. The research mission is known to have influenced faculty in the US universities to call for commercial exploitation of their research results leading to the emergence of an entrepreneurial university (Mowery, 2004; Libecap, 2005; Rhines, 2005). Therefore, the findings of the study portray the reality of entrepreneurship development, practice and perceptions in both the teaching and research missions of Malawian universities.

Furthermore, the majority of respondents (75%) had working experience of over 6 years in the university which means the findings presented in Chapter four are reliable and present a deep insight on the adoption of an entrepreneurial university concept in Malawian universities.

6.3 Extent to which Malawian Universities have Progressed from Traditional into Entrepreneurial Universities

Reference is made to role changes that have taken place in the university system where traditional universities have progressed into research intensive universities, during the first academic revolution and further into entrepreneurial universities during the second academic revolution as presented in Table 2.1 on page 31.

A traditional university focuses on teaching and archiving as the core functions. A research intensive university is aggressive in research while maintaining the teaching function and an entrepreneurial university brings economic development into the teaching and research missions. The first objective of the study aimed at establishing the extent to which Malawian universities have progressed into the first and second academic revolutions.

The findings on workload, personal assessment of work responsibilities, emphasis of university on work responsibilities, measurement on work output and other secondary sources have shown

that Malawian universities are traditional universities progressing into the first academic revolution with, nonetheless, some knowledge on elements of an entrepreneurial university. The findings on work responsibilities are discussed in sections 6.3.1 to 6.3.5 below.

6.3.1 Faculty Assessment on Work Responsibilities

The findings of the study on work responsibilities of faculty in Malawian universities confirms the traditional status of the universities as the majority focus on teaching with less work in research (Figure 5.6 on page 111). Despite having a majority of faculty in the institutions for more than 6 years (Table 5.1 on page109), research work has been minimal (Figures 5.6, 5.7 and 5.8 on pages 111, 112 and 113 respectively) while the teaching mission has been emphasized (Figure 5.9 on page 114).

Focus and emphasis on teaching with less research in the Malawian universities as pointed out above has impacted on the on economic development in teaching and research which is considered the main characteristic of an entrepreneurial university by Etzkowitz *et al*. (2000). Economic development in teaching and research is manifested through research contracts, consultancies, patent licensing, sale of faculty research products and student products and creation of USOs and start-ups.

The faculty attention on teaching portrayed in the findings on work responsibilities, self assessment on work responsibilities and work output above confirms the traditional nature of Malawian universities. Such focus and emphasis on the teaching missions defines a traditional university according to Castells (2001), Kerr (2001) and Cloete *et al*. (2011).

Considering role changes that have taken place in the university system globally, there is need for Malawian universities currently in the traditional state and facing numerous pressures and

demands to respond by adopting the entrepreneurial university model. This will facilitate their progression into the first and second academic revolutions simultaneously (Etzkowitz *et al.*, 2001).

6.3.2 Emphasis of University on Faculty Work Responsibilities

To further determine the extent to which Malawian universities have progressed into the first and second academic revolutions, there was need to find out emphasis of universities on the teaching and research missions. The findings presented in Figure 5.9 on page 114 show that Malawian universities (100%) place much emphasis on teaching responsibility than in research work (49%). According to literature, a traditional university places much focus on teaching while a research university in the first academic revolution places high emphasis on both research and teaching (Storr, 1952; Metzger, 1955; Veysey, 1965; Jencks & Riesman, 1968; Etzkowitz, 2003a; Kerr, 2013).

The findings, therefore, confirm that Malawian universities are traditional universities but making entry into the first academic revolution. However, the desire and purpose of the study was to facilitate the progression of Malawian universities into the second academic revolution by adopting the concept of an entrepreneurial university. Thus, processes that aim at progression of Malawian universities into both the first and second academic revolutions simultaneously as was the case with Latin American universities (Etzkowitz, 2001) are essential.

Unless the traditional Malawian universities adopt the entrepreneurial university concept and undergo the first and second academic revolution, the set national goals aimed at increasing access, relevance and improving quality of higher education for socio-economic development of

the country are likely not to be achieved. Furthermore, challenges and demands placed on the Malawian universities may remain unsolved.

6.3.3 Assessment on Level of University Entrepreneurship in Malawian Universities

To further investigate on extent to which Malawian universities have progressed into entrepreneurial universities, an assessment of entrepreneurship in Malawian universities was done considering that an entrepreneurial university demonstrates impact on economic development through both teaching and research (Etzkowitz *et al*., 2001). Assessment was done on work output, income sources and comments were solicited from relevant government officials discussed in the sub-sections 6.3.3.1 to 6.3.3.3 below.

6.3.3.1 Assessment of University Entrepreneurship in Work Output

University entrepreneurship in relation to this study focused on the three levels provided by Tijssen (2006). The lower level concerns transfer of knowledge which is consultancies and research contracts. The second and higher level is transfer of technology which is mostly licensing of university patents and outright sale of technology. The third and highest level is transfer of products or services where the university creates spinoffs or start-ups to sell products from their research projects.

In assessing the extent to which Malawian universities have progressed into first and second academic revolution, it was also important to check on the output of their teaching and research work in comparison with the levels of university entrepreneurship provided by Tijssen (2006).

Figure 5.10 on page 115 indicates clearly that there are low levels and emphasis on university entrepreneurship Malawian in universities. While publication is high in the Malawian universities, knowledge transfer, technology transfer and product or service transfer is minimal

with minute traces of research contracts and consultancies. However, the presence of lower level university entrepreneurship in the Malawian universities is presumably a stepping stone for higher level entrepreneurship as stated by Etzkowitz (2003a) and Tijssen (2006).

Although the highest level of entrepreneurship involving creation of USOs and start-ups is a challenge in the Malawian universities, the empirical evidence collected in Phase 3 of the study indicates a favourable lean towards adopting an entrepreneurial university model that emerged in UK and European countries (Etzkowitz, 2003b) other than towards the US model. The entrepreneurial paradigm in the UK and European universities was prominent with start-ups by student assisted by faculty while in US it was more of USOs by faculty (Etzkowitz, 2003b). The results are suggesting that the adoption of an entrepreneurial university in Malawi could commence with student start-ups.

Overall, the minimal levels of university entrepreneurship are signs that Malawian universities have neither progressed into the second academic revolution nor adopted the concept of an entrepreneurial university. This further confirms the traditional status of Malawian universities as discussed in Sections 6.3.1 and 6.3.2 earlier.

6.3.3.2 Assessment of University Entrepreneurship in Income Generation Sources

An entrepreneurial university through the three levels of university entrepreneurship (Tijssen, 2006) provides innovative ways of generating extra income (Clark, 1998). One way the study investigated on the extent to which Malawian universities have progressed into the second academic revolution, was to identify sources of income generation.

Findings presented in Table 5.5 on page 119 indicate that Malawian universities rely on traditional sources of income such as tuition fees and government subvention (for public

universities only). This is contrary to the elements of an entrepreneurial university model which aims at diversifying income sources to challenges emanating from dependence on such traditional sources of income (Etzkowitz *et al*., 2000; 2001). In addition, Dunga (2013), World Bank (2014) and Mambo *et al*. (2016) reported that overreliance on tuition fees and government subvention has proved futile in addressing needs of higher education in Malawi.

However, looking at results presented in the same Table 5.5 on page 119, the public universities have made strides in consultancy work which is considered the lowest level entrepreneurship in the university set up according Tijssen (2006). Learning from the benefits accrued from adopting the concept of an entrepreneurial university by scholars such as Etzkowitz et *al*. (2000; 2001), Arnaut (2010), Barnett (2005), Svensson et *al*. (2012), Todorovic *et al*. (2011) and others, it is equally cardinal to promote higher levels of university entrepreneurship for income generation among other benefits.

6.3.3.3 Comments on University Entrepreneurship by Policy Makers

Triangulation involved collecting data from relevant government officials (policy makers) in order to establish the extent to which Malawian universities have adopted the entrepreneurial university concept.

Findings presented in Table 5.7 on page 121 provide government's perception on the low levels of entrepreneurship in Malawian universities. However, the policy makers (government officials) were optimistic of the entrepreneurial university concept acceptance considering the challenges currently faced by the HEIs in Malawi on one hand and the benefits of an entrepreneurial university (such as extra income generation, contribution to socio-economic development, competent graduates among others) on the other hand.

6.3.4 Entrepreneurship Education in Malawian Universities

Worth noting from the findings in Section 5.3.4, presented earlier in Chapter five, is that 3 of the 5 Malawian universities that participated in the study have introduced entrepreneurship as a subject and one of the universities has a full program in entrepreneurship at both undergraduate and postgraduate levels. Notably, the majority of the Malawian universities (4 out of the 5 universities) that are offering business related programmes had introduced entrepreneurship as a subject in their curriculum. Other universities with non business related programmes are in the process of introducing entrepreneurship as a course in their curriculum (Table 5.6 on page 120). This development signals the growing interest in entrepreneurship education in the Malawian universities which would enhance the progression into the second academic revolution. Entrepreneurship education facilitates the acceptance and adoption of entrepreneurial paradigm in the universities as reported by Clark (1998), Ropke (1998) Etzkowitz (2003b) and other scholars in literature reviewed under Section 2.3.1 in Chapter two.

However, the findings of this study presented in Section 5.3.4 in Chapter five earlier, did not verify on the approach being taken in the delivery of the entrepreneurship course as there is need to emphasize on practical approach to avoid pitfalls indicated by Thorn & Soo (2006), Grundling & Steynberg (2009), Sawahel (2014) presented in Section 2.3.1 earlier in Chapter two.

Furthermore, there is need to encourage tailor made training courses in entrepreneurship for both staff and students in the Malawian universities as the findings reveal a weakness in this area. It is known that an introduction of the tailor made training programmes in entrepreneurship for both faculty and students facilitated the entrepreneurial paradigm and progression into the second academic revolution in European countries and some parts of Asia as reported by OECD (2009) and Williams *et al*. (2015). Unless Malawian universities introduce such tailor made courses in

entrepreneurship for faculty and students aiming at start-ups and spinoff creation, transformation into entrepreneurial universities is likely to remain a challenge.

6.3.5 Findings from Secondary Data Sources on University Entrepreneurship

Although the findings indicate that Malawian universities have maintained their traditional roles and lack higher levels of entrepreneurship, there are signs of basic knowledge in higher levels of entrepreneurship evident in an entrepreneurial university model provided by Tijssen (2006). Findings in Table 5.3 on page 117 confirm an intention in the Malawian universities to adopt the concept of an entrepreneurial university through 'transfer of knowledge' and 'transfer of technology' as prescribed by Tijssen (2006).

Despite having such documents with these entrepreneurial elements, findings presented in Sections 5.7.1 to 5.7.6, earlier presented in Chapter five, indicate that the Malawian universities have achieved less on the set strategic goals on knowledge generation (patenting) and knowledge transfer (consultancies, research contracts, marketing of student and faculty products as well as USO and start-up creation). Nevertheless, inclusion of such higher level entrepreneurial university output in such important documents is a step towards the right direction in the adoption of an entrepreneurial paradigm (Arnaut, 2010).

Apart from strategic documents stipulating elements of economic development in teaching and research, the availability of the research and development policy document in 4 of the 5 Malawian universities is a step in the right direction towards progressing into the first academic revolution. However, there is need to develop IP policy documents that facilitate commercialization of research output through patents, sale of technology and creation of firms (Etzkowitz *et al*., 2001; Rhines, 2005).

Thus, secondary sources of Malawian universities portray characteristics of an entrepreneurial university. However, such vision is not supported by actual facts on the ground given that realization of set goals and objectives is not evident. There is need to review and revise strategic documents and formulate achievable targets alongside relevant policies (such as IP policy; consultancy policy) to guide the adoption of an entrepreneurial university in Malawian university as alluded to in several studies (Mian, 1997; Henrekson & Rosenberg, 2001; Jensen & Thursby, 2001; Feldman *et al*., 2002; Siegel *et al*., 2003; Shane, 2004; Link & Scott, 2005; Lockett & Wright, 2005; Powers & McDougal, 2005; Rasmussen *et al*., 2006; Downie & Herder, 2007).

6.4 Strategies to Facilitate the Entrepreneurial Paradigm in Malawian Universities

Malawian universities need to devise strategies and take steps to successfully transform into entrepreneurial universities as the transition is neither accidental nor incidental (Clark, 1998; Etzkowitz et *al.*, 2000). Findings of the study have identified three strategies critical in the adoption of the concept of an entrepreneurial university in the Malawian universities. The three strategies are discussed in the Sections below.

6.4.1 Establishment of an Office to Coordinate University Entrepreneurship

The findings of the study presented in Figure 5.12 on page 124 indicate that establishing an office to coordinate entrepreneurship in the Malawian universities is cardinal in facilitating the transition from traditional universities into entrepreneurial universities. This is in agreement with Mian (1997), Henrekson & Rosenberg (2001), Jensen & Thursby (2001), Feldman *et al*. (2002), Siegel *et al*. (2003), Shane (2004), Link & Scott (2005), Lockett & Wright (2005), Powers & McDougal (2005), Rasmussen *et al*. (2006), Downie & Herder (2007) and other scholars who

indicated that traditional universities transforming into entrepreneurial universities had established offices to enhance entrepreneurship practices (Section 2.5.1).

Typical examples of such offices include Technology Transfer Office (TTO), Technology Licensing Office, Commercialization Office, Project's Office, Business Development Office, Commercialization or Innovation Managers, lawyers specializing in contracts and IP, Business Liaison or Development Officer, Incubation Officers among others (Rasmussen *et al*., 2006; Downie & Herder, 2007). Mostly, universities have created centres where such office positions are established (Rasmussen *et al*.,2006).

The key performance area of such offices that coordinate university entrepreneurship mission are outlined in Diagram 2.2 on page 39 where Bradley *et al*. (2013) presents steps and processes involved in commercialization of research results generated by both students and faculty.

Therefore, the views of establishing an office to facilitate the adoption of the entrepreneurial paradigm in Malawian universities are well founded. Much as other universities relied on external TTOs (Downie & Herder, 2007; Collier & Gray, 2010; Leisyte, 2011), the findings on the need to establish such offices suggest that Malawian universities would rather recruit officers to fill in internal positions in entrepreneurship than engage external experts to handle entrepreneurship matters.

6.4.2 Development of Policies to Guide University Entrepreneurship

The findings presented in Figure 5.12 on page 124 further indicate that developing a relevant policy to guide entrepreneurship in the Malawian universities would facilitate the adoption and success of entrepreneurial paradigm in the higher education institutions.

Policy guidance has been stated as important in an entrepreneurial university by scholars like Etzkowitz et *al.* (2001). Presence of a sound policy in entrepreneurship and establishment of an office to coordinate entrepreneurship in universities have been commended in the adoption of an entrepreneurial university by different scholars such as Mian (1997), Henrekson & Rosenberg (2001) and others.

Therefore, the strategy to set an entrepreneurial office and have a clear policy in entrepreneurship warrants the progression of Malawian universities from traditional into entrepreneurial universities.

6.4.3 Development of an Entrepreneurial Mindset

Malawian universities also considered development of an entrepreneurial mindset as another strategic goal to be pursued to facilitate transformation into entrepreneurial universities. Although not adequately discussed in the literature review, mindset change can be traced in the emergence of an entrepreneurial university in both the US and European universities. Regardless of the 'bottom-up' or 'top-down' approaches in the emergence of an entrepreneurial university, evident were new ways of thinking towards income generation and contribution to the society. The new thinking led to the discovery of innovative ways in income generation beside traditional sources. There was a change from conventional thinking to entrepreneurial thinking. It is the same entrepreneurial thinking that influenced the passage of the Bayh-Dole Act (1980). Mindset change is thus critical in the emergence and adoption of an entrepreneurial university. Therefore, it is critical that Malawian universities have equally considered mindset change towards entrepreneurship as a step towards adopting the entrepreneurial university model.

6.4.4 Suggested Future Strategies

Malawian universities did not consider establishment of facilities stated by Henrekson & Rosenberg (2001), Aziz *et al*. (2011), Allen (2012), Rasmussen *et al*. (2013), US Department of Commerce (2013) like science parks, incubation centres and proof of concept centre as important in the entrepreneurial paradigm. As reported by Link & Scott (2005), Bradley & Metla (2008), creation of USOs and start-ups increased in US and European universities because of these facilities. Much as this has not been considered by Malawian universities, establishing an office to coordinate entrepreneurship, developing a policy in entrepreneurship and creating an entrepreneurial mindset in Malawian universities would lead to insights into establishment of such facilitates. Eventually, there shall be an increase in entrepreneurship activities at higher level such as creation of USOs and start-ups.

6.5 Elements of an Entrepreneurial University Model to be adopted by Malawian Universities

A total of 7 elements of an entrepreneurial university in the study were adopted from Clark (1998) and OECD (2012) presented in Table 3.1 on page 62. According to the findings of the study, 6 of the 7 elements have been considered relevant towards the adoption of an entrepreneurial university model in the Malawian universities.

6.5.1 Element 1: University Leadership

Malawian universities consider university leadership as an important element in the adoption of an entrepreneurial university concept. University leadership was rated highly before (95.1%) and after (100%) Phase 2 of the study (Figure 5.13, page 125). This depicts how critical a strong and committed leadership is in the adoption of the concept of an entrepreneurial university.

University leadership was adopted from the entrepreneurial university frameworks by Clark (1998) and OECD (2012). Thus, the element of committed leadership applies not only in developed economies but in LDCs like Malawi.

6.5.2 Element 2: Integration of Entrepreneurship in Teaching and Research

The second element that was considered critical in the adoption of an entrepreneurial university concept in the Malawian university is the integration of entrepreneurship in teaching and research. The ratings were similar to the element of university leadership in 6.5.1 above (95.1% high rating before and 100% high rating after Phase 2 of the study; Figure 5.16, page 128). This element concerns creating an integrated entrepreneurial culture which is rooted in strong entrepreneurship practices (Clark, 1998). Etzkowitz *et al*. (2001) and OECD (2012) relate this element to economic development in teaching and research area where knowledge, technology and products are transferred to the industry and market for use. The element of integrating entrepreneurship is therefore, critical in the adoption of an entrepreneurial university model in both developed and least developed economies.

6.5.3 Element 3: Motivation and Support of Faculty

The third element that was considered important in the adoption of an entrepreneurial university concept in Malawian universities (92.5% before and 100% after Phase 2 of the study; Figure 5.15 on page 127) concerns the faculty also referred to as the '*academic heartland*' by Clark (1998). Clark (1998) in his entrepreneurial university framework stated that keeping academic departments and units vibrant, dynamic and motivated was cardinal in the university's entrepreneurial paradigm. Similarly, the entrepreneurial university framework developed by

OECD (2012) considers incentivizing entrepreneurial behavior in individuals as being critical in the transformation of a traditional university into an entrepreneurial university.

Along with faculty motivation, Tyler (2009) and OECD (2012) emphasized on supporting faculty in the development of an entrepreneurial mindset and support for business start-ups and other entrepreneurial activities in the teaching and research missions.

6.5.4 Element 4: Impact Assessment of Entrepreneurship Activities

Not explicit in Clark (1998) entrepreneurial university framework is the element of assessing the impact of an entrepreneurial university. This element was one of the seven elements highlighted by OECD (2012) entrepreneurial university framework. OECD (ibid) states that an entrepreneurial university should measure and understand the impact of the changes it has made on the institution, local, international and in the global arena According to the findings of this study, Malawian universities consider this element important in the adoption of an entrepreneurial university concept (an average of 73% before and after Phase 2 of the study; Figure 5.17 on page 128).

6.5.5 Element 5: Funding and Financial Management

The funding and financing element concerns plans by the university to invest in activities and processes that lead to the adoption of an entrepreneurial university model. Clark (1998) stated the need to invest in order to diversify income sources for use in the entrepreneurial paradigm in order to successfully achieve university entrepreneurship. Similarly, OECD (2012) emphasized on the need to have a financial strategy on the entrepreneurship mission. Malawian universities have also considered the element of funding and financial management important in the adoption

of an entrepreneurial university concept (71% before and 96% after Phase 2 of the study; Figure 5.14 on page 126).

6.5.6 Element 6: Internal and External Collaborations

Entrepreneurial universities actively seek connections and networks with external stakeholders to expand their development periphery (Clark, 1998). Building and sustaining a relationship with key partners and collaborators is equally pointed out as being an important element in the OECD (2012). Malawian universities have also considered external collaboration important in the adoption of an entrepreneurial university concept (high rating of 51.5% before and a high rating of 77.8% after Phase 2 of the study; Table 5.9 on page 133).

Internal networking was pointed out by both Clark (1998) and OECD (2012) as cardinal in the entrepreneurial paradigm in universities transforming into entrepreneurial universities. Entrepreneurial universities encourage interdisciplinary project-oriented research alongside departments as an additional approach to group academic work. However, this element is silent in OECD (2012) entrepreneurial university framework.

Initially, Malawian universities did not consider internal collaboration as highly important (47%) in the entrepreneurial paradigm (Figure 5.20, page 132). Later, after Phase 2 of the study, 75% of the respondents rated the element of internal collaboration to be of high importance in the adoption of an entrepreneurial university concept (Figure 5.20, page 132).

6.5.7 International Orientation

Internationalization involves integrating an international, inter-cultural or global dimension into the purposes, functions or delivery of higher education (OECD, 2012). This element is emphasized in the OECD (2012) entrepreneurial university framework but was not considered in

Clark (1998) entrepreneurial university framework. The findings indicate that Malawian university did not consider international orientation as critical in the adoption of an entrepreneurial university (2.3% before and 36% after Phase 2 of the study: Figure 5.18 on page 130).

6.6 Major Outputs of an Entrepreneurial University in Malawian Universities

The emergence of an entrepreneurial university in the US and UK universities took different approaches as reported by Etzkowitz (2003b). The differences dwell in the approaches used in introducing the entrepreneurial concept and also in the outputs of the entrepreneurial processes. This section focuses on the outputs before and after model operationalization.

In terms of the output, US universities focused on commercialization of faculty research while UK and other European universities focused on commercialization of student projects (Etzkowitz, 2001; Thursby *et al*., 2003; Etzkowitz, 2003b; DEST 2003; Mowery *et al*., 2004; Rhines, 2005; Libecap, 2005). According to the findings of the study, the Malawian universities are skewed towards the European approach where start-ups by students would lead the entrepreneurial paradigm with few USOs by faculty. After phase 2 of the study, findings in Table 5.16 on page 140 reveal a positive change in favour of start-up creation than USO creation.

However, student start-ups are very minimal in the Malawian universities compared to other entrepreneurial outputs like research contracts and consultancies. Findings from comments by respondents in Section 5.7.6, in Chapter five earlier, indicate that Malawian universities consider higher levels of university entrepreneurship hard to achieve in LDCs. Nonetheless, the lower level entrepreneurship outputs like research contracts and consultancies have potential to

strengthen the relationship between the universities and the industry which is currently reported to be weak.

Positive changes in the higher levels of university entrepreneurship like sale options, acquisition and licensing of patents as well as creation of USOs and start-ups would improve overtime as there is an indication of positive change in the participating universities when compared to university that was set as a control.

Therefore, the noticeable outputs of an entrepreneurial university in Malawian universities include: consultancies, research contracts and student start-ups. The outputs reported in this study do not match with the outputs of an entrepreneurial university in developed economies (Clark, 1998; Etzkowitz et *al.*, 2001; Tijssen, 2006). However, with proper planning, resource availability and more exposure, Malawian universities would improve on higher levels of entrepreneurship provided by Tijssen (2006).

The higher levels of university entrepreneurship such as USOs and start-ups are highly rated by scholars like Di Gregor & Shane (2003), Rasmussen (2006), Powers & McDougall (2005), Van Looy *et al*., (2011) and others as this level is said to prove university's intellectual eminence, quality and scientific productivity. However, the Malawian universities have a perception that this highest level of entrepreneurship will hardly be achieved in Malawian universities due to factors such as: inadequate resources; lack of expertise and knowledge in firm creation among other factors.

6.7 Model Development

The findings of the study have provided an answer to the main research question of the study which was:

"*What entrepreneurial university model can guide the progression of universities in least developed countries, like Malawi, from traditional into entrepreneurial universities?"*

Firstly, the findings have provided confirmation that Malawian universities are still traditional universities and therefore require sensitization and awareness regarding the adoption of an entrepreneurial university concept which could provide solutions to most challenges and demands faced by the HEIs. Findings on the major components of an entrepreneurial university are presented below.

Strategies that form major inputs into the model have been presented in the findings (Figure 5.12 on page 124) as: establishment of offices to coordinate entrepreneurship; development of policies to spearhead entrepreneurship and; development of an entrepreneurial mindset in the university.

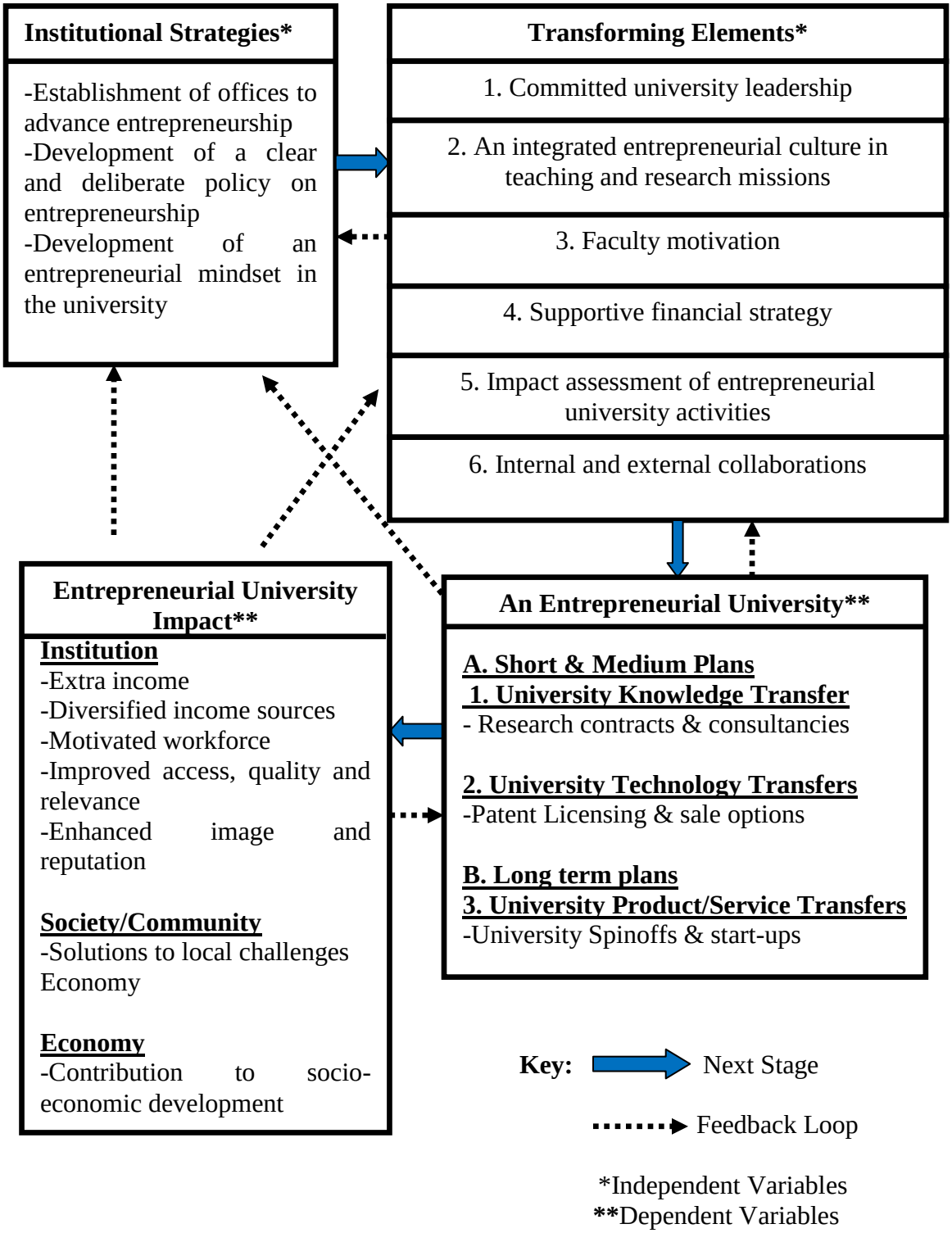
The second stage of the model comprises the 6 transforming elements considered important in the adoption of an entrepreneurial university concept adapted from Clark (1998) and OECD (2012). These elements are: committed university leadership; an integrated entrepreneurial culture in teaching and research missions; faculty motivation; supportive financial strategy; impact assessment of entrepreneurial university activities; internal and external collaborations.

Although current findings (presented in Sections 5.7.1 to 5.7.6 in Chapter five) indicate that outputs of adopting an entrepreneurial university model in Malawian universities are concentrated in the lower level university entrepreneurship categorized by Tijssen (2006), it is still important that such higher levels of university entrepreneurship form part of the entrepreneurial university model to be adopted by Malawian universities. Hence, Malawian universities can commence the entrepreneurial paradigm adoption with outputs that are

achievable in the short and medium term (lower level university entrepreneurship) as they work on the higher levels of university entrepreneurship in the longer term.

The end result of the findings guided by the conceptual framework is an entrepreneurial model for Malawian universities shown in Figure 6.1 on the next page.

Figure 6.1: The Entrepreneurial University Model for Malawian Universities



Source: Author (2019)

6.8 Summary of the Chapter

The Chapter presented a discussion of research findings. The discussions covered four main specific objectives of the study. Firstly, the discussion was on results on the extent to which Malawian universities have progressed into entrepreneurial entities. Secondly, the discussion was on strategies that have been considered by Malawian universities to facilitate the entrepreneurial paradigm in the institutions of higher learning. Thirdly, the discussion focused on elements that are considered crucial in the entrepreneurial university model to be adopted by Malawian universities. Lastly, the discussion was on outputs of an entrepreneurial paradigm in the Malawian universities. The findings of the study led to the development of the model of an entrepreneurial university for Malawian universities.

The next Chapter concludes the thesis. It contains summaries, conclusions and recommendations, as well as areas for possible further research.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This Chapter presents a summary of the main issues in the study and further provides a conclusion for the study. The research summary highlights main issues in the background of the study, the statement of the problem, the research objectives, the conceptual framework and the methodology employed to address the research objectives while the conclusion for the study has been based on the findings and discussion of the study. Based on the conclusion and research findings, the researcher has provided recommendations, including possible areas for further study.

7.2 Background

The emergence of an entrepreneurial university in the early 1980's brought a remarkable stature in the university system different from a traditional and research university that have existed ever since. A major characteristic of an entrepreneurial university has been its continued engagement with industry and businesses so as to transfer and commercialize its knowledge, technologies and new discoveries (Etzkowitz, 1998). Additionally, an entrepreneurial university actively seeks to innovate how it goes about its business and considers institutional entrepreneurship as both a process and an outcome (Clark, 1998). Consequently, an entrepreneurial university has been recognized worldwide as an engine of economic growth (Arnaut, 2010). The pioneering universities that transformed into entrepreneurial universities include MIT and UCB (Etzkowitz *et al*., 2000; Rhines, 2005; Tyler, 2009).

An entrepreneurial university emerged in the American universities on the heels of the Bayh-Dole Act (1980). Before spilling over to Europe and the rest of the world, the concept of an entrepreneurial university had widely been exploited to address a myriad of challenges faced by universities such as financial constraints, unemployment of graduates and contribution to societal needs. The advent of an entrepreneurial university also addressed deficiencies that existed in the NIS in US and UK and the rest of Europe where university discoveries ended up on the market following its adoption (Etzkowitz *et al*., 2000).

Consequently, it is the successful adoption and implementation of the concept that led to its popularity and subsequent adoption in most universities across the developed and developing economies. However, despite the popularity of the concept of an entrepreneurial university in America, Europe and other developed economies, little is known about its adoption in LDCs like Malawi.

Considering that universities and the NIS in LDCs face similar and probably more challenges than those in Europe, America and Asia, the purpose of the study was to explore and develop a model that can be adopted by universities in LDCs, Malawi in particular, to facilitate the successful transformation of traditional universities into entrepreneurial universities.

7.3 The Research Problem

The research problem of the study took cognizance of the need for universities in LDCs like Malawi to evolve into entrepreneurial universities in order to curb overreliance on the traditional sources of income such as tuition fees and government subvention. An entrepreneurial university exploits innovative means of income generation like licensing of patents, selling discovered technologies, creating and running own firms.

Additionally, the HEIs in LDCs, Malawi inclusive, are faced with demands to develop relevant and innovative HEIs capable of responding flexibly to the needs of stakeholders and society in ways that have real and lasting impact while enhancing the graduate attributes and spurring economic growth.

Although the Government of Malawi through the MoEST set goals for HEIs to increase access, improve quality of education and relevance of Malawian universities, it has been challenging for the institutions to achieve those set goals due to financial constraints among other challenges. Thus, the adoption of the concept of an entrepreneurial university by both the public and private universities in Malawi was considered desirable.

Unless Malawian universities adopt the concept of an entrepreneurial university and progress into the second academic revolution, multiple benefits associated with the phenomenon which includes sustainable income generation for university teaching and research missions may not be fully realized. However, progression into the second academic revolution and subsequent adoption of the entrepreneurial university requires motivation, planning, support, proper execution and championship.

7.4 Objectives of the Study

The main objective of the study was to develop an entrepreneurial university model that can be adopted by universities in least developed economies, Malawi in particular, to guide the transformation of traditional universities into successful entrepreneurial universities. The main research question was:

"*What entrepreneurial university model can guide the progression of universities in least developed countries, like Malawi, from traditional into entrepreneurial universities?"*

Four specific objectives were developed to achieve the main objective. The first specific objective aimed at establishing the extent to which Malawian universities had progressed from being teaching and research universities into entrepreneurial universities. This objective helped to create a baseline for assessing the status of Malawian universities. The related research question addressing this specific objective was:

"To what extent have Malawian universities progressed from teaching and research universities to entrepreneurial universities?"

The second specific objective aimed at identifying strategies that are considered crucial in the adoption of the concept of an entrepreneurial university in Malawian universities. Universities that have successfully progressed into successful entrepreneurial universities in advanced and developing economies devised strategies and instituted initiatives to facilitate the transformation. Examples of the strategies employed include: development of policies to guide the entrepreneurial paradigm; establishment of offices to manage the mainstreaming of entrepreneurship function in the teaching and research missions of the university; establishing facilities such as science parks, incubation centres and proof of concept centres to advance entrepreneurship at both faculty and student levels; enhancing networks with community, national and international stakeholders to facilitate the progression into an entrepreneurial university. This second specific objective was designed to identify strategies that would steer the progression of Malawian universities into successful entrepreneurial ones. The strategies were considered as a critical component in the input phase of the transformation process. The research question addressing this specific objective was:

"*What strategies are crucial in the adoption of an entrepreneurial university in Malawian universities*?"

The third specific objective aimed at determining elements that were considered critical in the adoption of the concept of an entrepreneurial university in the Malawian universities. Seven (7) elements were adopted from two popular theories of an entrepreneurial university developed by Clark (1998) and OECD (2012). The 7 elements are: committed university leadership, internal and external collaborations, supportive financial strategy, faculty motivation, integrated entrepreneurial culture, internationalization and impact assessment of an entrepreneurial university.The elements identified were considered a critical component in the second phase of the model of an entrepreneurial university for Malawian universities in the transformation process. The research question addressing this specific objective was:

"What elements of an entrepreneurial university are critical in the entrepreneurial paradigm in Malawian universities?"

The last specific objective aimed at finding out the major outputs realized from adopting the concept of an entrepreneurial university in Malawi. Known models of an entrepreneurial university incorporate entrepreneurship into their teaching and research responsibilities. Tijssen (2006) categorises entrepreneurial university outputs into three levels. The first and lower level, knowledge transfer, concerns university engagement in consultancies and research work. The second and higher level, technology transfer, concerns commercial exploitation of university owned patents and also sale option of discovered university technologies. The third and highest level, transfer of products or services, involves creation of firms known as USOs or start-ups to sell products emanating from faculty and student research work. It was pertinent to adopt the entrepreneurial university by firstly focusing on outputs that are achievable in the short and medium terms and then progress into the higher level outputs in the long term. The outputs

identified were considered important aspects of Phase 3 in the transformation process. The research question addressing this last specific objective was:

"*What are the major outputs realized from the entrepreneurial paradigm in the Malawian universities?*"

7.5 The Conceptual Framework

Development of the conceptual framework depended on literature reviewed, theories and models that were deemed relevant in the study.

The literature reviewed concerning the adoption of an entrepreneurial university by traditional and research intensive universities in addition to the two entrepreneurial university theoretical frameworks adopted (Clark, 1998; OECD, 2012), provided components of the entrepreneurial university model developed in the study. The transformation model was applied to guide the components forming an entrepreneurial university model to be adopted by Malawian universities.

The transformation model developed by Burke (2008) recognizes three important phases, namely; the input stage, transformation stage and output stage. An additional critical component in the transformation model is the feedback loop at each and every stage which allows for effective monitoring and evaluation.

The literature reviewed, the two theoretical frameworks by Clark (1998) and OECD (2012) together with the transformation model culminated into the conceptual framework (Figure 3.4 on page 67) that guided the study and mostly the development of data collection tools (Appendix B and C).

7.6 Significance of the Study

It is envisaged that the study will have an impact in many dimensions, in as far as the higher education sector in LDCs like Malawi are concerned. The study results will have the greatest significance for HEIs, the industry and the economy. The notable contributions of the study are discussed below.

7.6.1 Contribution to Theory

The study provides a critical insight on the multi-dimensional view of an entrepreneurial university from the context of universities in LDCs in Africa. Although the study focuses on Malawi, the results could also reflect on the multiplicity of models of an entrepreneurial university in HEIs in LDCs. Most studies and literature available is based on universities that have transformed into entrepreneurial universities in the developed economies. The conditions universities in the developed economies face are different from conditions that universities in LDCs face. Nevertheless, the adoption of an entrepreneurial university is not limited to universities in developed economies (Etzkowitz *et al*., 2001). The results of the study, therefore, contribute to knowledge on creation of entrepreneurial universities in least developed economies.

7.6.2 Use of Model

The researcher believes the tailor-made entrepreneurial university model developed in this study presented in Figure 6.1, on page 163, will direct and guide university leadership and faculty as well as policy makers towards creation of entrepreneurial universities in LDCs Malawi in particular. It is anticipated that the model will stimulate policy formulation at both national and institutional levels. The universities can use the model at the individual, department, faculty and

institutional level, hence its holistic approach in guiding the transformation into entrepreneurial university.

7.6.3 New System in Higher Education Institutions

Universities adopting the model of an entrepreneurial university developed in the study (See Figure 6.1 on page 163) will have to review and redesign their system. There will be need for new a new policy, new office establishments, new recruits, a review and redesigning of curriculum in view of the entrepreneurial paradigm. A major component of an entrepreneurial university is bringing in university entrepreneurship in teaching and research. As alluded to, it is not enough to offer entrepreneurship education but nurturing the entrepreneurial culture in all fields and university mission through practice is vital in the entrepreneurial university. Teaching and assessment approaches will also have to be aligned towards achieving an entrepreneurial status of the university.

Similar to incorporating entrepreneurship in teaching, faculty have to reconsider the research work conducted. Literature reviewed shows that faculty in entrepreneurial universities carry out research that leads to discoveries or solutions useful to the industry and society. Internal and external collaborations are at the centre of conducting such research resulting into useful knowledge and technology creation for the nation.

7.6.4 Rethinking Resource Mobilization: Diversification of Income Sources

Known entrepreneurial universities have claimed new and innovative means of generating extra income from processes undertaken in the second academic revolution. Universities considered traditional and still relying on traditional sources of generating income will have to rethink new

ways of mobilizing resources and generating income and an entrepreneurial university framework provides guidance.

Therefore, in adopting the concept of an entrepreneurial university, universities in LDCs have to come up with innovative means of resource mobilization in line with the concept. Economic development in teaching and research has dominated the entrepreneurial paradigm in successful entrepreneurial universities.

7.7 Research Design and Methodology

The research methodology was guided by the research questions and objectives, the extent of existing knowledge, the amount of time and other resources available, as well as the philosophical underpinnings. A number of mechanisms were adopted in this research to ensure that the findings are reliable and valid.

Firstly, a multiple case study holistic approach was adopted as suggested by Yin (2003) and Saunders *et al*. (2009). Two criteria were used to select the universities that participated in the study. Firstly, credibility of the university was an important factor followed by willingness to participate in the study. Secondly, age of the institution mattered as the study required a university that has been in existence for a period of time worth providing rich information. This approach helped in gathering a rich collection of quantitative and qualitative data through self administered questionnaires in Phase 1 and Phase 3 of the study.

Phase 1 of the study was a survey to collect data on the extent to which Malawian universities have progressed into the first and second academic revolutions. It also involved collecting data on elements considered important in the adoption of an entrepreneurial university.

Phase 2 of the study was an intervention where the concept of an entrepreneurial university was presented to the participating universities. The researcher monitored planning and implementation of the major aspects of an entrepreneurial university as propounded by Clark (1998) and OECD (2012).

Phase 3 of the study was a follow up on the survey conducted in Phase 1 to provide empirical backing to the results and confirm on the following: elements of an entrepreneurial university model for Malawian universities, strategies to facilitate the entrepreneurial paradigm; and outputs of the entrepreneurial paradigm in the Malawian universities.

To answer the research questions of the study, a mixed research method approach was adopted where both quantitative and qualitative data were collected. SPSS was used to capture quantitative data, generate descriptive statistics and conduct bivariate analysis. Microsoft Excel was used to generate pie charts and bar graphs where colour coding was employed for each variable. Qualitative data was analyzed using the open coding system where similar responses were put into categories.

7.8 Study Conclusion

The current trend worldwide has been different types of universities tirelessly adopting the concept of an entrepreneurial university and progressing into the second academic revolution. Malawian universities are typical traditional universities and require the findings of the study in order to successfully evolve into entrepreneurial universities. The research findings confirm that there is indeed a need for a fitting model to guide universities in LDCs like Malawi to guide the adoption of an entrepreneurial university which has become popular in developed and developing nations.

An entrepreneurial university is known for providing solutions to numerous challenges and demands placed on HEIs in all different types of environments. The main focus of Malawian universities however, is on the teaching mission with some traces of research work and consultancies mostly in public universities. Commendably, the Malawian universities, both public and private, have taken steps to introduce entrepreneurship either as a subject or as a full program and have incorporated issues of technology transfer, such as patents, in their strategic documents and policies. This development signals interest to incorporate entrepreneurship in the university system in Malawi hence the need for this study results to guide the introduction of entrepreneurship in the research and teaching missions. Thus, the study results will be useful in addressing this need through the entrepreneurial university model developed specifically for Malawian universities and other LDCs with similar characteristics

Malawian universities depend on traditional sources of income but are capable of generating extra income if the concept of an entrepreneurial university is fully embraced. Not only are Malawian universities pressured to generate extra income, they are also facing demands to increase access, relevance and improve quality of higher education. Adoption of the entrepreneurial university is therefore, a panacea to such pressures and demands.

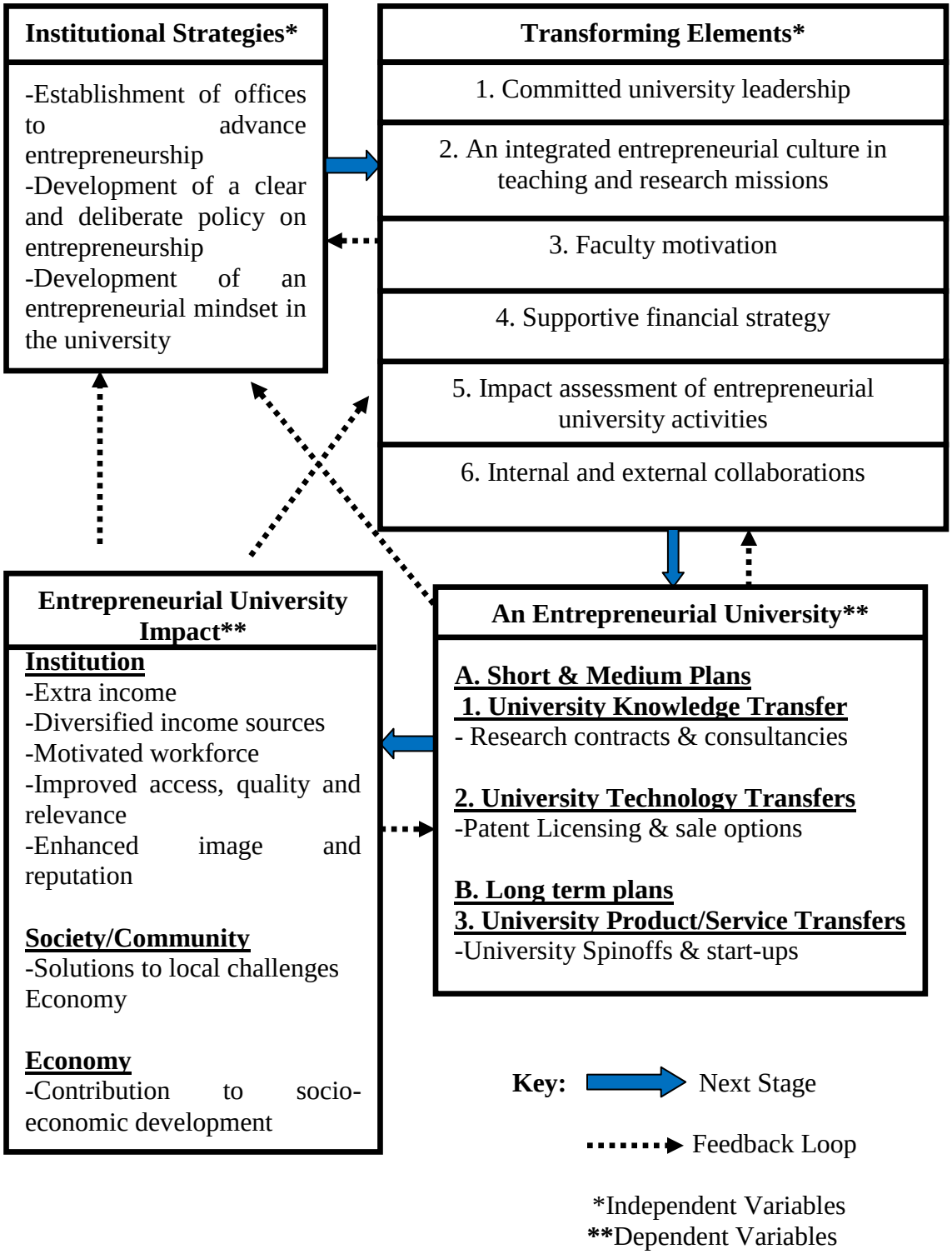
The concept of an entrepreneurial university is relatively new in Malawian universities and its novelty has attracted the interest of both the private and public universities. There is interest to integrate entrepreneurship into the Malawian university system however, a knowledge deficit on the phenomenon coupled with unavailability of a model or framework to guide the universities has seen them lagging behind while their counterparts in developed and developing economies have transformed into entrepreneurial universities. Malawian universities may consider using the

study results to address the challenges inhibiting their progression into entrepreneurial universities.

The study concludes that a holistic entrepreneurial university designed using the transformation model is ideal to guide Malawian universities that have little knowledge and practical experience of an entrepreneurial university. The entrepreneurial university model developed in this study presented in Figure 6.1 on page 163 copied and presented on the next page as Figure 7.1 satisfied the requirements of the transformation model as it covers the three main phases: the inputs which are strategies and initiatives, the transformation stage which basically focuses on transforming elements, and the outputs of the entrepreneurial paradigm. Feedback loops have also been included in the model.

The entrepreneurial university model to be adopted by Malawian universities presented in Figure 7.1 on the next page has been developed from the study guided by the theoretical frameworks and the conceptual framework presented in Chapter three earlier. In using this entrepreneurial university model, particular attention has to be paid to strategies that need to be adopted in order to spearhead the entrepreneurial paradigm. These strategies, according to transformation model presented in figure 3.3 on page 34, and herein in the first stage of the transformation include establishment of relevant offices, development of right policies and development of an entrepreneurial mindset. The second stage of the entrepreneurial university model in Figure 7.1 to be adopted by the Malawian universities concerns six critical transformation elements that need focus on in order to progress into successful entrepreneurial universities from the traditional university status. Further, the model in Figure 7.1 presents the outputs that have to be earmarked as target in the pursuance of the entrepreneurial paradigm both in the short run and in the long run.

Figure 7.1: The Entrepreneurial University Model for Malawian Universities



Source: Author (2019)

The entrepreneurial university model to be adopted by Malawian universities presented in Figure 7.1 on page 177 encompasses major components necessary in the entrepreneurial paradigm and EO. As guided by Tijssen (2006), particular attention in the adoption of the entrepreneurial university model has to be paid to the output stage. There is need for more resources and guidance on achievement of higher level university entrepreneurship which is regarded highly in the adoption of an entrepreneurial university. Recognition of Malawian universities as entrepreneurial universities will be realized once creation of spinoffs is evident hence a call for long-term plans to achieve this status despite the findings indicating feasibility challenges. Nonetheless, the road to success and prosperity is neither smooth nor quick as there is a saying, "*Rome was not built in a day*". Furthermore, Etzkowitz *et al*. (2000; 2001) believe the concept of an entrepreneurial university can be adopted by all types of universities with different trajectories but the outcome will emerge similar with time.

7.9 Recommendations

Based on the research findings and conclusions, the researcher has come up with several recommendations as follows:

7.9.1 Mindset Change

There is need for mindset change in the Malawian universities in order for leadership and faculty to consider adopting the concept of an entrepreneurial university as a reliable and long-term solution to challenges and demands faced by the HEIs. Unless creative and critical thinking is adopted in Malawian university system, not even the model developed in the study can lead to successful adoption of an entrepreneurial university. New thinking is necessary to Malawian

universities incorporate entrepreneurship into their teaching and research missions. Copying what other universities have done is fruitless in this endeavour (Etzkowitz, 2003a).

The entrepreneurial university model developed in the study requires a complete mental revolution. An entrepreneurial mindset in teaching and research missions at all levels and in all different academic fields needs to be developed otherwise progression into entrepreneurial universities will remain an aspiration. Mindset change along with capacity building in research and commercialization of research results would go a long way in facilitating a smooth transition into the second academic revolution.

Mindset change should begin with university leadership through to faculty and to the students. There has to be a new way of thinking on sourcing funds to scale up operations to improve quality and relevance of higher education in response to industrial and societal needs. Delivery and approaches in the teaching and research mission have to reflect economic development (Etzkowitz *et al*., 2000; 2001).

Faculty will have to gain new knowledge and skills to enable them incorporate entrepreneurship in their core responsibilities of teaching and research. Additionally, new networks and collaboration have to be formed. Universities are no longer '*ivory towers*' as indicated by Etzkowitz *et al*. (2000). Inevitably, support from university management to faculty and students through creation of relevant structures and engaging experts in the entrepreneurship field is critical and requires mindset change and strategic thinking.

7.9.2 Leadership Commitment and Support

The findings and various models in entrepreneurial university indicate that without university leadership championing the adoption of an entrepreneurial university concept, the transition

would be a failure. There is need for university leadership to be torch- bearers for the entrepreneurial paradigm in their institutions. Leadership commitment and support for the entrepreneurship mission is paramount. Commitment must start from the top and spread to the rest of the university members.

At the top level, management will be able to support and initiate the establishment of the required office(s), initiate and facilitate networks with industry and other stakeholders, lead in the development of relevant policies, develop and improve on required facilities and infrastructure, incorporate entrepreneurship in the strategic and operational plans and many other activities. If championed at the corporate level, there will be success in incorporating entrepreneurship in core missions of a university (Clark, 1998; OECD, 2012).

7.9.3 Motivation and Unity of Faculty

Motivation of faculty has been echoed to be at the centre of economic development in teaching and research. The need to take deliberate steps to motivate the faculty cannot be ignored. Clark (1998) emphasized on motivating the academic heartland and this is exactly what must be done in the Malawian universities. If the faculty are not provided any support or their expected monetary and non-monetary rewards are not addressed, the adoption of an entrepreneurial university in the system will hardly be achieved.

University leadership must engage the academic heartland (the faculty) when developing policies and making plans in relation to the entrepreneurial paradigm. Faculty will contribute provided they see themselves benefiting from the entrepreneurial paradigm specifically in terms of reputation, income and career advancement. Team work and consultations are cardinal.

Improved communication and collaboration within faculties and departments is critical. There is need to have the faculty work together as a team not as silos. Success in the progression into an entrepreneurial university rests in team work, interdepartmental and external collaborations. But they say '*charity begins at home*'. More benefits will be realized if there is unity and internal collaboration across disciplines within the university.

7.10 Research Limitations

The study faced a number of limitations. The first limitation is associated with the understanding of the phenomenon under study. An entrepreneurial university is a new phenomenon in Malawi and other LDCs. As such, participants had different perceptions of what this study was about. The researcher therefore had to use definitions provided in the literature to appropriately guide the participants on the understanding of the concept of an entrepreneurial university.

Much as entrepreneurship is a major term in the study, it is a body of knowledge which is broad and multi-dimensional with many definitions. Its application in the context of an entrepreneurial university differs from individual or corporate entrepreneurship. The researcher had to rephrase and modify the guiding question in order to capture the required information. However, the basic knowledge that a majority of respondents had in entrepreneurship was helpful for the survey and other discussions pertaining to the study.

The second limitation concerns the limited number of universities that participated in the study. The multiple holistic case study approach required a few universities to participate in the study. The results of the study could have been comprehensive if all universities in Malawi, both public and private, participated in the study. However, the criteria that was used to select the

universities and respondents that participated in the study enabled collection of rich, adequate and relevant data to achieve the study objective.

The third limitation lies in the target participants in the selected universities as not all took part in the study. The ideal situation was to have all academics in the participating universities participate in the study regardless of field or level as an entrepreneurial university is not for commerce related programmes but even the other academic programmes. However, the researcher anticipated busy schedules of targeted respondents. Furthermore, the researcher had limited time to gather the required data presented. Nonetheless, the response rate of 57% was considered adequate.

7.11 Recommendations for Further Research

The concept of an entrepreneurial university is a recent phenomenon in least developed economies exposing the need for longitudinal studies and interventions to ensure that the transformation of traditional universities into entrepreneurial universities and the progression into the second academic revolution is channelled towards the right path.

Another area for further research is the need to establish roles to be performed by other players in the NIS or triple helix in the entrepreneurial paradigm in the Malawian universities. It is evident that universities in US, UK, and other developed countries engaged the government and the industry to successfully transform into entrepreneurial universities. The focus of this study was on universities as one player in the NIS and triple helix. However, there is need for a strong and supportive environment where the triple helices i.e the government, the industry and the universities work together for the universities to progress successfully in the entrepreneurial

paradigm. There is therefore a need to investigate on roles to be played by government and the industry in the creation of an entrepreneurial university in Malawi.

Literature review indicates that universities in UK, Canada, Germany and other developed nations learn from each other on the role changes in the university system. Without necessarily copying from the counterparts, they adopt the new concepts and aim at improving the phenomena and create what is appropriate in their environment. Similarly, comparative studies on the extent to which universities in LDCs have progressed in the second academic revolution, challenges and opportunities need to be undertaken. The comparative studies must aim at learning from each other and not to copy their frameworks. Further, learning from successful entrepreneurial universities in developing and developed countries is also cardinal at this stage as globalization demands catching up with such progressions.

7.12 Summary of the Chapter

This last Chapter of the thesis concludes the study by providing a summary, conclusions and recommendations. The aim of the study was to explore on an entrepreneurial university model to be adopted by the universities in LDCs with a focus on Malawi. Despite the study limitations presented in the Chapter, the study provides valuable and interesting insights relating to the new concept of an entrepreneurial university which has taken centre stage in the universities across the globe in view of the many challenges and demands placed on the HEIs. Lastly, the Chapter has recommended some areas for further research.

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APPENDICES

Appendix A: Letter Requesting for Participation

P.O.Box 36711,

Lusaka,

ZAMBIA.

The Vice Chancellor,

(Name of University)

(Address of University)

……

16th March, 2017

Dear Sir/Madam,

REQUEST FOR UNIVERSITY PARTICIATION IN AN ACADEMIC RESEARCH PROJECT

My name is Ella Kangaude-Ulaya. I am a Malawian and doing PhD studies with University of Lusaka in Zambia. My study is focusing on university entrepreneurship and the title of my thesis is, **"Embracing the Second Academic Revolution: An Entrepreneurial Model for Malawian Universities".**

My writing is to find out if the university is interested to participate in the study. The study has three phases where Phase 1 is conducting a baseline study on university entrepreneurship in the university. Phase 2 involves orientation on to the concept of an entrepreneurial university and Phase 3 is the final survey in order to achieve the research objectives.

I am aware of the need to treat my findings with the utmost confidentiality and be assured that the results will be used solely for academic purposes. No source, individual or organization will be identified or comment attributed without written permission of the originator.

I will be glad if the university participates in the study. I wait for your favorable response which is required urgently.

Yours Sincerely,

Ella Kangaude-Ulaya

088 8 40 50 50/099 5 50 51 51 ellaulaya1@gmail.com

Appendix B: Questionnaire for Phase 1

P.O.Box 36711,

Lusaka,

ZAMBIA

1/07/2017

Dear Sir/Madam,

INTRODUCTORY LETTER AND SEEKING OF CONSENT

My name is **Ella Kangaude-Ulaya**. I am currently pursuing a PhD in Entrepreneurship at University of Lusaka in Zambia. The purpose of my study is to determine critical components of an entrepreneurial university model to be adopted by Malawian universities. We believe the results will not only be of value to individual universities but will also contribute towards socio-economic development of the country through the entrepreneurial university activities.

You are being asked to participate in this study by completing the attached questionnaire. The questionnaire will take approximately 20 minutes to complete. Your honest responses and participation is critical to the success of this study.

Participation is strictly voluntary and you may refuse to participate at any time. Individual responses are anonymous and will be held in confidence. Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number or email indicated below.
Please complete this survey and submit it using my e-mail address below or by posting using the address above. Preference is an email.

Thank you for your help.

Ella Kangaude Ulaya

ellaulaya1@gmail.com Mobile +265 888 405050/995505151

Title of the Research Project: **"*Embracing the second academic revolution: an entrepreneurial university model for Malawian universities*."**

Institution ID:…… (researcher to fill in) Participant Number ……

Section A: Particulars of the Respondent

1. Type of university Public ☐ Private ☐
2. Current position(s):……
3. Gender ……(M/F)
4. Length of service in the University: Years……. Months…….
5. Field of expertise/Department:…….
6. Highest academic qualification:……

Section B: Work Responsibilities

In respect to the university semester or academic year, please rate your following work responsibilities:

	The results in this section to add up to 100%	**Percentage (%)** **Please put the actual percentage figure in the relevant box**				
		0-20	**21-40**	**41-60**	**61-80**	**81-100**
8	Teaching and assessment responsibilities					
9	Research work/project assignments (do not include private works)					
10	Consultancies (do not include private works)					
11	Engagement in outreach services					
12	Administrative work					
	Total (100%					
Indicate actual figures in the box provided						
13	Number of my publications in peer reviewed journals					
14	Number of consultancies I have done as employee of the university					

15	Number of research grants/sponsorship I have received as an employee of the university	
16	Number of products from my research work the university has marketed to the industry	
17	Number of patents filed/acquired from my research work through university support	
18	Number of firms/companies/factories created to sell my research based products/services	
19	Number of firms/companies/factories created by students under my supervision	
20	Number of products produced by students and marketed by the university under my supervision	

Rate yourself in the following areas by ticking in the right box		**Excellent 5**	**Good 4**	**None/ NA 3**	**Average 2**	**Poor 1**
21	My teaching responsibilities at the university the past 2 years					
22	My research responsibilities at the university the past 2 years					
23	My consultancy work at the university the past 2 years (Do not include private consultancies)					
24	Research contracts given and done as an employee of the university the past 2 years					
25	Publication of my university research work in peer reviewed journals the past 2 years					
26	Application of the results of my university research work to the industry/society the past 2 years					

27	Commercial gains from my research work at the university the past 2 years					
28	Facilitation and supervision of student engagement with the industry, society, community in the subjects taught the last 2 years					
	Rate the following by ticking in the box	**High 5**	**Medium 4**	**Not sure 3**	**Low 2**	**None 1**
29	Emphasis on teaching in my university					
30	Emphasis on research work in my university					
31	Emphasis on outreach services in my university					
32	Emphasis on publication in peer reviewed journals in my university					
33	Emphasis on consultancy work in my university					
34	Emphasis on patent filing and acquisition in my university					
35	Emphasis on marketing of staff projects and research results in my university					
36	Emphasis on marketing student projects in my university					
37	Emphasis on giving student assignments that benefit the community/industry/society in my university					
38	Emphasis on collaborating and partnering with the industry on research, consultancies and innovation in my university					
Entrepreneurship Support and Education						

Tick in the appropriate box		Yes	No	Not Sure
39	The university offers undergraduate programme (s) (Diploma/Bachelors Degree) in Entrepreneurship			
40	The university offers postgraduate programme(s) (Postgraduate Diploma/Masters/PhD) in Entrepreneurship			
41	Entrepreneurship is one of the subjects in business related programmes			
42	Entrepreneurship has been included as a subject in non-business academic programmes			
43	The university organizes tailor-made entrepreneurship training to its staff members			
44	The university organizes tailor-made entrepreneurship training to its students outside classroom work			
45	The university encourages and supports business creation from entrepreneurship subjects/programmes/trainings offered			
46	The university offers incubation/support on business ideas from staff and students for business creation			
48	The university has recruited members of staff in entrepreneurship			
49	The university has an office/centre/section dedicated for entrepreneurship activities			
50	The university has a policy/guidelines on Intellectual Property			
51	The university has a policy/guidelines on Research and Development			
52	The university has a policy/guidelines on Consultancies and/or Outreach			

Using the following definition for an entrepreneurial university: *"An entrepreneurial university is one that is designed to empower staff and students to demonstrate enterprise, innovation and creativity in research, teaching and pursue use of knowledge across boundaries" (Gibb, 2013; Jameson & O'Donnel, 2015)***:**

	Rate the following by ticking in the box :	**Strongly agree -5**	**Agree -4**	**Not sure -3**	**Disagree -2**	**Strongly disagree -1**
53	University leadership/management is essential in facilitating and promoting entrepreneurship in the university					
54	Interdepartmental and interdisciplinary networking and collaboration within the university is important in facilitating and promoting entrepreneurship in the university					
55	Allowing academic staff and students to engage and interact with the industry is important in facilitating and promoting entrepreneurship in the university					
56	The university collaborations with banks and other financial institutions is important in facilitating and promoting entrepreneurship in the university					
57	Networking and collaborations with other universities (local and/or international) is important in facilitating and promoting entrepreneurship in the university					
58	Networking and collaborations with research, science and technology institutions is important in facilitating and promoting entrepreneurship in the university					
59	Establishing links with university alumni is important in facilitating and promoting entrepreneurship in the university					
60	Engaging the government in policy and programs development is important in facilitating and promoting entrepreneurship in the university					
61	Funding, budgeting and financial management is an important element in facilitating and promoting entrepreneurship in the university					
62	Motivation of academic staff members is an essential element that would facilitate and promote					

	Rate the following by ticking in the box :	**Strongly agree -5**	**Agree -4**	**Not sure -3**	**Disagree -2**	**Strongly disagree -1**
	entrepreneurship in the university					
63	Integrating entrepreneurial culture in teaching and research is essential in facilitating and promoting entrepreneurship in the university					
64	International orientation of the university would facilitate and promote entrepreneurship in the university (attracting international students and staff, design of the curricula with an international focus)					
65	Assessing the impact of entrepreneurial activities is essential in facilitating and promoting entrepreneurship in the university					

End of Questionnaire. Thank you for your time.

Please email questionnaire to: ellaulaya1@gmail.com

Or contact her on +265 888405050/995505151

Appendix C: Questionnaire for Phase 3

P.O.Box 36711,

Lusaka,

ZAMBIA

1/08/2018

Dear Participant,

FOLLOW-UP SURVEY

I thank you sincere for your participation in phases 1 and 2of the study which took place in July, 2018. Attached is a follow-up questionnaire for Phase 3 on my PhD study which aims at determining critical components of an entrepreneurial university to be adopted by Malawian universities.

The questionnaire will take approximately 20 minutes to complete. As usual, your honest responses and participation is critical to the success of this study.

Participation is strictly voluntary and you may refuse to participate at any time. Individual responses are anonymous and will be held in confidence. Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number or email indicated below.

Please complete this survey and submit it using my e-mail address below or by posting using the address above. Preference is on email.

Thank you for your help.

Ella Kangaude Ulaya

ellaulaya1@gmail.com Mobile +265 888 405050/995505151

Title of the Research Project: **"*Embracing the second academic revolution: an entrepreneurial university model for Malawian universities*."**

1. Institution ID:…… (researcher to fill in)
2. Participant Number …….(Researcher to fill in)

Section A: Effect of the Study on Participants

		Excellent 5	Good 4	Not sure 3	Average 2	Poor 1
3	My understanding of an entrepreneurial university before participation in this study					
4	My understanding of an entrepreneurial university after participation in this study					
		High 5	**Medium 4**	**Not sure 3**	**Low 2**	**None 1**
5	My interest before participation in the study					
6	My interest after participation in the study					
7	Use of knowledge gained after participation in the study					
Any comments on questions 3 to 7?						

Section B: Change in Work Responsibilities

After 5 months of being introduced to the concept of an entrepreneurial university, please rate prospects of change in your work responsibilities for the next academic year:		
	The results in this section to add up to 100%	**Percentage (%)** **Please put the actual percentage figure in the relevant box**

		0-20	21-40	41-60	61-80	81-100
8	Teaching and assessment responsibilities					
9	Research work/project assignments (do not include private works)					
10	Consultancies (do not include private works)					
11	Engagement in outreach services					
12	Administrative work					
Total (100%)						

Any comments on changes noted in the work responsibilities indicated in questions 8 to 12 above after your participation in the study?

After 5 months of being introduced to the concept of an entrepreneurial university, indicate prospects of the following activities in the next academic year by indicate figures in the box provided

13	My expectation on number of articles I shall publish in peer reviewed journals by end of next academic year	
14	My expectation on prospective consultancies I shall do by end of next academic year	
15	Number of prospective research grants/sponsorship I shall receive as an employee of the university by the end of next academic year	
16	Number of prospective products from my research work the university shall market to the industry by the end of next academic year	
17	My expectations on number of patents I shall generate from my research work	

	through university support by end of next academic year	
18	Number of prospective firms/companies/factories that shall be created in order to sell my research based products/services by end of next academic year	
19	Number of prospective firms/companies/factories that shall be created by students under my supervision by end of next academic year	
20	My expectation on products that shall be produced by students and marketed by the university under my supervision by end of next academic year	

Any comments on the expectations indicated in your responses in questions 13 to 20 above?

After your participation in the study, rate yourself in the following areas by ticking in the right box		**Excellent 5**	**Good 4**	**None/ NA 3**	**Average 2**	**Poor 1**
21	My teaching responsibilities at the university in the next academic year					
22	My research responsibilities at the university in the next academic year					
23	My consultancy work at the university in the next academic year (Do not include private consultancies)					
24	Research contracts given and done as an employee of the university in the next academic year					
25	Publication of my university research work in peer reviewed journals in the next academic year					
26	Application of the results of my university research work to the industry/society in the next academic year					
27	Commercial gains from my research work at the university in the next academic year					
28	Facilitation and supervision of student engagement with the industry, society, community in the subjects taught in the next academic year					

Any comments on the work responsibilities after your participation in the study in questions 21 to 28 above?						
	After your participation in the study, rate the following by ticking in the box	**High 5**	**Medium 4**	**Not sure 3**	**Low 2**	**None 1**
29	Communication emphasizing on teaching in my university					
30	Communication emphasizing on research work in my university					
31	Communication emphasizing on outreach services in my university					
32	Communication emphasizing on publication in peer reviewed journals in my university					
33	Communication emphasizing on consultancy work in my university					
34	Communication emphasizing on patent filing and acquisition in my university					
35	Communication emphasizing on marketing of staff projects and research results in my university					
36	Communication emphasizing on marketing of student projects in my university					
37	Communication emphasizing on giving student assignments that benefit the community/industry/society in my university					
38	Communication emphasizing on the need to collaborate and partner with the industry on research, consultancies and innovation in my university					
Any comments on responses provided in questions 29 to 38 above?						
Entrepreneurship Support and Education						

After your participation in the study, tick in the appropriate box		Yes	No	N/A
39	The university offers and/or has plans on introducing undergraduate programme (s) (Diploma/Bachelors Degree) in Entrepreneurship			
40	The university offers and/or has plans on introducing postgraduate programme(s) (Postgraduate Diploma/Masters/PhD) in Entrepreneurship			
41	The university has introduced and plans on introducing entrepreneurship as one of the subjects in business related programmes			
42	The university has introduced and plans on introducing entrepreneurship as a subject in non-business academic programmes			
43	The university has plans to organize tailor-made entrepreneurship training for its staff members			
44	The university has plans to organize tailor-made entrepreneurship training for its students outside classroom work			
45	The university is encouraging and supporting business creation from entrepreneurship subjects/programmes/trainings offered			
46	The university plans on offering incubation/support on business ideas from staff and students for business creation			
48	The university has recruited and/or plans on recruiting members of staff in entrepreneurship			
49	The university has established and/or has plans to establish an office/centre/section dedicated for entrepreneurship activities			
50	The university has /or is planning for development of a policy/guidelines on Intellectual Property			
51	The university has /or is planning for development of a policy/guidelines on Research and Development			
52	The university has/or is planning for development of a policy/guidelines on consultancies			
Any comments on responses provided in questions 39 to 52 above?				

Using the following definition for an entrepreneurial university: *"An entrepreneurial university is one that is designed to empower staff and students to demonstrate enterprise, innovation and creativity in research, teaching and pursue use of knowledge across boundaries" (Gibb, 2013; Jameson & O'Donnel, 2015)***:**

	After your participation in the study, rate the following by ticking in the box :	**Strongly agree -5**	**Agree -4**	**Not sure -3**	**Disagree -2**	**Strongly disagree -1**
53	I have realized that university leadership/management is essential in facilitating and promoting entrepreneurship in the university					
54	I have noted that interdepartmental and interdisciplinary networking and collaboration within the university is important in facilitating and promoting entrepreneurship in the university					
55	I believe that allowing academic staff and students to engage and interact with the industry is important in facilitating and promoting entrepreneurship in the university					
56	I have noted that the university collaborations with banks and other financial institutions is important in facilitating and promoting entrepreneurship in the university					
57	I believe that networking and collaborations with other universities (local and/or international) is important in facilitating and promoting entrepreneurship in the university					
58	I have realized that networking and collaborations with research, science and technology institutions is important in facilitating and promoting entrepreneurship in the university					
59	I have realized that establishing links with university alumni is important in facilitating and promoting entrepreneurship in the university					

	After your participation in the study, rate the following by ticking in the box :	**Strongly agree -5**	**Agree -4**	**Not sure -3**	**Disagree -2**	**Strongly disagree -1**
60	I have noted that engaging the government in policy and programs development is important in facilitating and promoting entrepreneurship in the university					
61	I have realized that funding, budgeting and financial management is an important element in facilitating and promoting entrepreneurship in the university					
62	I have noted that motivation of academic staff members is an essential element that would facilitate and promote entrepreneurship in the university					
63	I believe that integrating entrepreneurial culture in teaching and research is essential in facilitating and promoting entrepreneurship in the university					
64	I have realized that international orientation of the university would facilitate and promote entrepreneurship in the university (attracting international students and staff, design of the curricula with an international focus)					
65	I have noted that assessing the impact of entrepreneurial activities is essential in facilitating and promoting entrepreneurship in the university					
66. Any comments on responses provided in questions 53 to 65 above?						

67. As a participant in this study, what do you think must be done to facilitate the transformation of your university into a successful entrepreneurial university?

……
……
……
……

……
……
……
……
……

End of Questionnaire. Thank you for your time.

Please email questionnaire to: ellaulaya1@gmail.com

Or contact her on +265 888405050/995505151

Appendix D: Letter Requesting Access

UNIVERSITY OF LUSAKA

P.O.Box 36711,

Lusaka,

ZAMBIA.

The Vice Chancellor,

6th June, 2017

(Name of University)

(Address of University)

……

Dear Sir/Madam,

REQUEST FOR ACCESS INTO THE UNIVERSITY FOR AN ACADEMIC RESEARCH PROJECT

Reference is made to an earlier communication where I had written requesting your university to participate in this study titled **"Embracing the Second Academic Revolution: An Entrepreneurial Model for Malawian Universities".**

I am at this point collecting data to answer my research objective. As stated in the previous communication, my target respondents are the Deans, Heads of Departments and other academic members of staff.

The respondents will be given a questionnaire, at two intervals, which shall take approximately 20 to 25 minutes to complete.

I am aware of the need to treat my findings with the utmost confidentiality and be assured that the results will be used solely for academic purposes. No source, individual or organization will be identified or comment attributed without written permission of the originator. I can however share a copy of a report summarizing the findings if you are interested to know the results after the study is passed.

Once access to the university by your Office is granted, I will also be asking for consent from each one of the target respondents on their willingness to participate in the study.

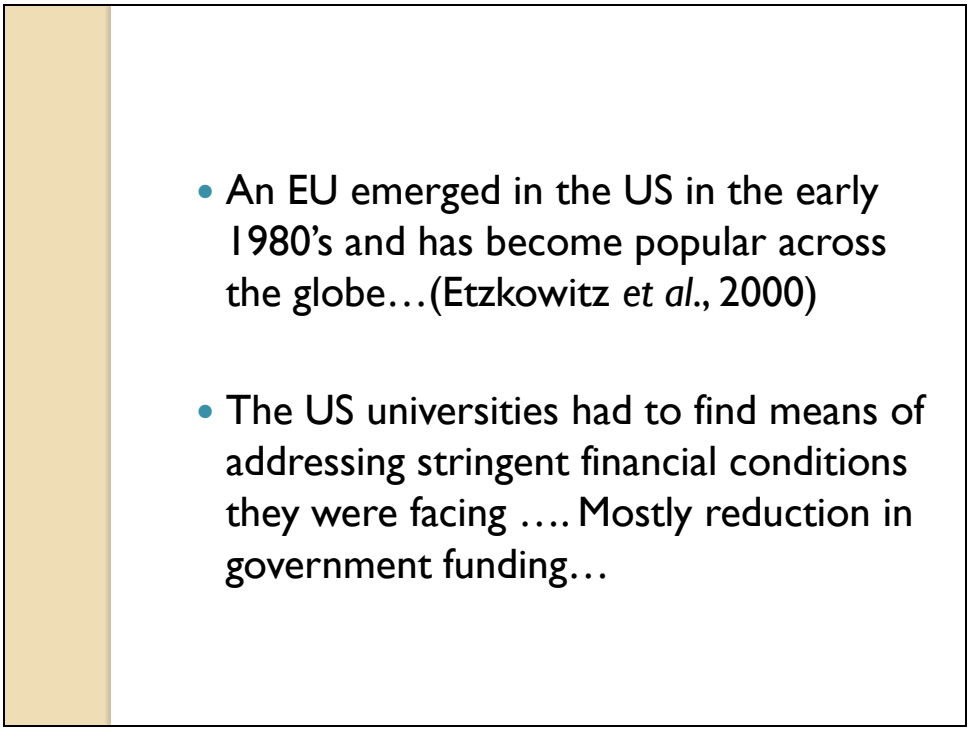
I therefore wait for your response which is required urgently.

Yours Sincerely,

Ella Kangaude-Ulaya

088 8 40 50 50/099 5 50 51 51 ellaulaya1@gmail.com

Appendix E: Power Point Presentation on an Entrepreneurial



- In addition to addressing the financial inadequacy in universities, the other aim of adopting the concept of an EU has been to facilitate university autonomy and strengthening ties with industry for socio-economic development.
- Diversification of income is therefore not the only benefit when adopting the EU concept but issues of relevance to the society, increasing access to HE, improving quality of education ….STI!…are realized….

What does an Entrepreneurial University do?

An EU operates in an entrepreneurial manner and fosters entrepreneurship in its academic staff (faculty) and students

Differing trajectories but all arriving at same format!

Entrepreneurship Education

EUs design, develop and offer short and long-term entrepreneurial programmes with **a practical orientation** to develop entrepreneurial competence and mindset in the target groups (faculty, students and community)

Universities have introduced entrepreneurship as a subject in both business and non-business academic programmes not only for knowledge but **practical use**

Its not enough to introduce the entrepreneurship module but…..

- EUs have redesigned their curricula to include delivery and assessment methods that stimulate creativity, innovation and entrepreneurship in all subjects…..
- Through learning entrepreneurship principles, students have come up with project ideas that have turned into viable businesses benefiting the university, faculty, students and the society (STI!)…..
- Students are involved in outreach activities, internship and consultancies where they practice what they have learned thereby improving low -tech businesses mostly in the local area…..
- Staff training in research, research commercialization, business development etc…

University Entrepreneurship

- Include:

1. The transfer of products (and services),
2. The transfer of technology
3. The transfer of knowledge

(Tijssen, 2009)

- **Transfer of products**:
  Creation of firms/factories/companies BY either faculty or students to sell research based products – university spin offs (USOs) and start-ups….
- **Transfer of technology**:
  - Licensing or sale of patents
  - Sale of technology to industry
- **The transfer of knowledge**:
  - Consultancy services
  - Contract research (research grants…research collaborations…)

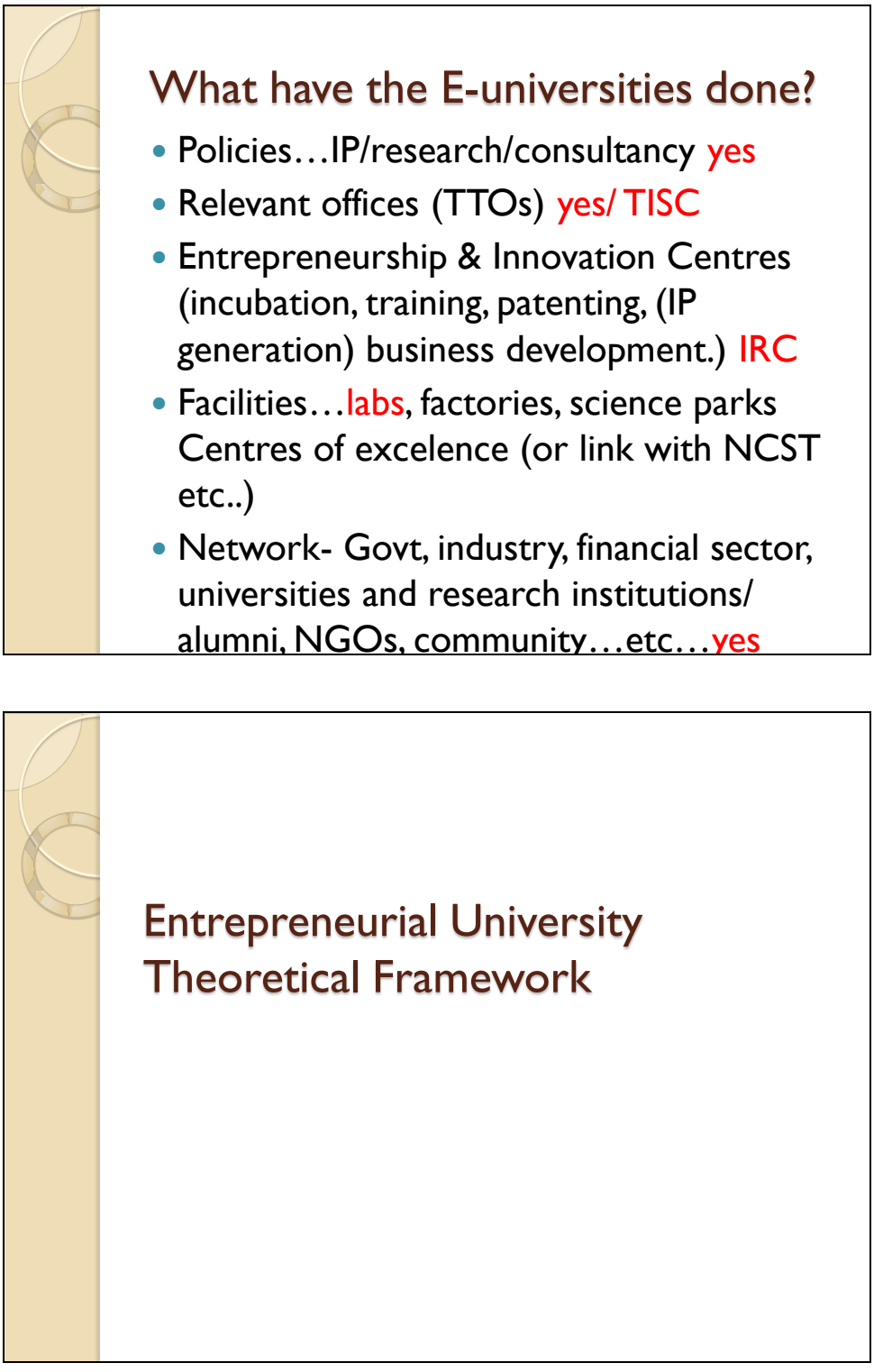
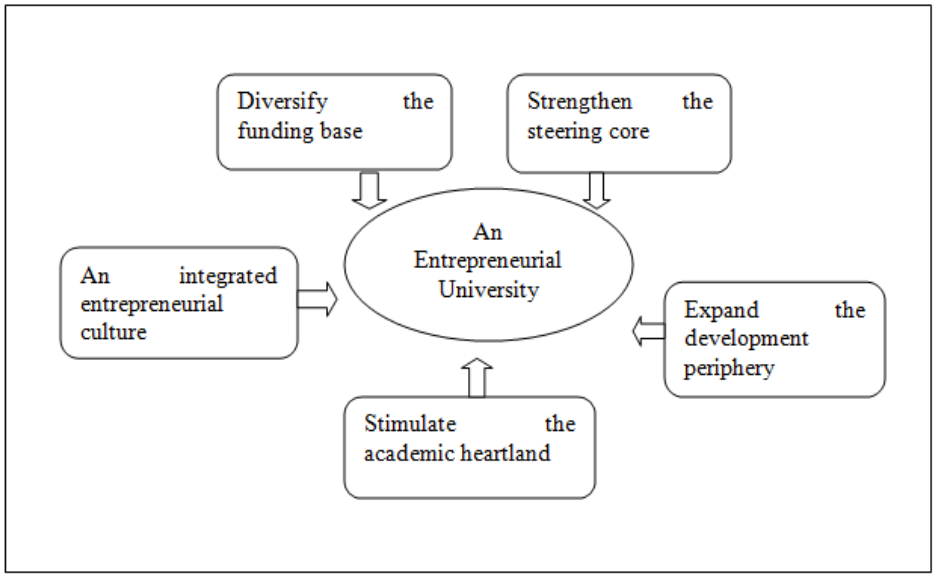
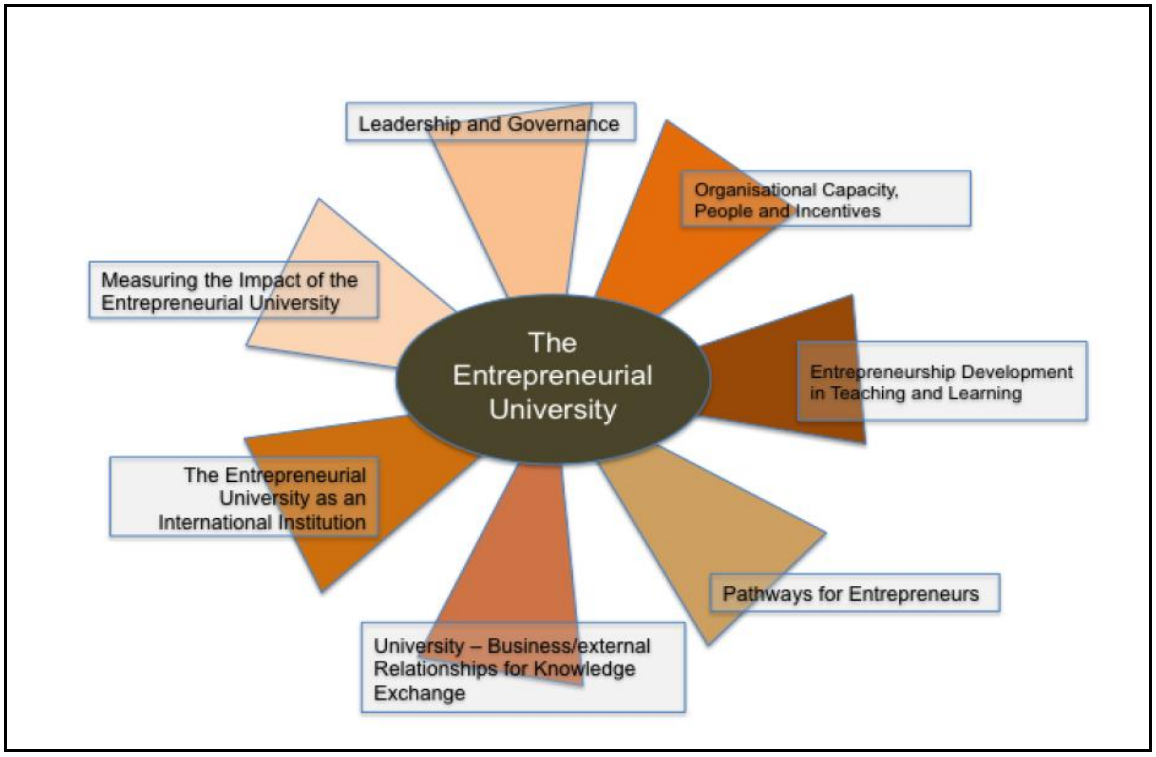


Figure 2.1: Pathways to an Entrepreneurial University



Source: Author based on Clark (1998)

Figure 2.2: OECD Guiding Framework for Entrepreneurial Universities



Source: OECD (2012)

References

END OF PRESENTATION

Appendix F: University of Lusaka Clearance Approval Letter

UNIVERSITY
OF
LUSAKA

Plot No. 37413, Off Alick Nkhata Mass Media, P. O. Box 36711, Lusaka
Phone: +260 211 233407, 258409, Fax: +260 211 233409, E-mail: ictar@zamnet.zm, unilus@zamnet.zm

All correspondence should be addressed to the rector

SCHOOL OF POSTGRADUATE STUDIES RESEARCH ETHICS COMMITTEE

8th January, 2018

Ella Kangaude-Ulaya
University of Lusaka
P.O Box 36711
LUSAKA

Dear Madam,

YOUR APPLICATION FOR RESEARCH PROJECT ETHICAL CLEARANCE

Reference is made to your application for research project ethical clearance. I wish to inform you that your proposal was approved.

Title: Diversification of income sources in Higher Education Institutions: An Investigation into the Entrepreneurial paradigm in the Malawian University

Date of Approval: 15th December, 2017

Expiry Date: 31st July, 2018

CONDITIONS:

This approval is subject to the following conditions;

a) The research project is based strictly on your submitted proposal. Should there be need for you to modify or change the design or methodology, you will need to seek clearance from the Research Ethics committee.
b) If you need any further clarification please consult the Postgraduate Office.
c) Please note that when your approval expires, you may need to request for renewal.
d) Ensure that a final copy of the results are submitted to the Research Ethics Committee

Yours faithfully,

Prof. Eustarckio Kazonga, PhD
DEPUTY VICE CHANCELLOR AND DEAN- SCHOOL OF POSTGRADUATE STUDIES

UNIVERSITY OF LUSAKA
RESEARCH & POSTGRADUATE
08 JAN 2018
P.O. BOX 36711,
LUSAKA

Passion for Quality Education! Our Driving Force

UNIVERSITY
OF
LUSAKA

Plot No. 37413, Off Alick Nkhata Mass Media, P. O. Box 36711, Lusaka
Phone: +260 211 233407, 258409, Fax: +260 211 233409, E-mail: ictar@zamnet.zm, unilus@zamnet.zm

All correspondence should be addressed to the rector

8th January 2018

TO WHOM IT MAY CONCERN

I certify that the Postgraduate Studies Research Committee of Senate of the University of Lusaka, approved the methodology and ethics of the Doctor of Philosophy research project by Ella Kangaude-Ulaya [PHDENT 15126001] on 15th December 2017.

Title: Diversification of Income Sources in Higher Education Institutions: An investigation into the Entrepreneurial Paradigm in Malawian Universities

Registration No.: 2018/01

Expiry Date: 31st July 2018

Prof. Eustarckio Kazonga, PhD
DEPUTY VICE CHANCELLOR AND DEAN - SCHOOL OF POSTGRADUATE STUDIES

UNIVERSITY OF LUSAKA
REGISTRAR CONSORTIUM
08 JAN 2018
P.O. BOX 36711
LUSAKA

Appendix G: National Commission for Science and Technology Clearance Approval Letter

NATIONAL COMMISSION FOR SCIENCE & TECHNOLOGY
Lingadzi House
Robert Mugabe Crescent
P/Bag B303
City Centre
Lilongwe
Tel: +265 1 771 550
+265 1 774 189
+265 1 774 869
Fax: +265 1772 431
Email:directorgeneral@ncst.mw
Website:http://www.ncst.mw

NATIONAL COMMITTEE ON RESEARCH IN THE SOCIAL SCIENCES AND HUMANITIES

Ref No: NCST/RTT/2/6

7th August 2018

Mrs Ella Kangaude-Ulaya,

Malawi University of Science and Technology,

P.O. Box 5196,

Limbe.

Email: ellaulaya1@gmail.com

Dear Mrs Kangaude-Ulaya,

RESEARCH ETHICS AND REGULATORY APPROVAL AND PERMIT FOR PROTOCOL P.07/18/294: DIVERSIFICATION OF INCOME SOURCES IN HIGHER EDUCATION INSTITUTIONS: DEVELOPING AN ENTREPRENEURIAL FRAMEWORK FOR MALAWIAN UNIVERSITIES

Having satisfied all the relevant ethical and regulatory requirements, I am pleased to inform you that the above referred research protocol has officially been approved. You are now permitted to proceed with its implementation. Should there be any amendments to the approved protocol in the course of implementing it, you shall be required to seek approval of such amendments before implementation of the same.

This approval is valid for one year from the date of issuance of this approval. If the study goes beyond one year, an annual approval for continuation shall be required to be sought from the National Committee on Research Ethics in the Social Sciences and Humanities (NCRSH) in a format that is available at the Secretariat. Once the study is finalised, you are required to furnish the Committee and the Commission with a final report of the study. The committee reserves the right to carry out

compliance inspection of this approved protocol at any time as may be deemed by it. As such, you are expected to properly maintain all study documents including consent forms.

Wishing you a successful implementation of your study.

Yours Sincerely,

Yalonda .I. Mwanza
NCRSH ADMINISTRATOR
HEALTH, SOCIAL SCIENCES AND HUMANITIES DIVISION

For: CHAIRMAN OF NCRSH

Committee Address:
Secretariat, National Committee on Research in the Social Sciences and Humanities, National Commission for Science and Technology, Lingadzi House, City Centre, P/Bag B303, Capital City, Lilongwe3, Malawi. Telephone Nos: +265 771 550/774 869; E-mail address: ncrsh@ncst.mw

Appendix H: Study Findings on Sources of Income Generation in Malawian Universities

Table 8.1: Sources of Income in Malawian Universities

No	Income Sources/IGAs/Entrepreneurship	Entrepreneurial Element(s)	Frequency %	% by University Type	
1	Tuition/fees through commercial fee paying students	x	91	Public	83
				Private	100
2	Subsidized tuition/fees (students on government scholarship)	x	55	Public	100
				Private	0
3	Government funding/subvention	x	55	Public	100
				Private	0
4	Consultancies	✓	45	Public	67
				Private	20
5	No formal/established IGA	N/A	41	Public	33
				Private	40
6	Contract research	✓	23	Public	43
				Private	0
7	Use of university labs and facilities by other research institutions and the industry	x	19	Public	35
				Private	0
8	Alumni contributions	x	18	Public	33
				Private	0
9	Building, owning and operating student hostels as a business	x*	18	Public	33
				Private	0
10	Hiring out university facilities for events (halls and classrooms)	x	18	Public	17
				Private	20
11	Short training courses	x	18	Public	17
				Private	20
12	Tuition from new modes of study at a commercial fee (ODL, weekend and evening classes)	x	18	Public	17
				Private	20
13	Organizing fundraising events (golf tournaments, dinner and dance, music festivals etc)	x	18	Public	33
				Private	0
14	Businesses in some areas in line with mission and teaching areas (mortuary, farm produce, sports centre)	✓	18	Public	33
				Private	0
15	Support from international funders such as the World Bank through proposals	x	9	Public	17
				Private	0

No	Income Sources/IGAs/Entrepreneurship	Entrepreneurial Element(s)	Frequency %	% by University Type	
16	Contacting well wishers (companies and individuals)	x	9	Public	17
				Private	0
17	Collaboration with industry partners (e.g. hospitals, hotels) and offering a service together at a fee	?	9	Public	17
				Private	0
18	Owning a gas station	x*	9	Public	17
				Private	0
19	Investing idle funds on the money market	x	9	Public	17
				Private	0

Key:
✓ = Entrepreneurial (16%)
x = Not entrepreneurial (63%)
x*= Ordinary business (11%)
? = Not sure/it depends (5%)
N/A=Not applicable as IGA/entrepreneurship (5%)