UNIVERSITY OF SOUTHAMPTON

FACULTY OF BUSINESS AND LAW

School of Management

The Role of Universities in Transforming a Developing Economy into a Knowledge-Based Economy: The Case of Pakistan

by

Shah Bano

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بسم الله الرحمن الرحيم

ABSTRACT

FACULTY OF BUSINESS AND LAW
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The thesis examines the functions of universities in transforming a developing economy into a Knowledge Based Economy (KBE). Universities play a vital role in strengthening the KBE by providing the resource, 'knowledge'. This study explores the challenges encountered by academic leadership in Pakistan, while striving to achieve a KBE. Although, the Higher Education Commission (HEC), has introduced a large number of reforms in universities of Pakistan since 2003 but these reforms are only a beginning of a process of engagement of universities in socioeconomic development.

The newly established Commission was charged with the task to align higher education with the needs of the country, provide greater access to quality higher education, and develop the skills of faculty. Other steps towards reformation of the higher education sector of Pakistan included the introduction of quality assurance systems in universities, investment in their physical as well as knowledge infrastructure and developing a ranking system for universities in order to create a competitive environment among them. These measures taken by the HEC were fundamental for the development of a globally recognised higher education system. The current emphasis on the promotion of entrepreneurship is now leading to the establishment of technology parks and technology transfer offices on campuses so that universities can contribute directly to the process of socioeconomic development.

The thesis elaborates the conditions, which facilitate or hamper the functions of universities in Pakistan. University–industry linkages in the United States (Silicon Valley) and United Kingdom (Oxford and Cambridge) have inspired many developing countries. In order to follow the same trends, universities in Pakistan are adopting the entrepreneurial role too. However, there is a gap in the literature regarding how the roles and functions of universities in developing economies differ from those of universities in a KBE. Therefore, the researcher aims to fill this gap in the literature by investigating the perceptions of academic leaders in Pakistan.

This research employs a qualitative design and grounded theory research strategy. The sample size consists of fifty semi structured interviews with various stakeholders of higher education such as the leaders of the higher education regulatory body (Higher Education Commission), five high ranking universities of Pakistan and the Intellectual Property Organisation (IPO) in Pakistan. Data are analysed inductively, resulting in a new substantive theory, the Model of Symbiosis.

The study reveals, there are external and internal factors which facilitate the formation of a KBE. The external factor which include, good governance, political stability, an effective policy framework and strengthening of the institutions (government, judicial institutions, educational and financial institutions) while internal factors include the development of physical infrastructure of universities and knowledge creation as well as dissemination activities taking place in universities. These factors help in the creation of positive mind-set towards 'knowledge'. Moreover, a KBE is based on surplus knowledge and innovation capability of a country. The production and use of surplus knowledge require collaboration among different institutional actors. The State, the National Eco-system of Education and the corporate sector, have to work in a symbiotic relationship so that synergy for a welfare society is generated. This welfare society will thrive economically and also it will become a part of the global international community. The researcher advocates that universities can put the economy on a stable condition if they are 'tasked' and deployed on a mission to solve issues of the society such as enhancing agricultural productivity, resolving the issue of electricity shortage, provision of clean drinking water, infrastructure development, and the growth of Small and Medium Enterprises (SMEs) to create employment opportunities. Hence, universities in developing countries can act as agents of change provided that their basic infrastructure (both knowledge infrastructure and physical infrastructure) is developed and it supports those universities in their roles. Secondly, along with the basic infrastructure, a regulatory framework and intellectual property regimes should also be in place to strengthen the economy in developing countries.

Table of Contents

List of Tables

List of Figures

List of Appendices

DECLARATION OF AUTHORSHIP

I, Shah Bano

declare that the thesis entitled

"The Role of Universities in Transforming a Developing Economy into a Knowledge-based Economy: The Case of Pakistan"

and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- none of this work has been published before submission.

Signed: .... Date: ....

Conference Contributions

❖ 'Sea Change' in the Higher Education Sector: A Case Study of the Higher Education Commission (HEC), Pakistan, presented at International Conference on Changing Universities: Governance, Relevance, Performance, 29 September – 2 October 2009. Istanbul, Turkey.

❖ New Trends of Technology Incubation in Pakistan and Prospects of Transformation into Knowledge Economy: A case study of two high-ranking universities of Pakistan, presented at 1st International Conference in Entrepreneurship, Innovation and SMEs, 3/4 November, 2011, Ecole de Management de Normandie, Caen, France.

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Dedication

This thesis is dedicated to

the *Prophet Mohammad* (Peace be upon him);

my parents with great devotion who kindled love for knowledge and wisdom in me...

and

to *my brothers*; in them lies my strength!

List of Abbreviations

A&HCI	Arts & Humanities Citation Index
ASAD	Applied System Analysis Division
BRIC	Brazil, Russia, India, China
CDC	Career Development Centre
CENUM	Centre for Nuclear Medicine
CIDA	Cultural Industries Development Agency
EFS	Endowment Fund Secretariat
FBR	Federal Boar of Revenue
FDE	Federal Directorate of Education
FPCCI	Federation of Pakistan Chambers of Commerce and Industry
GDP	Gross Domestic Production
H.E.J	Husein Ebrahim Jamal
HEC	Higher Education Commission
HEI	Higher Education Institution
HSSC	Higher Secondary School Certificate
ICT	information and communication technology
ILO	Industry Liaison Office
IMF	International Monetary Fund
IPO	Intellectual property Organisation
KAIST	Korea Advanced Institute of Science and Technology
KAM	Knowledge Assessment Methodology
KBE	Knowledge-Based Economy
KEI	Knowledge Economy Index
KI	Knowledge Index
LCCI	Lahore Chambers of Commerce and Industry
MCO	Marketing & Communications Office
MDS	Master of Dental Surgery
MNA	Members of National Assembly
MoE	Ministry of Education
MPA	Members of Provincial Agency
MS	Master of Surgery
MTDF	Medium Term Development Frameworks
NCFE	National Commission of Food and Education
NCNDT	National Centre for Non-Destructive Testing
NIFA	Nuclear Institute for Food and Agriculture
NIS	National System of Innovation
NMF	National Management Foundation

NORAD	North American Aerospace Defence
OECD	Organisation for Economic Cooperation and Development
PAEC	Pakistan Atomic Energy Commission
PCMD	Panjwani Center for Molecular Medicine and Drug
PDC	Professional Development Centre
PIDE	Pakistan Institute of Development Economics
PIMS	Pakistan Institute of Medical Sciences
R&D	research and development
RCMS	Research Centre for Modelling and Simulation
RIS	Regional Innovation System
SANDEE	South Asian Network for Development and Environmental Economics
SCI	Science Citation Index
SMEDA	Small and Medium Enterprises Development Agency
SSCI	Social Science Citation Index
STV	Science and Technology Ventures
TIC	Technology Incubation Centre
TTO	Technology Transfer Office
TTS	Tenure Track System
UGC	University Grants Commission
USAID	United States Agency for International Development
WB	World Bank
BBA	Bachelor of Business Administration
FDI	Foreign Direct Investment
IEAE	International Atomic Energy Agency
IP	Intellectual property
LUMS	Lahore University of Management Sciences
MBA	Masters of Business Administration
MBBS	Bachelor of Medicine and Bachelor of Surgery
MNC	Multinational Companies
MoU	Memorandum of Understanding
MTO	Managing Training Officers programmes
NESCOM	National Engineering and Scientific Commission
NGO	Non-Governmental Organisation
NSF	National Science Foundation
NUST	National University of Science and Technology
PG	Post graduate
R&P	Research and planning
S&T	Science and Technology
SEECS	School of Electrical and Engineering and Computer Sciences

SSRN	Social Science Research Network
TA	Technical Assistance
TAC	Technical Assistance Centre
TDAP	Trade Development Authority
UET	University of Engineering Taxila
UNTCD	United Nation's Commission for Development
VC	Venture Capital
WWII	World War II

1.Introduction

1.1 Background

The aim of the study is to present a critical analysis of the role of universities in driving a KBE by highlighting structural and functional challenges encountered in developing economies. This chapter highlights the aims and objectives of the study i.e. to understand the phenomenon of creating a KBE from the perspective of the academia in developing countries. The chapter explains what is the scope of the project and provides background to the higher education sector of Pakistan. In addition, the researcher has explained the aims and objectives of the study by stating research questions guiding this study. An overview of research methodology that how answers to the research questions will be achieved and what is the research philosophy underpinning the study is also given in this chapter. The significance of the study for higher education sector, the intellectual property organization (IPO), governments of developing economies, and for industry in Pakistan is then discussed. This chapter concludes with the structure of the thesis.

It is widely acknowledged that we are living in a knowledge society and a knowledge economy (Burke, 2000). The roots of the idea of KBE can be traced back to the eighteenth century. In his seminal work, *The Wealth of Nations*, Adam Smith (1776-1937) stated that the land is no longer the yardstick with which to measure the value of a nation; rather, industrial development will determine the value of a nation. The change does not stop there; instead there is a smooth transition into another stage where knowledge is utilised as a resource, and gradually this change is absorbed in societies and economies. Previously, the transition to an industrial economy occurred, the land was displaced by labour and industry. Nowadays, economies are known for their capacity to create and disseminate knowledge (Burton-Jones, 1999; Drucker, 1999). In many ways it has been a wonderful change in which 'knowledge' is used in combination with the other resources. In the opinion of David and Foray (2002), a soft transition from an industrial economy into a knowledge economy has taken place rather than a sharp break from the past. Nonetheless, the KBE is different from industry – and agriculture-based economies in terms of governance, socio-political and economic implications. It is evident from the success stories of large economies such as the United States and other, smaller, economies such as Finland and Sweden that while knowledge is a source of wealth creation; innovation is the lifeblood of economies (Bell, 1962; Drucker, 1993).

International organisations such as the World Bank (WB), Organisation for Economic Cooperation and Development (OECD) and the United Nations Commission on Science and Technology for Development (UNTCD) are the main proponents of the new mode of economy and the new framework of socio-economic development (Stiglitz, 1999). This new economic development framework has introduced new challenges for universities across the globe. As new economic paradigms appeared, universities have also extended their roles beyond teaching and research in order to cope with the rising global knowledge economy.

In a European context, the Lisbon Strategy had laid out the mission for European countries to become the most competitive KBEs by 2020; hence, knowledge-based development is the strategic aim of many European countries (El-Agraa & Ardy, 2011). OECD countries are spending a high proportion of GDP (Gross Domestic Production) on research and development (R&D), the higher education sector and information and communication technology (ICT). Table 1.1 indicates that the highest rate of GDP invested in knowledge activities is in North America while the lowest rate among OECD countries is 2–3%, which is invested in countries in the Southern Europe.

Table 1.1   GDP and creation of a KBE in OECD economies

Investment in knowledge through GDP allocation to areas such as: • R&D • Higher education • ICT	High-knowledge investment economies of North America, OECD Asia and Japan	6 %
	Middle-knowledge investment economies of Northern Europe and Australia	3 %
	Low-investment economies of Southern Europe	2–3%

Source: Based on Brinkley, 2006

The paradigm shift towards the KBE is observed not just in the European context but all over the world. Governments in many countries of the North and South are developing policies to enhance this knowledge and innovation competitiveness, including some developing countries (Yonezawa, 2007).

In developing economies, knowledge networks and knowledge-based partnerships between the different actors of national innovation systems have started to emerge (Berkes, 2009). A few examples are Korea, Taiwan and Brazil where the KBE has been adopted as a firm economic policy (Nelson, 1993). However, many other developing countries such as Bangladesh, Pakistan and Iran, among others, are still counting on agriculture as the main source of economic development. They rely on old methods of production and pay far less attention to education and research-led development than the developed knowledge-based economies of the world. The KBE offers challenges to both developed and developing economies. However, the developed economies are well prepared for this change and can exploit knowledge for the welfare of their societies due to the availability of resources (human, natural, social and intellectual). In addition to the availability of resources, the political will of their governments is supporting the knowledge based developments. Investigation into the KBE and its various aspects is comparatively easy to carry out in developed countries since, for field research in this area, quantitative indicators are available to benchmark or track the socio-economic progress. However, since most indicators are missing in the developing countries, the study of KBE is a challenging issue in these countries (Sharma *et al.*, 2009). Furthermore, Sharma *et al.* (2009) argue that these quantitative indicators are limited in terms of determining cause and effect hence, the KBE is a contemporary area of research in both the developed and developing economies but it needs attention of scholars to explore the concept of KBE in developing countries.

Why the KBE is still a challenge for developed economies when governments assign priority to KBE and have already largely achieved it? Actually, knowledge has always been a source of economic development. Farmers needed knowledge of soils and seasons to grow crops and businessmen were required to know the market pull-and-push phenomenon or knowledge about demand and supply. So what is new or different about KBE today? Nowadays, knowledge is considered an important key resource in combination with other resources such as land, labour and market – all of these are largely available to the developed economies. If knowledge is accredited as a resource then its nature must be taken into consideration and it is the nature of knowledge that it can be produced and reproduced in a continuous manner which is the concern of developed economies. In other words, the developed economies are striving for innovation and sustainability. The characteristics of knowledge such as spontaneity, embeddedness, self-reinforcement, transferability and subjectivity make it different from the other resources (Chua & Goh, 2008). Therefore, the KBE is fundamentally an important issue for both the developed economies and the developing economies (which are inspired by the success stories of the Silicon Valley, Emilia-Romagna and Baden-Württemberg and wish to replicate the examples set by the USA, Italy and Germany). This tension between the two kinds of countries, developed and developing, striving to adapt to the new mode of economy is a subject of great interest to scholars in the field of management (Barkema *et al.,* 2002). The goal is the same but the challenges are vastly different. The developed countries aim for sustainability and continued growth while developing countries are struggling to accumulate the pre-requisite human and material resources and set clear paths for socio-economic development.

The above scenario is fascinating. It intrigued the researcher to investigate, why it is so that despite the debate on innovation, the KBE and technology transfer in developed countries, these ideas are little understood and not yet the part of discussion in the parliaments of developing countries and the policy makers do not pay any heed to the recent developments in the world (Chattopadhyay, 2011). The rapidity with which new inventions are being transformed into goods and services is mind-boggling. The rapid pace of innovation, technology transfer and commercialisation in most developed countries offer huge challenges to developing countries to catch up with them in the race of KBE. The world has been clearly divided into a few countries that are producers of new technology and the vast majority of developing countries that are buyers of new technologies. Why are some countries ahead of others in the race towards a global knowledge economy? How and what strategies must the developing countries adopt in order to achieve development and sustainability? Scholars need to explore this area of research and this study responds to the need. Research is a process in which

researcher and researched cannot easily be separated and there is a relationship between the two (Bourdieu, 1999; Turner, 1981; Lipson, 1991). The current study takes into consideration both the interests of the researcher and the need to explore the concept of KBE in the context of developing countries.

Pakistan's academia has shown enthusiasm and an inclination to contribute towards the development of a knowledge economy by adopting new roles. Besides teaching and learning, universities are establishing technology transfer offices and technology incubation centres. According to the statistical unit of the HEC, the research output of universities in Pakistan has increased significantly in peer-reviewed journals in the fields of arts, humanities, information technology, engineering, social sciences and natural sciences, as indexed by Science Citation Index (SCI), Social Science Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), the ISI web of knowledge and Thomson Reuters databases (HEC Annual Report, 2010).

Furthermore, the number of researchers (most of them with a foreign PhD qualification) is 334 per million population (Shahid, 2010). This is a positive trend and many such developments have been seen in Pakistan's higher education sector during the last decade. Moreover, new partnerships are formed between universities and the communities. With the rapid strengthening of faculty and facilities and the phenomenal increase in research output and citations, universities are now well placed to change gears and start focusing on innovation and entrepreneurship programs. The higher education sector of Pakistan can now be actively involved in the welfare of society and the solution of problems in their own community and in the international community. Hence, there is a need to carry out a comprehensive empirical study and explore Pakistan's prospects of achieving a knowledge economy by 2030.

The study explores the challenges faced by universities while achieving Knowledge Based Economy (KBE) in Pakistan by exploring the perception of academia, by contributing to on-going debate on the role of higher education in a KBE and provide recommendations for policy and practice. The researcher aims to provide policy guidelines to various stakeholders of the higher education sector to improve the socio-economic conditions in the country, envisage new roles for universities in Pakistan in order to align the higher education sector with the vision of the country to transform into KBE as envisaged in the policy roadmap, Vision 2030 (PIDE, 2002).

The policy guidelines relate to coordination between different players of the National Eco-System of Education to surmount the structural and functional challenges faced by universities. It may be of interest to the reader to know-how countries entrapped in low value-added agricultural economies grapple with the challenges of trying to become knowledge economies and how they perceive the KBE.

The underpinning philosophy for this study is social constructionism (explained in detail in chapter 3) which advocates that the higher education sector of any country is embedded in the complex structure of society. The insight gained from the present study which takes into account the socio-political circumstances in Pakistan should help to provide deeper insight into the issues and challenges faced by universities and provide solutions to some of these problems. The main motivation for the current research was therefore to examine the potential contribution of the rapidly developing higher education sector of Pakistan to the socio-economic development of the country.

1.2 Scope of the study and research problem

Scholarship on the recently changing role of universities in the twenty-first century and the consequent restructuring of higher education has flourished (e.g. Rowley 2000; Candy 2000; Stilwell 2003; Connell 2004). In the context of the changing condition of society and the economy universities have always maintained their position in society as the keepers and creators of knowledge (Burton-Jones, 2003; Jones-Evans *et al.*, 1999). Since knowledge has become an economic source, the importance of universities in economic development has grown correspondingly (Drucker, 1993). In short, while universities were always prestigious and considered as seats of learning, they are now responding in different ways by focusing more on the applications of knowledge for the betterment of communities, rather than being mere teaching and research institutions unconnected with the needs of the society. The development of various sectors (hospitals, industries and government laboratories) is closely linked with universities (Godin & Gingras, 2000, p. 273).

The nature of work has changed recently with the shift to a service-based economy from a labour-intensive economy. Under current circumstances, universities cannot work alone (Birgeneau, 2005; Berkes, 2009). To facilitate the use of knowledge, universities and companies have to make meaningful alliances (Jones, 2003). They have to collaborate to identify the knowledge assets and knowledge gaps, as well as understand the dynamics of knowledge demand and supply in navigating the knowledge markets of the new economy (Jones, 2003). Particularly in the universities, there is a greater focus on contract research and commercialisation of knowledge that is opening up new vistas for universities. Clark (1998) and Gibbons *et al.* (1994) were the first to draw attention to the new vistas leading to new funding opportunities opened up by research (Mode 2). They advocate that, like other organisations, universities need funds to operate. The government as a single agency cannot be held responsible for their finances; universities are in an evolutionary process where their role and responsibilities as fund generating institutions are being defined and developed while these are involved in governance and management issues of countries as well.

It is assumed that this new role poses a threat to academic freedom that academics have enjoyed in the past. Universities might lose their integrity and freedom by giving up control of their research, study or innovation to others because they have been funding that particular study or project. Moreover, there may also be a political threat to their academic integrity. Hence Barnett (1990) argues that the evolution of universities might lead to a crisis in the form of the replacement of old values with new values and new functions. It is understood that evolution is a process of change and that every change takes time to become fully absorbed into society. When universities are involved in competition with enterprises and companies, it becomes difficult for them to maintain their identity as not-for-profit organisations and to fulfil their own needs and requirements (Cranfield & Taylor, 2008). Hence, the external pressure on universities has increased and HEIs are rethinking their role in a knowledge economy.

The Knowledge Economy (KE), as a concept, offers many opportunities for researchers to delve deeply into the various ramifications. A whole set of factors such as intellectual capital, human capital, structural capital, knowledge organisations, innovation policy, the information age and legal infrastructure are involved and we must understand their implications as well as meanings (Bontis, 2001). It is difficult to measure accurately the knowledge assets of organisations, as suggested by Bontis (2001). He defines human capital as 'the combined knowledge, skill, innovativeness and ability of an organisation' (*ibid.*, p. 45).

According to Bontis (2001), an organization's culture, philosophy and value make human capital, while buildings, software, patents, trademarks and anything that helps human capital to work productively form structural capital (Bontis, 2001, p. 41–45). He maintains that measurement of knowledge assets is in an experimental phase where myriad possible solutions are being suggested and, so far, a unanimously agreed method of measuring tacit knowledge has not been established (Bontis, 2001, p. 44). In particular, measurement of tacit knowledge in an organisation is a significant challenge as it 'cannot be quantified in terms of physical objects like land or industrial capital' (OECD, 1999, p. 1). It is the issue which researchers are dealing with. For example, exploitation of new knowhow is considered as the prime engine for socioeconomic development, hence it is debated extensively (Mina & Hughes, 2009). In fact the very nature of knowledge has many challenges to offer to researchers and scholars to investigate and deal with it.

Developing economies suffer from too many technological problems. The difficulty is not just the identification of tacit knowledge, as is the case for developed economies; in addition, the gap in explicit knowledge needs to be identified (World Bank, 1998). The WB report (1998) suggests that developing economies should formulate a policy framework that allows all the actors such as government, non-government organisations and the private sector to work together to remove the knowledge and technological gaps. The report also suggests that governments in developing countries should support research, either directly or through universities, and develops the capability to create knowledge (World Bank, 1998; Bloom & Rosovsky, 2000).

The fact that universities in developing countries have not taken a role in creating, absorbing and using knowledge is of great concern to the world's financial institutions (OECD, 1996). This failure may result in a widening of the digital divide until universities play their role in reducing the 'North–South scientific gap' (Bloom & Rosovsky, 2000, p. 70). The extent of the gap between the two groups of countries, divided on the basis of economic development, is not quantifiable owing to a lack of proper evidence from the scientific literature, but there is other evidence to show clearly that a gap exists and needs to be bridged (*ibid.*, p. 70).

Developing countries on average spend less than 0.5% of GDP on education, while the developed countries spend more than 2% of their respective GDPs (Bloom & Rosovsky, 2000). Therefore, they suggest that a well-developed higher education sector is fundamental to generate new scientific and technological knowledge (Bloom & Rosovsky, 2000). The higher education sector in developing economies must pass through a reform process. The report identifies the key weaknesses of the higher education systems in developing countries, such as unavailability of trained faculty, the lack of access to research-related equipment, the absence of linkage between universities and scientific communities, and the lack of access to the global stock of knowledge (*ibid.*, p. 70). Furthermore, the report implies that the developing countries should adopt openness and deepen the dialogue with society, which will lead to stronger democratic countries (Bloom & Rosovsky, 2000).

Reformation of education system requires investment, which many international agencies such as the World Bank, UNTCD, and USAID have been providing to developing countries. However, most of the developed countries' assistance programmes have largely focused on the development of primary education, and have funded very few projects in higher education. More recently, the WB has revised its strategy, realising that developing countries cannot emerge from the traps of poverty and hunger until they are able to migrate to KBE (Tilak, 2007; Conrad, 2011). Conrad (2011) believes, developing countries can achieve comparative advantage by improving literacy rate. Benhabib and Spiegel (1994) suggest that economic growth is inevitably linked with technological progress hence universities must be reformed for the changes in the economy and society.

The Millennium Development Goals approved by the UN (2001) have also contributed negatively since they make no mention of higher education and only a brief mention of science, technology and innovation, with no targets set for developing countries. This has done enormous damage to the developing world as many countries take these targets quite seriously. It is only after years of neglect that the slowly developing countries are now beginning to realise the importance of migrating to a KBE. This has been partly triggered by the change in the policies of the WB and the OECD during the last decade in respect of the need to propagate knowledge-based development programmes. A recent $300 million agreement between the WB and the Higher Education Commission in Pakistan is illustrative of the new World Bank policy, as is the World Bank's decision to establish a 'Millennium' science institute (HEC, unpublished source, 2012). The efforts of developing economies to enter the knowledge arena have not been properly documented so far, although some of these countries are taking

steps towards formation of a KBE. Therefore, the current study responds to this challenge.

While scoping this project, I presented a paper on the role of the HEC in contributing to the creation of a KBE in Pakistan. The response to the conference presentation was positive and the audience asked thought-provoking questions that raised many issues. Primarily, my attention was drawn towards the activities/reforms that the HEC has undertaken to reform the system of higher education in Pakistan but many of its initiatives were in their infancy. The Commission initiated numerous projects that needed a minimum of five years to complete and show their impact. Therefore, it was too broad an area for a doctoral project. Secondly, time and resource constraints would have hampered the research process had the entire gamut of reforms (over 300 different projects!) undertaken by the HEC been researched in depth. Third, the change of government had raised some insecurity in the members of the commission that the commission will be devolved (Fieldwork, 2008); although, in the future (February 2012) such attempts were made, but the commission continues to dispense its duties (see Appendix-A for the Supreme Court decision regarding the HEC). Keeping this in view, I decided to narrow down the research topic and to focus on the role of universities that are the agents of change in the developed and knowledge economies. Moreover, in the first phase of data collection, it was identified that there is a gap between institutions such as the state, universities, corporate sector and the civil society. This became the central focus of my research: Why does this gap exist and how these institutions can be moved towards efficient and effective co-management practices which the literature evidences that it is required for knowledge generation and social learning (Berkes, *et al.,* 2007). What is the relationship between universities, government and industry (Etzkowitz and Leydesdorff, 2000) in Pakistan? Table 1.2 depicts the progression in the author's ideas and the scoping of this project. Hence, after the first phase of data collection, the focus was shifted to the issues and challenges faced by universities.

Table 1.2   Scoping of research project

Problem areas too broad for doctoral project (before data collection, Phase-1)	Problem areas identified after initial scoping of the doctoral project (after the first phase of data collection)

The role of the HEC in creating a knowledge economy in Pakistan:
  o   Overview of the projects undertaken in 2001
  o   Quality assurance and monitoring of universities
  o   Budgeting and financing
  o   Scholarships and degree accreditation
  o   Ranking system of universities
  o   Internationalisation and exchange programmes with international universities
  o   Curriculum development
	o Political influences on the HEC itself
	o Factors facilitating as well as hampering functions of universities in Pakistan
	o Current collaborations between academy and industry
	o Newly built technology incubation centres and their importance for business and industry in Pakistan

Source: Researcher's Memos, (2008).

After the first stage of data collection, transcription and open coding, significant research issues started to emerge. Early data collection and entering the field without any preconceived ideas were an advantage in the sense that new ideas were welcomed and the research problem was established in a manner of grounded theory (Strauss & Corbin, 1990). The overall aim of the researcher is to develop a new substantive theory to depict the inter-relationships or overlay of relationships between universities, industry and government in Pakistan in order to foster a KBE. The study is guided by the following research objectives and seeks to answer these research questions as stated below:

The objectives of the study are as follows:

1.   To understand the phenomenon of the KBE from the perspective of academia and key stakeholders and understand the challenges faced by the universities in Pakistan.
2.   To investigate the types and dynamics of linkages between universities and industry in relation to the knowledge economy.
3.   To devise a model to understand the linkages within the knowledge economy (university, industry and government) in order to bring about socio-economic development in Pakistan.

The study seeks to find answers to the following research questions.

RQ1.   How do academics and leaders of key institutions such as the HEC and the IPO in Pakistan conceptualise a KBE? What are the perceived challenges of developing a KBE in Pakistan?

RQ2. Which functions of universities foster knowledge economy? What are the ways in which academia can collaborate with industry and business sector in Pakistan, now (for transformation into KBE) and in the future (for sustainable development)?

RQ3. How can the policymakers possibly help in making an interface between universities and industries in order to support the creation of a knowledge economy?

RQ4. What will be the implications of a newly created KBE on the higher education sector of Pakistan, the socioeconomic conditions of the country (in other words, for the country) and for the region, if any, taking into account the recommendations generated in the study?

1.3 Contextual background: Higher Education in Pakistan

As mentioned in section 1.2, this thesis presents the case of the Islamic Republic of Pakistan and elaborates the perceptions of academia on the creation of a knowledge economy in Pakistan. Pakistan is a South Asian state with immense human and natural resources that have not been properly utilised for the development of the country. It is the sixth most populous country in the world, with large deposits of copper, gold, coal and many other minerals in Baluchistan. It has one of the world's best irrigation systems in Punjab, mountain ranges (Karakorum 2) and valleys in Khyber Pukhtoonkhwa, fertile soil in Sindh and scenic places in Kashmir that could attract tourists from all over the world. Looking at the WB website for country data, however, one realises that most of the indicators of economic development are missing (WB Website). This illustrates mismanagement of the resources and a lack of accurate data for making any future plans for development.

Pakistan is a land of immense opportunities, according to the founder of the country, Quaid e Azam Mohammad Ali Jinnah. He expressed this in his speech:

> *'This new state has placed tremendous responsibility on the citizens of Pakistan. It is an opportunity to show to the world, how a nation lives in peace irrespective of cast and creed. Our mission should be peace within and peace without. We want to live with peace with our immediate neighbours and with the world at large.'* (excerpt from speech, Jinnah, 1947)

Jinnah was of the view that the three key pillars that can make a nation strong are 'education', 'economic strength' and a strong 'defence system' (Jinnah,1989-1947). There has been a constant threat to sovereignty of the country, but this threat was eliminated completely when Pakistan excelled in its defence system and became a nuclear state. Pakistan's army is the country's greatest strength, according to the people, as it is one of the best in the world. In contrast, the education system is in a deplorable condition and economic development is a distant dream of the people. Presiding over a welfare state, the government wishes to provide basic facilities, such as health, education and employment, for its entire people, but this wish has yet to be translated into reality.

According to the World Development Indicators 2010, Pakistan's adult literacy rate is 67% (male) and 40% (female), which is not appreciable compared to Afghanistan's rates of 60% (male) and 50% (female). China's adult literacy rate, by contrast, is 97% (male) and 91 % (female), and India's is 75% (male) and 51% (female) (Bloom & Rosovsky, 2010). Pakistan spends 2.9 % of her GDP on education, while India and China spend 3.2 % and 11% respectively. It is worth mentioning here that only 0.5% is spent on higher education and the rest is allocated to primary and secondary education. Bangladesh, Iran, India, Malaysia, Indonesia and others have focused on knowledge-based development while, apart from during the last decade, education has been in a deplorable state in Pakistan.

The state is responsible for making the economic environment suitable for development by placing an emphasis on education. The Constitution of Pakistan requires the state to eliminate illiteracy and provide compulsory secondary education for all (Constitution of Pakistan, Act No. X, 1976). The current high rate of inflation in Pakistan (15.7%) and the high risk of terrorism are attributed to the lack of political stability and frequent changes in national as well as foreign policy. Under these circumstances education cannot thrive and the economy is on the downturn (Dawn, 2011). Various educational policies have been designed and some of them have been put in practice, but these policies were never fully implemented due to frequent changes in the political scenario. The 'Karachi Plan' of 1959–1960 suggested that basic education be made compulsory, and inspiration for such a plan was derived from Japan's economic parity with the West (George, 2006, p. 549). Furthermore, the Millennium Development Goal of 2001 reiterated the same goals, that state-sponsored basic education should be provided to all and that gender disparities should be removed by 2015; so far, however, this goal has not been achieved (George, 2006, p. 549).

The challenges faced by schools are numerous, such as weak governance; lack of funding fragmentation between English and Urdu medium for teaching in schools; madrasa education; poor quality of teaching staff; and, at times, lack of adequate staff and facilities. Moreover, out dated curriculum has been in place which encourages rote memorising the subjects without completely understanding their concepts, the exam system is unfair, and there is poor monitoring and evaluation of the finance system. The ambitious Karachi Plan recommends that all Asian and South Asian states reserve finances for education, but the targets have not been achieved so far; however, the overall level of basic education has increased in these regions by 5.5%. This is not very different from Africa (5.8%) between 1960 and 1990 (Tilak, 1994).

The Federal Ministry of Education (MoE) and the Federal Directorate of Education (FDE) have responsibility for the development and coordination of national policies, plans and programmes in primary and secondary education (Class 1 to 10/O-Level) and higher secondary education (Class 11 to 12/A-Level). These two bodies are also responsible for the development of the curriculum at primary, secondary and higher secondary levels of education in Pakistan, while implementation of the policies is the responsibility of the local administration (Nordic Recognition Information Centre report, 2006). An overview of the educational system of Pakistan can be gained from the Appendix B.

Post-secondary education, that is, graduate and postgraduate education, is supervised by the HEC. According to 'Education in Pakistan: A White Paper' (2001), education is the primary ingredient in the development of an economy and society. This White Paper laid particular emphasis on the role of higher education in the development of a country as it suggested that secondary and higher secondary education can develop critical citizens who later on contribute to the growth of the economy (Aly, 2007).

Between the years 1999 and 2009, total revenues of $143 billion were generated, which is the highest figure in the economic history of Pakistan (IMF, 2007). The government during this period had developed a strategic approach to reduce the debt of the country, generate revenues and reform the key institutions of the country such as the judicial, educational and financial institutions. The national aim of the government during this period was to transform society into an enlightened society (the term employed was 'enlightened moderation'), for which the reformation of the key institutions, particularly the educational institutions, was inevitable (PIDE, 2001). A strategic approach was developed with the help of informed opinions of technocrats, expatriates and experts. This policy was named 'Vision 2030', a holistic policy laying down a roadmap for the transformation of the country into a KBE (PIDE, 2001). An important part of this policy was to align the higher education system with the needs of the country, as the system of education at that time did not match these national aspirations. The focus of the present study is on the creation of a KBE and the challenges faced by academia to achieve it. Therefore, this focus will be maintained in the following deliberations.

What levels of education are included in the higher education in Pakistan? After receiving 12 years of education, students apply for admission to HEIs and universities that offer education in various fields including medicine, arts, science and technology, management, engineering and business studies. In the past, the higher education system in Pakistan had failed to inculcate entrepreneurial mind-set, free values, conceptual understanding and analytical skills in students. For this reason the former government replaced the UGC with the new Commission, the HEC. The Task Force on Higher Education System of Pakistan reports:

> '...the UGC nevertheless serves as a transmitter of the universities' annual budgetary requests to the Ministry of Education and distributor of Federal government's grants to the universities, generally less than requested and not always delivered on time. This has contributed to the erosion of its credibility with universities.' (Task Force report, 2001)

The failure to inculcate the entrepreneurial attitude, research-led mind-set and innovative capability among students and faculties is partly attributed to the inefficiency of the previous regulatory body, the UGC, and partly to the lack of government support in strengthening higher education. The governance and management of universities during this period was considered very poor. A few examples will illustrate this point: there were 75 universities in the country, but most of these universities lacked infrastructure and staff; secondly, there were no standardised criteria for the awarding degree of M.Phils and PhDs; third, increments and promotion for faculty members were based on duration of service instead of performance; fourth, eligibility for the appointment of faculty members was based on references or political motives; fifth, as such, no professional training was given to academics for their continuous professional development (HEC, 2012).

The Higher Education Commission (HEC) was established in October 2002 to facilitate the public and private universities of Pakistan (Rahman, personal communication, 2007). The objective of the Commission is to transform the economy into a knowledge- and services-based economy by creating international centres of research and innovation. In this regard, the HEC has taken major initiatives so that universities' potential can be harnessed as socioeconomic engines in the country (personal communication with the HEC Executive Director, 2008; Rahman, personal communication, 2008). The following Table 1.2 summarises the achievements of the UGC and the HEC.

Table 1.3   Comparison of the UGC and the HEC

Programme and activities	University Grants Commission (UGC) between 1947-2001	Higher Education Commission (HEC) 2002 –2011
Total number of universities in the public and private sector	75	75 (total number now 150)
Universities ranked in World 600 universities	None	5
Newly established universities/HEIs	71	66
Enrollment in higher education	276,274	803,507
Scholarships awarded for PhD or post-doctorate	Less than 1500	8000
PhD output	3321	3658
Annual development funds) between 2000–2001 (UGC) and 2010–2011 (HEC)	0.4 billion PKR	14.45 billion PKR
Cumulative Development Funding 2000–2001 (UGC) and 2010–2011 (HEC)	7.5 billion PKR	97.3 billion PKR

Source: HEC, 2012; unpublished data; fieldwork document

During the last 10 years the HEC took some fundamental initiatives, such as improving access to higher education (which has grown from 2.6% of the 17–23 age group in 2002, to about 7.6% of the same age group in 2010), incorporating rigorous quality assurance systems within each university, strengthening the infrastructure of universities and, most importantly, making huge investments in human resource development for development of high quality facilities (The Dawn, 2010). These basic, critically important steps have laid sound foundations for an evolving higher education system in Pakistan that might be applicable to other developing countries (Nature, 2009). The HEC is determined to reform the higher education sector in Pakistan and link it to international markets as well as the local economy.

Recent developments following the establishment of the HEC include the establishment of new universities. There is now a total of 150 universities in Pakistan; 73 of these are in the public sector and the rest are private universities (HEC Report, 2010–2011). Isani (2001) directs our attention to the increasing emphasis placed by scholars in Pakistan on basic research and suggests that, keeping in view the societal and economic demands of the society and international market, universities in Pakistan must focus on their entrepreneurial role. He also suggests that higher education needs political commitment and public–private partnership to equip graduates better for the challenges of the twenty-first century (Isani, 2001). Higher education has received government support in the last decade, but public–private partnership has still not been achieved.

The HEC assessed that universities in Pakistan lack the capacity to generate knowledge through research. The universities do not have adequate staff with research capabilities. Therefore, in the period 2001–2009, research capabilities were considerably improved by the provision of infrastructure, sophisticated instrumentation, a digital library that provides free access to 25,000 international journals and some 60,000 textbooks from 220 international publishers, and huge faculty development programmes (HEC website). Some 8000 foreign scholarships were allocated to develop high-quality faculties with fully-fledged PhD and sandwich PhD programmes for students wishing to pursue doctorate studies; more than 4000 scholars have returned to their funding universities (un-published data HEC, 2011).

In Pakistan, the performance of five universities is extraordinary. These are Lahore University of Management Sciences, Quaid E Azam University, Karachi University, the National University of Science and Technology and the Agha Khan Medical University. These are world-renowned HEIs. Some research centres such as PIDE, Husein Ebrahim Jamal (H.E.J.) Research Institute of Chemistry, Pakistan Institute of Nuclear Science and Technology (PINSTECH) and Dr Panjwani Center for Molecular Medicine and Drug Research (PCMD) are the finest research centres in Pakistan. Research in universities under the command and control of UGC was not of good quality. The issue of plagiarism was not taken very seriously as most of the theses were hardbound; only recently has software to detect plagiarism ('Ithenticate' and 'Turnitin') been given to universities. All dissertations and theses are now digitised and follow standardised criteria of quality and merit; however, very few studies have been undertaken in the higher education sector. Appendix C gives the list of research conducted in universities in academic institutions but all of these studies have no relevance to policy.

Research and literature needs to be conducted according to the demands of time and the current issues so that the research has relevance for policymakers. These are only a few studies based on the HEIs in Pakistan with no relevance to policy.

Recently, some of its universities were included among the world's 500 highest-ranking universities, according to the Times Higher Education Supplement (THES, 2008). These are the prominent features of the landscape of higher education in Pakistan. These universities and research centres in Pakistan are working to international standards. A question arises: why is the overall quality of higher education not very appreciable, despite the existence of such universities and research centres? The answer is that most universities still lack high-quality creative faculties and, while this is being developed, the quality of higher education will be variable. It has already improved considerably in some universities while others are still far behind, producing low-quality graduates. As a result, the overall quality of education is, in general, still low. According to a recent study by Abbasi *et al.* (2011) the level of student satisfaction is alarmingly low. Students are dissatisfied with services and facilities such as teaching, libraries, administrative support, laboratory equipment, campus medical facilities and accommodation for both genders. Satisfaction has been reported only regarding three items: transportation, classroom facilities and prayer room facilities (Abassi *et al.*, 2011). The high -ranking universities can be taken as role models by the other universities and competition in higher education has been created in Pakistan after the HEC adopted the practice of ranking universities. The first ranking exercise was carried out in 2007 and a second in 2011.

In order that further development can take place, first, research needs to be conducted according to the needs and current issues need to be identified and as well as rectified. Second, the country has embarked on a steady drive to reform research and teaching in universities since 2001 to achieve a KBE, firstly by increasing access to higher education, as Table 1.4 and figure 1.1 shows. This policy should be continued.

Table 1.4   Access to higher education, preparation for the KBE

Years	Age Group 17–23 years	Do Nothing	Access to Higher Education
2001	23.1 million	7.8%	1.8 million
2015	25.2 million	HEC aims to reduce the ration	2.52 million
2020	27.7 million	HEC aims to further reduce the ration	4.15 million

Source: HEC master data (Fieldwork, 2008)

Currently, about 1.8 million students have access to higher education. Of these, about 0.46 million are studying at university campuses and another 0.51 million are on distance learning university educational programmes (Allama Iqbal Open University and Virtual University), while still another 0.9 million are studying in colleges and private educational programmes. This constitutes about 7.8% of young people in Pakistan between the ages of 17 and 23. If nothing is done to increase access, and enrollment is maintained at 7.8% of this age group, the number will increase to 2.52 million by 2015 and 4.1 million by 2020. If the country plans to double participation by 2020, then 8.2 million students will need to be accommodated in universities. This is a huge demographic challenge. The government should pay more attention to these colleges and institutes since they produce ready-earners because of the demand for technicians and people with vocational training. The students start their working life after 12 or 14 years of education. Other than these ready-earners, people fall into the category of uneducated labour. The dropout rate of students at primary and secondary level is very high and they become a burden on the economy if they do not learn any skills.

Figure 1.1 Enrollments in universities of Pakistan in 2001-2010.
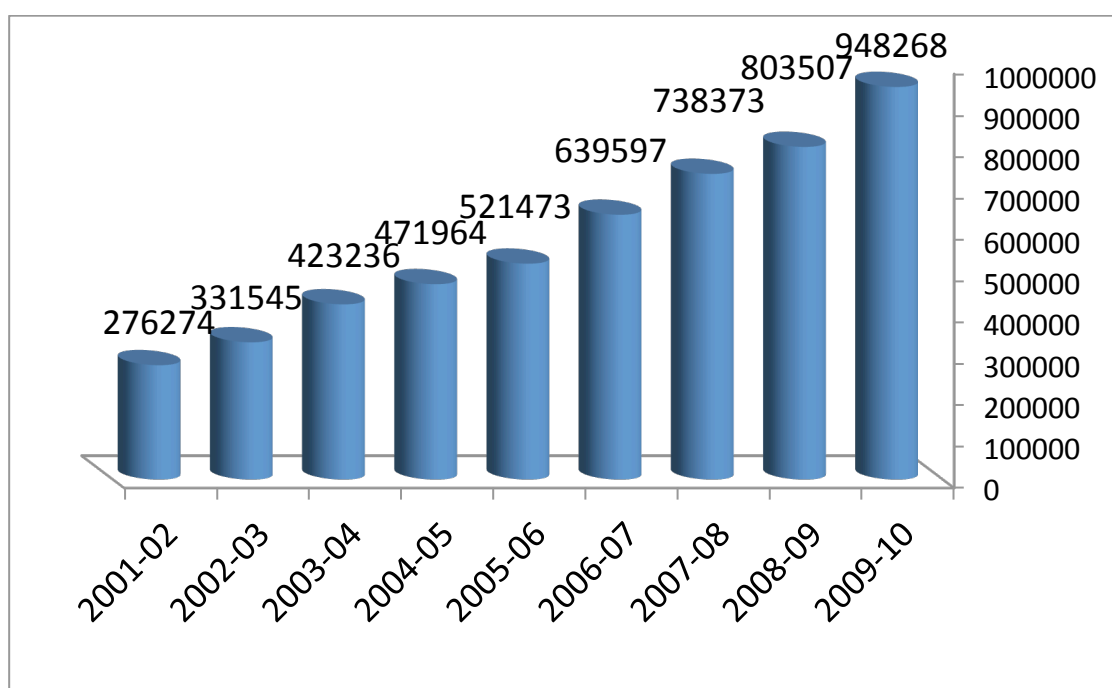
Source: HEC (Fieldwork documents, 2012)

Specifically, the aim is to analyse the paradigm shift in the national policy of the country in moving towards a KBE. This transformation or paradigm shift raises the question of whether this move towards a neo-liberal model of higher education is a well-thought-out strategy. It is worth inquiring into the perceptions of academic leaders on this shift in policy because they are in a key position to implement the policy.

1.4 An overview of research methodology

Methodology is 'a way of thinking about and studying social reality', while methods are the tools to solve a problem (Strauss & Corbin 1990, p. 4). The choice of methods and methodology for a particular research project depends on the research questions and the purpose of the study (Yin, 1994). Generally, all kinds of research projects take place between the two ends of a continuum namely, positivistic and phenomenological or interpretivist. Positivistic research is 'based on the rationalistic, an empiricist philosophy that originated with Aristotle, Francis Bacon, John Locke, August Comte, and Emmanuel Kant' (Mertens, 2009, p. 8). It is based on a 'deterministic philosophy in which causes probably determine the effects or outcomes' (Creswell *et al.*, 2003, p. 7). Moreover, since it is based on empiricism, a positivistic study holds true irrespective of place and time (Lincoln & Guba, 1985, p. 38). Overall, the choice between interpretivist and positivist paradigms depends on the researcher's perceptions of how the problem should be approached and also on the nature of the research questions (Yin, 1994).

The underpinning philosophy of this research is social constructionism. The theoretical perspective of social constructionism is that '… each of us, of necessity, must encounter the world from some perspective of another (from where we stand), and hypotheses must also of necessity arise from the assumptions that are embedded in our perspective', which appeals to the researcher (Burr, 1995, p. 152). The researcher's own experience of educational institutions, as a student and as a teacher in higher education, and the understanding of the culture of the chosen research context will help to generate deeper insights, so it is not necessarily correct to assume that the research is conducted completely objectively. The underpinning philosophy gives value to the views and opinion of the researcher and allows the researcher to 'work with their own intrinsic involvement in the research process' (Burr, 1995, p. 152). Therefore, the resulting study will be a co-product of researcher and researched; moreover '…facts themselves can never be impartial' (Burr, 1995, p. 152). They are the product of social, cultural and economic structures that apply to the research, as the higher education sector will be seen in a specific context. Why this particular paradigm is selected, and how it applies to this research will be elaborated in Chapter Three on methodology.

The current study is embedded in the context of Pakistan and is also time specific. The research questions are exploratory in nature, therefore, a phenomenological stance suits the nature of the research and qualitative methods will be used to collect data (Mertens, 2009; Creswell *et al.*, 2003). In addition, Guba and Lincoln (1994) assert that a qualitative or phenomenological approach can provide rich insights into human behaviour. This research is primarily concerned with understanding the perceptions of academic leaders and university researchers, and with how such perceptions influence behaviour. Therefore, a qualitative approach seems suitable for this study while grounded theory is the overall methodological framework for data collection and analysis (Hjorth & Steyaert, 2003).

Glaser (1998, p. 67) recommends the use of grounded theory methodology for an area of study that is relatively new. Following Strauss and Corbin (1998), fieldwork was started with no preconceived ideas. The first phase of data collection was undertaken with the intention of determining the scope of the project and identifying the research problem. This phase was important in the research process to determine the direction of the project and to identify further data collection sites. Many eminent scholars in the country, such as the Head of Intellectual Property Organization, the Ex-Chairman of the HEC and the Executive Director of HEC were interviewed. Following a purposeful sampling strategy these resource persons are deemed the sources of knowledge on this research area and, hence, they were consulted at the outset of the study (Strauss & Corbin, 1998, p. 72; Patton, 2002; Coyne, 1997). Table 1.4 summarises the key constructs investigated, the underpinning research paradigm for each research question and the method for data collection.

Table 1.5 Key constructs investigated and research philosophy

Sr.no	Research questions	Constructs to investigate	Underpinning research philosophy and research method
RQ1	How do academics and leaders of key institutions such as the HEC and the IPO in Pakistan conceptualise the KBE? What are the perceived challenges of developing a KBE in Pakistan?	Conceptualisation of KBE	Social constructionism; Interviews, documentary analysis and focus group discussion
RQ2	Which functions of universities foster knowledge economy? What are the ways in which academia can collaborate with industry and business sector in Pakistan, now (for transformation into KBE) and in the future (for sustainable development)?	Functions of universities that foster KBE; Dynamics of university–Industry Linkages	Social constructionism; Interviews, documentary analysis and focus group discussion
RQ3	How can the policymakers possibly help in making an interface between universities and industries in order to support the creation of a knowledge economy?	The role of policy makers and the state in fostering a KBE	Social constructionism; Interviews, documentary analysis and focus group discussion
RQ4	What will be the implications of a newly created KBE on the higher education sector of Pakistan, the socioeconomic conditions of the country and for the region, if any, taking into account the recommendations generated in the study?	Implications of KBE for developing economies	Social constructionism; Interviews, documentary analysis and focus group discussion

1.5 Significance and contribution of the study

The contribution of this study can be addressed from multiple perspectives: theoretical, methodological, and policy implications that are discussed in details in the Section 6.3. Drawing on a rigorously conducted empirical study with the participants from universities, and key government organisations such as the HEC and the IPO in Pakistan, a Model of Symbiosis has been generated to demonstrate the complications involved in the development of a KBE as an outcome of the proactive approach of universities towards socio-economic development of the country. Despite the fact that the concept of the KBE was born in the Western context and it has been researched now for the last two decades. Scholars such as Clark (1987) and Halsey (1992) have written extensively on the pressures on universities in KBE and the response of universities to those changes is explained by the proponents of the Triple Helix Model (THM) such as Etzkowitz and Leydesdorff (2000) and Becher and Trowler (2001) but in the context of the Western developed countries. With the rise of the concept of a global knowledge economy in the 1990s, many universities in various parts of the world have revisited their functions but studies of KBE and transformation of developing countries into a KBE are the handful (NCST, 2003). Therefore, the newly generated theory, the Model of Symbiosis, increases our understanding of KBE in the context of developing countries.

Higher education in Pakistan is an under-researched area compared with India, China, Bangladesh and Iran. Hardly any scholarly articles have been written on higher education in Pakistan so far; it evidences the lack of acumen of the government towards the importance of higher education in socioeconomic development. In practice, the study will increase the understanding of higher education in Pakistan. The anticipated outcome of the study is that it will be beneficial to a range of stakeholders such as higher education regulatory bodies, universities, intellectual property organisations, governments of developing economies, employment agencies and industry in Pakistan. The researcher aims to provide practical recommendation to apply the Model of Symbiosis in Pakistan in order to achieve socio-economic development. The study is a response to the Vision 2030, which sets a target for Pakistan to transform into a KBE by 2030. Therefore, the study investigates the preparation of universities at structural and functional levels, examines the perceptions of academic leadership, addresses issues such as what facilities are available to them to aid them build society and identifies hindrances in order to remove them so that universities in Pakistan can perform their desired role.

Last but not least, the study has made a contribution to methodology by making use of grounded theory in Pakistan on a pressing issue of education and socio-economic development (Strauss and Corbin, 1998). Coding in a bilingual context has generated some concepts explained in the Appendix D; as a result, our understanding of higher education in Pakistan has increased. These concepts are commonly understood in the education sector of Pakistan but might be novel for other researchers in the field of higher education; therefore, these terms are included in the contribution of the study, resulting from coding in bi-lingual settings. Due to the language barrier, the production of a substantive theory demanded the researcher to have good linguistic skills, which the researcher possessed already. This process of theory formulation is embedded in the cultural background of the researcher and his/her linguistic skills (Littrell, 2002; Temple, 1997). In short, translating an interview from Urdu language to the English language or coding of the terms, which cannot be translated in English, was a highly creative process. Strauss and Corbin (1998) suggest that translation should not distort the meanings of concepts. For this reason, I call the generation of new terms while applying grounded theory in the context of Pakistan, as an empirical contribution of the study. Glossary of new terms generated in the context of Pakistan is given in Appendix D. Contribution to practice and policy includes significant recommendations made for universities, education sector, higher education regulatory body, such as the HEC, intermediary bodies for industry, such as the IPO given in Chapter 5 and 6.

Figure 1.2 Organisation of the thesis

Chapter 1
Introduction

Chapter 2
Literature review

Chapter 3
Methodology

THEORETICAL CHAPTERS

The Role of Universities in Transforming a Developing Economy into a Knowledge-based Economy: The Case of Pakistan

EMPIRICAL CHAPTERS

Chapter 4
Case accounts

Chapter 5
Conceptual ordering and The Model of Symbiosis

Chapter 6
Concluding remarks and policy implications of the study

1.6 Structure of the thesis

The first section discusses the background of the study, personal motivations of the researcher, and the aims and objectives of this study, highlighting the research issues, the research questions, followed by an overview of the methodology. This chapter ends with a thesis outline. The rest of the thesis is structured as follows:

Chapter Two: Literature Review

This chapter begins with the discussion that why there is debate about KBE while industrialist and agriculture economy depend on knowledge as it is the focus in KBE. The difference is shown in the components and the significance of KBE. Next, the implications of neo-liberal debate for higher education systems are discussed. After highlighting the key theoretical perspectives on the knowledge economy, innovation and functions of universities, higher education systems in developing countries are discussed. There is gap in literature on the role of universities in developing countries. Therefore, this chapter intends to fill this gap. The chapter is summarised at the end.

Chapter Three: Methodology

This chapter presents the research philosophy and methodological choices of the researcher that are used to find answers to the research questions. The chapter discusses the nature and purpose of enquiry. It provides a justification for the selection of the underlying paradigm, research methodology and research methods. Data collection and analysis procedures are explained, and the chapter deals with the issues of the criteria for grounded theory qualitative study. After suggesting remedies to these issues, the chapter is summarised, which brings the theoretical part of the thesis to an end, as shown in Figure 1.2.

Chapter Four: Case Accounts

This chapter mainly deals with the findings from primary and secondary data. The findings are reported in the form of case accounts. These case accounts illustrate the context in which the phenomenon is taking place and a structured approach is taken while describing the case accounts so that in the next chapter common themes can be compared across the universities such as missions of universities, their perception of KBE and university industry linkages. The chapter concludes with a summary.

Chapter Five: Conceptual Ordering and the Model of Symbiosis

This chapter elaborates the core categories, using grounded theory methodology, from five concepts/ categories. These categories are: 1) Institutional support for creation of a KBE 2) Perceptions about the KBE: An academic perspective 3) Socioeconomic development through universities 4) Fostering a KBE, achieving sustainability. The researcher, with the help of these categories preceded the analysis to an abstract level and three core categories were generated. These core categories are 1) Ideological foundation, vision and policy 2) National Eco-System of Education 3) University Industry Linkages. Finally, the new substantive theory, (termed as the Model of Symbiosis) is generated. This theory identifies the missing links between the institutions of state in the National Eco-System of Education and suggests ways in which it can be linked to other actors of the state to create synergy for socio-economic development to occur.

Chapter Six: Concluding Remarks and the Policy Implications of the Study

This chapter summarises key findings of the research by revisiting answers to the research questions and it highlights the contribution of the thesis with implications for theory and practice.

It is important to mention that in the empirical chapters, that is, Chapters 4, 5 and 6, the first person will be used and direct quotations/ statements of the interviewees will be incorporated from the data in order to maintain the originality of the research and help the reader to understand the intricacies involved in this project. The organisational scheme is depicted in Figure 1.2.

1.7 Summary

This chapter introduced the thesis with an overview of the scope of the research problem leading to research aim, objectives and research questions. The chapter has also covered introduction to methodology and highlighted the contribution of the study. The chapter concludes with the structure of the thesis.

2. Literature Review

2.1 Introduction

'The selection of available documents (both published and unpublished) on the topic... the effective evaluation of these documents in relation to the research proposed' is called a literature review (Hart, 1998, p. 13). The critical analysis of scholarly articles, conference papers and books to summarise the significant literature in a particular area of research, and to reflect on gaps in the literature and indicate areas for further research are the common procedures for literature review (Punch, 2000). The chapter presents an overview of the relevant literature related to the research proposed. This chapter falls under the theoretical part of the thesis, as depicted in figure 1.2.

2.2 The Knowledge-Based Economy (KBE): What is new about it?

This chapter aims to locate the current research as a part of recent debate over the functions of universities in a knowledge economy and to identify gaps in the literature on the KBE and new models of higher education in global higher education. To start the review of previous research, the roots of the knowledge economy are traced and its characteristics are defined, along with indicators of the KBE. The researcher agrees with Bourdieu (1998, p. 95–96) that the KBE is a tool to propagate neoliberalism, which developed initially as a scientific programme of knowledge, but has taken the shape of a political system that has widely affected the governance structures throughout the world. It seems utopian, since it aims to change the social order, and might not be applicable to all parts of the world (Levitas, 2007; Kumar, 2006; Mannheim, 1946). Hence, there is a need to thoroughly explore the implications of the idea of development based on experiences in different parts of the world.

The role of major financial institutions such as the Organisation for Economic Cooperation and Development (OECD) the International Monetary Fund (IMF) and the World Bank (WB), in bringing about the KBE, is important in developing countries. They often exert pressure and try to impose their policies to facilitate creation of a knowledge economy in developing countries but these organisations need to comprehend that it is a target, which cannot be achieved quickly. Moving from their low value-added an agricultural economy towards a KBE requires constant supervision and in flow of funds in developmental projects in these countries. However, the present review aims to look deeper into the notion of the knowledge economy. It seeks to answer the questions regarding why, despite the recent global recession (that illustrates the failure of capitalism), neoliberal theories are enforced in most parts of the world? How knowledge-based developments are pursued enthusiastically in different parts of the world? How do the developing economies view the KBE? What is the utility of theoretical perspectives such as the Triple Helix Model of academy–industry–government relations (Leydesdorff & Etzkowitz, 1998), NIS (National System of Innovation) (Lundvall, 1992) or Regional Innovation System (RIS) (Cooke *et al.*, 1997) for developing economies, as these ideas are context-specific in countries where technological innovation was already taking place? Last, but not least, how can developing economies use leapfrogging techniques to catch up with the socio-economic development in developed economies?

The answers to the above questions will increase understanding of perceptions of the KBE in the developed and developing economies. It will also serve to highlight the importance of higher education in a knowledge society, particularly in the global policy and financial institutions that may aim to develop knowledge economy in developing countries, and root out the increasing danger of a digital divide, inequality and injustice prevalent in developing economies. In addition, this review will identify gaps in the literature that this study can at least partly address. The focus of the review is mainly on the role of universities in the transformation of developing economies into a KBE. This is a fairly under-researched area in developing countries. There is a need to develop a robust theoretical framework to align the roles and functions of the university with the emerging global needs of transformation into a KBE.

2.2.1   Conceptualisation of the KBE

In his seminal work, *The Wealth of Nations*, Adam Smith (1776-1937) suggested that land is no longer the yardstick by which to measure the wealth of a nation; rather, industrial development will determine this. Change does not stop there; instead there is a smooth transition to a further stage where knowledge is utilised as a resource. In the twenty-first century, economies will be known for their capacity to create and disseminate knowledge (Burton-Jones, 1999; Drucker, 1999). When the transition was made to industrial economies, land was displaced by labour and industry, but now there has been a wonderful change in which 'knowledge' is used in combination with all the previous resources. In the opinion of David and Foray (2002), the conversion from an industrial economy into a knowledge economy represents a soft transition instead of a sharp break from past economies.

Advocates of the KBE acknowledge that Daniel Bell (Bell, 1973, p. 3) is the pioneer of the concept of the KBE, because he used the term 'post-industrial society'. He presented the idea of the KBE in 1973 as a continuation of the post industrial economy and society, but with unique features. He argues that the post-industrial society signifies the centrality of theoretical knowledge; it is the axis around which economic growth and the stratification of society will be organised (Bell, 1973). He adds that no society emerges suddenly in a full-blown manner, but that a new economy is the result of an amalgamation of the old world order with the new world order (Bell, 1999). He maintains that, after the World War II, a transformation from agrarian to industrial society started to appear in East and South Asian societies while Great Britain, Japan, Western Europe and USA shifted the focus of their economies from manufacturing to service sectors. Bell (1973) symbolises the development of the KBE with a technological ladder that has five steps:

1.   Resource-based development
2.   Focus on manufacturing
3.   Heavy industry development
4.   Move towards high-technology and
5.   Development of knowledge economy.

Resource-based development includes the development of agrarian and extractive industries and is the first step towards the KBE. This can then evolve into economies that foster science-based biotechnology, material science, space stations and satellites (Bell, 1999). Japan has climbed this ladder in fifty years (Dore, 1973). The first knowledge economies, in his view, were those of the USA and Japan because these are the economies that have developed the capacity to produce and use high-technology and to transform knowledge into services to increase wealth (*ibid.,* p. 446).

According to a recent study (Gürüz & Nancy, 2011) the developing countries are also trying to improve their competitiveness in the global market. The study claims that 'China has emerged as the manufacturing hub of the global knowledge economy, followed by Thailand, Malaysia, Indonesia, the Philippines, Vietnam and Mexico (Gürüz & Nancy 2011, p. 16). It is also stated in the study that 'the world is moving in a direction where there are three groups of countries' (Gürüz & Nancy 2011); the first group of countries, headed by the USA, is branded as 'knowledge producers'. The second group of countries is the so-called 'knowledge users' (such as India and China) and the third group includes the countries which are either 'passive users of knowledge' or 'technologically disconnected' (Gürüz & Nancy 2011, p. 16).

The KBE received acceptance by many scholars such as Lane (1966), Naisbitt (1984) and Touraine (1971), while sceptics, such as Jameson (1991), Webster (2002) and Kumar (1995), maintain that knowledge has always been a driving force for all sorts of socio- and economic development. Knowledge, argue David and Foray (2002), has developed at the core of economic growth and social wellbeing since time immemorial. Sceptics believe that the idea of knowledge economy is as old as civilisation itself (Castells, 1993). Perhaps they are right to some extent, as farmers needed knowledge of the seasons to grow appropriate crops when agriculture was the main mode of economic development. The concept of the KBE being 'new' may, therefore, not be correct in this respect. However, despite scepticism, the views of most scholars converge on a few key points distinguishing the KBE from the old mode of economy, that is, the fast pace of knowledge production and distribution; the greater emphasis on R&D; and the increased use of ICT (Giddens, 1990; Castells, 2001; Maringe, & Foskett, 2010; Taylor, 2010). John Taylor argues in the *Globalization and Internationalization in higher education: theoretical, strategic and management perspectives,* KBE, globalisation and internationalisation are inextricably connected but dominant themes can be pointed out which illustrates the shift towards the KBE such as, wider access to knowledge and research; new awareness of universities about their international standing and an active sensitivity to the demands of international competition (Taylor, 2010, p.89).

The new economy has brought new challenges to which nations and states must rise. Globalisation and ICT are the factors, which nurtured the new economy. Globalisation, 'led to the demise of the comparative advantage' of 'industrial nations in many traditional industries, such as machine tools, metal working, textiles, and automobile production' and 'the comparative advantage' of nations or economies is shifting toward 'knowledge-based economic' activities (Audretsch & Thurik, 1998, p.1). According to Lane (1966), increased knowledge and information have led us into the KBE and knowledge society. Godin (2004) and Solow (1957) have indicated that two sources that have helped the KBE to gather momentum are globalisation (borderless trade and international deregulation of trade) and the revolution in ICT (Castells, 1996; Brennan, 2008). As a result of globalisation and ICT, the KBE flourished and subsequent changes are observed in many ways in all walks of life. Knowledge economy is characterised by continuous development of skills (highly developed skills), products (innovation) and services (Waters, 1995; Houghton & Sheehan, 2000). Stehr (1994, p iix) points out '...as labour and property gradually gave way to a new constitutive factor, namely knowledge, older struggles and contests, centred for instance on the ownership of the means of production, also make room for rising sentiments of disaffection with beliefs and values once associated with labour and property and ultimately result in a very different moral, political and economic debates and conflicts'. Therefore, the knowledge economy debate has substance and its presence can be traced, as Thurow (1991, p. 101) highlights:

> *'In the twenty-first century, comparative advantage will become much less a function of natural resource endowments and capital–labour ratios and much more a function of technology and skills. Mother Nature and history will play a little role. The knowledge economy is sometimes referred to as the 'new learning economy', 'post industrialist economy' and 'information age', and all these terms refer to the phenomenon of the increased use and impact of knowledge. Many terms are used interchangeably for the KBE in different disciplines, evidence that we are actually living in a knowledge economy and society or, as it may be called, an information age or a networked society (Petty & Guthrie, 2000).*

In fact, the new economy started to emerge in 1950 when econometric models were developed to measure the impact of R&D and science and technology on the growth of the economy (Godin, 2004, p. 679). The concentration of knowledge and information-intensive industries in the present-day industrialised economies contributes significantly to their development. It is also observed that knowledge-related professions have increased in knowledge economies compared with other professions, so much so that knowledge industries are created (Machlup, 1962). Furthermore,

Audretsch and Thurik (1998, p. 1) argue that employment patterns have also changed. They state that the 'knowledge-based jobs cannot easily be relocated to less advanced parts of the world' instead entrepreneurship helps in gaining a comparative advantage in the configuration of a new economic model because 'knowledge-based economic activity is predicated on new ideas and novel technology, such activity is inherently uncertain' (*ibid.,* p.1). Hence, unlike the industrial era, where types and levels of output were selected; the new economy is conceptualised as an economy where most of a nation's people are engaged with knowledge. Entrepreneurship works as a catalyst. People attain high levels of education and they can make use of information technology to create and innovate while governments/ policy makers prioritise research and knowledge as their high priority items in order to make (their respective) economies knowledge intensive, free from the abuse of market powers and technical assistance is available easily to new ventures (Audretsch & Thurik, 1998, p.1).

2.2.2   Defining the KBE

Powell and Snellman (2004, p. 8) defined the new economy or the learning economy as one of 'production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence'. Other scholars have defined the term KBE in various ways. According to Brinkley (2006) 'knowledge economy is what you get when firms bring together powerful computers and well-educated minds to create wealth' (*ibid.,* p. 3). He adds, 'In turn the new knowledge economy would give rise to new organisational forms within and between companies and a radical changes in employment relationships are observed as more and more knowledge workers became portfolio workers, freelancers, or self-employed' (*ibid.,* p. 4). His response to the critics of the KBE with respect to whether it exists or is just 'hype' is as follows:

> *'...the economy has always been driven by knowledge leading to innovation and technical change and knowledge-based institutions have helped store and share knowledge for centuries. What we see today is essentially more of the same but operating on a bigger scale and at a faster pace.'* (Brinkley, 2006, p. 4)

It depicts the accurate difference between the knowledge era and the previous era. Knowledge is an important aspect of the KBE but knowledge requires special circumstances to yield good results. In other words, knowledge is created on the basis of already existing knowledge and culture to tap into new possibilities and opportunities (Centina, 1999). The use of knowledge related terminology is used in this era in educational policies; industrial policies; science and technology (innovation)

policies illustrate new modes of development. Reading between the lines, these policies are designed when the policy makers acknowledge that in a given context, knowledge culture (already) exists. Hence, in order to define KBE, access to knowledge, presence of knowledge, infrastructure to apply already existing knowledge, knowledge culture, and effective policy framework to mobilise all resources for the use of knowledge as a resource, are the factors, which nurture a KBE. Moreover, the conceptualisation of a KBE depends on surplus knowledge (Tacit and Codified) to be taken into consideration.

To the best of researcher's knowledge no such definition of KBE exists to which scholars from sociology, management, education can agree unanimously. The researcher agrees to the perspective presented by Centina (1997, p.8), who states that a KBE or a knowledge society is 'permeated with knowledge cultures, the whole set of structures and mechanisms that serve knowledge and unfold with its articulation'. Therefore, in the opinion of this study, KBE can be defined as the capacity to produce knowledge, use knowledge and economise it in such a way that all users can easily access it. Knowledge economy is the economy where knowledge flow is ensured so that it can flow easily without any barriers. Also, knowledge is not just higher qualifications; rather, it is the capacity to apply ideas for solution of real life problems (Delanty, 2001).

2.2.3 Characteristics of the KBE

The Knowledge Economy has peculiar characteristics according to Peters (2000). He suggests that the first characteristic of the KBE is the 'economics of abundance', meaning that knowledge is a resource that multiplies. The second characteristic of a KBE is the 'annihilation of distance' meaning that ICT has made the world a global village. Access to knowledge or information in a KBE is provided twenty four hours a day; distances and time do not hinder the processes of acquisition, access and diffusion of knowledge. The third characteristic is the 'de-territorialisation of the state' which means that knowledge has no state; and no barriers can be imposed on it. It always flows from where it is in abundance to the place where its quantity is low. The fourth characteristic, as defined by Peters (2001), is the 'importance of local knowledge'. The fifth characteristic of a KBE is the 'investment in human capital'. This implies that, in an economy based on knowledge, human capital is considered vital since an economy based on knowledge depends on research and skills that do not, in fact, hover in the air. Instead, it is human beings that absorb and carry these skills. Moreover, the research skills applied in knowledge-based societies are believed to enable people to solve the pressing issues of society, propelling the economy to

prosperity in all fields. Furthermore, he maintains that, in order to cope with the challenges of the KBE, advanced economies have introduced major changes to their national policies.

With regard to timelines, globalisation accelerated the configuration of the current idea of the KBE in the 1980s and the impact of ICT in the early 1990s. History illustrates that in the post-industrial period (eighteenth century) economic development was affected by machinery. Hence, the focus had shifted from labour to capital (Porter, 1990). Economic development then shifted to technological progress (Solow, 1956) and later to technological progress (Marshall, 1890). In the nineteenth century, Schumpeter (1934) proposed that the key to economic development is innovation. Romer (1990) supported this view. In economic terms, the marginal cost to store and transmit information is virtually zero; therefore, the application of knowledge to all aspects of the economy is facilitated, ultimately giving rise to increased knowledge intensity (Houghton & Sheehan, 2000). The second factor that facilitates configuration of the KBE, globalisation, is characterised by 'financial flows, technology transfers, information flows and the inter-penetration of business activities' (Houghton & Sheehan, 2000, p. 6).

Knowledge as a resource is fundamentally different from other primary resources, because, unlike other resources, it does not diminish (Stiglitz, 1999). Therefore, the characteristics of a knowledge economy are also unique as a knowledge economy mainly relies on 'knowledge'. The nature of knowledge is such that it cannot be defined, but may be categorised into groups and categories depending on its use. According to the WB report (1998, p.5), two categories of knowledge are 'technical knowledge' and 'knowledge of attributes'. The absence of knowledge of attributes creates a major halt in the development of any country, because it results in an 'imperfect market, the collapse of markets or, worse still, the absence of markets', hence a knowledge gap is produced and it affects the economy directly (Machlup, 1962, p.21) The lack of technical knowledge results in poor infrastructure because it is important in the provision of goods and services for the people (World Bank, 1998). If both technical and informational knowledge gaps are filled, the general standard of living of people is improved and the economy flourishes. Therefore, both kinds of knowledge are required to foster a knowledge economy.

Knowledge may be categorised as tacit and codified knowledge (David & Foray, 2002; Polanyi, 1958, p. 49). As the title indicates, tacit knowledge is that form of knowledge that cannot be easily known, and the "owner" is unaware of its presence, so it is difficult to share. It mostly consists of habits and culture. In the context of an organisation, it is that knowledge that exists in the minds of the people of the organisation but that cannot be communicated to other people. On the other hand, there is codified knowledge that can be transferred, decoded and shared easily. This knowledge is explicit and the process of transfer of this kind of knowledge is known as codification. In a knowledge economy, an emphasis is laid on both the codification of knowledge and the commercialisation of knowledge.

Those believing in the emergence of the KBE hold fast to the conviction that knowledge is 'the only meaningful economic resource today' (Drucker, 1993, p. 38). In order to gain comparative advantage, nations have to think of innovation and knowledge instead of relying on nature or a low-cost labour force (Porter, 1990; Carlaw *et al.*, 2006). Innovation has become the lifeblood of economies. Innovation is 'the search for, and the discovery, experimentation, development, imitation and adoption of new products, new production processes and new organizational set-ups' (Dosi *et al.*, 1988, p. 222). Nonaka and Takeuchi (1995) maintain that markets change abruptly, technologies play a vital role, competitors increase and old products are replaced by new ones at a fast pace; therefore, in this uncertain world, companies focus on innovation techniques for wide-scale transformation of research into new technologies and products. Hence, it is evident that, in an uncertain economy, the only sure way to gain an edge over other firms is through knowledge and innovation (Nonaka & Takeuchi 1995). It is clear that innovation, commercialisation and commodification of knowledge are the key features of the new economy (Carlaw *et al*. 2006; Drucker, 1993).

The literature on the knowledge economy is vast and many fields of research have considered the impact of the new economy or post-industrial economy. Powell and Snellman (2004) have made an effort to sub-divide the literature on the basis of periods and they believe that the knowledge economy can be interpreted in numerous ways. It can be broken down into three broad categories. The 'old order', covering the early 1960s, considered the role of emerging science-based industries and their impact on socio-economic growth. Their focus was on Mode 1 research/theoretical knowledge enhancement. They suggest that the proponents of this approach are Bell (1973), Machlup (1962), Porat (1977), Stanback (1979), Noyelle (1990) and (Romer 1986, 1990). Powell and Snellman (2004) promoted the idea that some industries are more knowledge-based than others. Researchers of this second group analysed which sectors were more knowledge intensive and increased productivity. Many writers from this group believe that the KBE is unique and different from the old world order. Proponents of this idea are Brynjolfsson and Hitt (2000), Gordon (2000), and Kochan and Barley (1999). The third group, under the broad theme of the knowledge economy, researches the contribution of innovation and the learning process of firms. Scholars in this category are Drucker (1993), Nonaka and Takeuchi (1995), and Davenport and Prusak (1997). Their main interest lies in knowledge production and transfer. Hence, this group is characterised by Mode 2 (applied) research that implies that researchers are interested in its application.

To summarise the definitional construct of the KBE, it is clear that scholars have not converged on a single definition of the construct. This failure to define the KBE unanimously may be attributed to the very nature of knowledge. It can often neither be properly defined nor empirically proven. Brinkley (2006, p. 29) states:

> *'Defining the knowledge economy is challenging precisely because the commodity it rests on – the 'knowledge' – is itself hard to pin down with any precision. Perhaps for this reason there are few definitions that go much beyond the general sense of it and hardly any that describe the knowledge economy in ways that might allow it to be measured and quantified'.*

2.2.4 Performance Indicators of the KBE

What are the indicators, to be specific, for measuring the activity of a KBE? How big or small is the KBE? Is there again a lack of consensus on these questions, just like its definition? To answer these questions, we refer to the main advocates of the KBE, the WB and the OECD. The WB (1997) provides a framework to help countries to develop strategies for transformation into a KBE along the following guidelines:

An economic and institutional regime that can provide opportunities for the current use of knowledge, together with:

    a.   Human and intellectual capital that can make use of the existing knowledge and also produce new knowledge

    b.   An efficient ICT infrastructure for dissemination of research and information

    c.   An effective NIS comprising firms, research centres universities and other organisations.

Similarly Wood (2003, p. 148) categorised these indicators as follows:

    i.   Investment in knowledge capability, such as national investment in knowledge; and national investment in knowledge in relation to national investment in fixed assets.

    ii.   Specific or micro measures of knowledge inputs and outputs, including: national expenditure on education; knowledge diffusion measures; knowledge network measures; human capital indicators; and national R&D expenditure.

Also, in order to measure the KBE, the WB Institute has developed the Knowledge Assessment Methodology (KAM, www.worldbank.org/kam), used widely to assess the strengths and weaknesses of a country and facilitate its transition to the KBE by identifying the sectors that need more focus from policy makers (World Bank, 2003). According to this framework, with the help of three key variables: i) economic incentive and institutional regime, ii) education and, innovation, and iii) through ICT, the overall performance of a knowledge economy can be measured. This study is based on Pakistan, so the researcher was curious and used the methodology to measure Pakistan's strength in taking forward its transformation into a KBE. It appears that Pakistan's Knowledge Index (KI) is 2.48 (this is the simple average of the three variables mentioned earlier on), while Pakistan's Knowledge Economy Index (KEI) is

2.34 ; (this measures performance on the basis of education, ICT, innovation and social performance (KAM website). Compared with India, it is still relatively low: India has KI of 2.95 and KEI statistics equal to 3.09. Apparently, the reason for the comparatively poor KEI and KI indices is a lack of innovation capability and low GDP investment in education.

From the above frameworks, it is evident that the knowledge economy depends on innovation and human capital. This is further evidenced by a European Union report (2009) titled 'Knowledge Economy Indicators: Development of Innovative and Reliable Indicator Systems'. These indicators for measurement of the knowledge economy are developed for seven dimensions of the KBE, including four main drivers, two outcomes of a KBE and a cross-cutting dimension of the internationalisation of activities as shown in the following Table 2.1 (KEI, 2009).

Table 2.1   Performance indicators of the KBE

Production and diffusion of ICT	1. Economic impacts 2. Internet use by firms 3. Internet use by individuals 4. Government ICT
Human resources, skills and creativity	1. General education 2. Human resources in S&T education 3. Skills 4. Creativity 5.Mobility
Knowledge production and diffusion	1. Research and experimental development (R&D) 2. Patents 3. Bibliometrics 4. Knowledge flows 5. Investment in intangibles
Innovation, entrepreneurship and creative destruction	1. Entrepreneurship 2. Demand for innovative products 3. Financing of innovation 4. Market innovation outputs 5. Organizational innovation
Economic outputs	1. Income 2. Productivity 3. Employment
Internationalisation	1. Trade 2. Knowledge production and diffusion 3. Economic structure 4. Human resources
Social performance	1. Environmental conditions 2. Employment and economic welfare 3. Quality of life indicators

The four pillars of the KBE are as follows: first, skilled workforce; second, innovation system; third, an information infrastructure and fourth, suitable economic and institutional regime (Temple, 1999; Krueger & Lindal, 2000; Solow, 1957; Romer, 1986, 1990; Sachs & Warner, 1995; Bosworth & Collins, 2003). These four pillars can be seen in any developed economy or a KBE but in many parts of the world a weak economic and institutional regime exists that is main hurdle in fostering the KBE. Therefore, a KBE offers many challenges to developing economies as first these four pillars need to be established. Countries in the global North and South, East and West are making an effort to develop policies to foster the KBE and maintain lead in the race of the global KE.

Chen (2008) shows that research on the KBE and the desire of economies to transform into the KBE has increased in recent years. He used another methodology to measure the KBE. He applied the Knowledge Assessment Scorecards of the WB to address the causal model of the KBE and reports that the first requirement for application of knowledge is excellent human resources, with the power to innovate. Then, a country needs an effective information infrastructure to keep the knowledge circulating in the system and allowing knowledge to proliferate. A regulatory framework should be in place to protect ownership of intellectual property. Last, but not least, a strong incentivising system should be in place to foster an innovation environment (Chen, 2008). In this way, innovation-based development occurs that can be utilised as an indicator to measure the knowledge economy.

2.2.5   Implications and key debates regarding the KBE

The implications of the KBE are numerous. Lindley summarises the implications of the KBE in the following words:

> *'The potential impact of the knowledge-based society will be pervasive. Rights and responsibilities will need to be re-drawn. New understandings will be required, including those forged between social partners in industry, between local partners, and among communities in areas of acute social and economic disadvantage'* (1999, p. ii)

More importantly, the KBE 'will increase the complexity of interaction between education, training, and mobility within organisations, networked employment structures and the external labour market' (Lindley, 1999, p. ii). In a KBE if graduates lack necessary skills and knowledge at the time of employment, it is the responsibility of the employers to equip the graduates with these skills (Arthur, Brenan, & Weert, 2007). In the light of the current configuration of the KBE, in the European context or in the context of America, it gives a fair idea of how rapidly the world has embraced the knowledge economy.

New products are coming into the market and both technology and innovation are affecting people's emotional and intellectual development. Change is a prominent aspect of the KBE and over time, societies/people have readily accepted the new changes. Similarly, organisations are becoming network-based and 'people' (as opposed to machines) are gaining importance. Changes in the governance, management and all spheres of organisational life have been observed (Giddens, 1984) and institutions such as firms, universities and government bodies for public, as well as non-governmental bodies, have had to restructure themselves (Lundvall & Johnson, 1994). As a result, one can see many fragmentary knowledge economies in the form of national, sub-national or regional and local economies (Hepworth & Spencer, 2003; Cooke, 2001, 2002). By virtue of their potential for developing regional capacity, producing highly skilled human resources and social capital, universities are seen as assets for all these fragmentary economies (Goddard & Chatterton, 1999). The production and dissemination of knowledge is no more a 'self-contained quasi-monopolistic activities carried out in relative institutional isolation' (Gibbons, 1998, p. 35). Institutions and organisations need to network with universities in order to exploit knowledge for regional and economic development. Both players in the field of knowledge (the knowledge producers and knowledge consumers) are nested in the new institutional arrangements (Martin, 2001).

Despite the configuration of a new economic model, the major part of the world comprises countries with an ineffective institutional structure, lack of innovative capability and lack of access to technologically skilled human and intellectual resources (Youtie & Shapira, 2008). Therefore, the world is clearly divided into the technologically rich and poor nations. This literature review addresses questions such as how governments in developing economies might harness their universities to bridge this gap and improve the economic conditions, and how universities may be synchronised with other institutions in the country, so that synergy is created and innovation can take place or prevail (Leydesdorff & Bornmann, 2011). Is there any other way for such countries to catch up with development in the European world?

Solow answers these questions by contending that all the European models of development are context-specific. He observes that technology and innovation are the secrets underlying the knowledge-based development in countries such as Portugal or Brazil, but doubts that these models of development may be applied to countries such as Bangladesh, Zimbabwe and the slowly developing countries (Solow, 1997). So, what is the solution to the problem? Is there a need to develop a robust theory or model for socio-economic development for developing economies? The answer to these questions is still not known, but the European models of development will be discussed under the theme of neoliberal policy effects on the higher education sector.

2.3 Neoliberal policy implications on higher education sectors

The salient features of the neoliberal discourse, according to Olssen and Peters (2005), are that government's role needs to be constructive and positive; the economies need to be based on free market principles that offer opportunities to individuals, as they are best able to define their needs and interests. They maintain that this is in stark contrast to the classicism in which government efforts are deployed to make individuals free from all sorts of forces, while markets regulate private interests. In the configuration of a new economic model, i.e the KBE, markets provide opportunities to individuals (Olssen & Peters, 2005). Economic life and social life are connected; neoliberal debate has affected all spheres of life; moral norms are also changing, and all these institutional changes usually occur by human interaction and not by human design (Gray, 1982, 1984, p. 32; Olssen & Peters, 2005; Hayek, 1952). These debates have far-reaching effects on higher education systems because concepts such as accounting, auditing and management are now routinely applied to the education sector and higher education is considered by some analysts as an input–output based system that can be reduced to economic functions of production, according to Olssen and Peters (2005). The bureaucratic system that was previously in place has been replaced by more of a managerial system. These changes are further explained in the forthcoming sections to explore the implications of a KBE on universities.

George (2006) positions higher education in the debate on the KE and suggests that there are two kinds of options available to countries: 'State-centric' and neoliberal models of development. He presents the differences between the two models in Table 2.2.

Table 2.2   Neo-libral v/s state centric higher education

Issues	State-centric Model	Neoliberal Model
Beliefs about change	▪ State-driven ▪ Direction is decided by the state ▪ State direction is most efficient means of achieving desired outcomes	▪ Assumes direction of change is unknowable ▪ Free market competition
Finance	▪ State directs funding according to priorities ▪ Principally state funding or direct funding	▪ Competitive bidding among universities for finance ▪ Use of performance output indicators to allocate finance
Administration	▪ State involved directly in appointing teachers, designing curriculum, enrolment and awarding degrees	▪ Large number of private institutions ▪ Significant proportion of non-state finance ▪ High level of decentralisation of responsibilities to individual universities and teachers ▪ Use of performance indicators as management tool
Curriculum and teaching	▪ Existence of 'peak' universities that offer guidance to others ▪ State with high level of influence on curriculum, exams ▪ Emphasis on quantity of knowledge and memorisation	▪ Interactive teaching ▪ Problem-solving based approach in designing curriculum ▪ Students have freedom to choose courses ▪ Teachers design curriculum at lower level
Marketing Innovation	▪ State-directed research programmes in areas of perceived need. ▪ State directs application of research and innovation in economy	▪ State provision of competitive funding for research in priority areas especially to facilitate linkages between industry and tertiary institutions

Adapted from George, *Higher Education for Knowledge Based Economy* (2006, p. 601)

Table 2.2 summarises the implication of state-centred and neoliberal models of higher education. Each model has its own merits and demerits. George (2006) argues that adoption of any of the stated models depends on the local needs and national priorities of the country. The state-centred model has less autonomy in administration and finance, while the neoliberal model allows decentralisation of power, responsibilities and authorities to individual universities and sometimes to teachers and researchers. However, the neoliberal model proposes that direction of change cannot be known because it is more market dependent. The study warns that if developing economies do not develop their capacity to produce knowledge or absorb foreign technology for the welfare of their people, they might get left behind in the global market, and suggests that higher education can play a vital role in a country's socio-economic development. The study concludes that governments in knowledge economies and developing countries alike face the problem of harnessing the potential of higher education for socio-economic development.

2.4 Theoretical perspectives on new roles of higher education

The previous sections have established that notion of the KBE is sustained on the basis of continuous knowledge production and innovation, while it also has implications on the mode of governance and organisation management system. The role of universities has been a matter of frequent discussion and debate in connection with the KBE. There are few theoretical perspectives available to help understand the position of universities in society and economy (Freeman & Hagedoom, 1992) apart from the Triple Helix, NIS and RIS. These three perspectives highlight the interaction between different actors of state under which innovation takes place. This section will discuss this 'system' based literature, that is, national and regional innovation systems, besides highlighting the significance of the Triple Helix perspective.

2.4.1 National and regional innovation systems

Nelson (1993) Lundvall (1988) and Freeman (1987) presented their idea of an emerging National Innovation System. The concept of the NIS is based on linkages between these actors for increasing the technological capability of economies. It suggests that all these actors need to work in a collaborative system of knowledge creation and use of technologies (OECD, 1997, p. 9). It is believed that not all economies have strong linkages between these institutions and that if those gaps between relationships are identified then technological development can be achieved.

The OECD (1997) report states that:

> *'A number of framework policies relating to regulations, taxes, financing, competition and intellectual property can ease or block the various types of interactions and knowledge flows. Technological innovation takes place within a specific industrial structure and national context; a better understanding of this context or system will lead to better government technology and innovation policies.'* (OECD, 1997, p. 13)

Universities are repositories of knowledge and skills, according to the NIS theoretical perspectives, while innovation is considered as the product of 'a collision between technological opportunities and user needs' (Lundvall, 1988, p. 10), meaning that the NIS focuses on interaction between users and producers of innovation.

This theoretical perspective is based on the view that, for a vibrant economy, innovation must take place, but that continuous production of knowledge for innovation purposes is mostly tacit in nature (Lundvall, 1998). Therefore, innovation is wrongly perceived to be an outcome of science and technology search activities. Instead it is a result of a) knowledge about facts, b) knowledge about principles, c) knowledge about laws of nature, d) know-how, know-who and know what (Lundvall, 1998). These types of knowledge generate an environment at national level in which innovation thrives; therefore, it represents a pattern of behaviour, according to the NIS, while the concept of RIS suggests that attention might be paid to sub-national level activity, especially within regions; and, by strengthening the regional capacities innovation can be promoted. What are the basis for distinguishing regions in economic development? Cooke *et al.* (1997) set out their view that various regions in an RIS can be categorised, such as capital city regions; high-technology based regions; services-based regions; high-performance engineering regions; and rural or agricultural or peripheral regions. However, they made it clear that it is not simple and easy to make up a national picture if these regions are added together. Rather, the regional innovation system focuses on profiles, as shown in Table 2.3:

Table 2.3   Profiles of regions

Two Different Regional Profiles			
Profile 1		**Profile 2**	
1	Autonomous capacity for regional public spending	1	A certain degree of administrative decentralisation on spending
2	Regional capacity to impose taxes	2	Limited capacity to impose taxes
3	Little need for firms to approach the national capital market	3	Less potential for regional sources of financing
4	High level of regional financial intermediaries	4	Low level of regional financial intermediaries
5	Regional government control over financial intermediaries	5	Little local governmental control over financial intermediaries
6	Development of regional information and promotion policies	6	Slight development of own information and promotion policies
7	Regional control over execution of part of strategic infrastructures	7	No regional control over execution and management of infrastructure
8	Control or shared execution (state/region) of strategic infrastructure	8	Slight influence on execution and management of infrastructure
a	Density and quality of infrastructure for innovation and more highly concentrated in local or metropolitan areas	a	Density and quality of infrastructure for innovation exist but more in relation to local or metropolitan areas
b	Density and quality of infrastructure for innovation are more highly concentrated in local or metropolitan areas	b	Low density and quality of infrastructure
The region's general competence			
1	On educational and training system	1	State educational and training system
2	University related to the area	2	University slightly related to the area
3	Research laboratories in the region	3	No research laboratories in the region
4	Regional government	4	No regional government
5	Public procurement made by the regional government	5	State policies on industries, technology, public procurement and science
6	Industrial and technological policies and designs executed by the regional government	6	No regional science and technology programmes
7	Regional science and technology programmes	7	No regional industrial and technology policies

Source: Cooke *et al.* (1997)

They maintain that regions are of two kinds, as shown in the above profiles. If a region resembles the first profile, it is capable of developing an RIS. Therefore, two kinds of regions have completely different autonomy and jurisdiction, and different prospects for the KBE.

The third perspective, the THM, further analyses the systemic view of innovation, emphasising the co-existence of all the three systems in one place.

2.4.2   The Triple Helix Model

One of the theoretical perspectives to study innovation system is the Triple Helix Model (THM). Etzkowitz and Leydesdorff presented the Triple Helix Model in 2000 (Etzkowitz & Leydesdorff, 2000) and since then a series of conferences have taken place on THM. They argue that universities can play an important role in KBEs; their focus is on 'the network overlay of communications and expectations that reshape the institutional arrangements among universities, industries and government agencies' (Etzkowitz & Leydesdorff, 2000, p. 109). Etzkowitz and Leydesdorff (2000) present the following configurations to explain how the triple helix thesis works. In Triple Helix 1, it is the state that directs relations between academia and industry, as the figure shows:

Figure 2.1 Triple Hélix Model, configuration 1(Lassiez-Faire Model)
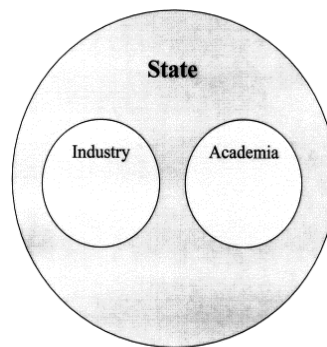
Source: Etzkowitz and Leydesdorff (2000, p. 111)

This envisages a separate institutional set-up in which nation state, industry and the academia function in their space. In Triple Helix 2, these institutions are divided by strong boundaries, as the following figure shows:

Figure 2.2 Triple Helix Model Configuration 2 (University-industry-Government)
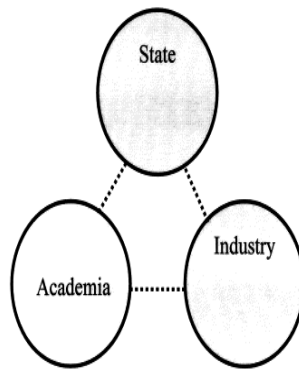
Source: Etzkowitz and Leydesdorff, (2000, p. 111)

In Triple Helix 3, an overlapping existence of the three institutions is observed. Examples of Triple Helix 1 may be seen in Latin America and Norway; Triple Helix 2 in Sweden and Triple Helix 3 in Australia.

Figure 2.3 Triple Helix Model Configuration 3
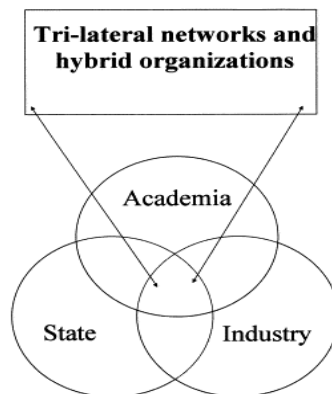
Source: Etzkowitz and Leydesdorff (2000, p. 111)

The proponents of the model advocate that every country follows one of these models, because all countries strive for innovation. Innovation can be defined at various levels, as shown in Table 2.3 and from various perspectives, according to the model. The Triple Helix hypothesis is that 'systems can be expected to remain in transition' (Etzkowitz & Leydesdorff, 2000, p. 113). They also suggest that a variety of perspectives on innovation helps to understand the complexity of the relationships between market forces, institutional control, political influences and technological trajectories in the process of innovation. Last but not least, the model suggests that technological innovations may require reshaping of organisations.

Table 2.4   Views on innovation

Evolutionary Economic perspective on innovation	Network view of innovation	Policy perspective on innovation
Firms as units of analysis as they compete in markets	Innovation is associated with firm-level products and processes	Concrete policies are designed according to framework of NIS to support innovation

Source: Based on Etzkowitz & Leydesdorff, 2000, p. 113

What are the implications of the Triple Helix debate? The Triple Helix Model depicts the current scenario in which universities, industries and states co-exist in the same environment 'in a compatible relationship' (Etzkowitz & Leydesdorff, 2000, p. 118). Universities are the oldest institutions and fulfil their role as the epitome of knowledge and learning. They need to be driven by strong social values, a mission to serve humanity and work for public good while the current emphasis is laid on the scientific knowledge which according to Bell and Castells plays vital role in economic development (Bell, 1974; Castells, 1996). This debate of economic development through knowledge is based on Mode-1 and Mode-2 forms of knowledge, suggested by Gibbons et al., (1994). The Mode-1 knowledge production refers to the traditional disciplinary research, conducted in universities, while the Mode-2 form of knowledge production refers to trans-disciplinary research in which researchers of different disciplines corroborate with business and industry. In other words, Mode-2 is applied research, which has its applicability visible as compared to the Mode-1 basic disciplinary research. When Gibbons et al. (1994) suggested these two streams of knowledge production have helped new hybrid disciplines to emerge; academia welcomed this thesis (Muller, 2001; Jacob& Hellstrom 1999) while Muller (2000) argued that not every discipline and branch of science would adopt the Mode-2 thesis. On the other hand, some scholars suggested that although empirical evidence is needed to support the Mode-2 thesis of knowledge production (Rip, 1997) but still, the blurring boundaries between institutions (firms and universities) call for attention (Weingart, 1997). Their (universities) function as corporations might force these institutions to embrace new roles and modify their traditional roles such as in the moral and social development of society (Zemsky, 1997; Zemsky & Wegner, 1998). In short, the Mode 2 proponents argue that the boundaries between science, society, businesses and academia have dissolved; similarly, the NIS theorists argue that firms lead the innovation process in a society.

The current model, that is the THM, supersedes previous models of knowledge production (such as discussed above i.e the Mode 2 (Gibbons *et al.*, 1994) and the NIS that give central importance to 'firms' (instead of universities) and states that firms lead innovation in an economy. According to the THM, universities have a third mission in addition to teaching and research, that is, playing a vital role in socio-economic development (Etzkowitz & Leydesdorff, 2000, p. 110). Universities in the KBE are expected to be entrepreneurial and innovative (Clark, 1986).

Universities are expected to produce future inventors as well as to remain knowledge producing organisations, but they are also supposed to take on the role of consulting firms or corporations. The Triple Helix thesis suggests that firms consult universities because universities have both resources and research capabilities in one place, a prerequisite for the completion of a project and absent in the workplace thus, universities have gained an important role in developing the KBE (Etzkowitz & Leydesdorff, 2000, p. 113).

National and regional innovation systems focus on firms, while the Triple Helix perspective lays an emphasis on the increasing entrepreneurial role of universities. Reflecting on the history of universities, they have always remained prestigious seats of learning and are among the oldest institutions of the world. In ancient times, higher education institutes were the responsibility of the church and the number of pupils used to be small. Later, in the twentieth and twenty-first centuries universities underwent a renaissance and subjects other than theology were taught (Eicher & García-Peñalosa, 2006). Still, however, the number of highly qualified people with a university education was not very large and the attainment of university qualifications was not a requirement for pursuing careers until the 1870s. Eicher & García-Peñalosa (2006, p. 197) suggest that, in the past, personnel with higher education were required when multinational corporations started recruiting those who had received appropriate academic education. In the light of this demand from society, the Harvard School of Business Management started its MBA programmes in 1908 for the first time in history. Academic institutions have therefore long been part of the fabric of society and their role used to be that of 'knowledge transfer', from teacher to the students who would later use it in the development of society. Scholars (Kerr, 1991; Altbach, 1991) maintain that rapid expansion of higher education is seen in only in the twentieth century when the population jumped from 51 million to 82 million students enrolled in higher education institutions in the world between 1980 and 1995 (Sadlak, 1998). As a result of this rapid expansion and the diversification of educational systems at universities, structural changes and functional changes in the universities became inevitable and a general perception exists in the UK that, if a university is not

conducting research it is not eligible to be called as 'university' (Trow, 2005). However, with the rise of the neoliberal debate, universities are increasingly driven by the demands and needs of market forces, as the three theoretical perspectives illustrate. The Triple Helix view brings universities to a central position in an economy, to steer the socio-economic condition of a country.

2.5 Higher education in developing countries

As the title indicates, this section discusses the higher education sectors in developing countries, particularly the structural and functional preparation for the shift from agrarian mode to knowledge-based and education-based development. This discussion continues from the previous section, in which the importance of universities is brought to light. Sections 4.1 and 4.2 establish that the universities hold a central position in order to drive the socio-economic development of a country. There is a need to understand how developing countries are responding to these changes and what stages of development they have attained. There is no definite scale to measure the shift, but knowledge economy policies can at least, be developed and implemented; and universities can be harnessed to take up the challenges of socio-economic development. The shift towards the KBE rests on the premise that universities are engaged in technology transfer processes. Increasingly meaningful interactions with other actors of state such as public enterprises and public research institutes are taking place. Their relationship with other actors and institutions is very complex (OECD, 1997) and should be researched and studied if a world free from poverty, illiteracy, diseases, discrimination and degradation of environment is to be achieved by 2015, as stipulated in the Millennium Development Goals (United Nations, 2000).

Concepts such as technology transfer from universities and the establishment of science parks are novel to most emerging and developing economies. The KBE offers a framework for rapid development, but would most emerging economies be able to catch up with the economic development in the West by using such framework? In most of the Asian countries a very weak or no Triple Helix effect exists. The world's biggest financial institutions have concentrated their assistance programmes in developing countries on the education sector, but on primary and secondary education. It is only recently that they have begun to give some attention to the higher education sector. Is it fair that inequality prevails in the world and no attention is paid to the huge economic disparity that prevails between the *developing countries* and the *developed world*? Of course it is not fair! If inequality cannot be completely eradicated, it must be minimised. While the responsibility for moving towards a KBE rests primarily with developing countries; they need to be helped by the advanced countries and by

assistance programmes from the financial institutions and aid-giving agencies such as the WB, IMF, the Cultural Industries Development Agency (CIDA), North American Aerospace Defence Command (NORAD), the United States Agency for International Development (USAID), The Deutsche Gesellschaft für Internationale Zusammenarbeit (abbreviated to GTZ), and the Swedish International Development Cooperation Agency (SIDA).

Bloom (2002) has described the alarming state of higher education in developing countries. The poor state of governance and management structures and practices, poor recruitment practices, lack of resources, lack of attention to research, and the politicisation of faculty, staff and students all block the path to efficient delivery. In the same vein, Lundvall (1988) has made the comment that developing countries are at a risk of territorial isolation and might face marginalisation if they do not cope with the new challenges and developments. Considering the state of higher education in developing countries, it has already been mentioned in Section 1.2 that investment in the education sector is very low in developing countries.

Higher education systems are not tailored according to the needs of their economies, Bloom explicitly states (2002), and ultimately they do not have the capacity to fulfil the demands of the international market. The dominant mode of economic and social development in most of the developing countries is through agriculture. Therefore, the measurement of economic performance of developing countries is still by its GDP. The widening divide between knowledge economies and those economies that are not knowledge-intensive is alarming and needs major policy shifts in both developed and the developing economies. Scholars suggest that knowledge can yield increasing returns while the return on traditional resources in terms of input and output will be constantly decreasing (Bontis *et al.*, 1999; David & Foray, 2001, p. 7). David and Foray report that measurement of the KBE needs re-thinking (David & Foray, 2002). The rich countries, according to the global pact of the Millennium Development Goals, should help the developing countries with financial aid. Such assistance is best rendered in education in order to support them to develop the long-term capacity for knowledge creation and domestic research. It is therefore important that indicators should be developed to measure the knowledge capacity of these countries. The aim of the present research project is not to devise new indicators, but rather to investigate where the gaps lies. According to Dore (1973) if developing countries make a leap from traditional skills to learning new technological skills, the technological gap can be reduced.

The economic progress of the West rests on the fact that universities and industrial research institutes are engaged in technology transfer and the innovation (product and services) process. This process is greatly facilitated by increased interactions with other actors of state such as public and private enterprises and research institutes. Their relationship with other actors and institutions is very complex (OECD, 1997). Literature indicates that networks among these institutions can be analysed, but how is it possible to analyse the communication between the key players of innovation, as suggested in the THM? To find the answer to this question, university–industry and government relations must be researched, in every part of the world, not just in the Europe and the United States

2.6 Academy–industry partnership

Tracing the development of the university–industry linkage gained popularity in 1992 after Lundvall (1992) presented this concept in his book, *The National System of Political Economy*. The concept of university–industry linkages originated in the European–American contexts. In the period 1992–2001, uninterrupted economic expansion was seen in America, attributed in part to the effects of Bayh-Dole Act of 1980 that gave intellectual property control and rights to US universities for their inventions resulting from university–industry linkages (Lester & Piore, 2004; Mowery *et al.*, 1999). In Europe, the European Union developed the Lisbon Strategy 2000–2010 to transform most of the European countries into knowledge economies (Maassen, 2008; Neave, 1988; Stensaker *et al.*, 2007). In both contexts, innovation through systemic approaches and university–industry linkages were the forces that guaranteed sustainability and economic success in Europe and America and in other similar contexts.

Marginson and Rhoads (2002, p. 284) report, with the proliferation of neoliberal policies, universities are embedded in both the national system and the marketplace. Continuous production of new products and processes used to be attributed to industrial innovation (Brinkley, 2006), but more recently it is correlated with university industry–linkages (OECD, 2001). Universities have technology transfer offices (TTO) in their campuses and their functions range from the identification of research results from the university setting to transferring them to the market. In this process of development of research ideas into products and services, collaboration between investors and researchers is extremely important (Etzkowitz & Goktepe-Hulten, 2010). This kind of partnership is often seen in developed economies that strictly follow the policy guidelines dictated by neoliberalism or the KE.

What kind of partnership is seen between universities in developed countries and industry? Mostly, it is entrepreneurial in nature due to financial, technological and political factors (Ewijk, 2007). Faculty members specialise in a particular field and can capitalise on it. In the KBE configuration, government plays its role but universities who do not entirely depend on government sources play key role by taking on new roles of consultation (Gibbons & Johnston, 1974).

Perkmann & Walsh (2009) have identified three types of academic consulting: a) opportunity-driven, b) commercialisation-driven and c) research-driven in which they negate the concerns of some scholars who fear that faculty might lose academic integrity and that a university's interaction with industry is increasing only due to monetary constraints. Furthermore, the study critically analyses the impacts of academia—industry linkages on both the universities and innovating firms and suggests that research-driven consultation not only increases productivity of firms but also academics learn from industry, receive greater access to the applicability of their research and more opportunities of research arise once trustworthy contacts are established. This kind of mutually beneficial interaction between universities and industries is important to foster an innovation culture (Capello & Faggian, 2005).

If the best practices of KBE are closely observed, for example, in the case of the UK's mission to remain competitive rests on innovation, entrepreneurship, and as a result of these two activities, the higher education sector of the UK is participating in the organisational cultural development and institutional development of the country (Gibb & Hannon, 2007). In fact, a network exist in between social, economic, institutional and technological organisations in an innovative system (Cooke *et al.*, 1997, p. 362; Cooke & Morgan, 1998, p. 71) while, entrepreneurship stimulates technology transfer processes and the commercialisation of academic research (Gibb & Hannon, 2005). Most of the above mentioned elements are missing in the institutional set up of developing countries, so they lag behind in gaining comparative advantage.

This whole debate of innovation and high technology entrepreneurship depends on university industry linkages and their role in the regional knowledge production (Hülsbeck, 2012). Yusof and Jain (2010) have investigated the effects of university-level entrepreneurship which has grown considerably due to active participation of universities in technology transfer processes and the increased role of universities in the NIS. Again, universities in developing countries have not moved beyond the traditional models of higher education i.e teaching and learning is considered as the main role of a university. Feng *et al.,* (2011) has developed a theoretical model to explain the relationships among intellectual capital, research outcomes, and

technology transfer (TT) performance, and they investigate the role of university technology transfer offices in the process of innovation process in Taiwan. Their study shows that the greater the amount of relational capital (the degree of university–industry cooperation) the more significant is the positive effect on research outcomes and the technology transfer processes (Feng *et al.,* 2011) while in the developing countries, mostly, foreign technology is imported, and no attention is paid to the development of domestic technology systems or the university industry linkages. In the Spanish innovation system, public universities are committed to social welfare as well as development of their local economic organisations (del-Palacio, Sole & Berbegal, 2011). Due to these reasons or missing elements, developing countries are not capable of producing products, improving services and in order to foster KBE innovation capacity should be developed first.

In the UK, linkages began to take shape when substantial cuts were imposed on university budgets in 1980s and universities capitalised on their 'knowledge' resource, forged links with industry and commercialised their services in order to gain complementary funding (Etzkowitz, 1998; Etzkowitz, 2003). Cuts in university budgets brought a new era of research commercialisation in European universities (Geuna & Nesta 2006). Similarly, universities in developing economies can convert the challenge (lack of proper linkages between university and industries and an effective educational system) into an opportunity by developing linkages with industry to fund many of their programmes and, at the same time, contribute to the process of socio-economic development according to local need. Moreover, an economy is no longer seen as just a cluster of firms and a function of market forces, having its own rules of operation. Instead, these days an economy is composed of networks (Mulberg, 1995; Samuels, 1995). In a network, there are diverse actors (universities, industry, agriculture and government policies) and the role of each is vital to economic development (Hodgson, 1994; Hodgson *et al.*, 1993; Hausner, 1995). In order for universities to function properly, they will still require a strong institutional set-up to function according to the three theoretical perspectives presented in Sections 2.4.1 and 2.4.2. A study of the literature confirms that strong academia–industry cooperation can have a profound impact on the growth of an economy (Gibb & Hannon, 2006; Bozeman & Boardman, 2004; Ferguson & Olofsson, 2004). However, in different national and institutional settings it is not easy to develop a single criterion or framework for knowing how successfully the universities are collaborating with industry, or the prospects for that country's transformation to a KBE.

2.7 Research Gap leading to research aim and questions

The above review of the literature illustrates that achieving a knowledge economy is as much, if not more, of a challenge to developing countries compared with the developed economies that need to maintain their competitiveness in the global knowledge economy. However, the paths for development in the developing economies are complex and not well understood. They are dependent on a number of complex variables. These include:

- o   governance structures
- o   legal infrastructure that protects intellectual property rights
- o   ease of doing business
- o   availability of high-quality human resources in the relevant fields
- o   access to venture capital
- o   role of universities and presence of technology parks
- o   government incentives to promote private sector R&D
- o   nature of natural raw materials and resources available to a country for production of value-added products
- o   presence of industrial and knowledge clusters and networks, and, above all
- o   the political will and competence of the leadership to migrate to the KBE

A study by Ted Fuller and Lorraine Warren (2006) conducted in the UK increases our theoretical understanding of entrepreneurial landscape of the UK but unfortunately, in most developing countries there is no such practice of carrying out foresight studies which can help us to understand their problems and develop their (own) local solutions. If conducted, these foresight exercises can determine their future roadmaps along proper scientific lines. The reason for lack of such practices is their policies fluctuate widely with each change of government. This adds difficulties to the process of development of competency for continuous innovation and socio-economic development.

Research should be carried out to suggest solutions to these economies according to their local conditions. Universities can act as catalysts of change, but they need to be strengthened with the requisite high-quality faculty, infrastructure, financial resources, incorporation of clear mechanisms to foster university—industry linkages and other forms of institutional support. With weak administrative and governance systems, universities cannot thrive. In developed countries, universities are usually well equipped with the necessary human and material resources to interact meaningfully with industry and secure funds to sustain themselves for their developmental needs. In the developing economies, however, universities lack such human and material

resources and suffer particularly from major weaknesses in their faculty, as it is not fully trained. They also lack the necessary facilities to initiate joint projects with industry. When universities are not engaged with industry these cannot attract industrial funding, and use it to build up their infrastructure.

China initially faced many problems in sustaining its long-term development and undertook massive human resource development programmes to strengthen its universities. It also strengthened the institutional infrastructure in order to enhance the indigenous innovation capacity and develop strong linkages between R&D and industries (Zeng & Wang, 2007). Similarly, Croatia failed to capitalise on its inherited science base that could start the transformation into a KBE (Svarc, 2006). Universities in developing countries must revive and rise to the occasion by undertaking major institutional reforms that will allow them to become internationally competitive and contribute to the process of socio-economic development by fostering innovation and entrepreneurship. Scholars recommend major structural and functional changes in order to prepare the universities to help countries move towards the KBE. This involves 'changing the classical university into an entrepreneurial one: institutional construction strategies include the creation of new departments and specialisations, while human resource management strategies include the development of an integrated entrepreneurial culture' (Zahria & Gibert, 2005, p. 32). Burton Clark (1998) is an authority on higher education who illustrates how traditional universities have transformed into entrepreneurial universities. He has written extensively about the innovative universities, and he rely on case studies of universities to generate his concepts. In his study, based on five universities i.e University of Warwick (England), University of Twente (the Netherlands), University of Strathdyde (Scotland), Chalmers University of Technology (Sweden), and the University of Joensuu (Finland) he identified common trends in these five case-studies. These trends include: a) diversified funding base (p.77), b) 'a strengthened managerial core' (p.83); b) 'the elaborated developmental periphery' (p.85); d) 'a stimulated academic heartland' (p.87); and lastly, e) 'an entrepreneurial culture' (p.89). These are the fundamental steps in order to transform into innovative universities (Clark, 2004, p.77-89). His views on the new trends of academic entrepreneurialism are summarised below:

> 'Traditional self-satisfied universities, short on volition, simple let rooted imbalances continue: let sleeping dogs lie lest they rise up in angry conflict. Complex universities that strive to keep up with the times attend to their various imbalances. They work at ways to maximise initiative at multiple levels, maintain some focused control over diffusion of character and strengthen capacity to serve diverse communities of interest'. (Clark, 2004, p.75)

Universities across the globe vary in many ways. Lundvall and Tomlinson (2001) suggest that these cultural, economic and institutional differences affect the performance of universities. They comment:

> '… countries are characterised by systemic differences and therefore what is best practice in one country or region will not be best practice in another.'
> (Lundvall & Tomlinson, 2001, p. 122)

Similarly, Polt *et al.*, (2001) agree that great differences are seen in the knowledge transfer patterns in different countries and universities, but to strive for knowledge development and technological advancement is a fairly new chapter in the history of developing countries.

Considering the case of Pakistan, Khan (2005) excellently portrays the current scenario of collaborations between academia and industry. He explains:

> 'Researchers at universities and managers in industries are deeply involved in technological and socio-economic issues for sustainable industrial growth, but they are working in isolation. Most of the research work is carried out in universities but the fruits of its commercial exploitation are not reaped by industry. It is therefore, important to bridge the gap between academia and industry for sustainable economic growth and effective industrialisation'. (Khan, 2005, p. 47)

Therefore, in this study, the researcher investigates the implications of moving towards a KBE with respect to emerging university–industry linkages in Pakistan. As mentioned in Section 1.5, the study seeks to answer the following questions. It is important to re-iterate the research questions here:

The study seeks to find answers to the following research questions.

RQ1. How do academics and leaders of key institutions such as the HEC and the IPO in Pakistan conceptualise the KBE? What are the perceived challenges for developing a KBE in Pakistan?

This research question addresses literature on the KBE and academic capitalisation and academic entrepreneurialism. Studies by scholars such as Altbach and Knight (2007); Barnett (1990); Blasi, (2006); Bloom (2002); Candy (2000); Cranfield and Taylor (2008); De Weert (1999); George (2006); Gibbons (1998); Olssen and Peters (2005); Aly (2007) and Hussain (2008) helped the researcher to gain an overview of the key authors in this area of research.

RQ2. Which functions of universities foster knowledge economy? What are the ways in which academia can collaborate with industry and business sector in Pakistan, now (for transformation into a KBE) and in the future (for sustainable development)?

This research questions addresses the literature on collaborations. In particular, literature on university industry linkages and higher education in developing countries is studied and compared with the findings of this study to make a new empirical contribution in this field (Leydesdorff, 2001; Lundvall, 2007; Nelson, 1994; Eitzkowitz, 2011).

RQ3. How can the policymakers possibly help in making an interface between universities and industries in order to support the creation of a knowledge economy?

This research question addresses the following literature: Jensen *et al.* (2007); Stilwell (2003); Winch (2003) and other similar studies in the area of neoliberal policy; its effects on higher education sector; and the response of governments to these changes.

RQ4. What will be the implications of the KBE on the higher education sector of Pakistan, and on the socio-economic conditions of the country (in other words, for the country) and for the region, if any?

The answer to these questions will yield a new model and recommendations specific to Pakistan's higher education ecosystem, but may also be applicable to similar contexts.

2.8 Summary

In this chapter, a review of the literature is presented to locate the gap in the literature that this study intends to fill. First of all, the concept of KE is explained by defining it and discussing its characteristics and performance indicators. The review establishes that the idea of the KBE has its roots in Western developed economies, where universities were supported by an appropriate institutional set-up to work along the lines of neoliberalism. Inspired by the success stories of the KE and economic development in various parts of the world, the developing countries have started to accept the influence of knowledge economies in the process of development. The developing countries are also trying to improve their competitiveness in the global market. Universities can play a significant role in this transformation; hence, either with the help of international financial institutions or using their own resources, they are improving the systems of higher education of their country.

The researcher suggests that, although the THM, RIS and NIS provide frameworks to map the roles and functions of universities in a knowledge economy by generating insights into the process of innovation, these theoretical frameworks fall short of providing specific guidelines for developing countries. These countries lack an understanding of the dynamics involved in bringing about such changes. Nevertheless, these theories suggest that innovation needs changes in the nation state, society and organisations. The sub-dynamics that influence the complex process of innovation are: regimes, political will, market forces, and institutional control (Etzkowitz & Leydesdorff, 2000). Institutions in most of the developing countries have major weaknesses and many developing countries do not have market which can support knowledge related activities. Therefore, a gap in the literature is identified in that a new framework needs to be developed according to the national context and local conditions of a developing economy (Solow, 1997). The researcher also believes that the lack of a standardised framework provides an opportunity to developing countries to make a new start, learn from the best practices and significant successes of other fast-developing countries in moving towards the KBE, such as Korea, Singapore, Malaysia and China in order to understand the weaknesses and strengths of their systems. In the struggle to catch up, they can employ ICT as an effective tool for leapfrogging; as such technologies have opened up vast new opportunities for developing countries.

3. Methodology

3.1 Introduction

This chapter constitutes an integral part of the study because it emerges out of the philosophical foundations of the thesis and directs the researcher to find answers to the research questions by adopting certain research strategy (Myers, 1997) which is selected and justified by the researcher in this chapter. These research choices pertain to data collection and analysis, as to which research strategy to adopt and why and how it is to be executed (Crouch & Housden, 2003). Discussion on paradigmatic choices (epistemological, ontological, axiological or methodological issues), research approach (qualitative or quantitative) and research strategy (data collection and analysis) are held in this chapter. Distinction between methodology and method needs to be drawn here. Methodology is 'a way of thinking about and studying social reality' (Strauss & Corbin, 1990, p. 4) and a method is a tool to solve a research problem by selection of certain 'techniques and procedures used to obtain and analyse data' (Saunders *et al.*, 2009, p. 3). In fact, the methodological legitimacy of an inquiry determines the extent of its credibility, validation of the results and transferability of the study, primarily because these are the key issues associated with any study (Lincoln & Guba, 1985).

3.2 Research paradigm

3.2.1 What is the research paradigm?

The categorisation of all social science research into clearly drawn paradigms is complex (Mertens, 2009, p. 7; Patton, 2002). The term "paradigm" originates from a Greek word *paradeigma* that means 'a plan, model or pattern' (Johnson & Duberley, 2000, p. 68). Historically, Kuhn is the pioneer of the concept of a paradigm (*ibid.*,68). Kuhn defines "paradigm" as a set of beliefs, values, assumptions and techniques that serve as 'a regulative framework of metaphysical assumptions shared by members of a given community' (Kuhn, 1970, p. 175). In the same vein, Burrell and Morgan (1979, p. 23) describe a paradigm as 'approaches grounded in fundamentally different meta-theoretical assumptions that are used to construct the frame of reference, mode of theorising and method of investigating of the theorists who operate within them'. More clearly than most other social scientists, Lincoln and Guba (1985, p. 15) succinctly describe the term. They argue that a paradigm represents a distillation of what we think about the world. Hence, paradigms are the cognitive lenses through

which one views this world. A paradigm plays a vital role in understanding 'what is important, legitimate and reasonable' (Patton, 2002, p. 69). Each practitioner community is characterised by a consensus, into which neophytes are socialised through their disciplinary training and share a way of thinking, working within an established network or ideas, theories and methods (Johnson & Duberly, 2000, p. 68). Hence, each paradigm uniquely treats the objects of the world under research (Kuhn, 1970). This is also referred to as Kuhn's incommensurability thesis, which means that scientists cannot maintain rational dialogue across boundaries as reality (ontology) is socially constructed (Keat & Urry, 1982, p. 60) and a different epistemology emerges under different paradigmatic lenses.

Now the question arises as to what is the significance of paradigms for researchers. In this regard, Patton (2002, p. 71) argues that paradigms help researchers to choose between a 'subjective' and an 'objective' study, and can influence the ideas of researchers as to what can yield a significant contribution to knowledge. Next, how can we view the world and which approach should be chosen for conducting research? For some researchers (positivist paradigm), reality and knowledge are visible and physical, and truth can be found objectively. The anti-positivist stance is that the actors in their minds construct reality and, therefore, that perceptions and feelings that are not visible can be studied (Lincoln & Guba, 1985).

Burrell and Morgan (1979) make a further contribution to the debate on the paradigm based on which worldviews a researcher might choose. All approaches in the social sciences are based on a common set of assumptions about the nature of science (the subjective–objective dimension), and the nature of society (the dimension of regulation–radical change) (Morgan, 1980, p. 607). The social reality can be analysed in terms of four broad worldviews or paradigms, that is, functionalist, interpretive, radical humanist and radical structuralist points of view. These are different in their approaches to social reality, but they formulate the network of inter-related philosophies as depicted in the following Figure 3.1, adopted from Burrell and Morgan (1979).

Figure 3.1 Paradigmatic Grid

Radical Humanists

Radical Structuralist

Interpretivist
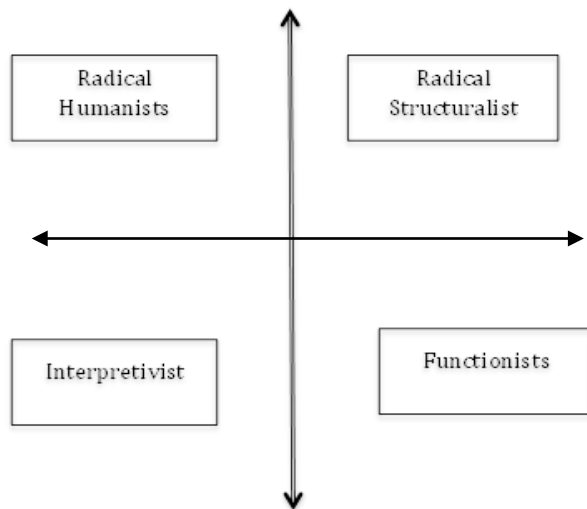
Functionists

Source: Adapted from Burrell and Morgan (1979)

Functionalists assume that one can understand organisational behaviour by hypothesis testing (Hopper & Powell, 1985; Burrell & Morgan, 1979; Morgan & Smircich, 1981; Alvesson & Deetz, 2000; Deetz, 1996). Researchers in an interpretivist paradigm investigate an on-going process in order to understand better an individual's behaviour (Hassard, 1991; Laughlin, 1995; Parker & Roffey, 1997; Chell & Pittaway, 1998). The radical humanists are mainly concerned with releasing social constraints that limit human potential, while radical structuralists see inherent structural conflicts within society that generate constant change through political and economic crises (Gioia & Pitre, 1990, p. 586).

The above framework, given by Burrell and Morgan (1979), is derived from two sources: the 'philosophy of science' and the 'theory of society'. The framework was developed because they felt the need to develop an understanding of the scientific and political assumptions that give rise to intellectual traditions and that guide the researcher's community. Although, by doing so, they create 'hermetically sealed intellectual compartments' (Hassard & Kelemen, 2002, p. 336). Moreover, the framework has been criticised due to paradigm commensurability (Willmott, 1998). As Figure 3.1 shows, paradigms are presented along two dimensions: objectivity and subjectivity. This is prescribed on the basis of ontology, epistemology, human nature and methodology. These terms are explained here:

Ontology (nature of reality) can be subjective or objective. Subjectivists/nominalists view the social world as the outcome of individual consciousness (Brown, 2000; Morgan, 1980), whereas the objectivist/realism approach emphasises that reality is external and exists independently of an individual's appreciation (Morgan & Smircich 1980).

Epistemology, or the nature of knowledge can be analysed by adopting either a phenomenological stance (knowledge of the world gained by personal experience) or a positivist stance (knowledge is objective and relationships exist between components of knowledge, irrespective of time and place – hence they are more quantitative) (Burrell & Morgan, 1979).

The natural human assumptions are that human beings are either free-willed (subjective) or that their life is determined by their environment (objective), emphasising the connection between human beings and their environment (Burrell & Morgan, 1979).

In short, a methodology is an approach adopted by a researcher in order to conduct a particular piece of research. The subjective or objective views about epistemology, ontology and axiology influence one's choice of methodology. If an ideographic methodology is adopted, the researcher will choose a qualitative study. However, if a nomothetic stance is adopted then a quantitative methodology will be chosen.

3.2.2   Social constructionism paradigm

The underlying paradigm for this study is social constructionism. In the historical context, social constructionism emerged a few decades ago from sociology and social psychology (Burr, 1995). The question remains as to how social order is created under social constructionism, according to the Burrell and Morgan (1979) grid. According to Scott (1987, p. 495), social order comprises shared social reality, which is a human construction; individuals compare their interpretations with others. If we look at society, it is 'an objective reality', but human beings are social products (Berger & Luckmann, 1967, p. 61). This means that social order is generated by the perceptions of human beings, despite the fact that society exists in reality. Their interpretations of reality are attempts to classify behaviour into categories that will enable the actors to respond to it in a similar manner as that in social interaction. Social constructionism advocates that social systems operate by way of social interactions; thus, reality is constructed by social actors and its meaning lies in the context in which the social actors are interacting (Gergern, 1994; Berger & Luckmann, 1967, 2011).

Epistemologically, the social constructionism paradigm envisages that the world in which humans live is constructed by them in their minds (Gergen, 2009, p. 4). Ontologically, social constructionists believe in socially constructed multiple realities (Karatas-Ozkan & Murphy, 2010, p. 458). It is believed that 'knowledge and understanding of the world are not given to human beings by external events; humans attempt to objectify the world through means of essentially subjective processes' (Morgan, 1980, p. 610). Hence, reality is viewed subjectively in this thesis and it is believed that the social world is 'constructed' in people's perceptions, individuals creating the 'reality' around them in which they live (Burrell & Morgan, 1979; Berger & Luckmann, 1967, 2011; Denzin, 2001; Mertens, 1998). Individuals operate under similar historical, cultural, political and economic backgrounds; hence, by adopting a subjective view of the world, it is possible to identify 'underlying patterns and order within the social world' (Morgan, 1980, p. 610). Reality cannot be understood apart from the meanings of the social actors (Berger & Luckmann, 1967; Hosking & Ramsey, 2000; Karatas-Ozkan & Chell, 2010, p. 62). In the light of these arguments, social constructionism has been chosen as the underlying philosophy for the current research because it fits well with the nature of the study and with the researcher's own beliefs and value system about the world, and about how research should be conducted.

The nature of knowledge (epistemology) in a social constructionism paradigm cannot be objectively determined. There are multiple factors involved and conflicting ideas might exist about the nature of knowledge, as different individuals have different perceptions. This fits the requirements of the study, and was apparent during the fieldwork carried out by the researcher. Based on their knowledge and experience, interviewees were found to hold different opinions on issues related to the higher education sector and the relevance of a KBE for Pakistan. It is after consideration of the multiplicity of viewpoints that one derives a complete picture of the phenomenon and understands its dimensions. Hence, epistemology is subjective, multiple and cannot be determined objectively. Ontology is also subjective and consists of multi-perspectives as perceptions vary and reality is socially constructed. Axiology is value-laden. Human subjects are involved in research and, since the researcher's own experience might generate insights, so axiology is not 'value free'. Table 3.1 shows the relevance between the selected research paradigm and the nature of research (expressed in the form of research questions). The table also shows the context of research, because, in social constructionism, the context is also important.

Table 3.1   Alignment of research questions and research paradigm

Research questions	Key aspects investigated and nature of questions	Epistemology	Ontology	Axiology	Context of study
RQ1	Conceptualisation of KBE (exploratory)	Social constructionism epistemology	Multiplicity of view point	Value-laden	Pakistan
RQ2	Functions of universities that foster KBE; Dynamics of University Industry Linkages (exploratory)	Social constructionism epistemology	Multiplicity of view point	Value-laden	Pakistan
RQ3	Role of Policy makers and the state on fostering a KBE (exploratory)	Social constructionism epistemology	Multiplicity of view point	Value-laden	Pakistan
RQ4	Implications of the KBE (exploratory)	Social constructionism epistemology	Multiplicity of view point	Value-laden	Pakistan

3.3 Qualitative research approach

Given that the purpose of the study is to explore the issue of the KBE in a developing country and to generate insights into how universities can contribute in the process of socio-economic development, a qualitative approach seems appropriate. What is qualitative research? Stake (1995, p. 40) highlights the difference between the two approaches, that is, qualitative and quantitative, as follows:

> *'To sharpen the search for explanations, quantitative researchers perceive, what is happening in terms of descriptive variable, represent happenings with scale and measurements (i.e. numbers). To sharpen the search for understanding, qualitative researchers perceive what is happening, in key episodes or testimonies; represent happenings with their own direct interpretation and stories (i.e. narratives).'*

He differentiates between qualitative and quantitative research. He contends that quantitative researchers are interested in explanations and control, while qualitative researchers aim to understand the complex inter-relationships that exist in the phenomenon being researched (Stake, 1995, p. 37). Qualitative research holds enormous variety in itself as the inter-relationships are explored (Punch & Punch, 2005). Miles and Huberman (1994, p. 1) describe the attributes of qualitative research below:

i)   It is 'a source of well-grounded, rich descriptions and explanations of processes in identifiable local contexts'.

ii)   Good quality data are more likely to lead to serendipitous findings and to new integrations. Moreover, qualitative research 'helps researchers to get beyond initial conceptions' and helps 'to generate or revise conceptual frameworks'.

iii)   The findings of a qualitative study are endowed with a particular quality i.e. conclusions are undeniable, because 'words, especially organised into incidents or stories, have a concrete, vivid, meaningful flavour that often proves far more convincing to a reader, a policymaker, a practitioner – than pages of summarised numbers'.

Strauss and Corbin (1990, p. 12) give two reasons for choosing the qualitative tradition:

    i)   They think that some researchers are oriented towards qualitative studies by nature.

    ii)   Sometimes, the nature of the research problem is such that it demands a qualitative approach.

Guba and Lincoln (1994) assert that the qualitative approach provides a rich insight into human behaviour. For instance, interviews allow researchers to read and analyse the perceptions that cause certain behaviour in human beings. Perceptions appear in the form of ideas and impressions and, based on these ideas and impressions, the phenomenon under investigation can be understood through interviews with human subjects that may not be possible by conducting large-scale surveys. To some extent, surveys do yield the general opinion of subjects on a particular issue, but face-to-face interviews have greater value as body gestures also provide clues to researchers. Surveys or quantitative approaches do not help in understanding perceptions and motives and do not give an answer to the 'why' question of the researcher (Wegner, 2003).

3.3.1   The case for qualitative research

The purpose of the study, as previously stated, is to generate insights into the phenomenon of the KBE in the context of developing countries and particularly the role of universities in these transformations. It is evident that the researcher deals with the exploration of perceptions, so using a qualitative approach helps to achieve this aim. Also, the researcher intends to experience the phenomenon and see it more closely by digging into the perceptions of academic leadership in order to better comprehend the research problem. According to Silverman (2005), only a qualitative research approach allows the researcher to get close to what is being researched. Under both conditions, the use of a qualitative approach is a better approach and suits the nature of the study.

Creswell (2007) highlights five traditions of qualitative inquiry, that is, biography, phenomenological study, grounded theory study, ethnography and case study. He compares these five traditions on the basis of their origin, focus of the study, data collection and analysis methods, and reporting style. He maintains that some traditions have single disciplinary traditions (e.g., grounded theory originating from

sociology, and ethnography founded in anthropology), and others have a broad interdisciplinary evolution (e.g., biography and case study) (Creswell, 2008, p. 64). In this study, grounded theory tradition is used, derived from ethnography. The relevance of Creswell *et al.* (2008) in making methodological choices is two-fold. First, it guides the researcher in making a decision regarding when data may be collected. Second, what is the role of theory in the current study? Figure 3.2 shows that grounded theory allows the researcher to collect data at early stages, so that the researcher can refer to theory after the data has been collected and analysed to draw the comparisons. Grounded theory advocates generating a theory in an inductive manner. The continuum in Figure 3.2 shows that, at the end of the study, the researcher may refer to the theory from grounded theory-based research.

Figure 3.2 Use of theory in grounded theory study
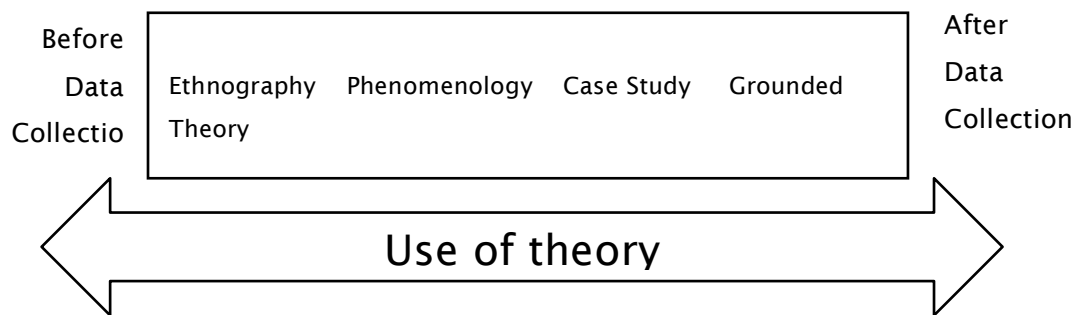
Source: Adapted from Creswell (1998 p. 85)

3.4 Research strategy: Grounded theory

An appropriate research strategy helps in the selection of corresponding suitable research procedures for addressing a research problem (Blaikie, 2007, p. 107). Grounded theory is applied as a research strategy for this study. In the social sciences, particularly in management and organisational studies, the use of grounded theory is common (Locke, 2001) because most of such studies deal with previously un-investigated topics. The term 'grounded theory' was coined by Glaser and Strauss (1967) and later Strauss and Corbin (1998) developed another version of the theory. The term refers to the very nature of the research strategy and signifies that the theory is 'grounded' in data and emerges inductively after an iterative process of data collection and analysis (Glaser & Strauss, 1967).

Glaser and Strauss (1967) present the classical version of grounded theory and advise researchers not to have any preconceived ideas before starting a grounded theory research. While Strauss and Corbin (1998) allow the researcher to have at least a sense of what it is that the researcher will investigate. It is this later version that has been applied to this study, as will be elaborated in the next paragraphs (Strauss & Corbin, 1998).

The classical version of grounded theory is often used in management literature (Gebhardt *et al.*, 2006; Narayandas & Rangan, 2004; Ulaga, 2003), but uncertainty exists among scholars in their understanding of the classical and the later version of grounded theory (Freshwater, 2000). The actual use of grounded theory is rarely seen in other disciplines (Suddaby, 2006). Studies claim to be based on grounded theory, but actually the name of the methodology is used only to invoke its authors (Locke, 1996). However, in management research, grounded theory is actually used to generate a theory. Sutton and Staw (1995) have presented arguments about what a theory is, and what it is not (Sutton & Staw, 1995). They have made it clear that a theory is different from data, methods, references, hypothesis, diagrams and even the list of figures that form the usual part of a research paper or study. Furthermore, they argue that:

'Theory is about the connections among phenomena, a story about why acts, events, structure, and thoughts occur. Theory emphasises the nature of causal relationships, identifying what comes first as well as the timing of such events'. (Sutton & Staw, 1995, p. 378)

Hence, theory generated through grounded theory allows the researcher to delve deep into processes and investigate the reasons for a particular occurrence or non-occurrence. Now the question arises over the version of grounded theory which can yield a robust theory and which version should be used. According to Wagner *et al.*, (2010), when researchers make a statement about which form of grounded theory they will use, they should also mention specific techniques to generate new theory and not just describe the cases. The two approaches, according to Wagner *et al.*, (2010), are described first: a) the Glaserian approach (Glaser, 1990, 1992), and b) the Straussian (Strauss & Corbin, 1998) approach. First of all, in order to explain what grounded theory methodology is, we need to look at the historical development of the concept.

Grounded theory was devised by Barney Glaser and Anselm Strauss and discussed in their book, *The Discovery of Grounded Theory* (1967). It has its roots in medical sociology and it is now widely practiced in education, management, nursing and psychology, since it first appeared in the qualitative tradition. This shows how influential it has been, as it has been accepted as a qualitative tradition across many disciplines. Although it is of recent origin, it has passed through an evolutionary phase that is, again, a sign of its popularity, its applicability in various fields and its flexibility to be used in different disciplines.

Glaser extended the classical version. The original version of the grounded theory was systematic, but too rigid which was extended by Galser (Glaser & Strauss, 1967) by adding concepts such as theoretical sampling, theoretical coding and the use of theoretical memos in the later version (Glaser, 1978). The two scholars of grounded theory had differences of viewpoint (Stern, 1994) but that these differences were in terms of procedures only and did not occur in the epistemology or ontology of grounded theory (Heath & Cowley, 2004, p. 142). Both approaches are equally considered as grounded theory methods, but apparently diverged when Strauss and Corbin gave specific procedures for coding data (Strauss & Corbin, 1998, p. 55–241) that were not considered as a part of grounded theory by Glaser (1992, p. 122).

Glaser raised the concern that data is forced into codes and 'tortured' (Glaser, 1992, p. 122). Similarly, its rigid analytical procedures are criticised as not meant for grounded theory (Keddy *et al.*, 1996). Despite these differences in the procedures, it is a popular research tool (Stern, 1994; Suddaby, 2006). Table 3.2 helps us to understand clearly the difference between these two versions of grounded theory

Table 3.2   Comparision of Glaserian and Straussian grounded theory

Glaserian Approach to Grounded Theory	Straussian Approach to Grounded Theory
Beginning with general wonderment (an empty mind)	Having a general idea of where to begin
Emerging theory, with neutral questions	Forcing the theory, with structured questions
Development of a conceptual theory	Conceptual description (description of situations)
Theoretical sensitivity (the ability to perceive variables and relationships) comes from immersion in the data	Theoretical sensitivity comes from methods and tools
The theory is grounded in the data	The theory is interpreted by an observer
The credibility of the theory, or verification, is derived from its grounding in the data	The credibility of the theory comes from the rigour of the method
A basic social process should be identified	Basic social processes need not be identified
The researcher is passive, exhibiting disciplined restraint	The researcher is active
Data reveals the theory	Data is structured to reveal the theory
Coding is less rigorous, a constant comparison of incident to incident, with neutral questions and categories and properties evolving. Take care not to 'over-conceptualise', identify key points	Coding is more rigorous and defined by technique. The nature of making comparisons varies with the coding technique. Labels are carefully crafted at the time. Codes are derived from 'micro-analysis which consists of analysis data word-by-word'
Two coding phases or types, simple (fracture the data then conceptually group it) and substantive (Open or selective, to produce categories and properties).	Three types of coding, open (identifying, naming, categorising and describing phenomena), axial (the process of relating codes to each other) and selective (choosing a core category and relating other categories to that)

Source: Adapted from Onions (2006, p. 8–9)

The reason for the researcher's inclination towards Straussian grounded theory is due to the fact that this study was undertaken as a part of a doctoral course. It is a requirement of a doctoral study that candidates must have an idea in mind regarding research problem. According to Strauss and Corbin (1990), a research problem can begin with professional experience and personal interests, and this has been the case with the researcher. Although, the KBE was a new area of study for the researcher, but it was a concept used in the everyday life of the university, which intrigued the researcher to take this project in doctorate. In a way, this study began with curiosity, as shown in the Glaserian approach, but contrary to Glaserian approach that the role of researcher has been active in this study.

A rigorous coding process, data collection and further analysis of the data were pursued passionately and rigorously in a systematic manner. Therefore, one can see that the researcher is inclined towards the Straussian version of the grounded theory used to collect and analyse the data. The Straussian approach is flexible and allows a researcher to begin with little knowledge about the area of investigation, giving the researcher a generic sense (Pettigrew, 2000; Strauss & Corbin, 1998, Mintzberg, 1979). Here, the aim was to explore and understand the phenomenon of the KBE as perceived by the academia in Pakistan and to develop a new substantive theory. Hence, the research started with an open-mind without a rigid structure to develop the research questions. The researcher did not follow any theoretical perspective at the beginning of the study, but had a generic sense of the multiple roles of higher education institutions and the importance of university–industry and government relations. She wanted to discover the newly emerging phenomenon of university industry linkages in Pakistan and develop a new theory to increase understanding of linkages from a developing country's perspective. No specific theory or literature has been applied in developing the research questions and identifying the research problem. Therefore, huge amounts of unstructured data were obtained from the interviews, focus group discussions and documents to identify the research questions (Eisenhardt, 1989).

Initiating a grounded theory-based research is a daunting task and offers many challenges. Glaser and Strauss (1967, 1977, p. 43) advise that adopting a systematic process of coding the data right from the beginning might overcome the initial challenge of making sense out of data. They suggest that joint collection; coding and analysis of the data form the underlying operation for generating initial codes that are actually the low-level concepts for generating high-order theory. These procedures lead the researcher to the formation of more abstract coding and categories. This theory generation process is technically termed as induction, the antonym of deduction. The choice of inductive and deductive logic in this study is guided by both grounded theory and the qualitative tradition; the difference between the two types of logic is presented in Table 3.3 (Creswell *et al.*, 2003, p. 125; Glaser & Strauss, 1998). Induction begins with information and ends in generalisation of theories, while deduction, as it suggests, is deduced from theory and the hypothesis is tested in a particular context. Since induction has greater scope for generation of a new theory on the basis of data grounded in reality and the researcher tests no hypothesis, inductive logic has been applied in this study (Carson *et al.*, 2001, p. 12). Glaser and Strauss (1967) maintain that a researcher should begin with raw data and develop as many categories as possible in order to compare these categories at a later stage. Hence, they were against the concept of deduction at the early stage of a study.

Table 3.3   Inductive and deductive logic

Inductive logic	Researcher gathers information, interviews	Researcher asks open ended questions and makes field notes and memos	Researcher Looks for broad patterns, generalisations, or theories from themes or categories	Generalisations, or theories to past experiences and literature
Deductive logic	Researcher measures or observes variables using an instrument to Obtain Scores	Researcher defines and operationalises variables; derived from the theory	Researcher tests hypotheses or research questions from the theory	Researcher tests or verifies a theory

Source: Based on Creswell *et al.* (2003) inductive and deductive logic (p. 123-125)

What are the challenges involved while applying grounded theory? Scholars (Goulding, 1999; Davidson, 2002) have identified that the use of grounded theory can be rather cumbersome and time-consuming. It was proven to be the case in this research. The process was indeed time-consuming, but also rewarding. As the researcher had begun the data collection process, rapport was already developed with eminent scholars and experts that would be useful to any new researcher for future networking. The data were collected during the first year of doctorate but it took one year to complete the process of coding. Case accounts were developed in the third year of study but theory formulation in inductive manner was an exhaustive step towards the end of analysis. The researcher conveyed the results and analysis to her supervisory team throughout the iterative process of coding, generating concepts, developing the core-categories and the emergent theory was also shared with them.

These processes are common to any doctoral research project and with the help of advice of her supervisory committee, the researcher reached to the end of analysis. As the researcher started making sense out of the huge quantity of data, the theory started to emerge; this was the best experience in this whole research process extending over four years but it would not have been possible without the grounded theory mentoring sessions. Some scholars suggest that grounded theory needs experience and that neophyte grounded theorists might get confused in the sea of data, but, at the same time, they suggest that the Straussian version is more systematic (Backman & Kyngäs, 1999; Pickard, 2007) which the researcher has adopted in this study.

The researcher firmly believes that a) Straussian grounded theory is logical, b) time-consuming, and c) that new researchers can learn a great deal from this research strategy and adopt qualities such as a sensitivity to data, paying attention to minute details and interpretation of data, organisation of huge data, open-mindedness and persistence. The outcome of this learning process is a genuine contribution (inductively generated theory) to knowledge, grounded in reality. While conducting straussian grounded theory study, the researcher developed a logical understanding of the phenomenon shown in the form the new substantive theory. This essentially means that the theory is applicable for a particular context in which it is generated but it has the quality of transference if applied in any other similar context. Had it been applied in other settings, such as in any other developing country, then, theory produced would have been a formal theory (Denscombe, 2002). Nevertheless, there is scope for the current substantive theory to be developed into a generalised formal theory by testing it in any other context.

3.5 Research design: Qualitative research and construction of case accounts

In this study, the grounded theory has been achieved through case accounts. The use of cases with grounded theory is consistent with Strauss and Corbin (1998) and Patton (2002, p. 93), who advocate that case findings can be generalised to produce a theory in order to improve policy decisions from patterns established and the lessons learned:

> *'The specific case provides guidelines (properties and dimensions) for looking at all cases, enabling researchers to move from description to conceptualisation and from the more specific to the general and abstract.'* (Strauss & Corbin, 1998, p. 88)

Lock (2000, p. 19) and Punch (1998, p. 149) suggest that both grounded theory and case study rest at the same level and can be used together to collect and interpret data, and that the two research strategies complement each other. Similarly, Merriam (1998) recommends the use of grounded theory with case study. The researcher has come across other grounded theory studies that simultaneously make use of case study. For instance, using exploratory case studies, Irava (2009) studied four firms (family businesses) in order to investigate entrepreneurial orientations and long-term advantages. In another instance, Senges (2007) used four case studies, that is, London School of Economics, Freie Universitat Berlin, Universitat Politecnica Catalonia, and Universitat Oberta De Cayalunya, in order to investigate knowledge entrepreneurship (in effect, the KBE in universities) with grounded theory as an overarching research strategy. Despite all these studies, an important comparison needs to be drawn here between case study and case accounts. Case study is a research strategy, while case accounts are a method through which data is reproduced in such a way that the reader comprehends it. Therefore, the researcher used case accounts as case units, or processed information, which helped the researcher to reach the level of abstraction required for generation of a theory or model. As the name suggests, the five cases presented in Chapter Four are the accounts and descriptions of the universities to give more information to the reader regarding the context. In this way, case accounts help to achieve the grounded theory (Karatas-Ozkan, 2006).

The choice of research methods and fundamental research philosophy underpinning the research are interdependent (Blaikie, 2000, p. 45). As mentioned earlier, social constructionism has been selected as the underpinning research paradigm. The qualitative research approach is chosen together with the application of grounded theory strategy. Hence, sampling and data collection methods also follow the principles of qualitative research. In a qualitative research project, the sample need not be representative of the whole population (Blaikie, 2009, p. 38). There are no rules for sample size in the qualitative tradition, but sampling in qualitative studies depends on the purpose of study and 'what can be done in available time and resources' (Patton, 2002, p. 243-244). The same criteria are followed in this research, described in the next paragraph.

3.5.1   Sampling of case units

In this grounded theory study, theoretical sampling criteria are applied to collect data, keeping in mind 'the scope and range of information' that can be collected from the informants (Blaikie, 2009, p. 38). The theoretical sampling technique recommends taking the sample from the place where the researcher thinks the phenomenon exists (Chenitz & Swanson, 1986, p. 3-9). Basically, theoretical sampling is employed as opposed to statistical sampling because it is a purely qualitative study. In addition, it is grounded theory research that guides the researcher, in that in grounded theory traditional qualitative sampling is not followed; the concern of a grounded theory study is representativeness of a concept (Glaser & Strauss, 1967). This means that sampling is done where the researcher thinks the phenomenon exists and not according to sites or individuals.

Patton (2002) divides theoretical sampling into 16 categories, but in this case purposeful sampling criteria are used. They allow the researcher to perform 'extreme case sampling and intensity sampling' (Patton, 1990, p. 169). Intensity sampling refers to 'information rich cases that manifest the phenomenon' while extreme case sampling means the cases of extreme success or failures. For in-depth studies, such sampling criteria (intensity and extreme case sample) help in identifying information rich participants. In extreme case sampling, the successful universities were selected that have managed to achieve high ranking according to the HEC ranking criteria. Table 3.4 highlights the key features of all the cases or universities:

Table 3.4   A snapshot of sample universities

University	Case account details	Area of excellence	Source of funding and HEC ranking	Years since establishment
University A	Case A	Agriculture	Public; 66.4	105
University B	Case B	Science and Technology	Public; 49.07	20
University C	Case C	Business & IT	Private; 57.20	25
University D	Case D	Health sciences	Public; Ranking unavailable	150
University E	Case E	Engineering and applied sciences	Public; 61.35	53

Source: Research Diary, 2008

Table 3.4 also shows that five universities in Pakistan are selected as case accounts: Case A (University A), Case B (University B), Case C (University C), Case D (University D), Case E (University E). Each of the selected university is a high-ranking university, apart from Case D, which was selected on the basis that it is a historic university in the subcontinent dating from the British colonial period. The Commission has adopted criteria to rank universities into groups on the basis of subjects and area of specialisation, such as medical universities, engineering universities, agriculture universities, business and management universities, science and technology universities. There is also a general group of universities that represents the universities in Pakistan that impart general education, and this is the largest group. This group delivers education across a broad range of subjects and its universities have many faculties, including the arts, humanities and social sciences. However, the researcher did not include any general universities in the research sample. The recent focus on research-based teaching and consultancy in all universities of Pakistan are due to the emphasis of the HEC on research as promotion criteria. The rankings of universities are based on the following weightings:

a)   Students (17%)

b)   Facilities (15%)

c)   Finances (15%)

d)   Faculty (27%) and

e)   Research (26%).

In the sample, only high-ranking universities from each category are selected. Neither the general group of universities, according to the HEC criteria, nor universities for arts and design are included in this sample. It is believed by the researcher that the selected universities exhibit the phenomenon of knowledge exchange and transfer, while those not included in the sample do not participate in the shift towards a KBE. There is no documentary proof to demonstrate any contribution to the KBE.

The sampling began at the onset of study by collecting data from the HEC that eventually led the researcher to narrow down the research problem to specific cases. Data were collected until theoretical saturation was reached; that is, perceptions of faculty of the five sample universities have been examined and, when the data started to repeat and match the previous data, it was decided that there was no need to conduct more interviews or explore more cases, since no additional themes were derived of open coding. Eisenhardt (1989) suggests that, in order to develop theory, at least four cases need to be examined; in this study, data collection was stopped after five cases as theoretical saturation was attained.

3.6 Sources and phases of data collection

Interviews, documents and focus group discussion are the sources, used to collect data for this project (Eisenhardt, 1989). Fifty interviews were conducted face-to-face, at the universities and with the participant of the HEC and the IPO. An example of interview transcript and the list of interviewees are given in the Appendix E. The documents analysed were policy documents from the HEC, any other relevant document collected from annual reports of universities and some articles published in daily newspapers regarding the shift towards a KBE. In some universities, the interviewees were facing time constraints (they had lectures during the researcher's fieldwork trip timeframe/schedule); therefore, instead of conducting individual face-to-face interviews, focused group discussions were held among the research participants to save time and overcome the issue of constant load shedding of power/electricity supply. In this way, four focused group discussions were also a source of data collection.

In addition to these three main sources of data collection, direct observation upon entering the field also assisted the researcher to gather information about the conditions and context of universities included in the research sample. The (universities) technology incubation centres, science parks and physical infrastructure, and the way these universities were working were better understood by visiting these facilities. In fact, these field trips helped in the construction of case accounts, as the researcher remembers all details vividly (Yin, 1994, p. 87). Memos were developed when the researcher came across new information and all the salient features observed in the field were noted as these held the key importance in building theory in later stages (Charmaz, 2000; 2003).

3.6.1   Interviews

What is an interview and why interview method was used in this study? An interview is a useful technique in qualitative studies to explore issues in depth (Denzin and Lincoln, 1998, 2000; Patton, 2002). What was the process of interviewing, how were the interviewees selected and approached, and how did the researcher enter the field? Before conducting an interview, universities were contacted, either through telephone or via email, and a letter of introduction (a sample is provided in Appendix F) was forwarded to the universities (either posted or emailed) in order to gain access to site and schedule an interview with the research participants. Response to one of the emails is presented in Appendix G which is very positive and provides access to the researcher to the site of the sample university. The letter of introduction was sent to the research participants in order to provide information about the researcher and the research project. The participants were identified before sending the 'request for interview' through emails. This process was carried out before entering the field. An interview protocol was developed around the key areas (presented in Table 3.3) to be investigated in the interviews. The websites of the universities were consulted and the annual reports were studied to acquire some basic information about the university before visiting the research participants and entering the field.

After the interview date was scheduled, the researcher obtained permission from the ethics committee at the University of Southampton and provided the risk assessment forms to the University. When the permission was granted, the researcher visited the universities and collected data for the project. All interviews, except for a few, were video and audio recorded, so that the researcher could transcribe them later at her convenience. The video files and the documents provided by organisations and universities were kept safe during the period of study. No one else could have access to these files. Field notes were taken regularly and the researcher maintained a field work diary to note down any observations that the researcher came across and any ideas that came to her mind (Goulding, 2002)

Figure 3.3 Key aspects explored through semi-structured interviews

Key aspects explored through interviews	1. Role and functions of universities in Pakistan
	2. Key issues of higher education sector
	3. Conceptualisation of KBE
	4. University's involvement with the community and society at large
	5. Current university industry linkages
	6. Role of state in higher education sector of Pakistan.

Who were the potential research participants? The research participants in the study were the heads of organisations, Vice-Chancellors, Deans and the Heads of Department. In addition, some faculty members are also interviewed. These research participants are information-rich resource persons, holding key leadership positions in their universities. Hence, they influence the work environment and the policy and procedures of their respective universities. In many cases, the research participants had international experience and they had served the country on key positions in civil roles as well as in industry. In this way, those research participants were interviewed who have insight into the higher education sector of Pakistan and who could provide significant information on the research problem. Quality data were achieved due to the above-mentioned research choices. Table 3.5 below highlights the position of interviewees in respective organisation, the purpose of interviewing them (intended

outcomes) and the outcomes of the interviews (results i.e the objectives of conducting interviews are achieved).

Table 3.5 Interviews, their intended outcomes and results

Position held at the university at the time of interview	Reasons for interview (semi-structured)	Outcomes
a) Head of the HEC and the Executive Director. b) Head the IPO	Accountable for the state higher education (Funding, provision of infrastructure, quality assurance, access to higher education, etc.) Information rich.	Detailed discussions on the features of higher education, role of the Commission and issues of universities in the country were held and an insight into the issues of higher education was gained. Intellectual property-related information is gathered.
University leaders (VCs, Director R&P, Deans, Professors and the other faculty members)	Currently working in the sector and can give help in gaining insight into the prevailing conditions.	Key themes (problems, motivations, expectations) emerged in the discussions.

Source: Fieldwork memo, 2008

To explore the research problem and collect data around the key constructs, semi-structured exploratory face-to-face interviews were conducted. In any study where human subjects are involved, Leedy and Ormrod (2001) suggest that research participants must participate willingly and that ethics should be strictly followed. They suggest that the subjects must be protected from any kind of damage, should be aware of the research project in which they are participating and should have the right to privacy (Leedy & Ormrod, 2001). All these criteria are fulfilled in this study, as the researcher had informed the participants about their rights and all necessary ethical considerations were observed. In the light of this approach, a consent (willingness to participate in this research) for interview form was given to the interviewees before the interview session began. At the end of the interview session, the interviewee signed the form and added details, such as the duration of the session and when it (the interview session) was conducted. Some of the interviewees mentioned their

credentials, such as their area of specialisation, at the end of the form that later helped the researcher to analyse the data.

A sample of the consent to interview form is given in Appendix H duly signed by the interviewees (sample provided with their permission). The aim of the researcher at early stages in the data collection was to identify the sources potentially leading towards identification of the research problem, and to design the research questions for further data collection in order to answer the research questions. Table 3.5 acknowledges that the researcher first explored the features of the higher education sector of Pakistan by formal discussions with the Chairperson and the Executive Director, as well as interviewing eminent scholars in the HEC. As the researcher was searching for potential research participants, an interview was conducted with the Chairman of the IPO in which he highlighted issues relating to intellectual property and innovation in Pakistan. The researcher intended to collect intellectual property related information in this session, but received substantial data on broad issues related to the major disconnection between institutions (including universities, executive, legislature, judicial set-up and the state) and society. It was a highly informative interview and the information falls within the scope of the research.

3.6.1.1 Phase one of data collection

During the first phase of interviews, the Commission provided internal reports that show that it aimed to implement five Medium Term Development Frameworks (MTDFs) aligning higher education with the national needs and determining the direction of education towards creation of knowledge economy in the country. These MTDFs involved investment from Federal funds, one of the biggest sources of funding in developing countries. The administration of the Commission expressed concern over the changing political scenario in the country and its effects on the functions of the HEC. There was a threat to existence of the Commission under the new government regime; the Commission might be dissolved. The HEC is an autonomous body and works directly under the Prime Minister of Pakistan. This threat was sustained for a while after embarking upon the doctoral project, universities were identified for further data collection based on analysis of the first phase of interviews.

For the above mentioned reasons, the focus was moved from the HEC to the universities. Later on, the threat to the HEC's existence proved to be real and a notification was issued in November 2010 reducing its functions and distributing them to the provinces as part of the devolution process. The universities and students protested actively against the idea of devolution of the Commission. An appeal was filed by the former Chairman of HEC (the Chairman when interviewed) in the Supreme Court of Pakistan against the government's notification to break up the HEC. The Supreme Court accepted the appeal and declared the step taken by the government as unconstitutional; with the result that the HEC survived. Whilst the new government inflicted huge cuts on the higher education budget, the Commission has not yet been dissolved.

3.6.1.2   Phase two of data collection

In the second phase, 42 semi-structured interviews were carried out and case accounts were developed. Denscombe (2002) argues that a larger sample size yields more reliable findings. In this project, the sample was large and theoretically developed according to the principles of grounded theory, but data collection continued until the saturation point was reached. This means a point was reached when no new themes were emerging from the data and it started to repeat itself. This was the sign for the researcher that the process of data collection was complete. Thus, only five feedback interviews were conducted in the third phase of data collection.

3.6.1.3   Phase three of data collection

In this third phase, research issues were discussed with the senior leadership of the sample universities and issues were validated. One interview was conducted at each university. As data collection and analysis were carried out simultaneously, after case accounts were generated, the interviewees were given a chance to look at the case descriptions and accounts. This step was taken to increase the accuracy and credibility of the research and to keep the interview participants informed about the doctoral project. The three phases of data collection are summarised in Figure 3.4.

Figure 3.4 Three phases of data collection and time frame of data collection

1st stage of data collection: Three interviews (IPO, HEC)	2nd stage of data collection: 42 interviews (Universities)	3rd stage of data collection: Five feedback interviews (Universities)
Time period: Two months Time frame: September–October 2008	Time period: 3 months + 3 months = 6 months Time frame: June–August, 2009 March–May, 2010	Time period: Two months Time frame: October–November 2010

How long were the interview sessions? An average interview took up to one hour, and in some cases lasted an hour and a half. It is worth mentioning that weather conditions were severe. In the summer, the temperature was around 50-56˚ Celsius and electricity shortages made the process fairly challenging. Under these circumstances, the research participants suggested that it would be convenient if they could all be interviewed in one office. Therefore, instead of individual interviews, focus group interviews were held. As mentioned earlier, the interviews were recorded, but, in this case, only the voice was recorded, as it was often too dark to capture the images of the research participants. However, this did not affect the length of the interviews, as all the research participants were committed to the project whilst participating. After the field trip, the researcher shared the insights with her supervisory team; the scope of the research problem was narrowed down to investigate the perceptions of the leadership of academia on the knowledge economy.

Were there any difficulties in the data collection process? Numerous difficulties were faced during interviews. The fieldwork was carried out in 2008–2010 and at this time the major cities were under the threat of terrorism. On numerous occasions, the researcher escaped bombs and shelling in Islamabad. The strikes in Faisalabad over the electricity shortage also delayed the data collection process on some occasions. These were the major hurdles. Another issue involved the adverse weather conditions. At the time when most of the interviews were conducted, the climate in Pakistan was very hot and, due to lack of electricity, it was sometimes not possible to make field notes. Generally the interviews were recorded on video, but some research participants did not permit this. There were also some language issues. Some interviewees preferred to be interviewed in the national language, Urdu, so transcription of these interviews took longer than those undertaken in English. The interviewees were presented with a pro forma 'consent for interview' beforehand; whilst some refused to sign it, they were quite willing to be interviewed for the project.

In the research journey, where does the above process fit? Basically, Figure 3.6 is a holistic figure encompassing the entire fieldwork period that extends to ten months. It began with the identification of a research interest in the area; this was followed by simultaneous data collection and data analysis. This is characteristic of grounded theory research, so that the researcher has to go back and forth until the point of saturation is reached (Bryman, 2001; Jones-Evans et al., 2001; Pandit, 1996). The process is cumbersome and does not follow a linear path; the researcher has to make decisions at every step. At the same time, it was the interplay between new and previous data that kept my interest in the study alive.

3.6.2   Focus group discussion

Zikmund (1997) describes a focus group discussion as an unstructured interview with a group of two or more people, where the purpose of the session is to discuss an issue. The format for such discussion or interview is highly flexible as all the research participants were allowed to express their views freely, and the moderator (the researcher) facilitated a free-flowing discussion. Due to practical circumstances and the preference of the research participants, focus group interviews or discussions were conducted instead of individual interviews. It proved to be a good research strategy as it saved time for the interviewees. Also, it benefited the researcher by obtaining richer data, as different perspectives were collected in each session from three to four research participants.

In total, four focus group discussions were held. The experience of the focus group discussion was very good because a comment from one research participant triggered discussion in the group. The participants in focus group discussions were at ease in such small groups and did not feel threatened by openly expressing their viewpoints, however controversial these may have been. It was also observed that the research participants spontaneously expressed their views of their own will, which was not the case in the individual interviews, when generally the interviewee responded only after they were asked questions by the researcher. These are known to be the merits of focus group discussion (Zikmund, 1997). The researcher much appreciated this research strategy because valuable information was gathered in less time.

3.6.3   Documentary analysis

The documents collected set out the most recent situation and functions of universities (see Appendix I and J). These documents were used to collect secondary data. The documents collected for this project were the annual progress reports of the Commission, reports produced by the universities, website-based information about the Commission and universities, newspaper articles, blogs and internal communications within the organisation (memos and letters). Some of this data was publicly available, while other data was requested from the universities and the HEC, such as annual reports and internal memos of the universities. This type of data was helpful in a) entering the field/site, as it provided basic information about the university or organisation, and b) it was helpful in triangulation of information gathered by other tools, such as interviews and focus group discussions. Triangulation means that data from each source is intermingled in such a way that one can cross-check its authenticity; moreover, the data obtained from one source enhances the understanding of another (Denzin, 1978). Details of documents received cannot be provided here, due to the issue of anonymity and privacy. However, Table 3.6 shows which universities in the sample were most helpful in providing primary (interview) and secondary (documentary) data. The table 3.6 is adopted from Miles and Huberman (1983, p. 81) who argue that such information gives a more complete picture and allows the researcher to decide what to do next during the fieldwork.

Table 3.6   Data accounting table

Research questions	Cases	Interviews: Yes (Minimum, Average, Maximum) OR NO (interviews conducted)	Documents (Yes/No)	Focus group discussions (Yes/No)
RQ1	Case A	Yes (Average)	NO	Yes
RQ2	Case B	Yes (Maximum)	Yes	Yes
RQ3	Case C	Yes (Minimum)	Yes	No
and	Case D	Yes (Average)	NO	Yes
RQ4	Case E	Yes (Minimum)	Yes	Yes

Source: Based on Miles and Huberman (1983, p. 81)

As the table illustrates, there is variation in the data collected through primary or secondary sources. According to Strauss and Corbin (1990), if more data is accumulated from different sources, then greater variation is achieved through evidence and more density is found in concepts. Whenever the researcher observed that the interview source would not be sufficient for the collection of information on the phenomenon under investigation, emphasis was laid on the collection of documents for that particular case. It helped the researcher to fill the gaps in information obtained from interviews, and supplemented with information from focus group discussion or documentary analysis. This process of making memos placed the events in perspective and context. The rigour, depth and quality of a qualitative study are enhanced when such a multi-method approach is used to collect data (Eisenhardt, 1989; Denzin & Lincoln, 1994; Yin, 1994).

3.7 Data analysis procedures

As mentioned earlier, there are different versions of grounded theory and Straussian version is applied in this research project (Strauss & Corbin, 1990). The recurring process of coding and analysis are the characteristics of the Struassian version of Grounded Theory, as at any one time the researcher is dealing with various stages and processes of analysis depending on the concept, category, or pattern under examination (Jones-Evans et al., 1999). According to Strauss and Corbin (1990), generating theory from unstructured and undirected data demands a systematic approach that includes description, conceptual ordering and theorising. This is the overall technique that has been applied in the current study and the organisation of empirical chapters is consistent with this principle of grounded theory (description, conceptual ordering and analysis) or the scheme of analysis (Strauss & Corbin, 1998) as shown in table 3.7.

Table 3.7   Data analysis and write-up scheme

The grounded theory principle	Relevance and application in this research
'Description'	Description is applied in the current study to: a) Provide background to the reader/audience; b) Supply evidence on the research issue and develop a standardised format for cross-case analysis; c) Organising huge chunks of data into themes and categories. Chapter Four illustrates this (description) principle of grounded theory.
'Conceptual ordering' and 'theorising'	Conceptual ordering is used to: a) Present open, axial and selective coding in detail b) Conduct the cross-case analysis. It is demonstrated in Chapter Five. Theorising is the last stage of the analysis and is applied to generate theory. This principle of analysis, according to grounded theory, is presented in Chapter Five in which the Model of Symbiosis is developed.

Source: Based on (Strauss & Corbin, 1998, p. 15)

Now, we will look at these techniques or principles of grounded theory (Strauss & Corbin, 1998, p. 15) although, these steps are performed and explained in detail in chapter 5.

3.7.1   Description

According to Strauss and Corbin (1990), description is a basic step in grounded theory study. They argue, 'the descriptive details chosen by a story teller usually are consciously or unconsciously selective, based on what he or she saw or heard or thought to be important' (Strauss & Corbin, 1990, p. 18). The importance of description lies in the fact that it 'provides basis for more abstract interpretations of data and theory development' (Strauss & Corbin, 1990, p. 18). They maintain that a description implicitly embodies concepts (*ibid.*, p. 18). Constructions of the cases are not merely tools for presentation of evidence related to the phenomenon under study, but also a method to generate knowledge. Hence, in the view of the researcher, the description of case accounts leads to finished products (complete insight and perspective of the context is gained) that are also a contribution to the study (Remenyi *et al.*, 1998; Bourgeois & Eisenhardt, 1988). Hence, these case accounts provide background knowledge about the context and phenomenon under investigation.

According to McClintock *et al.*, (1979), an important issue in narrating case accounts is that novice researchers often indulge in exhaustive details of events, organisations and people. To avoid such detail, common themes are derived from the data to write the case accounts. These themes are stated below:

First of all *background* of case account is presented with the help of *physical infrastructure* and *knowledge infrastructure* of the university. Next, the perceptions of academic leaders on *the readiness of the universities* in terms of preparation for the KBE are explained. This theme has sub themes such as: *mission and functions of a university*; perceived understanding of the KBE; challenges faced by academia; policy matters; and finally the researcher concludes the case account with any recommendations presented by the academics.

This has helped the researcher to bring consistency in the organisational scheme of the cases as well as rigour in the research. How is rigour achieved in research? In his study, Burton Clark (2001) has used the case account approach to generalise concepts about transformation of traditional universities into entrepreneurial universities. He has selected best universities, which have risen from the traditional university criteria to innovative universities. By the same measure, only these universities are used in the sample, which show a trend of transformation in their annual reports. It is worth mentioning that, when the purpose of the analysis is to build a theory (Strauss & Corbin, 1998, p. 88), sampling of more than one case is useful in order to sensitise the researcher to the relevant properties and dimensions.

In this study, five such cases were chosen so that a refined theory can be induced. It helped the researcher in moving from specific to general and in achieving conceptual density required for a generalised theory or a model. Therefore, each case is rigorously compared with other cases to generate a substantive theory. Strauss and Corbin (1998) suggest that, the greater the number of cases, the higher is the possibility of yielding diverse categories. Therefore, the researcher moved from one case to another, asking theoretical questions about each case and comparing the properties of categories, events and incidents across the cases, and also compared the data within cases and with other cases to gain a broad picture of categories and concepts. The researcher thus comes to find similarities and differences. In the current study, each case account has *inter alia* some unique aspects in terms of historical development of the university, the source of funding, and the functions in the society, future aspirations and infrastructure. However, since the institutions are operating in the same higher education system, overarching common themes have also emerged from the data that enabled the researcher to compare the cases, and thus a robust substantive theory is developed.

3.7.2   Conceptual ordering

We come to know, what we do not know, by virtue of what we know.

> *'Just as we do not reinvent the world around us each day, in analysis we draw on what we know to help us understand what we do not know.'* (Strauss & Corbin, 1990, p. 80)

An explanation of the above statement can be given in the context of current study that case accounts help to perform cross case analysis and constant comparative analysis to produce the substantive theory. The conceptual ordering begins with coding. According to the Straussian version of grounded theory, coding comprises three steps: open coding, axial coding and selective coding (Strauss & Corbin, 1990). Coding is a process that takes the analyst one step further towards theorising (*ibid.,* p.60). In addition to the three types of coding, a constant comparative method is applied during the process of coding. This means that the researcher asks questions, such as what category does the code fall into; why does it fall within a particular category; and what are its dimensions. In this way, what, why, who and how are the questions that a researcher constantly bears in mind while analysing data (Strauss & Corbin, 1990, p. 62).

The above mentioned process is symbolised by fracturing data and exploring the dimensions of categories, so that they may be conceptually grouped in later stages. The material thus gathered is then explained in the form of a theory regarding what was going on in the data or context (Glaser, 1978, p. 55). The steps shown in Table 3.8 to code the data and reach the next stage of producing a substantive theory guided this research.

Table 3.8   Open, axial and selective coding

Steps	Detailed procedures according to Strauss & Corbin (1990, p. 61–176)					
Open Coding	Line by line coding	Concepts	Categories	Sub-categories	Properties	Dimensional range
Axial coding	Sub-category of a category					
	Causal condition					
	Phenomenon					
	Context					
	Intervening conditions					
	Actions reaction strategies					
	Consequences					
	Conceptual density					
Selective coding	Story Line generated	Core Categories	Subsidiary Category	Paradigm	Related categories at dimensional level	Validate relationship against data	Fill in the categories

Source: Based on Strauss & Corbin (1990; p. 61–176)

Firstly, interviews were transcribed from the raw data recordings into rich text format documents that were imported into the qualitative software, QSR NVivo, v.9 (as shown in Figure 3.5). After importing interview transcriptions, the video recordings were also imported into the software for ready reference and consultation as and when required in the future. These files can be consulted by clicking on an external folder and are also linked with the sources. In the technical language of NVivo, these transcripts of interviews are called 'sources'. The following illustration shows all the 'sources' imported into the software and 50 sources were generated for open coding

Figure 3.5 An example of interviews imported into the software

All sources: the interviews in the internal folder

Externals: the raw data or the videos sit in external.
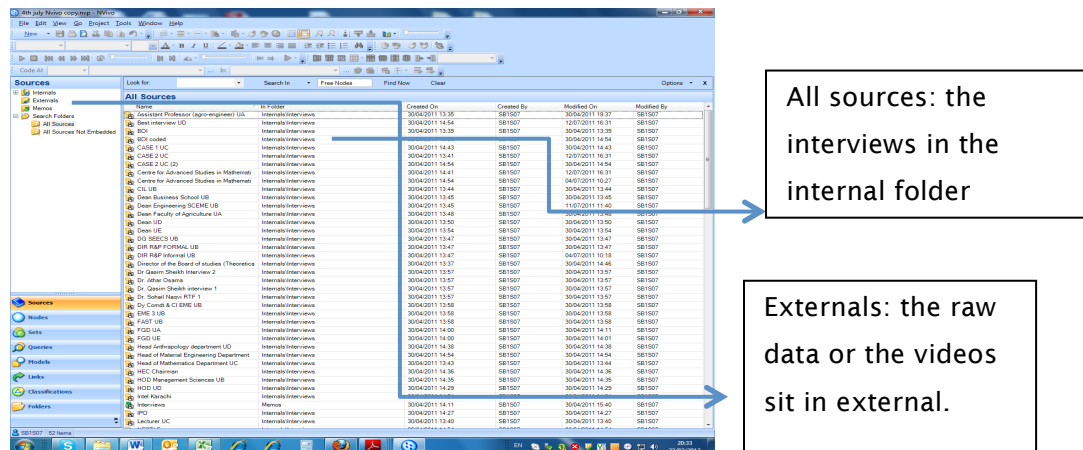
A database was developed separately, outside the environment of the software, in which the basic details were entered regarding the research participants, their area of specialisation, duration of interviews and the language in which the interviews were conducted. All interviews imported into the software were in English Language (since interviews in Urdu were translated into English), and then these interviews were coded line by line. This is open coding, in terms of grounded theory (Strauss & Corbin, 1990). In the software, these codes are called nodes. An example of free nodes is presented in Figure 3.6 below but besides free nodes, tree nodes were also created.

Figure 3.6 An example of free nodes in NVivo

Free nodes
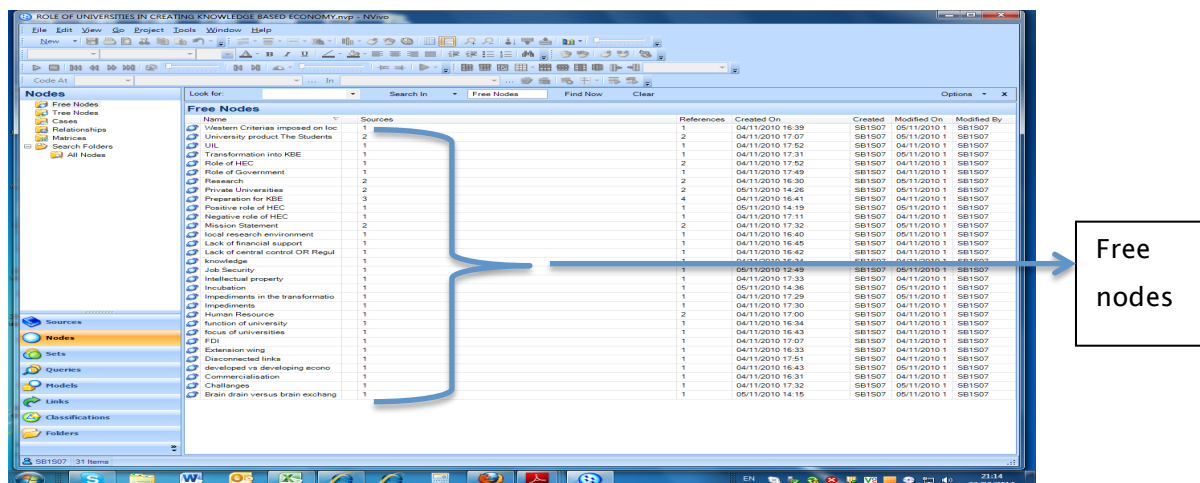
Next, making use of the 'Word Frequency Query' tool in the software, the most frequently appearing words were identified and coded to the same nodes as those of the initially created codes. This step was taken in order to identify the high frequency words, as well as to follow the reference regarding (as shown in figure 3.9) in which particular source the word has appeared and its relevance in the analysis. An example of word frequencies is presented in Table 3.9, drawing attention to words such as 'research', 'industry', 'system' and 'linkages' that were followed up in the respective transcripts. These words were an amalgamation of concepts and properties that were later separated manually on separate sheets of paper.

Table 3.9   Word frequency table

Words	Count	Words	Count
Research	354	National	57
University	160	Development	55
Industry, Industrial	136	Higher education	49
Education	121	Society	46
Knowledge	91	PhD	42
HEC, H.E.C, Commission	87	Teaching	38
Culture, Cultural	78	System	37
Money, Funding	73	Challenges	34
Economy	72	Basic	30
Problem	72	Policy	30
Government	70	Linkages	25
Business	63	Quality	25

Figure 3.9: An example of text search query: A snapshot of NVivo

An illustration of the process of following a word search query is given in the figure 3.7 which shows all the sources referring to the term 'Knowledge Based Economy', 'Higher education', 'culture' and 'university' are opened in one window so that researcher can see, how many references to these terms are being made and by whom? The software facilitates the researcher to see at which stage codes of similar qualities appear on a coding stripe. The coding strips helped the researcher to see which codes lie in the same territory and are closely related. This process helped the researcher in developing concepts in the later stages of analysis.

Figure 3.7 Word search query and coding stripes
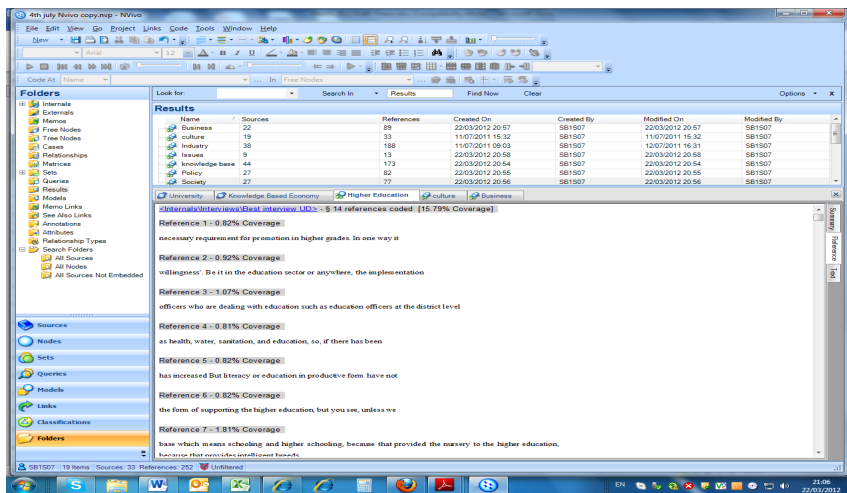
open codes were arranged in the form of axial codes based on their properties that were then grouped into themes and named as selective codes in order to synthesise the similar open codes under the same categories and find out the possible relationships between these codes. All the axial codes with similar properties were coded under the same tree node.

According to Marshall (2002), the use of software for qualitative analysis limits the creativity of the researcher; hence, the selective coding was performed manually with the fewest possible codes and here the utility of the software also ends. The researcher has used the software only to organise the data (Merriam, 1998; Ryan & Bernard, 2003). NVivo does not allow one to make a model in the same manner as the researcher managed in the Microsoft PowerPoint application and MS Word. Hence, analysis was performed manually with the help of memos, charts, spread sheets and diagrams. Selective coding is the last step of the 'coding' process and it ends when the researcher has developed a story line. To summarise, the systematic procedures described above, conceptual ordering involves coding and re-coding until the desired level of abstraction is reached, after analysis and synthesis of data (Strauss & Corbin, 1990, p. 19).

3.7.3 Theorising

The last step of grounded theory analysis is theorising, an activity based on the three kinds of coding. It begins when the researcher has developed insight into the issue and is in a position to throw light on the issues under investigation. The researcher has been taking notes and making memos during the coding process and when the themes and concepts are developed; the relationships between them was visible. The Strauss version of grounded theory suggests that, when a researcher is committed to the central idea, all categories fit nicely into a theory (Strauss & Corbin, 1990). In this way, through exploratory statements of relationships, the researcher explains the social, psychological, educational or other phenomena (Strauss & Corbin, 1998, p. 161). The same procedures were followed in this study. Once closure was gained in the data coding process, the researcher's understanding of the issue moved towards abstraction, by virtue of which the Model of Symbiosis was generated. In this way, generation of a substantive or formal theory depends on strictly adhering to these steps (Strauss & Corbin, 1990, p. 23).

3.8 Establishing the quality of study

According to Strauss and Corbin (1990, p. 17) the grounded theory criteria for establishing the quality of study are based on the following questions:

- Were concepts generated in a systematic way?
- Were there any links between concepts and the categories developed?
- Has the researcher achieved conceptual density from data?
- Has the theory been fully explained including the variations, processes, broader conditions that might affect the phenomenon?

If researchers ask all these questions, they can see the links between concepts and can understand the phenomenon well after remaining inside the data and working with it, so their answer will definitely be positive. The answer to the above questions is 'yes' from the researcher's perspectives in this case as well, but in order to establish criteria for the quality of this study, triangulation, audit trails, grounded theory mentor checking and peer debriefing are used. This step was taken while keeping in view Patton (2002) and Strauss and Corbin (1998) criterion that multiple strategies help in establishing trustworthiness in grounded theory.

3.8.1 Triangulation

Data was collected from three sources, interviews, documents and focus group discussions, in order to establish credibility. The data was triangulated from three sources (Lincoln & Guba, 1985). This is also termed as 'methodological triangulation'. In addition, the investigator's triangulation was used; coding was shared with the supervisory team to establish consistency in findings and analysis.

3.8.2 Audit trails

Inaccuracy and biases are not acceptable in case accounts (Patton, 2002, p. 93). After data collection and case description, the case accounts were emailed to few of the participants and they validated the cases by replying by email that they agreed to all the details given in the case descriptions and that the interview transcripts as presented to them were accurate. In other words, the universities have accepted the validity of the cases because the information stated was what the research participants provided at the time of the interviews. This process can also be regarded as an audit of the study, as an external person is reading the interview transcripts and cross checking it against the original raw data (Morse & Richards, 2002), thereby establishing the quality of study.

3.8.3 Peer debriefing and grounded theory mentor check

Lietz *et al*. (2006) recommend the use of member-checking criteria for establishing the quality of study. In this study, regular discussions were held with colleagues at the School of Management who were also conducting research through grounded theory. A grounded theory mentor was consulted for (any) difficulties arising in the study at the write-up and earlier stages of the study. This process is also called as 'peer debriefing'. In this way, objective judgements and opinions were received from colleagues and the grounded theory mentor. Moreover, this work was presented in two seminars which also provided a critical view on some aspects of the research.

3.9 Summary

The researcher has presented the methodological framework based on social constructionism in this chapter. Methodology is an integral part of any study. It establishes a connection between the empirical and theoretical parts of the thesis, as shown in Figure 1.2. The chapter began with explanation of the concept of paradigm. A justification is provided for social constructionism as a suitable paradigm and the qualitative tradition is chosen as the research approach. Then, the researcher discusses the research strategy, the use of grounded theory in management studies and mentions the different versions of grounded theory research strategy. Finally, data collection methods, processes and organisational schemes of the rest of the thesis are discussed. An important part of the chapter is data collection and analysis procedures, based on which the analysis will be presented in the next three chapters. The chapter ends by answering the question of how quality is established in this research.

4. Case Accounts

4.1 Introduction

This chapter presents five case accounts i.e. Case A, Case B, Case C, Case D, and Case E. These case accounts of universities are structured uniformly around two key themes. The first theme, i.e 'Background' explores, the 'settings' of each case account and it comprises two sub-sections, the 'physical infrastructure' and the 'knowledge infrastructure'. In the absence of these two kinds of infrastructure, no university will be able to perform its intended roles and functions. The physical infrastructure of a university includes, buildings, laboratories technology incubation centre and industrial liaison/extension services offices etc. While the knowledge infrastructure includes qualified faculty, research equipment, libraries, research funding etc.

Figure 4.1 Structure of Case Accounts
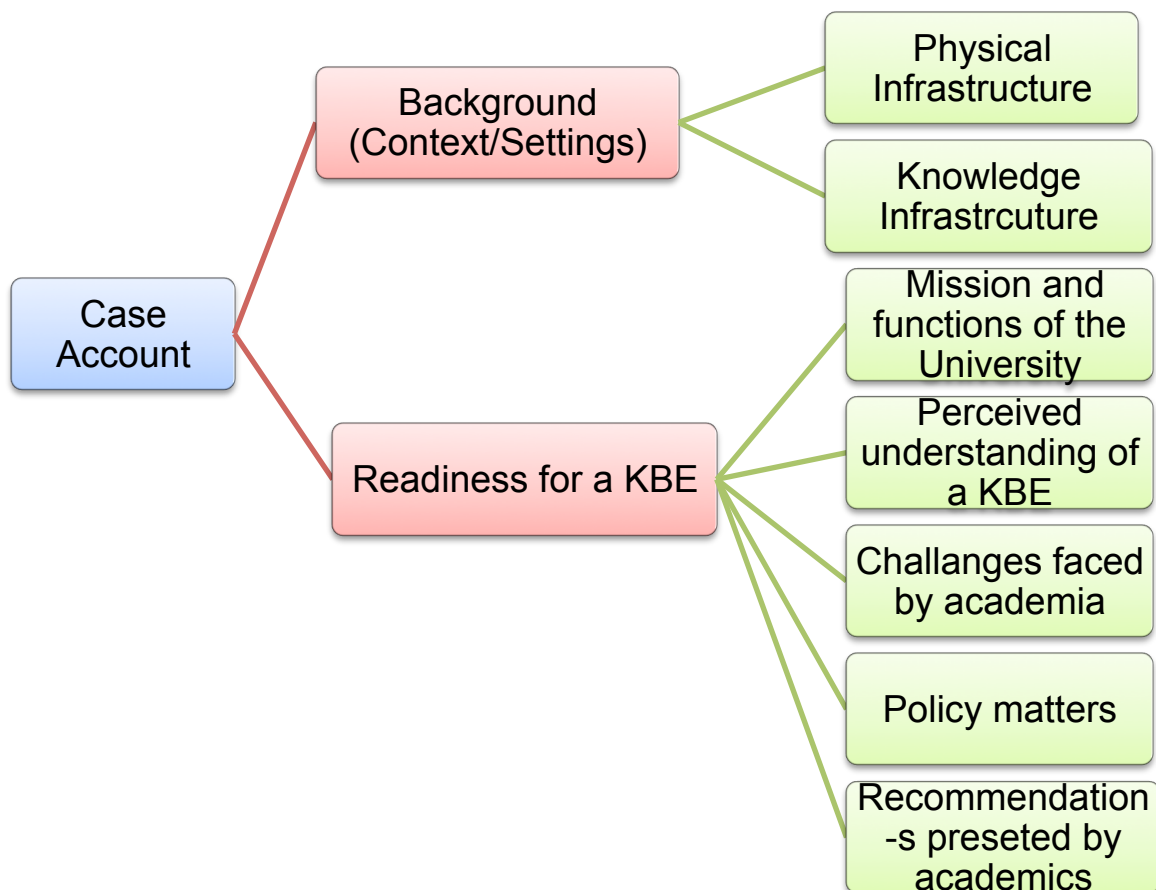
The second main theme, i.e 'Readiness for the KBE' explores the conditions of the case account, to explore the preparation of the university for transformation into a knowledge based organisation or an entrepreneurial university. The 'readiness for KBE' is structured in five sub-sections i.e ' Mission and function of the university'; 'Perceived understanding of the KBE'; 'Challenges faced by academia'; 'Policy matters' and 'Recommendations presented by academia'. The following Figure 4.1 depicts this structure more vividly.

The functions of this chapter are various. First it forms the empirical part of the thesis as depicted in figure 1.2. Second, it presents the case accounts. These are the least analysed part of data yet it helped the researcher to:

a) Explore the perceptions of academia about the KBE;
b) Identify the challenges hampering the functions of universities
c) Discuss the opportunities which facilitate universities in performing their role
d) Understand the dynamics of university-industry linkages
e) Explore the views of leaders of academia, regarding how to solve the problems their universities are facing.

Third, this chapter helped the researcher to organise raw information in such manner that huge volumes of data are reduced to manageable chunks. This allowed the raw data to be utilised as evidence in the current study in respect of the research problem (Ackroyd & Hughes, 1992). Patterns are identified in the case accounts, which help the researcher to move from specific issues to general solution and inductively produce a substantive theory in the next chapter (Patton, 2002). The categories and core categories developed from these case accounts are also discussed in Chapter five along with the newly developed theory. In this way, this chapter links the empirical and theoretical parts of the thesis. In fact, the empirical part of the thesis leads to the formation of a new theoretical framework at the end of the analysis. At the end of the chapter, a summary is presented to conclude the chapter.

4.2 Case Account A

4.2.1 Background

Pakistan is an agricultural economy. After independence (1947) from British colonialism, the National Commission on Food and Education (NCFE) Pakistan strongly urged the Government of Pakistan in 1950 to establish an agricultural university to enhance the agricultural productivity of the country and promote agricultural education and research in the country. The university A was established as a research college in 1906, but it gained the status of a university in 1961–1962. This step was taken in the light of recommendations of NCFE that agriculture colleges should be upgraded to universities to meet the national requirements for agricultural education. The University A possesses an effective physical and knowledge infrastructure to support the research and teaching based activities. It has developed as a leading agricultural university and has a good research oriented faculty.

4.2.1.1 Physical Infrastructure

The physical infrastructure of the university comprises a large campus, which extends over an area of 1950 acres (Chairman, Department of Rural Sociology, University A). It has a main campus in Faisalabad and sub-campuses in at Toba Tek Singh, Depal Pur, and Dera Ghazi Khan. Since it is a public university, funds for its development and operations are received from government. When the researcher visited the research site, most of the faculty members pointed towards the fact that the city of Faisalabad changed into an industrial hub with the production of the best quality cotton and cloth in Faisalabad and it is called as the 'Manchester of Pakistan' (Dean, Agronomy, University A). Taken in historical perspective, the university was created one hundred and fifty years ago keeping in view the land grant university concept. Industry and a residential campus developed around the main campus. In this way, the research college became the hub of economic development. The industry in this area is largely related to cotton that grows in the area (cotton ginning factories, weaving, knitting, dyeing, textile machinery manufacture such as boilers, jet dyeing machines, looms etc.). The Dean, Faculty of Agriculture, University A explains this fact in the following statement:

> *'The cotton produced in Pakistan is of the best quality and (therefore) the agro-industry is highly developed in Faisalabad.'* (Dean, Faculty of Agriculture, University A)

Being an agricultural region the need for the establishment of the university in Faisalabad can be readily understood. The university is prominently involved in community building and socio-economic development. The faculty members seemed happy with the housing facilities and other facilities available on the campus. The Vice-Chancellor expressed his opinion in this regard with pride:

> *'This is a residential campus. This is probably a unique place in the country – you will not find such serenity that you see here--- (the faculty members) would not like to leave the place once they are in because they are settled and satisfied and their family needs are also being satisfied. So it's not only the pay package but also the prospects in the career and the personal and family satisfaction'* (Vice-Chancellor, University A)

The statement shows the university provides an excellent environment for its faculty members and students to gear the learning processes and participate in knowledge exchange.

4.2.1.2 Knowledge Infrastructure

The university has a well-developed knowledge infrastructure: the library; laboratories with state-of-the-art equipment and technology incubation centre (TIC) are three of its prominent features. The new centrally air-conditioned library, upgraded in 1973, has an area of 45,000 square feet having a blend of modern and oriental architecture (Lecturer, University A). It has 246,220 volumes of books, journals and other reading materials, including 21,035 manuscripts and 51,800 volumes of national and international research journals. The World Bank has donated most of the publications (Librarian, University A). Library membership stands at almost 9,000, mostly faculty members and students who consult the library for teaching and research purposes. The online digital library supports 200–250 users at a time. An Internet facility is available, but wireless is not yet installed.

The Technology Incubation Centre facilitates start-up companies by coordinating entrepreneurs with available on campus resources and services. The aim is to mobilise capital, coordinate entrepreneurs with available services and resources and create market demand for an innovation-based agriculture system. The University offers consultancy services and guidance in various fields through its following faculties:

- Faculty of Agriculture
- Faculty of Sciences
- Faculty of, Agricultural Engineering and Technology
- Faculty of Agricultural Economics and Rural Sociology
- Faculty of Animal Husbandry
- Faculty of Veterinary Science
- Division of Education and Extension.

There are a number of institutes that contribute to the knowledge infrastructure of the University. These include the following:

- National Institute of Food Science and Technology
- Institute of Horticultural Sciences
- Institute of Soil & Environmental Sciences
- Institute of Animal Nutrition & Feed Technology
- Institute of Microbiology
- Institute of Business Management.

About 10,000 students graduate each year. There are 500 faculty members, of which 224 hold PhD degrees, largely from major foreign universities. The research output of the university is the highest among agricultural universities. It produced 959 research papers in 2009–2010 of which 299 were in international journals (Internal documents, University A).

The institution had an extension wing to serve the needs of the farmers when it was a college, but when it was upgraded to a university, this was terminated. The Dean of Faculty of Agriculture expressed his view that the old system was much better

> 'Before 1961, it was an ideal system. At that time there was integration between research and policy related to agriculture. Since the link is broken, we have been feeling it. The same old, Lyallpur model is still applied in India. They are still running the same system and they are successful' (Dean, Faculty of Agriculture, University A).

On some Saturdays exhibitions are held with farmers in open fields under an outreach programme, but this does not happen frequently. The new extension services division was re-established at the University under the directive of the Governor of Punjab in 2003. Its functions are largely to hold exhibitions in which faculty members and students display their new products or convey any useful information to the participants.

The Vice-Chancellor of University A explained the system of linkages with the farmers at his university:

> *'We have a fully-fledged system of external linkages. ---There are many ways in which linkages are created and made effective---we create the linkages by entering into a range of agreements ---most of these linkages are really focused for global competition.'* (Vice-Chancellor, University A)

Besides global linkages, the University has formed many effective linkages with local partners such as other universities and multinational companies.

4.2.2 Readiness for KBE (conditions)

The readiness of University A for the mammoth change is presented below by highlighting the conditions of the universities and perceptions of faculty members.

4.2.2.1 Mission and functions of University A

The University has the mandate to serve humanity in general and the farmers in particular (official website, University A). The Vice-Chancellor of the University said:

> *'The purpose of a university is the resolution of problems faced by a given set of communities. For us the set of societies is farmers and rural communities.'* (Vice-Chancellor, University A) The University aims to modernise the national farming system and encourage farmers to use technology-based farming methods in everyday activities to enhance productivity (Annual Report 2008-2009, University A). The University fulfilled this mandate by integrating the roles of teaching, research and extension services (application of research produced by faculty members in their fields). One of the assistant professors expressed his view that since promotion and incentives are linked to research-based skills, many faculty members are participating in research activities:

> *'Research is our main focus these days (since) promotion in universities is based on research. I have designed three machines, which have been patented by the government of Pakistan. One is a University Boom Sprayer, a second is a Zone Disk Tiller Drill and a third machine has been developed from my PhD research.--...'* (Agro-Engineer, University A)

He was of the view that the farming community, the target community of the university, does not benefit from applied research as they used to before the 1960s:

> *'I feel sorry today that we are universities and our job is just producing research----, while the extension wing, which has the responsibility to contact farmers and transfer our knowledge to them, that part is completely dead.'* (Agro-Engineer, University A)

The extension services were terminated due to the upgrading of the agricultural college to university status, since there were greater numbers of students and more emphasis on teaching. Later in 2001, the HEC emphasised research as a criterion for promotion, so research was revived once again in the university. Hence, the traditional roles and functions of the university have been both teaching and research.

The Vice-Chancellor at University A said that the emphasis is laid on human resource development:

> *'We are pursuing a very systematic human resource development program which provides opportunities for continuous upgrade of the skills of current faculty as well as newly recruited faculty. We are recruiting staff with cutting-edge, knowledge and skills. So to me the role of a university is knowledge creation, application and continuous human resource development.'* (Vice-Chancellor, University A)

In this way, the functions of University A are knowledge creation, application of knowledge and human and resource development.

The university also aims to develop the community and help farmers to use technology based farming methods. In the focus group discussion, the point was raised regarding how the University A serves society, as this was a part of its mission. The discussion is quoted below:

1st participant: *We are working mostly with NGOs. For example, if someone is doing research on water issues, he would come to us and say: 'we need such kind of help' and we then provide them consultancy and help them to solve their problem.*

3rd Participant: *Also, we are ready to work with the industry but the industry is not ready to work with us.*

Researcher: *What do you think, what is the reason for that?*

3rd Participant: *Actually there is no culture of research and working with industry in Pakistan.*

Researcher: *What do you mean by 'culture of research and working with industry'?*

3rd Participant:

They (industry) are not ready to spend a single penny on it.

2nd Participant: *The people who are in the industry, they have their own restrictive attitude and they don't think that the research done in collaboration with the universities can change the condition of their business. Now they have seen this is working out in developed countries and they know that this partnership works well there, so now the link is developing in Pakistan as well. As such it has not become a part of the culture yet. The phenomenon is occurring at a very low profile.'*

The faculty members believed that it was important for the university to adopt a proactive approach and develop collaborations for mutual benefit. One of the faculty members blamed the industry for the lack of linkages with the university. He pointed out that many industries were established with fraudulent intentions. Large loans were taken from banks and later written-off by using political influences so that the industrialists had no vested interests in such dummy operations, and no motivation to establish linkages with universities:

'... I think, the concept of university industry linkages is new here. Nevertheless, it is a very important concept to make the research available for solving problems of society or for taking research and making it a business. In the West, actually the industry invests in the research in the university because at the end of the day, it is the industry that gets the benefits. In Pakistan unfortunately the industry has never had this culture of investing into the research. The industry is usually created by loans, and it is created for (profit) but not for the benefit of the society... of course, the industry is business and... of course... It's supposed to make a profit but if it makes a profit by investing in research that is one thing. If it makes profit/returns by just (arranging to the) writing off of loans, then it's another thing.' (Vice-Chancellor, University A)

While the University is performing its traditional role as a teaching and research institution, its interactions with industry and the farming community are limited. New partnerships are being forged, but these are at a very early stage. The University staffs wish to collaborate with industry, government and non-government bodies, but it will take time for such partnerships to develop and evolve fully. The culture of carrying out research or investing in external research does not exist in an industry that acquires foreign technologies on a turn-key basis. This is a major hurdle in the development of effective university-industry linkages.

In fact, the extension services of the university to farmers remain weak, though in recent years it has established a technology park and a Technology Incubation Centre. It has significant potential to contribute to the development of high value added agricultural products including the development of high yielding and disease resistant crops, dairy products, pharmaceuticals from plants, essential oils, horticulture, fisheries and veterinary sciences. The university needs to explore the possibilities of linkages with industry far more aggressively. This may be achieved by undertaking focused projects and then preparing feasibility reports and business plans professionally in order to persuade industry to invest in them. The faculty members were unhappy at the pressures exerted by HEC to publish their work in internationally recognised journals. The retention of high quality faculty is a major problem. However this issue had been satisfactorily addressed by the HEC through the introduction of a performance based 'tenure track' system with excellent salaries, and by introducing a Foreign Faculty Hiring Programme under which hundreds of outstanding scientists who are originally from Pakistan but form the diaspora in the USA and Europe had returned to serve universities in Pakistan.

4.2.2.2   Perceived understanding of KBE

To understand the perceptions of academia about KBE, research participants were asked about what their understanding was of KBE. The question posed was: 'What is a knowledge economy and how do the people perceive the term KBE?'
 First of all the Vice-Chancellor, said that KBE makes perfect sense to all sectors of the country, as it will improve the overall society and economy of Pakistan:

> *'It (achieving KBE) surely is a challenge for Pakistan. This term is used quite frequently these days. --- There are strong reasons to believe that it should work. We were talking about industry, agriculture, education (and) everything (connected with them). Any segment of society, whether it is an industrial need or business need or farming community's need, for all of them the knowledge-based economy makes sense because knowledge is power.'* (Vice-Chancellor, University A)

The following question was then asked to the participants: 'If Pakistan became a knowledge economy, in what respects would the country be different? Some of the staff members brought up the issue of affordability, as the fee was very high in certain universities. It was felt that if KBE developed in Pakistan it would address this issue of affordability effectively. The head said:

> *'You were talking about the Lahore University of Management Sciences and National University of Science & Technology'. There is an issue of affordability in these universities. I would love to send my son to these institutes but who will pay for them? ----The system has to be affordable. KBE can be viable only when the access to knowledge is made readily available, and made affordable and it needs acceptable quality standards.'* (Vice-Chancellor, University A)

The Vice-Chancellor indicated that when KBE is developed, the educational system will offer knowledge to all sectors, be they industry, community, or government. Free access to knowledge will raise the quality of life for the people by the resulting economic prosperity. He expressed satisfaction that access to higher education in the country was being enhanced, an important prerequisite for KBE:

'There is a still long way to go, if we talk about other sectors such as industry or businesses but at least from the higher education side I can tell you, we have made good preparation. The persons who could go for higher education were only 2% now the ratio is 4.6%, that means access to higher education is enhanced. And when we enhance the access simultaneously we face the challenge of quality.' (Vice-Chancellor, University A)

Therefore, in his view, Pakistan is moving towards the KBE but the progress is slow. The higher education sector is ready for this shift as it has increased access, but now it faces the challenge of quality of education. Large numbers of scholarships have been awarded for PhD level training abroad so that the faculty in universities could be strengthened but this effort was on-going and would take some years to bear fruit. So while the higher education sector had begun to make its contribution to KBE, other sectors had still to move in the same direction and had not yet realised that 'knowledge is power' (Vice-Chancellor, University A).

According to an assistant professor, universities in countries with strong KBE secured funding for scientific projects, worked on research topics of national importance and helped to commercialise research. These working conditions are not available in their country, as KBE was in its infancy. He said:

'We are starting with knowledge-based economy. Everything will be scientific and everything would have criteria for evaluating. Right now, there is no merit, standard procedures, logic or scientific approach. Everyone has his own perception and there is no main control. Money should be at hand. We spend (our own) money, and it is difficult to get it back. In the UK and USA first you get the grant and later you do research.' (Agro-Engineer, University A)

The lack of central control in the quotation implies that there are no established procedures and guidelines from the government for carrying out research: there is a lack of approved policy. The industry lacks vision as it cannot understand the value of research. Universities do not work towards national priorities on specific areas of research and the government makes policies, but does not follow them. Hence, there are many shortcomings in the system and links are missing between different key actors of a National Innovation System.

A wayward approach to teaching and research will not allow the education system to contribute towards any kind of development. Faculty members execute research projects according to their personal research interests and receive funding according to the perceptions of the higher management in the University. There is no central committee to review the research projects and ensure that the funds are allocated to projects of national importance. How should one determine which project is more urgent and important? It should be decided by national goals or the priority given by the University. Such a system is missing, in this context, and knowledge production is a slow and bumpy process with too many bureaucratic issues.

The academic leaders of this university fully comprehend the need for the university industry linkages, there is little motivation for them to proceed in this direction as the criteria for promotions and rewards are linked to research output in international journals and not to activities involving service to the community. Some progress has been made in the higher education sector; the universities still lacked strength to be able to deliver meaningful to industries or to the farming community. In fact, the area identified by most of the faculty members is the lack of culture for the KBE. Moreover, there was no central planning or policy that would provide mechanisms and funding for such linkages to be established. In view of many faculty members, the KBE is still in its infancy, and while there was a growing awareness of its importance in the process of poverty alleviation and socio-economic development, the process was of an evolutionary nature that had yet to reach maturity. It leads to the argument that a robust system of linkages and steps to take the university towards those functions which foster a KBE is needed to be introduced in university A. It includes, incentive structures to encourage faculty for linkages with businesses and reward faculty members for performance in this respect. At the government level, there is a need to have clear priorities for research both at national and university levels. The wayward research in the university should be geared towards such priority areas.

4.2.2.3   Challenges faced by academia in Pakistan

Access to funding and retention of faculty members with research skills are the two biggest challenges faced by academia, according to most of the interviewees at University A. The government support for education as a whole remains dismally low (about 1.8% of GDP) and the share of higher education as a percentage of the education budget is also only 13%. The low priority accorded to education in Pakistan has caused serious issues of quality and access at all levels. The situation had improved somewhat at the higher education level but the overall scenario remained weak.

Usually universities never stop working, even in periods of war, but in Pakistan the university faculty sadly recounted that they were forced to close down for a day in protest when payments of their salaries were delayed. Over the year, there have been ups and down in the availability of funds and the performance of universities was adversely affected on this account.

A faculty member said:

> 'We are lacking in many aspects and face many challenges in the university. The first one is of course, funding. Without funding, no one's research will be done properly. Then the second one is the lack of human capital. In many areas people are not competent. Then the other (consideration) is the 'mind-set'. That means (having a) positive and constructive attitude towards work. ---Even the rewards and punishments are not based on abilities or work. It is based upon other components such as personal links.' (Lecturer, University A)

The dilemma in Pakistan is that although KBE is considered as a means to social equality, attainment of quality work and standardisation in procedures, unfortunately there are cultural barriers and a lack of mind-set to bring about these changes in the local setting. A positive attitude towards work needs to be developed among the people. The lack of human capital and funding demotivates the researchers, and rewards are often based on recommendations or personal links. In addition, in reality knowledge is not considered 'power', as the Vice-Chancellor has reported. In Pakistan, 'power' is generally considered to be superior to 'knowledge'. This refers to the strong feudal system that prevails in Pakistan with its accompanying mind set. The Vice-Chancellor said:

> 'Unfortunately, we have been facing difficulties in all major sectors of society. Knowledge is not superior in this country, but power is superior.' (Vice-Chancellor, University A)

In the context of Pakistan, high level of corruption seems to be a result of craving for power. An explanation of the above statement by the Vice-Chancellor can be given like this: Powerful citizens and elite members of the society have easy access to loans for developing industries. Therefore, loans are not provided because a person is an entrepreneur or has business skills. Instead, the loans are given on the basis of how 'powerful' a person is or how many strong links the person has. In the same manner, land is not given because someone has knowledge of good farming. Instead, it is given to feudal lords who already have much land in their control (Vice-Chancellor, University

A; Lecturer, University A; Focus group discussion, University A). It is generally believed in the University that land, industry and power reside with certain families in Pakistan for whom power is more important than having knowledge. Rather, this upper class deliberately keeps others ignorant so that they can exercise their power with them easily. This is the reason for low development and low literacy rate in Pakistan. Therefore, academics woefully expressed that the 'culture of KBE in itself is missing' in Pakistan (faculty members, University A). This highlights the fact that 'knowledge economy is a culture' that operates under certain rules and regulations based on knowledge and skills.

Research publications from University A had been almost exclusively in local journals till the HEC came into being in 2002 and started pressurising universities to publish internationally. The criteria for appointments and promotions were also modified so that publications in internationally recognised and abstracted journals were considered. This requirement for publication in international journals with high impact factors or of international patents set by the HEC as a requirement for promotion in all universities were resisted by some faculty members who had been publishing their work in local journals and magazines. It is perceived by some as being an incorrect policy and the result of lack of understanding on the part of the HEC. It is also seen as blind adoption of Western criteria for research in Pakistan. However, the faculty members felt that working on local issues and published in local journals will help the universities to diagnose the ailments of their own society and economy and, once the problems are identified, these can be removed. What the faculty members did not seem to understand and accept was that publication in international journals was an important yardstick of quality and that the work could still be carried out on local issues but published internationally if it was of sufficiently high quality. One of the faculty members said:

> *'I appreciate their (HEC) concern, but I object that the criterion for promotion is based on Europeans criteria. We are lagging behind 100–150 years from developed countries. The research there is cutting-edge because they have excellent facilities and infrastructure—their issues are different from our issues and our research should focus on our problems.'* (Agro-Engineer, University A)

Neglect of local research and local journals is not appreciated, but it has two facets. On the one hand, if researchers do not publish in international papers then universities in Pakistan will not receive any prominence in international research. On the other hand, researchers are key problem-solving entities (focus group discussion, University A), so their skills should be targeted to solve local problems and building their own economy first and only then should the direction change towards international research. In order to develop local journals and improve their standards, HEC has been supporting them liberally with grants and encouraging them to acquire international recognition by having strong peer review processes and international advisory boards. Since a regulatory framework is missing, it is the responsibility of the HEC to assess the needs of higher education, understand the local issues and then create balance in focusing on local or international research. It is notable, however, that HEC has no say on which topics researchers work on – this is a decision that the researchers themselves make. HEC, however, requires that the research carried out should be publishable in international journals instead of low-quality local journals.

The above discussion illustrates that the universities have faced serious funding problems over the last several decades, though the situation had improved considerably in recent years after the establishment of the HEC. The strong feudal system that exists in the culture of the country has been a major hurdle in the development of a KBE in Pakistan as power was considered to be far more important than knowledge. Hence, feudal lords retained their power and authority over the people of the country by not allowing them to educate themselves.

4.2.2.4   Policy matters

There is currently no link between policies and practice in the field of agriculture, according to most of the research participants of this case account who tried to illuminate the current situation in Pakistan. The Ministry of Food and Agriculture in the country has not developed any policies to benefit the farmers and provide food security to consumers (focus group discussion, University A). The discussion also indicated that, officially, many plans are announced but in practice most are not carried out; they only appear in government files. The government aims to make policies that are profitable (in order to develop the economy) and sustainable (so that the benefits are continued), but the major crops (rice, cotton, sugar cane) have low production yields and are not properly stored. Most of the time, about 30% of crops such as wheat is wasted due to attack by fungi and pests.

Pakistan's storage capacity is only 25% of its needs, far too small for an agricultural economy that has the potential to double yields if modern farming methods are applied and if weather and economic conditions are favourable. In addition, many crops with a high impact on Pakistan's import bill are not grown. These include plants for of edible oil production, such as olive and palm trees, that could be grown in the country but are not cultivated. Similarly, the government has failed to introduce any effective policy pertaining to production and export of fisheries, livestock or poultry in the last five years. The experts in these fields at the University claim that the economy could flourish if policies for these items are properly designed and implemented (focus group discussion, University A).

The faculty members at the University A maintain that the policies are designed to meet the interests of a section of society that exerts control of the policy-making section of the country (focus group discussion, University A). It is claimed that the opinion of experts and specialists is not taken on board, and that influential people in local and Federal government determine policy. The Vice-Chancellor stated:

Vice-Chancellor: *'The policy-making body in Pakistan is the Pakistan Institute of Development Economics (PIDE). It has a purely, dedicated section for polices; PIDE the feeds its policies into the Planning Commission, and the Economic Affairs Division. These are the government systems of policy making (and implementation). Then there is a political process that starts all the way from the district and tehsil level, to provincial and national assembly. So I think, the policy formulation process requires expert opinion more than a popular sentiment'.*

Researcher: *What do you mean by popular sentiment?*

Vice-Chancellor: *Actually 'popular sentiment' is the main criteria for making policies in Pakistan; it means that the interests of provincial ministers or federal ministers matter a lot. In that case, how can you expect the economy to rise? However, if visionary policies are formulated, then you have to put these things on the back burner and get the think tanks to work for the country, and create some intellectual environment by developing visionary policies. This is happening to a certain degree but I suppose that it is still a very weak one. The policy is more of a popular nature, not of an intellectual nature in Pakistan, unfortunately.'* (Vice-Chancellor, University A)

The Vice-Chancellor's statement that policy in Pakistan lacks intellectual inputs and that it is based on 'popular nature' is alarming. Its consequences are seen in the economy. A feudal mind-set prevails that does not allow farmers to own the land that they farm. The middlemen between the farmers and consumers take control of the market and consumers have to face the negative consequence: inflation. The bureaucracy brings its influence to bear on policies to be implemented, that are in vested interests, and policy makers do not invite eminent researchers to formulate policies for agriculture. The focus group discussion concluded on the same note:

> '*In Western society, the policies of all the sectors such as social sector, environment sector, economic sector, are backed by the researchers of universities but here, the bureaucrats think that we are competent, we have the knowledge, (and that) these professors, researchers, their findings are not valuable.*' (Focus group discussion, University A)

The faculty members protest that they hold foreign doctoral degrees and could present many practical solutions to existing problems to the government, but their opinion is not taken into account in the policy-making process. To summarise, the link between policy and practice in Pakistan is weak or missing. The research participants have indicated serious issues related to the 'policy formulation' process in Pakistan.

The faculty members perceive that their society follows 'the rule of the jungle', where powerful individuals exercise authority over the less powerful. This power issue can be explained with reference to stratification of society into a lower, middle and upper class. The upper feudal class has maintained strict control over the lower- and middle-class societies in Pakistan. The government is expected to be fair and governed by the people, but it is not the case in Pakistan. However corruption and nepotism allow incompetent persons to be appointed at key positions, thereby distorting the entire development processes. This lack of a merit-based approach goes all the way to the level of Federal Ministers appointed to the Cabinet. This was highlighted in the focus group discussion:

> '*Actually there is no right man at the right place in our country. Jahangir Badar is a lawyer (by qualification); but actually he is serving as the Minster of Petroleum, now--- what does he know about petroleum? So, there should be a chemical engineer but since he had good links so he is selected for that position.*' (Focus group discussion, University A)

The role of government is to govern the state and manage its affair in the best possible way. However, if corrupt leaders select incompetent politicians as Ministers, the concept of good governance cannot prevail.

The Dean of Agriculture perceives it to be the responsibility of the government to develop visionary policies and take the country forwards. His point of view is that Pakistan is a developing country and, unless a proper strategy for knowledge economy is designed and applied in both letter and spirit, universities alone cannot be made responsible for socio-economic development. The government needs to develop an appropriate credible environment in which businesses can flourish. However the private sector should also contribute in the development of the economy. The Dean said:

> *'Look, we are always in developing phase. As the development occurs at the national level and the needs arise, our universities come up to the expectations of the society and try to fulfil the requirements. There is no trend in Pakistan where the private sector comes to play its part in knowledge, education and research. It is starting... at a very slow pace. As the private sector comes forward, we would be happy to link with them for the sake of society. We have signed many MoUs with many organisations such as seed companies, etc. This linkage is not very significant but a trend is set. I think it is a good trend and we need government support to make the environment suitable for businesses.'* (Dean, Faculty of Agriculture, University A)

The faculty members at the University A are of the view that the government has a vital role to play in developing informed policies. This should be done in collaboration with researchers and after conducting surveys so that they have a complete, accurate and up to date picture of the issues confronting them. One of the interviewees said:

> *'The government and HEC are planning that every development aspect should be a knowledge-based development. I have already explained that it is a matter of 'mind-set', since we still do not believe that development is linked with knowledge. Without knowledge, development it is not possible. And we are moving towards this situation but it is not possible without government's will and policies.'* (Lecturer, University A)

Hence, the role of government is considered vital in transforming into a KBE. In the country, agricultural policies are formulated without consultation with the eminent researchers in their respective fields. The implementation process is often based on the vested interests of powerful feudal landlords that exercise influence on government functionaries in order to have access to resources (agricultural loans, road construction, access to waterways, fertilizers etc.). In this situation, the regulatory body for the education sector, the HEC needs to work with the Federal and Provincial Ministries of Agriculture in order to formulate policies that will help in establishing strong linkages between universities and the farming community/industry. These agricultural policies should be a part of an overall national strategy and action plan for Pakistan to transition to a knowledge economy. Without an all pervasive merit based process that ensures that the best qualified persons are appointed at various positions the KBE cannot be achieved. The faculty members maintain that there is an urgent need to implement strong feedback mechanisms on policy implementation with a built-in reward and punishment system to ensure effective timely implementation of policies. In short, both the government and the HEC are expected to deliver some workable policies so that the working environment can be changed, a new national mind-set towards work is developed and culture of collaborations is fostered. It is only then that the country can move towards knowledge-based development.

4.2.2.5   Recommendations presented by faculty

The Vice-Chancellor has encouraged his faculty to collaborate with local and international universities to work on meaningful projects and to generate funding to combat the issue of lack of finance.

> *'We are responding to those challenges. First of all the faculty is encouraged to enter into collaboration… global collaboration.'* (Vice-Chancellor, University A)

The Vice-Chancellor explained that his University has active collaborative links with more than 67 countries and 132 research projects are in the pipeline, while 450 have been completed by 1999–2010 (Annual Report 2009-2010, University A). The source of funding for these projects is varied, from the Pakistan Science Foundation, USAID, HEC, and Endowment Fund Secretariat (EFS) at University A, International Foundation of Science (Sweden), the Punjab Agriculture Research Board, the South Asian Network for Development and Environmental Economics (SANDEE), Nepal, and other international donors. He further added that faculty with networking skills and research capabilities can be transferred to the new tenure track system introduced by HEC that offers excellent salary structures, but requires regular international evaluation of the research productivity prior to grant of tenure. He said:

'Tenure track system (TTS) is an accepted way of challenging faculty and creating incentives for good work that has been adopted. The tenure track faculty here starts with PKR 80,000 salary (ordinary faculty starts with PKR.18, 000) and the salary of the newer track faculty can go up to PKR.300, 000 whereas the salary of ordinary faculty goes only up to a maximum of Rs. 75,000/- So the incentive is there for good work. In addition to that, we also create the opportunity for fast track promotions. We are very liberal in terms of allowing the faculty to go abroad for further studies or under research mobility programmes, because it can go a long way in terms of promoting the international exposure and links with international collaborators.' (Vice-Chancellor, University A)

The Vice-Chancellor believes that it is important to take up issues such as lack of faculty, lack of researchers, low quality of education as challenges. Increasing the quality of human resources by providing greater access to higher education can overcome these challenges (Vice-Chancellor, University A). However, the problems are usually not considered as 'challenges' but passively accept as a sad reality. No one fights to solve such problems or demands their right to quality higher education. As a result a hierarchical system has developed in Pakistan, where the poor co-exist in the same environment as the rich in a state of denial of their basic rights – they have simply resigned themselves their fate.

Regarding the issue of lack of mind-set in universities (to focus on research among faculty members and to develop problem-solving attitudes among students), or the issue of how to change the attitude of people or society in general towards work, a research participant stated:

'In order to change the mindset, of course, there is a need to change the conditions of the people. Two factors are important and interlinked: the social factors and the economic factors. If a person has a high level of illiteracy, it will

not change the mindset — and the illiteracy rate is high in Pakistan. With an orthodox traditional attitude we cannot prosper. On the other hand, if the level of education of a person is high and (he/she) has better economic conditions, it will change his worldview and he will adopt an open mindset. That means that without changing the socioeconomic conditions, the mind-set cannot be changed. ---- We still believe in traditional methods and we do not believe in knowledge – that development is linked to knowledge' (Assistant Professor, University A)

This argument is valid because education spreads awareness and is also a means of improvement of economic conditions of persons and economy; therefore, education should be promoted in the country. However, people do not give due importance of knowledge. Instead, their way of thinking is orthodox and traditional, which cannot lead towards any kind of development. This can be changed with increased access to free, quality education at all levels (primary, secondary and tertiary).

In the findings, the issue of preference for secondary education versus higher education was also raised. The Vice-Chancellor of University A maintained that it is the mismanagement of the resources in primary and secondary education sector that is the main underlying problem, since they have received their due share of finance for operational expenses and development. He said:

> *'I do not agree that in Pakistan (a greater) emphasis is laid on higher education whereas the primary education and secondary education are neglected. To me that is a management crisis. It is not resource crisis. If you look at the relative allocation of resources, the resources have been going into that (primary and secondary) sector but they have never been properly managed. The relative allocation of resources for higher education has been in decline as compared with the allocation to the other two sectors.'* (Vice-Chancellor, University A)

This concurs with the fact that the issue of resource allocation to primary and secondary education or higher education is linked to the management of resources and leadership of the sector. The dilemma of primary or secondary education in Pakistan is that it is governed by incompetent leaders who are selected by political influence or on the basis of personal links and references. As a result, primary and secondary education has not developed for many years. Funds were allocated in every fiscal budget to primary and secondary education. However, often these funds are embezzled and the official facts and figures on expenditure are a far cry from reality.

The case account advocates that unless appointments at all levels occur strictly on merit, KBE cannot be achieved. It has emerged as the biggest hurdle in the data that the feudal lords have a strangle-hold on the governance of the country. The faculty members envisage that if the government can focus on the higher education sector to link it with the socio-economic development, the government is capable of achieving success in improving the primary and secondary levels of education as creativity and talent exists in abundance but the willingness to implement such policies is lacking in the government. The government needs to understand that both a system of universal primary and secondary education; and high access to quality higher education are vital for the development of a KBE. This can however happen only if there is a visionary, honest and competent leadership. For transformation into a KBE, the academia recommends that agriculture can provide a launching pad. Once the agriculture sector is improved, as it is the most important economic sector of Pakistan, the at later stage high tech industry and service sector can also be established in the country. For now, it will be pragmatic if the country can enhance yields and develop value-added products, it can lay the foundations of a strong KBE in the future.

4.3 Case Account B

4.3.1 Background

University B established in 1993 by upgrading old colleagues set up when Pakistan came into being in 1947. These were previously used to train armed forces and, after the University was formed, all the colleges, schools and departments were opened up to civilians. Now the University aspires to nurture scientists with a profound theoretical knowledge of their respective disciplines. The leaders of the university aim to suitably equip the university with practical knowledge in order to serve industry. As a result of the efforts of its leaders, the university is developing as a top class science and engineering university with excellent research and teaching facilities. The new campus of this university is located on the outskirts of the city of Islamabad. The University has continuously updated its roles and functions with the passage of time. The Pro-Rector of University B explained to me that his University facilitates students and faculty in every possible way. The students receive scholarships while the faculty are provided with a highly incentivised environment to work in. However, these facilities are available to faculty who are competent and have participated in raising the research profile of the University. The Pro-Rector said:

> *'For the faculty, I very strongly believe that you can hire, them at a very high salary, but you do not necessarily retain them, on the basis of salary alone. So for that, you have to have some kind of scheme, some kind of environment, some kind of incentives, whereby they keep working for you, so we have schemes for their professional development. For example, we will be sending them for Post-Doc, similarly, whoever, gets his or her paper presented in an internationally reputed … Then we have our research policy, our consultancy policy, we encourage our faculty to go into sponsored research, to go into consultancy work, and then they can share whatever they earn out of such schemes. So, in a way instead of becoming a tuition centre, just pure teaching and making money, in my opinion they have opportunity to strike oil wells, they can convert their ideas, into products, into technologies, in the processes, and in that context we are the first university, I must say, which has established a technology incubation centre. So what this centre will do, it will help our students as it will our faculty.'* (Pro-Rector, University B)

A combination of different schools of thoughts and approaches among the leadership (although all leaders have concerted their efforts towards the development of the university) has attracted many industries and multinational companies to invest in this university. Some have sponsored research laboratories at University B, and details of selected research laboratories are as follows:

a. IBM established an Open Source Resource Centre at University B which is worth US$1 million.
b. CISCO opened a TAC center by investing US$2. 4 million.
c. INTEL has helped University B establish a state-of-the-art computer lab and install the fastest computer in the country. It's worth is not known but it is estimated to be around US$10 million.
d. HUAWEI formulated a CDMA laboratory worth US$4. 2 million at University B main campus.

In spirit and essence to provide a technologically smart campus and apply all kinds of employee retention methods, the university claims to be *entrepreneurial* in nature and a model university for other universities in the country.

4.3.1.1 Physical infrastructure

University B established in 1991 by the Ministry of Science and Technology, Pakistan, on the format of the Korea Advanced Institute of Science and Technology (KAIST) that provides scientific knowledge to pupils, especially in the fields of engineering and technology. The University has 22 schools and colleges, which is why it is called a multi-school university. The headquarters is located in a newly constructed campus in H-12 Islamabad, but other campuses are spread all over the country in the main metropolitan cities such as such as Karachi, Rawalpindi and Risalpur.

The Islamabad campus comprises:
Business School; School of Art, Design and Architecture; School of Chemical and Materials Engineering; School of Civil and Environmental Engineering; National Institute of Transportation; Institute of Environmental Science and Engineering; Institute of Geographical Information Systems; Institute of Civil Engineering; School of Electrical Engineering and Computer Science; Research Institute of Microwave and Millimeter Wave Studies; School of Mechanical and Manufacturing Engineering and the Atta-ur-Rahman School of Applied Biosciences.
The Rawalpindi campus has the following buildings and schools:

Army Medical College; College of Electrical and Mechanical Engineering; Military College of Signals; Atta-ur-Rahman School of Applied Biosciences; Institute of Peace and Conflict Studies; and Research Center for Modelling and Simulation.

In Risalpur, two colleges are part of University B, that is, the College of Aeronautical Engineering; the Military College of Engineering while the Pakistan Naval Engineering College in Karachi is also part of the multi-campus University B physical infrastructure.

University B has the latest facilities on its campuses such as hostels for both men and women who attend this university. It has mosques, gymnasium, swimming pools, squash courts and various auditoriums.

4.3.1.2   Knowledge infrastructure

In terms of knowledge infrastructure, University B has the fastest supercomputer in the country that can be used for intensive research projects in Biosciences, as well as to manage huge data processing applications in social sciences. It is in a fully functional condition in the Research Centre for Modelling and Simulation (RCMS) and can be used for forecasting weather and earthquakes, exploration of minerals and gas, the design of energy efficient buildings and for developing transportation system at national level (Official website, University B). Since it is the fastest graphical processing unit installed in the university and no other institution in Pakistan offers this capacity, the university has invited all other universities to share it for purposes of research and teaching. Other facilities include libraries at various campuses to fulfil the needs of undergraduate, graduate and postgraduate students and faculty members.

University B is a public sector university. Each year about 9000 students graduate and most find jobs in multinational companies and government and non-government departments because of the good reputation that the university enjoys. University B has 817 faculty members, most of whom hold a doctorate degree to their credit. Their research interests lie in diverse fields of engineering sciences such as aerospace, avionics, civil, computer software, mechanical, solar energy, Geotechnical, structural, marine, telecommunication and environmental engineering. The Director of Research and Development at University B expressed his view that University B is a multi-campus and multi-disciplinary university and has an international reputation for its excellent standards in the various fields of studies that it offers to students.

> 'We claim to be a multi-disciplinary university. We have IT, management sciences, we have almost all fields of engineering sciences, and we also have medical sciences' (Director of Research and Development, University B).

The University has a Centre for Innovation and Entrepreneurship with four research centres to meet the requirements of applied research and innovation of the country. The centres are listed as follows: The IPO; the Technology Transfer Office (TTO); the Industry Liaison Office (ILO) and the Marketing & Communications Office (MCO). There is a Directorate of Research; Technology Incubation Centre (TIC); Science and Technology Ventures Ltd (STV); Professional Development Centre (PDC); and Career Development Centre (CDC). The aim for establishing these centres is to promote a research culture and create a dynamic environment that fosters critical thinking and creativity among faculty and students. Since all schools, centres, offices and hostels are located in the same campus, it allows better linkages among different departments and schools, claimed the Director of Research and Development (Director of Research and Development, University B.

In its short period of existence, it has emerged as the leading entrepreneurial university of Pakistan that can be a model for other universities in respect of steps that they need to take to contribute to KBE. With one exception that, since this university is strongly linked to the national defence agencies. Its Rectors have always been army Generals, and it has defence personnel occupying key administrative positions, which may not be the case for other universities, so other universities need to have a strong and visionary leaders.

4.3.2   Readiness for KBE

The readiness of University B for transformation into a KBE is presented below by highlighting the conditions of the universities and perceptions of faculty members.

4.3.2.1   Mission and functions of University B

My first question to the research participants was: 'How would you introduce your University and what is the aim and specialisation of your university?' I will quote an excerpt from the interview session with the Director General of the School of Electrical Engineering and Computer Science to illustrate the mission of the University B. It is a long response from him, but explains well how the University faculty perceive their role and mission. He said:

'SEECS stand for school of Electrical Engineering and Computer Science. This is one of the schools of University B. Our major focus is on research. We believe that the knowledge in books is there to build up the fundamental concepts, but as part of the studies, the students have to understand the application of knowledge rather than just teaching from the books...Universities should create two facets of knowledge: one is to strengthen the fabric of the society which is environment, tradition, culture, national character and this happens through sociology, anthropology, philosophy, human psychology, logic, critical thinking, music, sports; all of these are extremely important. The other aspect of a university is to (acquire the) use of scientific knowledge to help industry, in order to improve productivity, products and services, through research, entrepreneurship and innovation. Once this happens, it will create financial resources to enhance the standard of living. So this is the model, which we are trying to pursue with our faculty members.' (Director General, School of Electrical Engineering and Computer Science, University B)

University B has adopted an entrepreneurial model, with different level of courses in diverse fields, since in current circumstances when the focus is on entrepreneurship and creation of employment, a University should focus on these areas. The Director General laments that most universities in Pakistan follow typical model of universities in which they are no more than degree issuing machines, contributing little to the betterment of the society, and that there is huge gap between knowledge and its application. Similarly, the Deputy Commandant of graduate courses at University B said:

'We are offering a large number of disciplines at the College of Electrical and Mechanical Engineering, being one of the constituent colleges of University B. Others include a medical college, school of electronics etc., which you can see on our website. We are offering four undergraduate disciplines, which are electrical, mechanical, computer and electronic engineering. Six postgraduate disciplines including electrical, mechanical, electronics, computer engineering, computer software engineering and engineering management are also offered. These (represent) the major drive behind the economy. All the major initiatives start from universities. Universities play a major role in first conducting research, which is ultimately utilised for the development of technologies. Moreover no nation can survive without education and good universities produce good education and inputs to society. The society makes a major contribution to the economy and we are (therefore) targeting the whole society through these various courses which are offered at our campuses.' (Deputy Commandant, University B)

The aim and mission of the University B is to drive the economy by focusing on R&D of new technologies. The Deputy Commandant replied:

'In the UK where you live, you must have heard the term KBE... Korea, Japan, European countries is part of a global knowledge economy--- here at University B, we are playing our role and trying to improve general knowledge and making everybody educated in diversified areas so that we can upgrade the economy from an agriculture-based and from low value-added products based (with no service industry to change it) into a KBE. Our efforts started from very basic education in different fields. We had started from basic sciences, economics, physics, mathematics, some arts related subjects & then went on into engineering and medical fields as well as management. So by actually introducing all these subjects, University B is trying to contribute towards KBE and I hope that with more universities joining us in this forum, we will have long-lasting effects.' (Deputy Commandant, University B)

University faculty members hold different opinions on collaboration with the community. For example, in the case of University B, the academics think that the industry cannot absorb the products that they develop. This is partly due to the fact that the stakeholders in the industry do not know that the academics can present solutions to their problems. Also there may be pressure groups, which do not allow the products to be marketed.

'I think, the industry is slower than what we can actually offer to them. Look, when we raise IP, there are many pressure groups in the industry that will not let this product to be absorbed in the industry. If a product is developed, there are six stakeholders for it and those stakeholders can be beneficiaries of this product, but due to this pressure group that product does not travel to those stakeholders.' (Chemical Engineer, University B)

Are there any real pressure groups or is this a self-concocted theory to defend the failures of the academic community? Further discussion on this issue is held in Section 5.2.1. Moreover, some other issues involved in keeping the barriers up are corruption and lack of seed money for faculty members. All these barriers prevent the commercialisation of research becoming established.

'Everybody wants a bite of the cake. Similarly, we need more interfacing between our own outfits at University B. (There was a need for a) constituent organisation that can create knowledge capital and act as an interface. The Rector of our university therefore made a company called S.T. Venture that needs to be more proactive. There has been progress made in some projects. The commercialisation of products is however very slow. We do not have seed money to demonstrate (the feasibility at) the pilot project (level) to stakeholders.' (Chemical Engineer, University B)

Multinational companies in Pakistan have appreciated the value of local researchers and the strengths of some of the schools at University B, whose performance can be compared with best international universities. The Head of Centre of Industrial Linkages claims:

'We have the best researchers in the country working with us at University B. They have secured millions of dollars from abroad, in international and local projects, so that every school has its own unique capabilities. But, you see, there are different mind-set, there are different schools of thought. One school of thought is that the institute should be a research-based institute since the role of a university is to create knowledge. But there is another school of thought which says that if you don't do consultancies, how will you teach your students about what is happening in the corporate sector.' (Head Centre of Industrial Linkages, University B)

The focus of the University is on serving the business and industrial communities of the country by adopting a proactive approach. One of the assistant professors

explained that the mission is to promote the spirit of entrepreneurship among students. He said:

> '*We just need to be enterprising. We need to inculcate the spirit of entrepreneurship in your students by sending them on an outreach program where they work with industry. In classes, practical tutorials should be delivered to them (since) we have got the most expensive state-of-the-art equipment with us in the university labs.*' (Head of Chemical and Material Engineering, University B)

This spirit will be inculcated only if the students work with industry, where they will get to know their skills and competencies. Being young and enthusiastic, they have bright ideas that they can materialise later on, after completing their degrees. In short, it needs equipment in laboratories, knowledge and soft infrastructure and also a 'learning by doing approach' while teaching courses to students to develop these entrepreneurial skills.

University B has strong two-way links with industry. It has a huge campus and provides space for training and exhibitions, whilst companies invest in the students by awarding scholarships and sending faculty abroad for skill acquisition and training. Coca Cola and Shell are among the companies that have funded the University on various projects of skill development. The faculty members appear keen to prepare the students for the challenges that they will face after the completion of their studies. This preparation has to be planned and implemented from the start of their degree course. This applies especially to the students of telecommunications studies and business administration. A faculty member said:

> '*We are working in the industry. Our product (students) is going into the telecom industry, into the software industry and into computer science. Our business graduates with MBAs and BBAs are going into business. I think that they (industries) should tell us in open houses and seminars regarding how many people they need, so that we can try and meet their demands---and also what kind of training should we give them*'. (Head CIL, University B)

Faculty members expect that industry will move closer by participating in seminars and exhibitions and will express their requirements, so faculty can prepare students accordingly. The University wishes to update its curriculum according to the needs of industry and in fact some of the courses have been modified, but this is still a new and slow process.

It is very interesting to see that all faculty members at University B were young and their approach towards work was current. They do not use obsolete methods of teaching, that is, rote learning, and encourage their students to know the concepts being taught in the courses by doing it practically in the laboratory. This new approach demands that faculty members develop the curriculum according to the needs of both courses and the needs of industry/society. The Director General SEECS expressed the current scenario very clearly, saying that in the universities of Pakistan emphasis has always been laid on the welfare of the community. He said:

> *'The government, as in any other states of the world, deals with education, housing, health and other issues. I dispute this, since health, housing conditions and education have not been up to standard. The government keeps talking about these issues; it has done little to solve the problems. What is missing in national policy is a regulatory framework for business, industry and service sector. Universities have come forward to help the government bridge the gap between industry and economy.'(Director General, University B)*

In other words, the Director General has pointed out that the key issue is that of linking the academic community circle with the financial circle, which can be done only if faculty members are ready to deliver up to date courses and design curriculum according to the current requirements of their stakeholders. He said:

'*We can draw two circles. In one circle we have community welfare, which includes education, housing, health and things of this nature. The second circle is a financial circle, which includes business, industry, products, services, and consultancy. We have a lot of community welfare: we have a lot of public and private schools and universities, but linking that community welfare with the financial circle is really difficult job. Unfortunately, we have not developed our curriculum, which will benefit the industry, because we never developed our curriculum in consultation with different trades and industry. We don't know their requirements; we are simply teaching their standard teaching material as it is taught in different universities in Pakistan. But in the process we never consulted the industry, that what type of student teaching will be essential for those people'* (Director General SEECS, University B).

The whole idea is based on the practical use of knowledge and the skills of graduates. In the telecommunications industry of Pakistan, faculty members appreciated the efforts of the former Minister for Science and Technology, Dr. Atta-ur-Rahman. He revolutionised the information technology sector; as a result, many telecom companies now operate in the country. The major 'leapfrog' in this regard is the use of ICT in the higher education sector. The faculty member said:

'I think the IT and telecom revolution has also helped the universities in Pakistan, and again this is the contribution of Dr. Atta-ur-Rahman. We must acknowledge that he not only developed higher education but at the same time (he developed) information technology. Pakistan has seen a revolution in communication technology and universities in Pakistan is certainly benefiting from it. These universities had never thought that at one point in time they will have a conference called video-conference system, now we have it.' (Lecturer, University B)

In this way the collaboration between industry and academia helps to fill the gap between industry and economy, and also links universities with the process of socio-economic development. The use of information technology in education itself has helped considerably; now faculty members do not have to travel to different places for seminars. University B has facilitated this knowledge sharing process and the Chemical Engineer said that scholars from foreign countries are invited for video conferences and many schools see the benefit:

'We have mechanisms by which we invite some top scholars from many parts of the world to give lectures. We can relay these lectures to our different constituent schools, at one time, so the audience will not only look at it in the University B auditorium, but it will be seen and heard in many parts of the country. Again these are the developments that took place in the IT and telecom sector and universities, here, are benefiting from that. We never had a culture of teaching through power point presentations, now this is a common thing.' (Chemical Engineer, University B)

Because of the new developments, a research culture has started to emerge where ICT is used for education purposes and the University provides the breeding ground for innovation and development in various sectors of the country. However, there are a few impediments that need to be removed for transformation into KBE. For instance, there is a need to understand clearly the difference between futuristic intelligent products that might need incubation, and products that are available off the shelf. In other words, technology should be assessed for the current stage of a product and its state of development. This is not possible, however, without comprehensive discussion, assessment and reflection by academics and businessmen.

'In certain cases such products can be made which are straight away applicable. They are off-the-shelf products and can be (immediately) used by people. Therefore, the need of the hour is to identify and define such intelligent products but this is possible (only) when academia and industry sit together and contemplate on it. There should be research assessment and technology assessment country wise. It is my experience that in our universities characterisation is very good but the fabrication is nil.' (Head of Chemical and Material Engineering, University B)

It was while applying the knowledge of students in practice in the laboratory that the Professor of Chemical Engineering discovered that students are good at characterisation and lack the skills for fabrication. The students have hands-on experience of determining the quality and nature of things, but they cannot develop products from them. The Professor diagnosed this problem and established how to train students in this area. If students were left to face this after completing their degrees, it would have been too late and professors might not be able to help. Therefore, this approach of learning by doing is very effective, and all universities in Pakistan should adopt it.

The Head of Chemical and Material Engineering advised that life is a process of learning and the life of a nation pass through various stages. With it, survival is linked to problems but the nation has to break this vicious circle by developing a problem-solving approach, as they never come to an end.

> *'Survival is connected with problem solving; you are just running in a vicious circle of problems and you never get out of them. This is the problem of our nation. If everyone is so busy with solving his or her own petty problems then how can a higher idea appear to us? Problems will come but you should not become 'problem-minded' (develop a negative approach, focused on the problems that you constantly run into) rather you become opportunity minded. It is a mind-set, it has nothing to do with financial capital or resources you have....'*
> (Chemical Engineer, University B)

In this way, a brighter aspect of discussion on national issues is raised; instead of becoming pessimistic, the nation should develop a positive attitude and mind-set towards issues and problems. This means Pakistan should stop lamenting its lack of resources and financial capital and use minds to generate positive ideas for improvisation. If a supporting environment for knowledge development is not available, then how can people develop it? For developing a logical approach and a scientific mind-set, the professor suggested that citizens should break the vicious cycle of survival and stop looking at the negative side of the picture. Instead, they should use their energy and capabilities for innovation and creativity, which comes from actually doing the work.

> *'For research you have to have a vision, which should be a contributing vision. Then you can connect this 'significance' with creativity. Creativity resides at the top where 'significance' resides. Survival resides at the bottom, where problem solving resides. In our country, everybody wants to be an executive so we encourage the students to work in the lab with their hands.'* (Chemical Engineer, University B)

'To be an executive' means one do not have to work much. One has to be more commanding, so that others follow commands. It indicates a bossy attitude and also shows that most people are not willing workers. This attitude needs to be changed. An interesting finding in University B was the desire of the members of staff to encourage companies to practice corporate social responsibility. The Head of TIC said:

'If you visit UK and especially in US, you will find such benches and corridors and classrooms, which are dedicated or commercialised. Dedicated to my father, dedicated to my uncle... or to their loved ones, whatever. So a company would get an opportunity to invest in a place, which they can claim as corporate social responsibility, because they are helping the society by providing benches, they are providing infrastructure. Similarly, here they can help us to develop our infrastructure. Every good company is looking for a good human resource, which we are providing. Companies in Pakistan have to invest in money in real terms. For example, if we ask them... currently, we have such a huge campus... which you have seen, but there are no benches at the moment and of course, we are, a semi-government institute so we are looking forward to corporate sector to assist us in developing our infrastructure. This is one way of looking at it. It is not mandatory for them buy they can always adopt good business practices to improve their profitability and help the society. It is always job of business to supports and uplifts a society from poverty and take it towards development'
(Head, TIC, University B)

This is an important reference. It implies that, in the absence of support from government, universities and companies collaborate with one another to build society. The universities build it through developing social capital, while companies can provide infrastructure. However, these concepts are new and it will take time to institutionalise such philanthropic processes.

In terms of links with business community, then, what do business gets out of this process? The Head of S. T. Venture said:

'All the MNCs conduct MTO programmes, that is, Managing Training Officers programme. What do we do? Our role is to provide entire infrastructure of a university, invite them to conduct trainings and seminars. So this is something, which is very effective from a corporate sector point of view and it has worked for us. Again, there are some companies that have given scholarships to our students and faculty. For example, Mobilink has provided scholarships to our students. And Mezan Bank will give scholarships to ten students but they should have a good representation in GPA.' (Head, Science and Technology Venture, University B)

It has been established that the University B has adopted an entrepreneurial model of development, with courses offered being carefully chosen in view of the needs of the industry. This is an important step towards the establishment of a KBE. A number of multi-national companies have become involved in the research and development activities of the university. These include IBM, CISCO, INTEL and HUAWEI (China) with investments of several million US dollars. These international linkages and investments lend credibility to the claims of the university regarding its high standards of research. Furthermore, in order to meet the requirements of applied research and innovation, the university has established the Intellectual Property Office, the Technology Transfer Office (TTO), the Industry Liaison Office (ILO) and the Marketing & Communications Office (MCO). It has also set up the Directorate of Research, a Technology Incubation Centre (TIC) and established a company "Science and Technology Ventures Ltd (STV)". These are all important steps to further promote a culture of innovation and entrepreneurship. In this respect University B is leading the way in Pakistan, demonstrating how a university can combine world class research with innovation and thereby contribute in a significant manner to KBE.

4.3.2.2   Perceived understanding of KBE

University B is unique by virtue of its international ranking. It has managed to be awarded a position in the top hundred universities of Asia in the fields of a) IT and Engineering and, b) Natural Sciences (Official website, University B). In IT and Engineering it was ranked 58 in 2011 while in Natural Sciences it was ranked 73 in the same year. This shows that the University has been moving in the right direction to achieve its mission of creating an innovative environment in Pakistan.

The Head of the Centre for Industrial Linkages expressed his view that KBE is a reality that cannot be denied; knowledge is power in this age of knowledge economy:

> *'When we say KBE, I believe, ten years, down the road there would be KBE everywhere. If you look at history, the most powerful person used to be (the one) with strong muscles, but things have changed. Today, a powerful man might be very skinny but he has the brains, so perceptions have changed. The same is true for the economies. In the past, those who had advanced weapons were (considered) strong, but now, it is economic power and a few years down the road, it would be knowledge economy where the power would be considered to be knowledge.'* (Head of Centre of Industrial Linkages, University B)

These views illustrate that nuclear weapons or physical power of persons and nation state is being replaced by the intellectual capabilities, knowledge and skills in a KBE. It is a huge change; the traditional approach is being replaced by a new approach. Physical strength is no longer a criteria for someone's success; rather knowledge, entrepreneurial capabilities and having good interpersonal skills can help people to succeed in the new mode of economy.

What does KBE mean for the academic staff at University B? An excellent and vivid explanation is provided by the Head of Chemical Engineering:

> *'In a knowledge economy there are many factors that contribute towards creation of wealth. The major driver of wealth creation is intellectual property in modern knowledge economy. According to an assessment of the World Economic Forum, countries with a strong IP regime are developed economies while in countries which are not very developed, their IP regime is also low. How to raise IP then? Modern economies rely on technological development and R&D for development. To drive technology or support technology there are many mechanisms. One of the major mechanisms involves Patents and IPO. If a researcher invents something, the government helps him to secure the rights of that thing through patents or utility model. This means that if a small invention is protected, then it facilitates in commercialising that invention. These days governments are introducing such organisations that can help in commercialisation of these inventions of the researchers. Technology incubation centres is one such example, others are IP Help Line, IP auctions, technology licensing offices in universities, etc. So in this way university industry linkages are also established and the economy moves towards KBE. Here at University B, we are following this pattern of developing intellectual property, patenting and (establishing) linkages with industry to foster innovation.'* (Head of Chemical Engineering, University B)

This University has the necessary physical, knowledge and soft infrastructure to carry out these activities. Unique in this respect it has most of the facilities available on campus. Commenting on the general understanding or perception of the term KBE in academia in Pakistan, the Dean of the Business School comments that not all universities fully understand the concept yet. He explained:

'University B is a different platform, so I will not generalise the situation, because that will not give you a proper picture of universities of Pakistan. The only way to succeed is by remaining competitive in the global community. Without transformation into KBE we cannot compete with the rest of the world. If, however, we can't compete, we will never be able to survive. The world is moving in that direction (towards knowledge economy) and Pakistan, I think, is lagging behind. My university is lucky in that sense. The government, the Ministry of Finance, Planning Commission, Economic Affairs Division, all of them have been extraordinarily supportive to my university. So this is I think where the secret of success of University B lies. If you want to get support, from the government, you have to show something. Therefore, I have no hesitation in saying that we have received tremendous support from the government, but again, our university is totally different from other universities in Pakistan. Others will have to do the same kind of work as we are doing. You have to show your performance and commitment to good quality teaching and research. I am sure, it will make a difference' (Dean, Business School, University B)

This evidence reflects that government support is essential for the progress and development of any university that aims to be a key player at regional level. However, such support from government can only be won if the university performs well. The faculty at University B understand the importance of knowledge economy and suggest that all universities should adopt a similar attitude towards work. They should aim for excellence at regional and global level and create a competitive environment in Pakistan if the country is to survive and progress in the global knowledge economy.

The evidence also suggests the university faculty members appeared to a have a good understanding of KBE and how University B could contribute towards it. While the university has developed an excellent infra-structure and taken up projects of commercial significance, it has yet to demonstrate its true potential through commercialisation activities. Details of how many products had been actually commercialised, what is the total amount of inflow of funds through commercialisation or international patents filed are provided in Appendix I (documentary evidence 1-12).

4.3.2.3 Challenges faced by academia in Pakistan

By providing examples from other developing countries, academic staff laments the dearth of teaching staff at schools, colleges and universities in Pakistan.

When asked about the challenges facing academia and how they cope with them, almost all faculty members start by pointing out the lack of human resource, especially qualified faculty and teachers. For instance, in the following quotation it is emphasised that if highest qualification of a schoolteacher is merely a higher secondary degree then quality education cannot be expected from the educational system. In addition, the faculty member indicated that if more people graduates, it is likely that some of them might start teaching at primary and secondary level schools as well as colleges.

> *'I was reading about Malaysia and Korea, they say for teaching at a primary school, they should have a minimum of master's degrees. So, this is what they will produce at university and they will go back to the primary or higher secondary and will give you an overall balanced kind of educational system.'*
> (Director of Research and Planning, University B)

How do problems with schoolteachers relate to the challenges of academia in universities? It is because a school is a basic training institution; if students do not receive quality education at schools and colleges, their basic concepts will be weak. When such students enter colleges and universities they will not be creative and productive. This issue is related to having a good student intake to universities. Also, the faculty thinks that universities are not there to provide basic training; rather they prepare the workforce for specific fields of practical life or professions and it is not part of their job to teach basic skills, ethics and values to graduates. At the University, staff explain, 'we produce the best graduates', but if their values and ideology are not strong enough, corruption and other ailments cannot be rooted out.

A research participant elaborated the situation in the universities of Pakistan. He stated that in Pakistan there were only a few research centres working to international standards. The same pattern as adopted by University B needs to be adopted in them all, since research and education has not received due importance in the past. He said:

'There is no culture of research in the universities of Pakistan. There are only a few centres of excellence in Pakistan. For example, if I take Karachi University, the Husein Ebrahim Jamal Research Institute for Chemistry, again headed by Atta Ur Rahman, is one of the Centres of Excellences. You can rate that institution with any institution in the world. Similarly, in the Quaid E Azam University, there is the Department of Physics... it is an outstanding department and you can compare it with any good centre at a university. These are centres of excellence but, in general, we have not promoted research in our universities for two reasons. First, we (the leadership) have not encouraged; second, the faculty and the teachers were also not motivated. (This was) because the promotion of a teacher was not on how much you produced or published, (but) it was based on the length of service. So, you were not pushed to (carry out research) and publish. That was, I would say, the hindrance to research activities in the universities. (Dean, Business School, University B)

The above statement suggests that, in the past, research was not a part of the culture of universities in Pakistan. This poses the biggest challenge to academia in taking the country towards a KBE. The evidence as stated above also shows that, without the support and will of government, the prominence that this university has attained cannot be matched. Also, the faculty in universities did not participate in research-related activities due to the lack of proper mechanisms before the HEC establishment into existence, in the absence of incentives. The faculty used to be promoted on the basis of years of service instead of independent assessment of creativity and productivity. Hence, proper laws and rules were simply not there to guide faculty members. There were however concerns that the universities alone could not carry out the task of building KBE, and that unless the political climate, law and order situation and industrial growth improved, the efforts of universities will not bear fruit.

4.3.2.4   Policy matters

Most faculty members agree that past policies have not delivered any fruitful results. A reason of policy failure is attributed to policy formulation and implementation process. Policy formulation is a political process in which the government makes policies according to individual interests, without any consultation with informed researchers at universities or experts in the field. This statement provides evidence for this fact:

> *'This is not the culture in the country because I have come from the government. And I was exceptional – the regime was also very exceptional, because this is not the standard practice that you bring professionals in the government and take their advice very seriously. I was trying to spend time in the Ministry of Finance for 11 years, in different capacities; I was in Pakistan Institute of Development Economics. I was involved in basic research, and I was asked for advice as Economic Adviser… then I became Special Secretary for the Ministry of Finance. I played a major role in shaping our economy over the last one decade, but this is not the conventional practice in Pakistan that we involve the faculty, the researchers, the industries and the think tanks in policy making. No! We don't have that culture.'* (Dean, Business School, University B)

Besides policy formulation, policy implementation is also a faulty process.

> *'Basically, we have made polices after much contemplation but the implementation is lacking. Sometimes it (the step undertaken) is reversed.'* (Head of Chemical Engineering, University B)

It is generally believed that either proper policy does not exist or that usually it is not fully implemented. There is also corruption and nepotism involved in the policy implementation process. Personal interests often dominate the process and policies are never properly implemented (Lecturer, University B).

There is one more problem raised by academics, particularly about higher education policy. Most academics believe that higher education has not received due recognition in Pakistan in the past. There are political forces against the policy of supporting higher education policies financially. The opponents either do not understand the importance of higher education or there are forces against the development of the country, so that they deliberately do not allow higher education to flourish. They misguide the policy makers and often change and twist the directions of the policies to suit vested interests.

144

'The previous government wanted to create a research dominant university culture, but this government seems to be focusing more on undergraduate education and primary education. I do not (completely) disagree with this idea, F.Sc. (high school level) is a basic launching pad and the primary education should be quality education. That defines your character for engineering etc. We agree to this but it should not be at the cost of higher education'(Faculty members, University B).

F.Sc is higher secondary school certificate education (HSSC), and after passing, students enter higher education (undergraduate level education). The current government is inclined towards HSSC and higher education is ignored once again. I think, there should be a balance between the two kinds of policies because capacity development is a major challenge to the government. The greater the number of students that enters higher education, the greater will be the number of qualified graduates and researchers that become available to contribute to the development of KBE. There are two strings attached to this idea. First, what kind of human resource is needed and what kind of policies should the government design? The answer to this question is found in one of the interviews. The Director General of the School of Electrical Engineering and Computer Science believes:

'I think this is a very big question. I think the first thing is to develop the right kind of human resource. Our policies should be based on merit and we pick up the right kind of people and then empower them with knowledge. That is the crux, otherwise, you keep making any kind of policies and it will not make any kind of difference.' (Director General, School of Electrical Engineering and Computer Science, University B)

Secondly, the process of reformation of the educational sector in order to produce the desired human resource needs careful planning at grassroots level, but it can be started with a top-down approach, beginning with improving the higher education sector, as high quality schoolteachers produced by the higher education sector can contribute greatly to the improvement of education standards in schools. The respondent said:

'First of all, primary education could not be improved if higher education is not good. In our under-developed areas, a boy with only eight years of education can teach at schools level and therefore the level of teachers teaching in schools is not even matric (O-Levels). If base of higher education is increased only then the base of primary education will also be increased and strengthened. In fact, you have come from the place (Wah Cantt) which has 99% literacy rate, and you would have seen that in just a four kilometre-long defence base you have more three universities, and hundreds of colleges and schools in which more than 50,000 students are studying. Also, the health facilities are excellent. That small town has 14 factories, so you see, that is the effect of higher education that it trickles down to other levels of education and other sectors are well. It is something in the air that even the uneducated workforce also appears to be civilised as compared to the uneducated workforce in other areas.' (Director, Research and Planning, University B)

Since the concept of university–industry linkages is very new in of Pakistan, the academics suggest that more seed money should be available to faculty members. These are the enablers or facilitators that should be planned by top management so that an environment is created where universities and industries can interact. The Head of Chemical Engineering said:

'These are the issues that need to be discussed at the top management level that ok, this is a stakeholder, take the investment, give him 20% rather than not taking anything in the hope that we will own the entire business and that project may never get materialised. So these are some issues, which I call business matters.' (Head of Chemical Engineering, University B)

The HEC has recommended that all universities should have a quality assurance cell as well as an Office of Technology Transfer for university–industry linkages, but very few have actually established these. University B is one that acted on the advice, and the Head of Chemical Engineering and Material Engineering added that technology incubation takes time; the foreign technology transfer process first needs trusts to be established. If technology transfer is to encourage technology incubation in Pakistan and capacity development, this objective must be kept in mind.

'I would call it a timely step in the right direction but it needs more proactive approach. It needs more passion to first incubate and then develop the technology. Their thrust is that they try to buy the existing companies, and then they try to sell their technologies. This is one model. It will work if we are fair in the game. I mean, if we bring the company in, then we steal their technology and try to sell it then this model will fail. The company coming in should have a very secure feeling that we have a secure sharing. We should not be selfish in this. We should promote incubatees. Because, our ultimate aim is not to earn the money, our mission is technology promotion and capacity building of public and the private sector.' (Head of Chemical and Material Engineering, University B)

To generate wealth, academia has another track to follow. It is through intellectual property. The Chemical Engineer said:

'If money has to come, it should come through IP. You get patents and then you have IPs in the package. My own view is that university is not there to establish plants and sell the products. Public or private sector has to do this. University's function is to raise IP and enhance their product. Universities get income form the royalty of the IPs. The property of university is knowledge... knowledge, which is saleable and should benefit the society as Qurran says: Ilum-Un-Nafay (profitable knowledge). We have a good working order here and a successful one. At least ten products have already been absorbed in industry.' (Chemical Engineer, University B)

The University expects the government to increase the budget of education for the primary, secondary and the higher education, write off loans to industry, make policies that facilitate businesses and increase intellectual capital. Most research participants said that the government should give priority to higher education because investment in higher education can go a long way in creating wealth for the nation. One of the faculty members said:

'I do not support the idea of one thing at the cost of other. For this we need to increase the budget, but increase in budget is possible when the government makes it its priority. In debt-burdened economies we are not choosers. Cushion is not available to increase the budget of education because it is an indebted economy. In an indebted economy you try your best to pay the instalments first. If this is your priority to save the state from becoming defaulter then how can you think of education and other things? I think we are in the situation since 1947. To combat it we need more spending more higher education, more innovation, more IP capital and more financial capital. There is no way out, unless you raise financial capital, to meet your debt services. No one will write off the debt, so in the current situation the only solution is to raise the intellectual capital and financial capital through creativity and through research. This will be a very strong arm actually, to meet this heavy burden.' (Head of Chemical Engineering, University B)

Some believe that HEC has already been working remarkably to uplift the quality of education and improve the state of higher education in Pakistan. If the same kind of work is continued, the educational system at least can be improved and the shortage of human resource be fulfilled. The Commission has been working honestly and on merit to empower youth. A faculty member praised the commission for their fair criteria of granting the research grants:

'In case of the HEC, you can write a good proposal and get the grant for a project. You never need to see an HEC person. There is no presentation carried out at HEC. They never see you, you never see them, and the project is approved.' (Faculty member, University B)

Some scholars believe there is a need for experts to advise the government on different opinions. Their aim should be to help the government to identify pressure groups and, with proper planning and strategy, discourage these elements that hamper the development of the country. There were some suggestions presented by faculty members, as presented below:

'I think, besides this, there should be a body comprising of professionals. There are pressure groups sitting in all the monitoring bodies, which will not let the country specific and national need based programmes prosper. Unless we get rid of these cartels, our progress will be hampered. I am convinced about it, but it is a harsh reality of Pakistan. People are assigned this role that university should never link with industry in Pakistan. All such efforts are defeated badly. They try not only to defeat that project but also the person taking this initiative is demoralised, so much so that the person starts letting go of the patriotic feelings for the country. He starts hating his country rather than loving his country.'
(Head of Chemical Engineering, University B)

In this way, this organisation will inform the government on current issues and provide expert opinion so that the government can analyse the prospects and consequences of their actions in the long run.

4.3.2.5   Recommendations presented by academics

Many academics emphasised that in order to develop the economy and adopt KBE, Pakistan must have an efficient and effective education system comprising of primary, secondary and tertiary level education. The Dean of the Business School (University B) said that KBE could be achieved if government gave priority to higher education and the leadership of universities was committed to meeting the challenges of the twenty-first century. He said:

> *'I think that the first thing should be the acknowledgement of the importance of higher education at the highest level in the country [at the Prime Minister and Presidential level]. Atta-Ur-Rahman succeeded because he had the full blessing of the Chief Executive of that regime. So for any success in terms of reforms, I think that the most important thing is the commitment of the Chief Executive, who is the President or the Prime Minister, that yes, higher education and the university education are the keys to success. If they are involved, through their acts, it will then trickle down (to lower functionaries) in the government. I strongly believe that if the leadership wants to promote university education, the rest will follow. So, the number one reform is that there should be stated commitment from the leadership.* (Dean, Business School, University B)

The research participant mentioned the name of an eminent scholar, and this leads to two considerations. First, although in his opinion education is a public good and its effects trickle down to all other aspects of life, he also thinks that people are more important than organisations in Pakistan. To explain this, higher education's effects will be seen on primary and secondary schools if more high quality Masters and Bachelors students opt to teach at school level, since it is the basic building block of the society. The foundations of society can be strengthened. Moreover, doctorate researchers can develop policies for schools and government to implement and diagnose the problems of the educational system. Secondly, when Prof. Dr. Atta-ur-Rahman was the Chairman of the HEC, the government diverted significant funds to the higher education sector; when the new government came with different priorities and the 'person' was forced to resign from that position, major cuts were imposed on the higher education sector of Pakistan. Therefore, at national level, the leadership of the country should aim to develop the education sector in a sustained manner so that socio-economic development can follow. It may be explained by this example: if the population is educated, people will contract fewer diseases because of their awareness of the requirements of hygiene for public health; society will be healthy and workers will earn their living in good mental and physical health.

I find it very interesting that almost all research participants have recommended that government must invest in science and technology if innovation and sustainability are to be achieved. Moreover, the Director for Research and Development said that if teachers have sound knowledge and are men and women of character and moral strength, it would make a good impression on the minds of the country's youth. He added that the strength of the country lies in 'faith'. Since he has a military background and a practical bent, one can understand his statement that knowledge without application is of no use. Faith, the main strength of the people of Pakistan, might help the nation to synergise the positive energy towards development. It can be done by putting a high level of trust in the Supreme Being and applying knowledge with good faith for the development of society. It is characteristic of Eastern cultures that knowledge is given importance and that teachers, being resource persons, are highly respected. Therefore, these characteristics should be translated into actions as well.

Those that benefit from higher education are another strength of the nation. If people can be educated, then they can significantly change the working environment and social conditions, and the economy will be developed.

> *'I will just give you the example of Korea. In 1960s they were behind us. Today they are 13th largest economy. How did it happen? It happened because they put all their eggs in one basket. They concentrated on education, science and technology. So, this is the route (that you have to take) if you have to achieve economic strength. Finland has less than 6 million people only. The total population of Finland is less than of Lahore. But I read somewhere that years ago, their sale of Nokia (cell phones) was 35 billion dollars.'* (Director, Research and Planning, University B)

For KBE both these assets can be used, but it cannot be done without investment in knowledge. He said:

> *'My perception of KBE is that you base your economy on... let's say... uhhh... knowledge. I was trying to find an appropriate word. For example, if we base our economy on buying and selling real estate, then it would not be called a knowledge-based economy. Therefore, we need investment in knowledge'*
> (Director, Research and Planning, University B)

He also clarified that he did not mean that we should pressurise all universities to focus on knowledge-related issues, as this change will come over time; it cannot be done overnight. Therefore, one must understand the difference between the functions of Western and Eastern universities or higher education systems in developed countries, and the needs of their own educational system. The Director said:

'Now what is the role of universities in socio-economic development in developing countries and in developed countries? I personally feel, their roles are slightly different. For example, at the University of Southampton, where you are studying, it is important that cutting-edge research should be done, so that they can eradicate swine flu, or they can develop some nuclear technology, or they can do something else. However, we would like our universities to (develop methods for producing) clean drinking water to our people. What I am trying to say is that our role is (that of) reinventing of the wheel. Or we would like our universities to provide already existing knowledge to our masses. But we would like to improve the living standard of our people by applying or adopting the current technologies for our people. For example, clean drinking water, waste management, or making electricity. So this is the role as far as our country is concerned'. (Director, Research and Planning, University B)

So, first of all living standards should be improved, and this will ultimately lead towards the creation of a KBE. There was consensus that education must be a priority if Pakistan was to emerge with a strong KBE, and that the policy of the new government to support lower level education but disregard higher education was destined to failure. A balanced approach to strengthen all levels of education needs to be adopted. The faculty members were concerned at the sustainability of government policies. Higher education was given a priority during 2002-2008 but this was only due to the strong support that its founding leader had received from the previous government. As the single most important factor at primary and secondary levels of education is the best quality teachers therefore, if the government continues its support to the higher education sector, then it will have a direct impact on the quality of teachers at basic and secondary level as well. Hence, the overall national education system will improve.

4.4 Case Account C

4.4.1   Background

The University was established in 1983 by one of Pakistan's leading industrialists. It received a Charter from the government in 1985 and since then has been imparting education through degree programmes at both undergraduate and doctorate level. It is a venture of the National Management Foundation (NMF) and leading private and some public corporations support it, therefore, is able to meet its requirements of physical, knowledge and soft infrastructure by raising funds without support of government. University C represents an excellent example of a high quality private sector university focusing on business management and related disciplines. It can boast of an outstanding faculty and it succeeds in attracting the best students of the country because of its excellent standards. Backed by some of the leading industrialists of Pakistan, it has already taken important steps to show how universities should perform in order to contribute to KBE

4.4.1.1   Physical infrastructure

To cater for the needs of students from diverse cultures and backgrounds, the University has excellent facilities. University C is an international mono-campus residential institution based in Lahore, equipped with state-of-the-art facilities and enjoying an international reputation (Times Higher Education Supplement, 2009). All staff exhibited active involvement in enhancing the image of their university.

> 'we started about 25 Years ago, we took our first student and we started as a businessman's business school...so that's how we started...now at this stage we will like to call ourselves as a research university.' (Dean, University C).

The statement shows the progress of this university is good in terms of research and development. University C comprises of academic blocks, residential buildings, state of the art laboratories, sports facilities, a university owned superstore, mosques, and banking facility for students and staff. The university is divided into three schools i.e

1) Suleman Dawood School of Business,
2) School of Humanities, social sciences and law
And
3) School of Science and Engineering.

When the researcher visited the university, its auditoriums and classes were equipped with the state of the art facilities. According to the annual report (2009-2010), alumni of this university contribute in development of infrastructure of this university. The faculty speaks of their graduates that they have high employment rate. Furthermore, in his opinion, this university is a role model for other universities and that the HEC should try to establish some benchmarks, as he says:

> 'I have been saying that the biggest contribution of University Cis not that it has produced 4000 good graduates, but the biggest contribution of University C is that we have set up a bench marks of others to follow'(Dean Business school)

The faculty members of the university expressed a desire that all universities should follow this pattern and an environment of competition needs to be created. One of the deans of university C suggested that in many universities of Pakistan, some research centres and departments are very good at their work, so these should be made centres of excellences:

> 'We need to create role model or centres of excellence that I talked about 5 cities over here which then becomes a breeding ground for others to emolliate'   (Dean University C)

4.4.1.2   Knowledge infrastructure

Knowledge infrastructure of this university consists of the following research centres which are increasing the research profile of the university in the region:

1)   Small and Medium Enterprises (SMEs): According to their website, the Konrad-Adenauer Foundation, Germany has set up this centre in 1990 to play a key role in economic development of the country.

2)   The Case Research Centre (CRC): It performs the editorial function in case studies written by the faculty members in Suleman Daood School of Business (SDSB). This centre publishes an international journal namely, Asian Journal of Management Cases, biannually.

3)   The centre for Advanced Studies in Mathematics (CASM): It encourages research in mathematics and provides a forum for interaction of the academia, students and the local businesses and multinational companies.

4) The Social Enterprise Development Centre (SEDC): It is established by the financial support of CIDA. The need of establishing this centre aroused in 2001 when NGOs mushroomed in Pakistan and they required the organizational and management skills to be taught to them.

5) The Development Policy Research Center (DPRC): Is established to encourage cutting edge multidisciplinary research at University C.

To facilitate a learning environment in the university, faculty members stated, its most important resource is the digital library. One of the deans mentioned:

'Our library is in really very nicely state. Also we have through HEC we have access to digital library, which makes it level for the university. In terms of the computers, we have one of the best computers ratio over in the country and our computer resources are comparable to the best universities in the world as well for faculty for instance, computers are replaced every three years and most of the faculty would have computer or laptops which are less than three years old' (Dean University C)

These research centres and the qualified faculty attract many students in the country but only the brilliant students are offered places on different courses. The university has started PhD programmes as well in various fields of business; hence, a learning environment is created suitable for community development and the development of society.

4.4.2   Readiness for KBE

The readiness of University C for creation of a KBE is presented below by highlighting the conditions of the universities and perceptions of faculty members.

4.4.2.1   Mission and functions of University C

The aim was to establish a University that fosters excellence and does not follow the traditional unscientific and illogical system of rote learning, but develops a questioning and problem-solving approach among students. The Vice-Chancellor of the University said:

'We urge our professors to spread education through a questioning approach. We ask them to foster debate and produce critical open minds.' (Vice-Chancellor, University C)

155

The mission of the University at the time of its establishment was to impart high quality business education, but more recently it has also established a faculty of engineering.

> *'We started about 25 years ago, we took our first student and we started as a businessman's business school... so that's how we started. Now we are graduating from that, now at this stage we like to call ourselves as a research university.* (Dean, Suleman Dawood School of Business, University C)

In Pakistan, universities are accepting new roles; research has been taken up as one of the key functions these days, after decades of neglect. The private universities are paying lucrative salaries to faculty members, driven by the new tenure track salary structure introduced by HEC in public sector universities. At the same time they challenge them to work on national needs and current international imperatives. Both basic and applied researches are conducted at University C:

> *'The mandate of research is both, expanding the frontiers of basic knowledge, as (illustrated by) the Maths department involved with this task for the last two decades. Also, the academic staff is interested in Mode 2 research.'* (Visiting faculty member, University C)

Similarly, another research participant expressed his views on the mandate given by the University C to staff members:

> *'We do have a mandate to discover basic knowledge but our significant mandate is to discover applied knowledge and as a result the cases that we write are real life cases. Many of the papers that we publish have an impact upon the real businesses in Pakistan and around the world.'* (Assistant Professor, University C)

The University holds competitions and rewards the best case studies. These case studies are based on the professional consultancies of the members of staff and these are published in the University journal.

The mandate of University C has broadened since it came into being. Both staff and students are challenged with new tasks and missions that they have been successfully fulfilling till this point in time. Now the horizon has further broadened. Programmes encompass business and management as well as engineering sciences education. Besides diversification and modernisation of the curriculum, internationalisation of the university and recruiting foreign faculty, the University has undertaken research as an

156

important mission and aims to become a research-intensive university at regional level, as described by the Dean of the Business School:

> *'So the mandate got broadened. About two years ago when I joined University C, along with the faculty we looked at the vision and the mission statement of the school again and we decided that we wanted to be regional players.'* (Dean, Suleman Dawood School of Business, University C)

The University has achieved an international reputation. It is therefore able to attract students from abroad. One of the faculty members pointed out that universities are recognised by the quality of their faculty and its students, so they are recruiting high quality foreign faculty who originally belong to Pakistan. Many overseas students are also coming to study at University C:

> *'We want to be one of the top business schools in the region. The region that we are looking at right now is South Asia, including the Middle East but we are not going to South East Asian countries like Singapore and others. They are probably ahead of us. Our boundaries are across Asia... maybe we go up to Thailand as well...'* (Dean, Suleman Dawood School of Business, University C)

University C is highly respected as an institution that is a philanthropic enterprise, so raising funds for its development has not been a major issue. One of the reasons for its establishment was the lack of workforce for business and industry. In many other parts of the world there has been an 'unprecedented growth' of private sector higher education due to the public sector's 'inability' to provide greater access of education to the country's people (Altbach, 1991, p. 311). Similarly, many private universities have been established in recent years and are now functioning in Pakistan. The reasons for the rise of private sector post-secondary education in Pakistan are not very different from those in the rest of the world. The faculty members think:

> *'Pakistan's education system has been one of the casualties. Good public education can create opportunity in societies, but in Pakistan it has been under-financed and ignored, in part because the political class that runs the country does not (support) its services. Fewer than 40% of children are enrolled in school here, far below the South Asian average of 58%. As a result, Pakistan's literacy rate is a grim 54%.'* (Professor, Business and Management, University C)

Hence, the main reason for the rise of private universities in Pakistan is that public universities were under the control of the government and standards of teaching quite low, with some exceptions. Another research participant expressed similar views. Since faculty members are government employees, they cannot be removed easily for poor performance or low productivity. Strong teaching unions in the universities also protect them. The standards of many public sector educational institutions have therefore been seriously compromised. Under the supervision of the government, universities have been deteriorating in past decades apart from the period after 2002 when a major positive change was visible. He said:

> *'Universities have been until very recently under government control so yes, you can say that these are under bureaucratic control. Along with the deterioration of the other institutions you see that universities have also declined in standards.'* (Visiting Professor, Computer Science, University C)

The research participant refers to the Steel Mill Corporation of Pakistan, Pakistan International Airlines and similar public companies and public organisations that have suffered a decline in quality and reputation in the past few decades. The lack of standards has done no good to society. The recent mushrooming of private universities has helped the private companies recruit good human resources. All like-minded academic staff at this university are motivated by a sense of patriotism and a genuine desire to build up the economy and society of Pakistan. The leadership of University C perceived that the impact of a university on society is very important, apparent in the following statement:

> *'The role of the university is the creation of knowledge and dissemination of knowledge. The universities are measured by the impact they create. To give you an example, the first graduate of our business school graduated in 1988 and many of our graduates are (now) CEOs and the directors of various companies.'* (Vice-Chancellor, University C)

He also maintains that output should be apparent to everyone. The leadership of the university was proud that they are directly building the country's economy:

> *'Many of them (students) are entrepreneurs; they have created many companies, which have created so many jobs – so that's an impact. We train thousands of executives every year. So that is the impact on industry. This means that they come in, and we give them state-of-the-art information in business, which goes back over and improves their business performances.'* (Vice-Chancellor, University C)

So the University has produced business graduates who are not just self-employed, rather they create job opportunities by opening up new companies and produce jobs in the market for others. This should be the pattern that other universities in Pakistan follow. On a macrocosm, Pakistan is mostly negotiating with financial institutions on how to seek more loans or to write off loans. As a result Pakistan is a debt-burdened economy. Our universities should come forward and develop entrepreneurial minds so that job opportunities are created for the people and unemployment is curbed. No financial institution will develop an economic policy for Pakistan; it is the universities that have to spread this awareness in the country, get the best experts in the field around a conference table, discuss the problems and find solutions.

A model is already available in the form of University C, proud of its graduates and receiving financial assistance from many local and international donors. Knowledge is wealth these days, and if universities can create knowledge, then wealth will follow. So, it is evident from the above discussion that University C is an active player in national economic development and in the region. The following quotation also supports this idea:

> *'I am very proud to say that the business school has been very successful in setting some of the key things over in Pakistan. I don't know that you are familiar with SMEDA (Small and Medium Enterprises Development Agency). That was set up by the faculty members; they were the pioneers of University C. SMEDA was formed by business School Faculty.'* (Dean, Suleman Dawood School of Business, University C)

The faculty has excellent research skills to attract financial and social capital and students stand good chances of employment due to the high quality of education and training, matching the needs of the business and industry. Clearly, the University is producing elite and corporate graduates who are employed as Chief Executives and hold many key positions in the business sector, both locally and abroad. The mission is to incorporate critical thinking, research capability and networking skills in students. The faculty has pursued these rigorously and won a distinctive place for the University among the private sector universities of Pakistan.

University C has many active links with community and industries. Faculty members work for industry and provide them consultancy services, writing a case study after completing a project with industry. In this way, the case becomes a reference for all other businesses with similar problems. The Dean of Business School said:

> *'University C has high proportions of entrepreneurs specially the business school produces a large number of entrepreneurs who go up and set up business not only here but also in San Francisco, you know in, Silicon Valley. There are success stories of University C over there as well. We run case competition – comes here for instance regularly. We conduct, you know, University C is at the forefront of encouraging these activities you know... so we do play our part. Our mandate is not beyond that our mandate is creation of knowledge and dissemination of knowledge. Our mandate is to excite people who then becomes entrepreneurs and who goes over and help the society.'* (Dean, Suleman Dawood School of Business)

The University sends its students on an outreach programme to under-developed parts of the country to help them understand the issues of local villages and help solve their everyday issues. Students are encouraged to teach in schools that are far from cities, where there are no colleges or schools as such. The faculty members were proud of the impact their university is making on society. One of the professors said:

> *'The role of the university is the creation of knowledge and dissemination of knowledge. Dissemination of knowledge universities are measured by the impact they create to give you an example the first graduate of business school graduated in 1988 and many of our graduates are CEOs and the directors of various companies. Many of them are entrepreneurs; they have created many companies, which have created so many jobs so that's an impact. We train thousands of executives every year. So that is the impact on industry which means they come in and we give them state of the art information over in the business which goes back over and improve their business performances. Our satisfaction index of people who come in for executive training is tremendous look at the social enterprise. International donors have funded many of our social enterprise development centres. And we have a network of fellow around the country, that discriminate the knowledge, which we create over the university, and through the network we pass it over to them. Our student, faculty and staff has been active in any national disasters of the country in earthquake University C took huge lead over there even the recent earthquake in Baloshistan, SEDC was at the forefront in Swat. Our university always take initiative in a lot of relief efforts.'* (Scientific Director, University C)

The above quotation illustrates the areas in which the University has helped the community at times when disaster struck the nation and also routinely.

The university carries out business related case studies as a part of its research programmes. These studies are helping businesses in Pakistan and in other countries. The university has established several institutions through which it is interacting with the industrial and business communities. These include the Centre for Small and Medium Enterprises (SMEs), the Case Research Centre (CRC), the centre for Advanced Studies in Mathematics (CASM), the Social Enterprise Development Centre (SEDC) and the Development Policy Research Center (DPRC). The excellent faculty and facilities in the university have allowed this institution to be the role model for other institutions interested in providing quality education linked to national needs. The university's mandate has broadened from a national university, and it is now aspiring to become a top class regional institution in south and central Asia. It produces business graduates who are not just self-employed, but are entrepreneurs --- they create job opportunities by opening up new companies and produce jobs in the market for others. The elite and corporate graduates produced by the university are employed as chief executives and hold many key positions in the business sector, thereby contributing to KBE. A key reason for its success has been the freedom to act quickly, being free from bureaucratic processes and procedures that slow down the implementation processes in government universities. Another reason for its success is its focus on attracting the best quality from all over the world, and providing them the enabling environment to perform.

4.4.2.2   Perceived understanding of KBE

Knowledge economy creates competition and in the future nations will be increasingly known on the basis of their reliance on knowledge. Nations wanting to survive in this competitive world must meet this challenge. One of the Deans expressed these views:

> *'The competition is going to be there for real – your generation has to face that challenge of KBE. And you know there is a positive side to that.'* (Dean, Business School, University C)

One of the aspects he mentioned about knowledge economy is that in a globally connected world, information and communication technologies have made it far easier for researchers to have access to vast reservoirs of knowledge and be better prepared to conduct research (Dean, Business School, University C). He said:

'*There is lesser pain for you. You have access to information sitting over here. In the remote parts of the country you can still have an access to all the resources provided that you have the will. Unfortunately, this (KBE) is not that easy to come about overnight.*' (Dean, Business School, University C)

The dean of business school referred to relevance of research to the needs of the country and rigour in research. He said:

'*As I am the Dean of Business School and I keep on saying that there are four elements….Four "R's"of the school. The first "R" is for "Rigor", I don't know of any business school top business school in the world which does not emphasise rigor. Rigor comes from emphasis in scholarships, rigor comes in from publishing in top journals, rigor comes in from encouraging scholarship activities like arranging conferences and steps like that. The second "R" is for "Relevance"; that means whatever that I teach over in the class room must be relevant to the real life as opposed to theoretical subjects. Some body working on physics does not have to worry too much about relevance because their mandate is to discover basic knowledge. We do have a mandate to discover basic knowledge but our (more) significant mandate is to discover applied knowledge and as a result the cases that we write are the real life cases. Many of the papers that we publish have an impact upon the real businesses in Pakistan and around the world.*'
(Dean Business School, University C)

In these few lines the dean has explained that every school in a university shall participate in research activities such as writing papers, publishing in five star journals, conducting seminars, conducting both basic and applied research, and conducting research which is relevant to the needs of the country. However, these research activities need an environment and culture. The Dean referred to these adjustments in the society such as change of mind-set and cultural changes are required. Many faculty members at this university despised the feudal mind-set of the politicians who keep the individuals subjugated and deprive them of their basic human rights (Faculty member, University C).

*'We have people with feudal mind-set that is the problem. Some body with 100
acre of land is hardly a feudal according to a global definition. But I have seen
people who are councillors and they act like feudal lords. We have to change that
feudal mind set. We have to bring supremacy of law in our society, respect for
law in our society ------ having said that we need to keep the pressure on politician
and engage them positively so that the money spent on education is money well
spent. It is an investment.'* (Faculty member, University C).

Hence, understanding of the term KBE is related to a mind-set bent on development.
As a result of overall development, the faculty members perceive that many other
changes can be introduced in the society such as equality and equal opportunities for
every one --- law should be the supreme authority to curb any evil in the society.

Another faculty member directed the attention of the researcher to the fact that a
knowledge economy is based on a high literacy rate. The following statement shows
that academics are aware about the issues and hurdles faced by the country, but, they
are irresolute in purpose and action.

*'I have been quoting the example of Korea --- a lot of other people have done
that as well. Korea in 1962 had a per-capita income of less than that of Pakistan
and it is said …it is rumoured…probably correctly, that they borrowed
Dr.Mehboob Ul Haq's 5 years plan and they implemented that in Korea. The rest
is, as we say, history but what people do not realise is the basic information that
the literacy rate in Korea was 86%. In 1962, other social indicators were very
also superior to Pakistan. Pakistan has a very lower level of literacy. Literacy is
still less that 50%.'* (Faculty member, University C).

Some faculty members have indicated that the issue is more severe than just the low
literacy rate. Some faculty members have pointed to the lack of capital while others in
the same university claim that even if capital comes in, the country will face the huge
problem of lack of trained workforce. The following statement provides evidence to
this fact:

*'Well that is the problem in Pakistan. Even if the capital comes into Pakistan very
soon, we will get into the bottleneck of the capacity of literate work force. A
knowledge economy requires knowledgeable workers as well. Even if investment
starts coming in, pouring in --- we will have difficulty in finding good managers, -
-computer literate people, people with marketable skills.'*(Faculty member,
University C)

Hence, the faculty perceived that in a KBE, all kinds of skilled human resources need to be available. So, for creation of a KBE, the country needs to develop the capacity first. The researcher asked the faculty members: 'Are universities not producing human resources?'. A faculty member replied:

> '*Again universities of Pakistan were until recently under the control of the government. A section of the government makes policies, while another section implements it. ----- There is a major disconnection between policy formulation and implementation. Universities produce tons of graduates; the graduate population is less than 3% but in my estimate 70% of the graduates are useless for the economy. How many do you need with English language higher degrees? Their role is to become teachers in English language or Persian or Urdu or Arabic or religious studies or social studies or political studies. OK! You do need them but specialist graduates in these area have a very limited role. All graduates should have a broad based education where they learn about literature, economics, politics etc --- in all these areas education is mainly to produce educators. But how many graduates do you specifically need in each one of them ? the government should provide this direction to universities. You need graduates in engineering, technology, entrepreneur ship, business, medicine and many other areas that are going to contribute in the creation of wealth in the country. That's where we have failed miserable.*' (Faculty member, University C).

In the above statement, the faculty member indicates that the country needs graduates who can contribute to economic development. He points out the importance of such subjects as engineering, business, medicine, and new inter-disciplinary subjects, that can create wealth. The faculty members believe that once the society has attained a certain level of socio-economic development, only then should the society develop its aesthetics by focusing on arts and social sciences.

It is also thought by the faculty members that government plays vital role in creation of an independent, free enquiry based environment in universities, if universities are encouraged to look for other sources of funding and not just depend on the government channel.

'I would not give too much control and responsibilities to government bodies. The government bodies needs to have a role of commissioning these studies from private sector, where there is no conflict of interests. The government needs to adopt an encouraging attitude towards informal sources of funding. In fact, the government cannot be held responsible for all the 135 universities. Through the indirect channels of funding, the universities can be made more self-reliant. That is one thing, the other thing is, if the government really wants to encourage technology based development in Pakistan, then government should be funding technology initiatives of university. However, if the government wants to encourage computer sciences, the government should be funding computer related projects of universities. As opposed to setting up Quotta's that you can't have produced so many graduates, which is a negative way of achieving targets, there is a positive way of doing it. That is to encourage and provide support areas when you want to encourage growth. That's the way I would do it.' (Head of Centre of Advanced Studies in Mathematics, University C)

It provides enough evidence that the initiatives are (deliberately) not taken in the right direction. It is mistrust on the government, but this perception is a result of failed governance system prevailing the country. As a result, the country presents an image of war-zone. The economy is deliberately kept as low developing economy so that it can serve as breeding ground for the feudal lords who can easily exploit the uneducated masses. Hence, the role of government is to ensure that universities are working for a purpose and these institutions are working with other organisations in the country, which is not being performed currently. In fact, the negative attitude of bureaucracy, the low priority accorded to education by the government, and the casual mind-set to work is perceived as key challenges in creating a KBE in Pakistan.

4.4.2.3 Challenges faced by academia in Pakistan

According to academic staff of University C, the perception of reality in the universities of Pakistan is different from that prevailing elsewhere in world, and needs to be changed. This means that some universities might perceive that they have excellent facilities, and good teaching staff and organisational set-up. However, it will only be good by Pakistan's standards; in international terms, it might not be ideal. So the academics of University C perceive that perceptions must be aligned with the rest of the world. Pakistan has some good universities but, overall, the country is still an agricultural economy. A faculty member expressed these views:

'By Pakistan's standards it is excellent (research environment and research culture in universities), but it is not ideal and still needs to be improved. If you assess the research environment in terms of publications and conferences, then it is not very good. Since there are very few universities which are doing good quality research, so you cannot generalise that all universities are working like that. I don't know about the sciences but the research output of the universities in social sciences is not very impressive.' (Assistant Professor, Social Sciences, University C)

Case C suggests that bureaucracy, government interference and the attitude of people towards work and towards other people, their abilities, are some of the challenges encountered. To illustrate this point, the Head of Centre of Advanced Studies in Mathematics had this to say:

'No, there are many problems other than lack of resources and good faculty... In my opinion, it is a much bigger problem than lack of resources or shortage of faculty... there are different bureaucratic as well as attitude problems. Most of the universities are facing these problems and they are saying that they do not find employees with appropriate skills. But when a (suitably qualified) person is knocking at their doors, they are not ready to open it and use his skills to fulfil the task. (Head of Centre of Advanced Studies in Mathematics, University C)

The attitude towards work is negative. People try to find the excuse that resources are not available, or faculty is not there, but in fact there is a mismanagement of the resources. The above statement shows that human resources with appropriate skills are available but too much bureaucratic control and petty jealousies towards other people and their skills stops them from using their talents. As a result, there is inertia in the system. If people and resources are managed properly there should be no lack of human or other resources. Furthermore, he added, that there is an air of mistrust in every organisation of the country. In his words, there is 'breach of trust' at the national level. He said:

'They have bureaucratic problems. We do not have trust in our institutions and in our decision makers. In fact the basic problem, a national problem, is a breach of trust in all respects.' (Head of Centre of Advanced Studies in Mathematics, University C)

166

In Pakistan, the people often look at every good initiative with scorn, negativity and mistrust. What can be the reason? Is there a group of people who create this mistrust and try to disillusion the people, or is there any external factor for ideological subversion? The Professor of Mathematics explained this point with an example. President Ayub wanted to industrialise the economy and root out feudalism, but no one trusted him and his initiative:

> *'You see it has been a feudal society since 1947. Maybe Ayub Khan tried to move towards industrialisation. This change was not fully accepted. Had it been accepted decades ago, Pakistan would have stopped importing things from foreign countries. We have only one industry, that is defence, and for the rest we do not trust our men.'* (*Head of Centre of Advanced Studies in Mathematics, University C*)

The faculty members emphasised the need for considering the teaching and research standards from a global perspective. It is only by comparing the universities with the best institutions in the world that the universities in Pakistan will achieve an understanding as where do they stand in terms of development and they will be able to see what challenges lie ahead. It reflects some of the cultural impediments; no-one is ready to take initiative, and those who do are not trusted/rewarded/motivated to continue the process. It also means that the culture of the country does not accept experiments, which is not a good aspect if innovation needs to take place. Any society that does not take risks cannot impact on the economies of the world. Such a culture needs to be flexible and moderate, and accept changes openly. The feudal society of Pakistan is also seen as another major threat to the formation of a KBE in Pakistan.

4.4.2.4   Policy Matters

The staff members think that currently there is no link between educational policy and national development. Even the policy is not developed in consultancy with researchers. Whatever the policy of the moment, it does not contain incentives. A reward system must be introduced so that people understand the value of knowledge creation and encourage discussion of solutions of problems. The Dean of the Business School said:

'We need to align our rewards system in that direction so that people value knowledge and knowledge creation. So if we do not value knowledge or value the process of knowledge creation then no one will think along these lines. My biggest strive over here is to change the mind-set of people. I have a few friends in the US who are doctors by profession and they want to introduce new methods in medicine in Pakistan while people here in Pakistan keep saying to me, it will not work in Pakistan... etc. this is an attitude which I do not like in people.' (Dean Business School, University C)

So it is not just that people are opinionated and lack a logical and scientific approach towards issues and their solutions. It is also the government's fault that the population is not trained to accept the challenges. Very few people in Pakistan work for the national interest, since most are self-centred. They need to be educated properly and their mind-set changed. Such efforts can be done at an individual level, but it will not have the impact of concerted efforts at national level by the government. The major tools to bring about such changes are policy formulation and policy implementation, so they should make use of these. One of the professors thinks that a major issue with policy is that decision-making power is very weak. He suggests that the processes that lead to policy formulation are not consultative and participative:

'The more you learn, the more you find out how little you know and how careful you have to be before passing generic statements. Decisions must be made through participative environment. We need to align our rewards system in that direction so that the people value knowledge and knowledge creation.' (Professor, Suleman Dawood School of Business, University C)

On an individual level, academics have been trying to implement such educational policies at a university level to help in community building. As far as the government is concerned, youth have no hope of ever getting any benefit from present educational policies.

The Dean of the Business School explained that he has been pursuing the establishment of centres of excellence across the country, but has not yet succeeded. This could be a really good step towards improving the educational system of Pakistan. It shows an understanding on the part of universities that if government is not playing its part, then they have to come forward in building the community because this is one of their roles. His ideas are presented below:

'I have been pushing very hard for the last two years that we need to create centres of excellence all over the country, and to start with I have been pushing for five centres of excellence, four in the provincial capitals and one in the centre. That you will need to have, in any case. And I am also being pushing that each provincial capital needs to have a mandate to spread its influence in its vicinity centre. You know, the centre in Peshawar needs to have the mandate to do that in close collaboration with universities in Kohat, Banu, Daira Ismail Khan. Similarly the centre in Lahore has a mandate to link up with Multan, Sargodha, Faisalabad, Sialkot, Gujranwala and so on. The other dimension is (competence). Suppose that we have centre in Baluchistan that does not have the capability to do top level research. I am not insulting my colleagues over in Baluchistan. it might be that they lack expertise of research. So the way to raise the profile of centre excellence in Baluchistan will be for them to team up for instance with the colleagues over in University B, where they become co-principal investigators. As a result, the research profile will go up over a period of time by rubbing at the shoulders (with other competent researchers).' (Dean, Suleman Dawood School of Business, University C)

They can be centres of excellence spread across the country, or based on subjects as shown in the following figure:

Figure 4.1: Centres of Excellence – Subjects
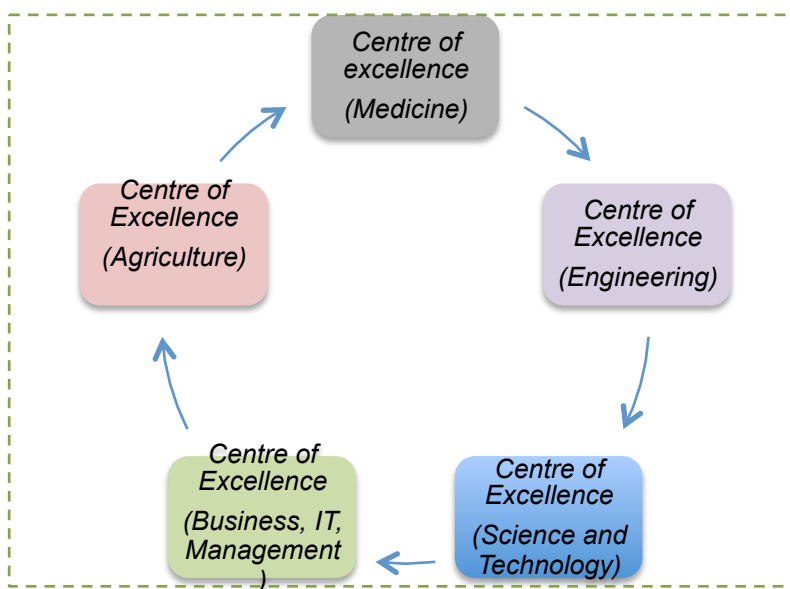
These centres might be linked to the HEC to report on progress, as proposed by the faculty member. There are so many ideas and solutions to the problems of academia of Pakistan, and these ideas need to be implemented. It was also suggested that those who implement the policies must be rewarded, because it is the important part of policy process. The Dean of the Business School said:

> *'But what is more important is that the policy makers make policy after policies and after policies but there are no implementations of policies. So, people are rewarded upon writing a report; nobody is rewarded upon the implementation part of it. Is it according to the plan or how well it was implemented? So if there is no accountability to what you do, as a doctoral student whereas at the end of the day, if the dissertation does not come up, if the paper does not get published in the top journals, you are not going get the degree, that's the way accountability is important.'* (Dean of Business School, University C)

It was an interesting finding because all academics speak about policy formulation and policy implementation issues, but rarely does any academician point out that policies should receive feedback at the end of tenure and held accountable for whether a policy has worked. If it has worked well, reward those who have implemented this policy. Faculty members expressed their views that the numbers of universities have Increased tremendously under the HEC, hence:

> *'... HEC has more than a hundred universities (to look after). There are universities which are centuries old like Punjab University, which is more than a hundred years old, but their role in economic development is not visible. (There is) some mismanagement, some lack of marketing and many (other) factors perhaps, (but) we do not like to discuss those'.* (Faculty member, University C)

In short, they were of the opinion that:

> *'But some of the plans were too ambitious without any reality check that has taken place. I think, they need to encourage competition and they need to prioritise the things occasionally. I get a chance to talk to key decision makers and I do make the point that while we have a role to raise the profile of all institutions, (this should be done) slowly over a period of time.'* (Dean, University C).

University C is a successful venture by the business community. In developing countries, such efforts by the private sector are needed and if the two collaborate and 'channel their scarce financial and political resources to developing social and human capital, buildings the basic infrastructure and creating a level playing field for the private sector, that will go a long way' in transforming an economy into a KBE (Quibria *et al*,. 2003, p. 823). This University has a mission to bring about change in the landscape of higher education of Pakistan by setting an example of an international private sector university and to a great extent it has achieved its aims. However the university aims to work in a competitive environment. In order to generate that competitive environment, the academic staff expects the government to play a major role. At the moment, there is no link between educational policy and national development. Without such a link and a clear implementation plan, at hand, the universities will not be able to properly contribute to create a KBE. Therefore, there is a need for establishment of genuine Centres of Excellence in various provinces that could then network with other institutions in their respective fields and help to raise their standards. Some faculty members felt that HEC had tried to do too much too soon, so that some of the programmes did not have the desired impact. Also, the HEC should make universities self-reliant instead of making universities dependent on government sources.

4.4.2.5   Recommendations presented by academics

Bridging the communication gap is one of the suggestions given by academic staff. They indicate gaps between academia and industry that must be filled, otherwise industry will never know about the potential of universities.

> *'Firstly we agree with that there should be communication between universities and then we should try to establish communications between university and industry.*' (Head of Centre of Advanced Studies in Mathematics, University C)

The university staff member thinks that the gap in communication is due to lack of trust between the two spheres of academia and industry. They believe that only governments can create this trust. In order to make a national plan for industrialisation or KBE, first of all people should be taken on board and aims and objectives communicated to them. Once accepted, the national leadership should first use the strengths of the country. Pakistan has all kinds of experts, but still multinational companies are considered more expert than our own people:

'Multinationals are coming (into the country), all the industrial plants are imported from somewhere and their so-called 'advisers' are always coming from there (abroad), most of the time. No, there is a communication gap between the industry and universities.' (Head of Centre of Advanced Studies in Mathematics, University C)

This foreign dependence will not lead to any kind of progress; therefore, a need exists to link the different sectors of economy with the experts and researchers at universities. This seems to be the solution to most of the challenges that academia is facing. In simple words, self-reliance and management of own resources are better than reliance of foreign aid or expertise. Currently, there is a serious communication gap between the universities on the one hand and between universities and industry on the other. This gap needs to be filled by government by making an interface. The huge foreign dependence on imported technologies and the lack of a national innovation policy has stifled the spirit of self-reliance. The government should develop such policies that will result in national self-reliance and make the country free from the burden of foreign imports. This can be achieved through the promotion of KBE in the country, in every sector, not just universities.

4.5 Case Account D

4.5.1 Background

The current University D started as a medical college in 1857 but due to the War of Independence, the college started functions in 1860. At that time, it was the second medical college in the continent, after the medical college in Calcutta. In August, 1860, the public relation officer of the university told the researcher, Dr. IB. Scriven of the first medical college in Calcutta was invited to become the Principal of the proposed Lahore Medical School too and he accepted this proposal. Hence, the establishment of the medical college dates back to 1860 but the university, has been imparting medical education since the last one hundred and fifty years, hence, it is recently upgraded to the status of a university.

> *'The institution was established in 1806 as a medical college. In 2006, the government, appreciating its contribution towards medical education and health care of the nation of Pakistan, upgraded it to a university* (Vice Chancellor, University D)

Now that the status of the university has been upgraded to a university, it aims to impart high quality medical education as well as undertake research to help the humanity.

4.5.1.1 Physical Infrastructure

The University has fulfilled the needs of society by producing world-class doctors, nurses and other technical staff for hospitals. The University, a public sector institution, has the oldest campuses in Pakistan after the University of Agriculture, Faisalabad, and the Punjab University, Lahore. Its physical infrastructure was adequate for the needs of a college but, now that it has been upgraded to a university, the government needs to improve its physical infrastructure. The old medical college, which included Mayo Hospital, Lady Wellington Hospital and the Lady Aitcheson Hospital, is an asset and the buildings are of historical importance. Since the government may not appreciate this, there is growing concern among faculty members that Lady Wellington Hospital might be changed into a public park. The provincial government is taking this step. The politicians need to understand, the faculty members protested, the importance of preserving a historical college, which is one hundred and fifty years old. The university is an asset to the nation and its buildings are the nation's heritage. The University has the following buildings to its credit:

- Mayo Hospital
- Lady Wellington Hospital
- Lady Aitcheson Hospital
- School of Physiotherapy, and
- The School of Nursing

After explaining the physical infrastructure of University D, the Public Relations Officer explained to the researcher that structurally it is not ready to compete with the others in knowledge economies. Different blocks carry the names of the philanthropists who donated funds for these buildings, such as Patiala Block (administrative block, library, lecture theatres), Bahawalpur Block (Pathology, Physiology, Biochemistry and Community Medicine), Farid Kot Block (Anatomy) and Kapurthala Block (Pharmacology). However, in recent years no new buildings have been erected. This shows neglect on the part of government.

4.5.1.2 Knowledge infrastructure

In order to support the educational goals and instructional needs of different programmes being taught at this University, a library was established when the medical college came into being in 1860. When I visited the research site, I found out that the library has a wealth of books dating back to the early fifteenth and sixteenth centuries. It has some two thousand books published before the nineteenth century. This is a huge asset, and also the World Health Organisation has provided reading materials. The library provides access to CD-ROM, microfilms, audio and video-cassettes of different surgical procedures for its students and faculty, with free access to some 25,000 international journals and 60,000 textbooks that HEC has made available to all public sector universities in Pakistan that cover all the disciplines taught. Various reference tools such as medical encyclopaedias, dictionaries, and atlases, are placed in the reference section and save much time for students.

In knowledge infrastructure, the University has a few research centres as well. These include:

- The Centre for Nuclear Medicine (CENUM)
- Convalescent Centre
- Mayo Hospital, Pakistan
- Medical Research Council (PMRC)
- Punjab Institute of Preventive Ophthalmology
- School of Nursing
- School of Orthopaedics Technology
- School of Paramedical Studies, and
- The School of Physiotherapy

The University offers education at both undergraduate and postgraduate level. At undergraduate level, it offers a Bachelor of Medicine, Bachelor of Surgery (MBBS) and Bachelor of Science (BSc). At postgraduate level the programmes are a Diploma (D), Master of Science (MSc), Doctor of Medicine (MD), Master of Surgery (MS), Master of Dental Surgery (MDS), Master of Philosophy (MPhil), and Doctor of Philosophy (PhD). The university has 150 faculty members and it has facilities to accommodate 1300 undergraduate and 800 postgraduate students on campus.

From the above discussion it can be said that the University D is a reputable medical university of Pakistan. Although, it has a number of hospitals and schools for patient care and teaching but it appears to be seriously deficient in research facilities. The buildings are old and there appears to have been no expansion in recent years. The university also appeared to lack in research oriented faculty that could contribute to KBE.

4.5.2 Readiness for KBE

The preparation of University D for the paradigm change into a KBE is presented below by highlighting the conditions of the universities and perceptions of faculty members.

4.5.2.1 Mission and functions of University D

The institution has been imparting medical education for the past one hundred and fifty years. Now that it has been converted to a university, it aims to impart high quality medical education as well as undertake research, and to help humanity using the latest equipment, technology and techniques. One of the assistant professors mentioned:

> *'Honestly speaking, we are very primitive. We are almost unable to carry out any such research that can lead to formulation of a new drug or a new salt. We are not working on those lines.'* (Public Relations Officer, University D)

This used to be the oldest medical college in the country but now its status has now been changed to a university, it has presented new challenges for the institution. A faculty member commented:

> *'After becoming a university, our workload has increased. We lack faculty members. Moreover the current faculty serving the university has no benefits at all'. (Faculty, University D)*

There has always been a conflict between the University and the provincial government. There are a few pressure groups that want the University to revert to college status, but the Vice-Chancellor and faculty are not yielding to such pressures. However, the University has always asked the government and the HEC for funds to construct more buildings and facilities. It has been its aim to first upgrade the physical infrastructure and, once the need for additional construction and other facilities and equipment is met, it can also modify roles and functions as required of a university. Since this has not yet been achieved, the University gives it as the reason for its slow progress and not being ranked highly by the HEC.

With respect to collaboration with other sectors for economic development, staff was humble and frank in admitting that their contribution in economy development is indirect:

'The contribution of any medical university is an indirect one. For an example, we can suggest farmers or industry workforce to take certain measure so that the workers and farmers are safe from diseases and they will be working longer so medical university contributes indirectly'. (Vice Chancellor, University D)

Another way to contribute is through pharmacology and clinical research so new medicines are discovered. A faculty member expressed his views:

'We can contribute directly is our pharmacology. Pakistan is already exporting medicines worth billions of rupees. For other sectors the beneficial effects are indirect.' (Faculty member, University D)

However the concept of linkages with industry has not been popular among doctors. The University has established links with other universities in the country:

'We have researchers publishing at international journals though at a very small scale. We have international linkages and MoUs signed with 14 international universities in USA, Britain, Saudi Arabia, and with LUMS as well.' (Vice-Chancellor, University D)

So, the faculty members admitted that the university had been functioning like a college with little or no emphasis on research, there are some developments occurring at University D, but these projects will take time to mature and deliver results. However, the concept of links to industry has not been popular among the doctors. The researcher obtained the impression that there were various political groupings within the university that prevented cohesive national programmes to be developed. Since, the university cannot develop; the HEC also cannot help this university. This lack of expansion is attributed to the lack of support from HEC for construction of new buildings. However further investigations revealed that the provincial government had not made any land available and no formal project indicating availability of land (PC-1) was ever submitted to the HEC. The commission has certain requirements, fulfilling those requirements will make a university eligible for its grants. It shows the university has not been able to fulfil those minimum standards of a certain number of faculty member, students and physical infrastructure. The university must first adopt a clear vision and strategy on how it wants to contribute to KBE and then work towards its implementation.

4.5.2.2 Perceived understanding of KBE

The Vice-Chancellor perceives that a KBE is driven by industry, through high value-added product imports or high-technology export and import. However, no such processes occur in the context of Pakistan. He said that industry is low value-added and does not use any kind of advanced technology:

> *'The industrial sector has not come up to international standards. I believe we possess the skills and our economic sector can also come up but up till today, we are an agriculture economy.'* (Vice-Chancellor, University D)

Secondly, Pakistan is different from a knowledge economy in a further respect. The welfare of the people is not a priority of the government. The politicians loot and plunder public funds so they cannot be used for the benefit of the people. The Vice-Chancellor expressed his views:

> *'In Pakistan the money spent on health is not taken as developmental funds whereas in other countries, the money spent on health is considered as a positive spending.'* (Vice-Chancellor, University D)

I asked the Vice-Chancellor about the role of University D, since the HEC was planning to transform the economy into knowledge economy and was trying to make its universities world-class Centres of Excellences. His response was very positive, but he added that transformation into KBE cannot happen overnight and that politicians must patiently pursue this goal, as it is the absolute need of the times. He said:
> *'It is an absolutely true mission and we must follow it. The only problem is that the output of a knowledge economy does not come in a short span of time. It takes much longer and politicians do not understand it. They have to join hands with the HEC to achieve this mission.'* (Vice-Chancellor, University D)

If the economic conditions of a nation are improved, the civic sense and general conditions of living will also improve, but all of this comes with more education, he added:

> *If you have more and more educated and highly educated people, they are certainly of use to the society. Let me give you a very crude example. They will have a better sense of driving. The more educated people a society has, the better will be the output.'* (Vice-Chancellor, University D)

R&D is an integral part of KBE but, according to the Vice-Chancellor of the University D, in Pakistan research is conducted on trivial issues that are not going to change conditions for the people. For KBE, cutting-edge research, such as innovation of new medicines is required, which is not the case in Pakistan. He said:

> *'We are not working on those lines. We are just doing analysis on the drugs produced by the US, whether they have a good or bad effect on us? So we are far behind in the genuine research, which can change the fortune of the country.'* (Vice-Chancellor, University D)

Genuine research and research on local issues are areas that the academics think are important aspects of developing a knowledge economy.

One of the deans commented that, for a knowledge economy, there should be a pool of knowledge of all kinds. In his view, Western knowledge economies excel in a few aspects but lack family values and religion. In a way, he was associating KBE with the culture of the West and expressing the limitations of a Western concept of knowledge economy. He said:

> *'There is different sort of knowledge, moral knowledge, ethical knowledge, subject specific knowledge. If we cover all these fields and gain knowledge then we can grow fast, otherwise we will be lagging behind.'* (Dean, University D)

The Dean supported his argument by citing the example of Pakistan, a nation that cannot say proudly that it has invented any machines or made great progress in science in technology. At the same time the people have strong family values that can be seen in the way that usually one person, the head of the family, is responsible for the livelihood of the whole family. The reason is that they lack a serious attitude towards work, a passion towards their country, and ethical and moral sense.

> *'In Pakistan the situation is such that the businessmen, industrialists and investors have no moral sense. They are dishonest and corrupt. A person can be an excellent businessman but if he is corrupt the country cannot move forward. Or if the businessmen are selfish and motivated by self-interest they can give money to mass media and change the opinions of people easily. '* (Dean, University D)

In the examples quoted above, KBE appears to be an economic strategy, but it is also a cultural characteristic. KBE is linked to overall development. It is not just the development of a single sector such as health or education. It ensures that holistic development, along with socio-economic development, moral and ethical development, also occurs. He said:

> *'So I believe all these sectors go together and we must accept the importance of each and every sector. It's not only that you invest only in health sector and ignore all other sectors. In addition to that, personal development and ethical values should be there, which come from reading and interacting with people. In the developed countries, you have seen that while jogging, or travelling in tubes or buses, everyone has a book in hand which they are reading. Our society is in a downfall and our businessmen are not honest. There they have good habits such as reading and have good technology to amuse them but they are not interacting (with one another) any more. However, these people are not aware of the next-door neighbours etc.'* (Dean, University D)

Hence, the faculty members are aware of the positive features of the developed countries that knowledge and learning are considered important for growth of society and economy and the society of Pakistan is facing downfall because there are some negative traits in the people of the country. One example given above is the businessmen who are not honest. Similarly, corruption in every organisation does not allow a KBE to emerge or to allow any kind of positive change to occur in the society or economy of Pakistan. The faculty suggests that good qualities of KBE should be adopted but the government must customise the concept of KBE for the use of people of Pakistan. KBE is a strategy which leads to development but it needs consideration that how does it coincide or it does not coincide with the aims, culture and economy of the country.

4.5.2.3   Challenges faced by academia in Pakistan

Some faculty members pursue research because of their interests and they explicitly commented that the current research that is advocated and emphasised by the HEC is 'wayward' and 'directionless'. He said:

> *'Currently there is a lot of emphasis on research. As you will go to different universities, you will hear about it but the current research in various universities is wayward and directionless which is not going to help the economy in any way. We need a direction.'* (Assistant Professor, University D)

By direction, the Assistant Professor means that there should be a central body at Federal level that can define the priorities of the economy and direct what research is done in those areas. Wayward education system and wayward research will not help the economy to grow.

The head of the University has frankly admitted that there is pressure from the HEC on every university to focus on research, but research is done at a very low scale in University D. He said:

> *'Until now, we are primarily a teaching university and we are trying to come up on the research side also. Still in the teaching capacity, we are proud of the students that we have produced. As far as the research papers are concerned these might not be in that a large number at international* level. (Vice-Chancellor, University D)

The reasons for inclination towards teaching are various. First of all, there is a significant workload that forces doctors to spend more time in their hospitals. That is the first source of knowledge and excellent research can be done (focus group discussion, University D). The head of the University stated:

> *'As far as our university is concerned, we have got two challenges. One is that the workload is too much as compared to the space that we have got… They (doctors) spend their whole time in the hospital and in the university. They can contribute a lot as knowledge workers, but when the government does not pay them their market price, then they are bound to work in hospitals during day time and work at clinics at night. Hence their research capabilities are minimised and affected.'* (Vice-Chancellor, University D)

Due to the issues of lack of infrastructure and increased workload, many doctors tend to leave the country in search of better opportunities of life.

> *'As far as undergraduates are concerned, they pay here and graduate out and leave the country.'* (Vice-Chancellor, University D)

'Brain drain' is one of the biggest challenges for academia in Pakistan. Although, professionally, doctors and educators are respected by society, they have reason to leave the country. They search for better opportunities of life for themselves and for their families:

'But as far as the postgraduate students are concerned, they are all qualified doctors. When we give them admission for PG studies, they demand some stipend. That I believe is their right because as PG student they not only study but they also contribute as doctors in different departments.' (Vice-Chancellor, University D)

Medicine or health care is a means to serve humanity, but it is also a profession. Doctors are professionals just like bankers and businessmen, so they need subsistence. After completing postgraduate studies, they adopt a particular area of specialisation and make a demand for a salary or at least a stipend to survive on. It is their right to demand remuneration because they are serving on different wards of the hospital where they are studying. Their demand remains unfulfilled:

'You go and see that the doctors who are working there (abroad) are mostly Indians, Pakistani, Turkish and Iranian.' (Vice-Chancellor, University C)

Doctors are not offered permanent jobs. There was recently a strike by doctors in hospitals that lasted for weeks. This does not normally happen in other parts of the world, but here, in this context, doctors and paramedical staff have to make a protest for their rights.

'They are working in Pathology laboratory. They are teaching undergraduate students. So they demand stipend and that is their right. But till today, we do not have any stipend for any postgraduate students.' (Vice-Chancellor, University D).

As some faculty members argued that there was no point in carrying out research that is "wayward and directionless". The large teaching work load and lack of research infra-structure were also given as reasons why the university has been able to make any significant research contributions.

4.5.2.4   Policy matters

An issue discussed by the academics of University D is that policies are short-lived. Even under a competent government, such as when the country was driven on the path of socio-economic development by the previous president, there is an element of haste and hurry. Nothing lasts for long and circumstances are highly unpredictable. This has greatly damaged the political and economic conditions. In supporting his argument, the Vice-Chancellor cited Malaysia, a country that has highly qualified experts in all walks of life, adding:

> *'Remember this success has taken fifty years. In our country people demand output in four years or three years.'* (Vice-Chancellor, University D)

In expressing his views on policy formulation, he said:

> *'The linkage between policy and practice in Pakistan is very poor. The commissioners, district management people, who are basically working as policy makers, they have very little contact with the research scholars who can illuminate their minds on solid facts and figures or with the public for whom they are making those policies.'* (Vice-Chancellor, University D)

The bureaucrats live a luxurious life and they do not understand the problems of ordinary people. By the time the government begins to understand these issues, due to a public hue and cry a new government replaces it. The focus group discussion concluded:

> *'By the time the bureaucrats start understanding the problems of a department, say the Health Department, say in two to three years, by that time the Secretary of Health starts understanding what the Health Department is and how it works, he gets transferred out.'* (Focus group discussion, University D)

The Vice-Chancellor had elaborated this issue from another perspective. He said the bureaucrats are there for making policies but should have a team of scientists and researchers from universities working in close liaison with them. This will help them to make informed decisions.

> *'I believe that bureaucrats have their own value and they have their own importance, I don't deny that. Their supervision (however) must contribute – they must be surrounded by a number of professors, researchers, or top most people of that profession, in terms of guiding them what has been done and what needs to be done.'* (Vice Chancellor, University D)

The University claims that it is the joint responsibility of the HEC and the provincial government of Punjab that universities are supported, but the realities are very different from their expectations. The old medical college has been recognised for its services since the British colonial period and the Government of Pakistan has upgraded its status from medical college to medical university, but does not support structural adjustment to the new status it in any way. During the past two years, the University has made various demands from the HEC and provincial government, and since

research is non-existent the HEC has helped. It is not a fair distribution of resources when a teaching university recognised for its services since its inception does not have the chance to extend its infrastructure to meet the increased intake of students and needs of the faculty. The HEC and the provincial government have been shifting responsibilities between one another, it was claimed, but neither had actually sorted out the issue and taken full responsibility for the financial assistance, according to faculty members.

> *'The doctors work for the patients of province of Punjab so the government of Punjab is responsible to give the stipend to the doctors doing postgraduate studies, but, they do not take charge of this duty. The HEC is responsible for universities, but in our case, the stipend to postgraduate doctors is concerned, that is not the headache of the HEC, why? This is not fair... it is misappropriation.'* (Focus group discussion, University D)

All academic staff of University D expects systems in the country to continue, unless there is a huge change at the leadership level. They are of the opinion that, under the supervision of great leaders, countries have shown remarkable results. In the same way, they expect the government of Pakistan to develop visionary policies and the country's leadership to pursue these policies to bring about overall change. To support the argument with an excerpt from one of the interviews, I would like to quote the Vice-Chancellor:

> *'I give you the example of Malaysia. They were poor compared to Pakistan, when they got a dynamic leader and what Mahatir did was that, in every sector, he sent his top most students to world-class universities.'* (Vice-Chancellor, University D)

So he expects the government to deal with governance and management issues diligently and invest in welfare-related issues such as health and education, because, from his point of view, the two can change the destiny of a nation. Both the education and health sectors of Pakistan are in a miserable condition.

These are basic requirements for survival, but there is one more issue even more important than those discussed above. That is, the people demand security in their lives. Unless their life is safeguarded, other processes of life such as education, business, etc cannot easily be carried out. The Vice-Chancellor expressed these views in the following lines:

'The foreign qualified doctors are highly reluctant to come to Pakistan and deliver a lecture. Our own brothers who are in Britain or USA, just for security reasons they are reluctant to come to Pakistan. So security is a concern but I hope and pray Insh-Allah, things will improve soon.' (Vice-Chancellor, University D)

Therefore, the first priority of the government should be to provide security and the second should be to focus on welfare-related issues. With the help of these two structural adjustments, the diaspora abroad can be brought back to the country with suitable incentives.

'Those (doctors) who have been to USA, they have done wonderful jobs – Professor Khalid Butt was the pioneer in renal transplantation – the majority of (our) doctors are at very key positions at international level in Saudi Arabia, Britain and USA. They are contributing a lot to their society.' (Vice-Chancellor, University D)

Especially in the field of medicine, if doctors in medical universities and government hospitals are paid salaries at market price, they will not have to earn their living through private practice in the evening. This is the sincere opinion of a vice-chancellor:

'as a vice-chancellor I very sincerely believe that my faculty can deliver a lot better, if they are paid their market price, then they are not allowed to do any private practice.' (Vice-Chancellor, University D)

The demand of the head of the University is fair, and the recent approach that doctors have adopted to increase their salaries is not right on humanitarian grounds. The doctors have announced that they will not work on emergency wards and hospitals will be closed until the present government accepts their proposals for an increase in salaries. The Young Doctors Association has been criticised by critics and television commentators (Hussain, 2008) as patients are suffering due to this strike. However, it is the result of inconsistencies in policies. The same doctors had filed this request almost two years ago and the government paid no heed, so now the situation has worsened.

The above discussion shows that objections were raised that the policies were short lived and with each change of government, new priorities were set. This prevented the sustainable development of higher education. In the same context, the faculty members complain that education and health have been awarded the lowest of national priorities. Lack of research and consensus among major stakeholder of a policy has also contributed towards the low socio-economic development. If universities aim to change the current circumstances, their salary structures are low, and do not award them for such initiatives. Moreover, doctors are not appointed on regular basis, so that the faculty members are forced to work in their private clinics in the evenings. The salary structures needed to be drastically increased so that doctors and researchers do not migrate abroad in large numbers. Although now the HEC had increased the salary structures dramatically, making them five times those of Federal Ministers in 2005, but linked them under a contractual "tenure track system with regular assessment of creativity and productivity by an international panel of experts. So excellent salaries are available for good researchers in universities in Pakistan while very few researchers have good skills to win those grants or be eligible for such incentives. The faculty members desire that their learning and professional training should continue during service but no such trainings are available to them.

4.5.2.5 Recommendations presented by academics

The head of the University D strongly recommends that students are taught morality and ethics because, as far as their knowledge is concerned in subjects such as medicine, they are already doing well. However, they are so much absorbed in study that they forget their relationship with society and how to live. The Vice-Chancellor said:

'We have taught our students all the subjects – science, management studies and engineering and medical and engineering but we haven't trained them. I gave you the example of a traffic block, that if in developed countries the road is blocked, then all in the lanes will wait at their places and no one will overtake the other cars but wait for their turn. We haven't taught them ethics and moral law. I ask my students of medicine that you read voluminous books of medicine and surgery and are highly qualified doctors but basically you are uneducated because you have no time to read newspapers and roam around (interact with) the people—the best lessons are learned by practically experiencing life and by interacting with people. In the past in Eastern traditions, nature was considered the biggest teacher, because it teaches patience, compassion, principles of give and take, humanity etc, I am sorry to say that these things do not exist anymore in people and we must revive their souls.' (Vice-Chancellor, University D)

Patience and continuation of policies irrespective of the change of government, has been one of the oft-quoted solutions:

'The slogan of KBE by HEC is very correct and is the need of the time, but the only problem is that the governments and the politicians need results in short span of time within fortnight and that is not possible'. (Focus group discussion, University D)

Similarly, the Vice-Chancellor gave the example of Malaysia where dynamic leadership has capitalised on human resource in different fields. The country sent many students to different universities of the world, said the Vice-Chancellor:

'...And told them once you complete your studies, we will pay you more than any other country. They paid heavily to their PhDs and to their specialist doctors and the result is that in every sector today in Malaysia – in education, health, industrial sector – every sector is headed by internationally qualified people and they have changed the fortune of the country.' (Vice-Chancellor, University D)

The implication of the above quotation is that our country should retain its bright human and intellectual resource. Employability and retention of faculty is a challenge, but it offers opportunities to retain people in Pakistan to build up their own economy.

'The output of universities takes decades and decades. For example, America adopts (attracts) the best doctors in the world and employs them in US. They gave them excellent salaries. They give them all sort of benefits. (Vice-Chancellor, University D)

Investment in welfare-related issues such as health and education is money well spent, as it will come back to society and the economy.

> *'As a result, America is on top as far as health care is concerned. They are earning billions out of it. You go and see that the doctors who are working there are mostly Indians, Pakistani, Turkish and Iranian. So that is one example, that when you attract an educated lot and they stay at work, it's wonderful to reap the benefits.'* (Vice-Chancellor, University D).

The vice-Chancellor was of the view that the brain drain should be replaced with brain exchange. Moreover, the students needed to be taught ethics and moral values, as command over their respective subjects was insufficient for their character building and personality development.

4.6 Case Account E

4.6.1 Background

University E is a high quality research university that has evolved as a genuine Centre of Excellence in Pakistan. It has an outstanding faculty and the required equipment for its needs. The students are well trained and largely employed by defence organisations such as Pakistan Atomic Energy Commission (PAEC), the Nuclear Institute for Food and Agriculture (NIFA), Pakistan Institute of Nuclear Sciences and Technology (PINSTECH), and others. It has only limited interaction with industry but works closely with national strategic organisations on defence related projects. It has also developed equipment such as laser machines for cancer treatment.

4.6.1.1 Physical infrastructure

This is a public sector research university, established in 1967. Its main campus is in Islamabad, the capital of Pakistan. Access to the campus is not easily granted, and the researcher had to wait three months to visit the buildings and faculty for fieldwork. Due to the fact that all interviews were conducted in a closed environment where researcher was not permitted to take a campus tour, not much information could be gathered about the physical infrastructure. I have seen the departments and divisions but, due to privacy, I cannot provide details aside from each department having a separate building, that classes were spacious and equipped with the latest teaching resources and that a secure environment was observed across the University.

4.6.1.2 Knowledge infrastructure

The University has various facilities, especially state-of-the-art laboratories. 'I would proudly mention that the library was established in1969, at the Centre for Nuclear Sciences' (Faculty member, University E). Till today, it caters for the needs of researchers and academics and has reading material for Chemical and Materials Engineering, Electrical Engineering, Mechanical Engineering, Nuclear Engineering, Computer & Information Sciences, Communication and Management Sciences, Medical Sciences and Physics and Applied Sciences. As mentioned earlier, these are the subjects currently taught and need up-to-date facilities for the students. Some of the equipment that I saw during my visit is as follows:

- Cryogenic probe station with environmental chamber
- LCR meter
- Parameter analyser
- Software for IV and CV measurements

I am not an expert in this field I do not know the functions of this equipment, but I observed that students were using it in practical demonstrations of the courses being taught.

This is a public sector research university. It is one of the high-ranking universities in the field of engineering which is why it is selected as a case for understanding the role of universities and challenges in establishing KBE in Pakistan. The University started teaching physics, information technology, biomedical engineering, materials engineering, chemical processing, mechanical structures, and laser technology, nuclear medicine, nuclear technology, and physical sciences. To broaden participation and encourage greater competitiveness in this programme, scholars are challenged during their courses with a number of research activities and successful scholars are awarded scholarships. Laboratories are well-established and new buildings are being erected. The enhancement in infrastructure will always be needed in a fast-growing university such as this. The University has nearly a hundred faculty members and 500 students graduate annually from it. Almost fifty students are enrolled in PhD programmes on national security-related research topics. An unusual aspect is that research has always been an integral part of the curriculum here, with over thirty research laboratories across the country and expensive equipment capable of conducting cutting-edge research. The students excel in developing products from their research: a computer-controlled drill, a milling machine, tanks and robots have been developed, as a few examples (Newsletter, University E, 2010).

4.6.2   Readiness for KBE

The university E is fully prepared for the paradigm shift into a KBE. Describing the conditions of the universities and perceptions of faculty members in the following sections highlights this theme.

4.6.2.1 Mission and functions of University E

University E aims 'to improve its students' learning experience', enhance the quality of research, 'serve the community to the best of our ability and improve its efficiency so that it is better prepared to meet the current and future demands of working in higher education' (Vice-Chancellor, University E). The University meets the expectations of its customers, added the Vice-Chancellor. The commercial application of the knowledge created and its application are apparent in its links to other universities, research centres and the industry sector.

The human resource produced at this University is for Pakistan Atomic Energy Commission (PAEC), the Nuclear Institute for Food and Agriculture (NIFA), Lahore Chambers of Commerce and Industry (LCCI), Pakistan Institute of Nuclear Sciences and Technology (PINSTECH), National Centre for Non-Destructive Testing (NCNDT), Applied System Analysis Division (ASAD) and many international organisations such as IEAE. The faculty expressed their ideas on the market value of their students that:

> 'We produce limited numbers of students and those students are employed by our defence industry' (Faculty members, University E).

Elaborating on the problems of industry, the Dean of Chemistry said:

> 'Original research is not conducted in our industry. Industry deals with petty issues that we do not deal with. They cannot absorb high level, original research. Therefore, their link is very weak with us. Our industry does not aim for making new products, creative and innovative, rather their level is very low…Atomic energy is benefitting from universities, and some projects are going to the industry such as manufacture of batteries. The environmental group is working on Thar coal. The coal mines issue is not highlighted properly. Actually in our coals, the sulphur contents are very high and unless that is handled, coal cannot be used for power generation. …I am working on cancer by laser treatment. We are doing it free of cost. It is directly benefiting the common man. We are doing both Mode 1 and Mode 2 researches' (Dean of Chemistry, Case E).

These are a few of the projects that are benefiting the market, but overall the research of the universities is not utilised in industry because of its low absorption capacity.

> *'Basic research cannot be used immediately and we do not have continued funding forever. It takes 10 years. The clinical research can be brought immediately to the public. We have made laser equipment for treatment of cancer but such technique does not exist in our market so we are the users and makers of the product.' (Faculty member, Case E)*

Another faculty member expressed the same situation:

> *'The current products, which are available in market, do not need research. You can do research on new things and when you wish to advance a product or a service. The universities have the potential to do up to date research but why would industry invest in new products when there is no market for these new products?*' (Faculty member, University E)

Some attribute this lagging behind in the race of knowledge economy by developing countries to their weak institutional set-ups and inertia. The nation does not move forward, as the following words suggest:

> '*Institutional system in Europe facilitates development but in Pakistan there is a force of inertia in the institutional system. There are so many hurdles that we give up making any positive changes. Our system does not give liberty to people to work in innovative way'. (Faculty, Case E)*

Why is there inertia in the institutional set-up? It might be considered to be a national cultural impediment that people do not like experimentation and taking risks. It might also be that people's minds are slaves to the feudal system in the country and are not allowed to think independently. To keep people under strict control, the feudal lords of the country do not allow the local population to educate themselves. It is a vicious circle that can only be broken by educating young children not to surrender to feudal lords. Speaking of his university, one of the faculty members said that it is leadership that determines the direction of an organisation, university or state. At the same time, he was dissatisfied with the paperwork, procedures and bureaucratic hurdles found in all public organisations:

'I think that in our have the talented students and hardworking faculty members. We can easily do things that we will not be able to do in other organisations in the country. The heads of the university is very cooperative and they encourage changes in the system of university. Rectors and VCs are the authorities but they make positive use of their power. In government organisations things are very bureaucratic and cannot be done easily. If I am able to use laser technique in the Pakistan Institute of Medical Sciences (PIMS) it is because I am sitting in University E. Similarly, I have submitted my proposal to the Ministry of Science but so far they haven't funded my project and it has been one year now'. (Faculty member, University E)

Speaking of collaborations with the community, the University has a targeted community and an industry for which it works but, commenting on the overall scenario of university–industry linkages, faculty members expressed the following view:

'If Rolls Royce is spending millions of pounds on Material Engineering department at Cambridge, they would have made sure that they can get back something out of it. No such thing is possible here. Our universities cannot solve the problems of industry so the industrialists do not invest in Pakistan.' (Head of Material Engineering Department, University E)

It means that because universities and industries have never collaborated, their respective strengths and weaknesses are unknown. The University believes that other universities cannot solve the problems of industry; hence industry does not invest in them. However, it is not so. Many companies have invested in other universities, knowing that they can obtain services at low cost. The linkages are not sufficiently effective to bring about a change in the system and as a result this wrong perception on the part of that particular academic was noted, yet it is a fact that a gap in communication with industry does exist in the context of Pakistan.

4.6.2.2   Perceived understanding of KBE

I asked the staff about their perception of KBE and the prospects for Pakistan's transformation into KBE. They explained that Pakistan, being an agricultural economy, could capitalise on the agriculture sector. All four crops Pakistan produces are world class and, if exports are increased, the economy can grow. They said that although, agricultural universities are researching and producing new seed, this is not enough for the country. Many faculty members complained that new technologies could be used to increase the field productivity, but agriculture has not been regarded as an industry. I will quote from one of the interviews to support this view:

'I think we should invest in agriculture. It is not an industry in Pakistan. NARC, PARC and Agriculture University are doing very good research but still we are not focusing on the agriculture sector as an industry. (Head of Material Engineering Department, University E)

Although Pakistan has the largest irrigation system, four seasons and all types of land, no one has tapped into this area of the economy to strengthen it.

The faculty members also pointed out that shift towards the KBE depends on the will of government.

'Well…. it depends on the will and wish of the government. For example Dr. Atta had government support and we have many good things happening in Pakistan.' (Professor of Nuclear Medicine, University E)

When the leadership of the country embarked on a mission of socio-economic development in the past, Pakistan really progressed. The academics at this University have a conviction that if investment continued in higher education for at least a decade, alongside basic education, then the economy of Pakistan can improve. However, basic education (primary and college level) also needs a good leader who can completely restructure it. Secondly, the faculty members state that industry is paralysed as well as outdated, and to develop a knowledge economy a complete restructuring of the economic system is essential.

The faculty members believe that research on agriculture should be a priority area for Pakistan. The researcher agrees with him as this could lead to maximum returns in the shortest time, involves relatively simple interventions such as farmer education through extension services, and could lay the foundations of KBE by generating funds that could then be invested in critically important projects.

4.6.2.3 Challenges faced by academia

The quality of education at University E is excellent, but the head of Material Engineering expressed his view of other universities in the country:

'Quality of education is not up to the mark. The numbers of universities have increased but quality has not risen. We don't have industry. The only industry we have is the defence industry. If I submit a proposal that I can make a device, which can catch terrorists, then I will immediately receive funds from defence. We are just exploiting the defence industry'. (Head of Material Engineering, University E)

The staff first of all appreciated that the HEC has increased access to higher education, yet pointed out the pragmatic issue that when access to higher education is increased, quality also needs to be considered. Since there are now many universities in the country, the HEC cannot unfortunately deal with all quality issues. That is why few universities following HEC guidelines manage to produce top-notch human resource and collaborate with industry. All universities need to raise the quality of education by following best practice. However, neither they nor the HEC can deal with all aspects: the government has to come forward and build industry, introduce land reforms and create an environment appropriate for business. The HEC has been focusing on university–industry linkages, but when there is no industry in the country how can such links be forged? In answer to his own question, he said:

> *In fact we are too much in a bureaucratic control. It is one-man show. Our system revolves around a person. If Atta-Ur-Rahman is Chairman all his rules will be followed. Our universities have no systems.'* (Head of Material Engineering, University E)

Basically, in Pakistan there is no system of merit or institutional set-up: organisations revolve around people. When Dr. Atta was the Head of the Commission, the government supported him and HEC did a miraculous job. Now the government is not in favour of HEC it has imposed budgetary cuts on HEC and the universities. The same governance issue was raised in the focus group discussion. If the head of an organisation is competent, it performs well. However, when that person leaves after completion of their tenure, quality and productivity decline. The members of the focus group provided the example of the University of Engineering and Technology, Lahore, that has raised its teaching and research profile significantly under the supervision of a lieutenant general. They said:

> *'Take the example of UET, the university was growing worse. All of a sudden a lieutenant general becomes the leader of the university. He knows how to get money out of the higher-ups, so he is successful and so is the university.'* (Focus group discussion, University E)

The evidence suggests that leadership of an organisation plays an important part in its development. It is also seen that military personnel prove to be efficient and effective administrators. Disappointed with the corruption of politicians, many people of Pakistan think that in order to run the country, strict discipline is needed. The military, alas, is the only institution in the country that has this discipline to carry out tasks as planned.

Although the performance of University E is excellent but the faculty members were pessimistic of the development of KBE since there was very little industry in Pakistan. Industrial development and strength were important before a meaningful interaction with universities could occur. There was concern expressed at the twin and often conflicting challenges of access and quality of higher education that were being addressed by the HEC but the issue still persists. The commission aim is to increase the access to higher education and improve the quality of education besides making education relevant to the needs of the country but these steps need significant investment while there is lack of political will to continue these policies to strengthen the higher education sector or the industry in the country. The lack of a sustained policy and system that results in the appointment of competent leaders on merit is another hurdle which stops the country from any knowledge based development. Moreover, corruption in the government at the highest levels has prevented sustained socio-economic development.

4.6.2.4   Policy matters

All academics believe that the first and foremost responsibility of a state is provision of basic facilities such as education and health services. The changing political scenarios have affected the development of national institutions of government for education, such as school, colleges and universities. Different governments have different priorities; some focus on primary education while others think higher education is more important. One of the faculty members indicated that this change in interests of politicians has created an imbalance in the educational system. A holistic system of education is a prerequisite for socio-economic development, and both basic and higher education are important in their own right:

> *'My students used to go to another university but now we have all the equipment. Have a look at our policies, when Benazir was PM she focused on primary education. Then, Musharraf focused on higher education. Now the primary education sector is affected. We need to have a balanced approach.'* (Focus group discussion, University E)

The focus group discussion also indicated that the culture of the country accepts corruption as a part of culture of society. The focus group suggests that the country has had excellent policymakers but that some individuals manipulate policies for personal gains.

> *'We have good policies but due to lack of sincerity and sometimes due to corruption we do not carry out those policies. We do not think as a nation. We have individualistic approach.'* (Focus group discussion, University E)

This attitude is found in every organization of the country, according to the group discussion. Also, they have suggested it needs to be changed if economic development, harmony and peace are to be achieved. Those are the internal factors. External factors pertain to international politics that directly affect the national policies.

'One more thing: we have made ourselves involved in international politics and we are suffering because of that. We say that if we do not divert 80% of money to our security and defence this will happen or that will happen. We are a welfare state and we should focus on the wellbeing of our citizens. Our focus should be health, employment and education, which is not at the moment!' (Focus group discussion, University E)

An external threat (either hostile neighbours or economic bankruptcy) has always threatened the people of Pakistan, endangering the country, and huge funds are allocated to the defence sector. In the global knowledge economy, the faculty members expressed with rage, this argument does not work, since other nations are fighting on the knowledge front rather than borders. The government needs to focus on strengthening the educational sector, the knowledge base and the service sector. Since leadership lacks real sincerity, mere slogans and rhetoric are used to pacify the people when they ask for their rights. Wilfully neglecting the education sector and focusing on defence and security issues have halted intellectual awakening.

Moreover, one of the researchers said:

There is no electricity and gas – how can industry be run then? You go to Faisalabad and then you will find people having strikes against the government for failing to provide electricity.' (Faculty member, University E)

Basic infrastructure is missing that is critical for development. One of the deans of University E made a similar comment, that the real issues are power shortages and unemployment that could be resolved if the government designs an effective strategy, makes use of local resources and assigns tasks to universities to solve local issues. Individuals cannot change the system, but governments can turn around the country's condition because it has fully-fledged machinery available for any such changes. One such engine of socio-economic development is the university! The Dean said:

'Let me tell you one thing, see in the country there is a serious power shortage problem. In a country like Pakistan where there is huge hydro-electric potential and wind potential in the south of the country and engineering universities are there, (yet acute) shortage of electricity is there. Physics and applied physics departments do a lot of work in this direction but these sorts of initiatives are not to be done by individuals; efforts and funds are required from the government. For example in Nepal, hundreds of micro-hydro power-generators are installed. The same type of hydropower generators can be installed in the northern areas and even in the south. I do not understand, why there is no effort in this direction...that is right, the government should take the first step then the universities come into play' (Dean, University E).

Commenting on the Commission's role in the development of the higher education sector in Pakistan, academics had positive views. However, they look with scorn at the quality of research currently being done and the expectations of the HEC. Recently the trends have been changing with the immense investment into higher education but the research does not have any direction as what are the priority areas of research for the country so that universities can focus on those areas. Besides teaching, the faculty started taking part in the research initiatives. But the dichotomy lies between the preference for publishing in international journal and conducting cutting-edge research and ignoring the local journals and under-researched local problems.

'Research environment: it has improved a lot during the last 10 years in applied sciences and in engineering. It is also noteworthy that one of the requirements for promotions is that you should publish in international journals of repute. If the scholars in Pakistan address the local problems the international journals may not be ready to publish your research.' (Dean, University E)

Academic staff believes that educational policies have been made every five years since the country came into existence, and their implementation has been the greatest hurdle in the development of Pakistan's economy and in raising living standards for the people. They believe that sometimes policies were made in consultation with bureaucrats and technocrats but, by and large, all the policies have done is 'decorate the shelves', as they were never implemented. One of the research participants has expressed this idea in these words:

'I had quite a good look at the educational policies in Pakistan and looking at those policies all sounded very good. I believe that there may be weaknesses such as the one that you have mentioned about the input from the researchers. But I believe that just policy formulation is not a good solution. I think we need to address the implementation part as well. The execution has been at zero scale probably.' (Nuclear scientist, University E)

The Head of Applied Sciences was asked about how the policies should be implemented. He said that only if everyone was willing policies would be implemented and output seen. There has been major halt in the process of implementation of policies; a group of dishonest people do not allow the country to develop a fair system based on principles, rules, merit and competence. The Head of Applied Sciences suggested this idea:

'Be it in the education sector or anywhere, the implementation requires willingness. I will deviate a little from the topic and give you an example. Such a willingness existed on the part of Edhi and they established such a big organisation. Willingness existed on the part of Shaukat Khanum and they have made a good hospital. So if there is willingness, We Can Do It!!' (Head of Applied Sciences, University E).

In fact the pervasive corruption in the government was pointed out as a major factor that prevented the formulation and implementation of visionary policies that could lead to KBE. The faculty members expressed concern at the inconsistent policies and the low priority accorded to education. The need for having a high quality holistic system of education for socio-economic development is stressed with both basic and higher education being accorded importance. A concern is expressed at the huge amount of funds that were being diverted to the defence sector at the cost of health and educations are damaging other sectors of the country. More importantly, the education sector needs to be developed and some of those funds need to be diverted to education. This will need a national visionary policy to be geared to important national needs (education, health, power crisis etc) and then defence should also receive its due share.

4.6.2.5   Recommendations presented by academics

I would like to quote from a focus group discussion regarding the solutions provided by academicians. One is to create harmony in the country, first of all:

> 'In Pakistan the first issue is harmony and peace, which is required in this country. Secondly, research is needed in those areas, which should address our immediate problems, industrial problems, social problems and economic problems.' (Focus group discussion, University E)

The faculty members believe that the budget allocated to defence is greater than the budget allocated to education. They think that if Pakistan invests in education, there will be no need to invest in defence as the mode of economy is changing worldwide. In a global knowledge economy, wars are won on the basis of expertise in technology –the country that is most technologically powerful and innovative. Due to consistent neglect of education, especially higher education, there is no research environment in Pakistan and people do not have a scientific attitude to life and work. The overall education in the country is directionless and so is the current research. Research should be used, as one of the professors pointed out, to solve industrial, social and economic issues. In terms of either industrial or service sectors, Pakistan is not a developed country. Apart from a few textile mills, Sui gas companies, food processing, chemical and agro-chemical industries, the country has not seen any other industry established in 64 years. Local industries prefer to consult their own research centres and mostly do not innovate. Therefore, academics were concerned that, first of all, there is no industry in Pakistan. Secondly, the government has not developed any policies to facilitate industrial sector growth in the country. Thirdly, universities have proactively supported the rise of businesses and conduct consultancy, but the government had not been able to develop a regulatory framework for the sectors of industry and academia to work together. One of the faculty members at University E said:

> 'There is lack of linkage between universities and industry. The Government of Pakistan should devise such encouraging policies that industry and businesses can flourish in Pakistan and the universities can take up their problems and solve them.' (Faculty member, University E)

Faculty members indicated major public organisations, The Federation of Pakistan Chambers of Commerce and Industry (FPCCI), Trade Development Authority (TDAP), Federal Boar of Revenue (FBR), Intelligence agencies, Customs, as being responsible for the growth and development of industry and businesses. However, there is no coordination mechanism available; universities are not aware of industry's problems. Had the enterprise sector formed partnerships with universities, the situation would be completely different.

One of the nuclear scientists said that universities can help businessmen and industrialists as well as government solve the issues of poverty, increasing productivity of crops, generation of electricity, and other similar tasks, but no one is guiding the universities to work in this direction:

> *'Normally people do PhDs in those areas which are addressing the (problems of) the West. Our local issues are not addressed by our PhDs. For example, we have problems in agriculture but no one addresses them. People are not doing research on power generation.'* (Nuclear scientist, University E)

It is true that the government, responsible for all affairs of state welfare, should provide direction and that if there is no political will to change the condition of nation things will remain the same. A professor said: 'every development depends on the political will. If the political will is not there, how can a nation prosper?' (Professor, University E)

This case account illustrates that academia emphasised on the need for peace and harmony in the country before progressing towards the establishment of a KBE. It will not be realistic if people's life is not secure and the country is aiming for the KBE. Besides, security issues, the country are facing many other local issues. It was stressed that research should be directed in Pakistan to solve immediate problems such as those related to health, education, energy crisis, access to water and other needs. The faculty members recommend that the government should develop a regulatory framework for the various sectors of industry and academia to work together in order to solve these local and international issues. Why is it international issue? It is because the right image of the country is not projected to the international community, if the country has civil war or it is in the state of emergency. The need for close collaboration of universities with industry and such national organisations as the Federation of Pakistan Chambers of Commerce and Industry (FPCCI), Trade Development Authority (TDAP), Federal Board of Revenue (FBR) was stressed by this case account. Proper coordination mechanisms need to be developed for the purpose.

4.7 Summary of case accounts

This chapter has presented the processed case account, on the basis of which, the researcher has developed substantive grounded theory (discussed in section 5.4). It is an important part of the data analysis according to grounded theory procedure (Struass and Corbin, 1990) as shown in Figure 1.2 (the organisation of study). Each case study began with some background information about the history of its establishment. Next, the infrastructure of each university is described, along with the mission or the mandate being pursued. The perspective of each university on KBE and the perceptions of the academics on current issues faced by academia are investigated. A section on the solutions to these problems of academia is included, as presented by the academics. In each case the researcher' critical analysis on these themes are also presented. Finally, the chapter is summarised.

5. Conceptual Ordering and the Model of Symbiosis

5.1 Introduction

In this chapter the researcher compares and contrasts the themes explored in case accounts (chapter 4). The purpose of case accounts was to show 'what is going on' in the field, what is reality and which challenges are faced by universities and how the universities meet these challenges? This chapter extends analysis to an abstract level by cross-case analysis. By processing five case accounts, patterns are identified, themes are compared across the five cases and core categories are developed using techniques (conceptual ordering and theorising) of grounded theory (Strauss & Corbin, 1990). In order to provide insight into the inductively generated Model of Symbiosis, it is useful to begin with explanation of the key concepts. 'Concepts' are divided into 'categories' according to their properties and dimensional range (Strauss and Corbin, 1990). Core concepts are determined besides identifying the subsidiary concepts. Concepts with similar dimensional range are then re-arranged to make the new model. By applying the principle of conceptual ordering four categories are generated, which are stated below:

1. Institutional support for creation of a KBE
2. Socio-economic development, through universities
3. Perceptions about the KBE: An academic perspective
4. Fostering a KBE, achieving sustainability

The above stated categories lead to three core categories i.e.

1. Ideological foundation, vision and policy
2. National Eco-System of Education
3. University Industry Linkages

The substantive theory generated by these procedures is called the Model of Symbiosis. The model is described in five phases. These are

1) Institutional development
2) Governance and Management
3) Synergy
4) Normalisation and leapfrog
5) Feedback

These phases represent the five stages of the roadmap for transformation into KBE. Other characteristics of the Model of Symbiosis include its spatial disposition and activities. Spatial disposition represents the location of the Model of symbiosis in global context and activities are the specific policy recommendations of the study for transforming a developing economy into KBE. At the end, the chapter is summarised.

5.2 Conceptual ordering

This section deals with discussion of the emerging concepts to unfold the intervening conditions of the phenomenon occurring in the universities, action reaction strategies, and their consequences. Conceptual ordering is an analytical process based on two procedures: asking questions and drawing comparisons across the case accounts. Due to these two procedures, the core analytical procedure is termed as 'Constant Comparative Method of Analysis' (Strauss & Corbin, 1990, p. 62; Glaser & Strauss, 1987, p. 106–107). Concepts are divided into categories according to their properties and these are related to the core categories in a logical way to produce an inductive theory. These procedures helped the researcher to attain conceptual density and categories are discussed in this section.

1.   Institutional support for creation a KBE
2.   Perceptions about the KBE: An academic perspective
3.   Socio-economic development, a proactive role adopted by academia
4.   Fostering a KBE, achieving sustainability

5.2.1   Institutional support for creation of a KBE

The case accounts illustrate that first and foremost role of a government is to develop visionary policies and implement them over a longer period of time, if the outcomes of the policy are positive. Case A evidences this fact in the following statement:

> '*If you want to have a visionary policy, then you have to put these things (politics, reference, vested interest etc.) on back burner and get the think tanks work, and create some intellectual environment*'.*(Case A)*

The KBE is considered as policy shift by the academics therefore, they suggest, the government ought to design policies, which support the creation of a KBE. However, in the context of research, 'policy' has emerged as a key problem towards development of KBE (as noted in sections 4.2.2.4, 4.3.2.4, 4.4.2.4, 4.5.2.4, and 4.6.2.4) in Pakistan. The tables 5.1, 5.2, 5.3, 5.4 and 5.5 summarise the policy related issues raised in case accounts under the major category of Institutional support for creation of a KBE in such a way that the 'policy formulation', 'implementation', 'policy output' and 'feedback' are represented individually with their properties and dimensions. At each stage of policy framework shortcomings are seen which suggest that the system of governance has failed miserably. The government is paying lip service only, instead of developing a strategy for holistic development. The first sub-category in the Institutional support for creation of a KBE is policy formulation. Table 5.1 shows policy makers are competent to develop policies in the context of research but they do not consult the faculty members for opinion in any field. In the last sixty four years, a mix of competent and incompetent policymakers developed policies for the country but neither of the two groups of policymakers, consult academia for opinion on how to solve the issues of the slow development. On further probing into the issue of policy framework and failed governance system in the country, it is observed that, the bureaucrats or policymaking bodies are guided by the politician's vested interests instead of demands of the public. Academia explained that there is no intellectual input in policy. Academia said that there is no 'direction' provided by the government as what targets the country wants to achieve so that the faculty members can conduct research, educate human resource according to the requirement of the state.

Table 5.1 Policy formulation

Category: Institutional support for creation of a KBE		
Sub-category	**Properties**	**Dimensions**
Policy Formulation	Competency of policy makers	Highly competent Incompetent
	Composition of the policy making team	Bureaucrats Intellectuals/Experts in the field
	Direction	Politically influenced Public opinion based
	Nature of policy	Based on ideology Adopted/foreign influence
	Time period	Short lived Completed its tenure
	Resources	Available Unavailable

Source: Author

What are the other issues with policy framework in the context of study? Policy matters in Pakistan are more of a political nature or of a popular nature rather than having policies formulated on merit to address the pressing problems of the public. This implies that the political leaders influence policy makers, to the extent that policies are manipulated. Bureaucrats design policies according to will, wish and needs of politicians. Read the following statement which advises that researchers who have accurate information and understanding of issues, are not included in the policy formulation teams hence they are excluded from the policy making process.

> *'I believe that bureaucrats have got their own value and they have got their own importance, I don't deny that, their supervision must contribute, even if they contribute they must be surrounded by a definite number of professors, researchers, or top most people of that profession, in terms of guiding them what is done and what needs to be done'. (Case C)*

This has emerged as a trend in Pakistan that advice of experts and demands of public for education, employment, health, clean water and energy (all sorts of fuels and electricity) is ignored in the policy formulation process. Hence, policy is influenced by politics. Usually, rulers such as the President/ Prime Minister and Ministers, as well as their machinery such as MNAs (Members of National Assembly) and MPAs (Members of Provincial Agency) are the actors on the political stage of a country and their actions are referred to as 'politics' (Minogue 2005). These political leaders work according to certain agenda in other countries but in the context of current study, uneducated political leaders govern the country. They do not observe the human ethics and fail to provide the facilities which states provide to its citizens. The people of the country despise the so-called 'leaders' of the country who rely on foreign aid heavily while plunder the public money. Inequality prevails and youth are frustrated. The politicians (note, that the faculty use the term, 'politicians' instead of leaders) cannot be expected to develop any visionary policies for driving the economy towards the KBE. Table 5.1 shows all kinds of resources are available in the country, but these resources are not utilised for the welfare of the people. The governments are not willing to bring any change through sincere efforts for development. The reasons are various but two major reasons are cited by case accounts. First they lack vision; second, government is not willing to take the country towards development in concrete terms. Table 5.2 demonstrates the deterioration of governance.

Table 5.2   Policy Implementation

Category: Institutional support for creation of a KBE		
Sub-Category	**Properties**	**Dimensions**
Policy Implementation	Funds	Embezzled Resources are not utilized fully
	Fully implemented	Implemented(in foreseeable circumstances)
	Un-implemented	Unimplemented (in unforeseen situations)

Source: Author

Table 5.2 also shows the process of implementation of policy is plagued by funds embezzlement and since no policy is fully implemented, therefore, no one can stop this social evil of miss-use of public money.

Table 5.3   Policy Implementation

Category: Institutional support for creation of a KBE		
Sub-Category	**Properties**	**Dimensions**
Policy Outputs	Public satisfied	Positive feedback
	Public unsatisfied	Negative feedback

Source: Author

Table 5.3 shows that the output of policies is not visible. The people do not have the basic facilities (education, health and employment) of life. The 'output' of policy framework in Pakistan is not admirable. Most of the people of the country are not satisfied with policy outcomes for health, business and other sectors. Some improvements are seen in the educational sector only. The documentary evidence shows that the aim of the Pakistan Council of Scientific and Industrial Research (PCSIR) is to achieve 'economic growth, improve quality of life, national security and safety through implementation and utilization of advanced science and technology' (PCSIR, 2010) but the ground realities are different. The economy is not flourishing and the rate of inflation is rising. The education sector has improved as there are more universities, researchers, research councils than in the past but the enabling environment is still lacking to which the academics have referred to in case accounts. One example is provided below which shows the faculty members are not satisfied with the overall quality of education and the implementation of education policies in Pakistan. The academics have only a few examples to refer to had they been asked to name the best universities or research centres of the country:

> *'The research culture is very sporadic. If you look at the HEC ranking, QAU, Agha Khan University, Punjab university, Peshawar University. I mean these are the few 4-5 names that come to the front when talking about imparting quality education or successful educational policy implemented in our country' (Case E).*

It shows education sector has some achievements but the research environment is not yet created. This can be explained further by the next category i.e 'feedback' on policies shown in table 5.4. If policy yields good results and the people are satisfied then the policy should be continued.

Table 5.4   Feedback on policy

Category: Institutional support for creation of a KBE		
Category	**Properties**	**Dimensions**
Feedback	Intended outcomes Achieved/not achieved	Positive feedback Feedback unknown
	Failed policy	Presence of Pressure
	Purpose	Ideological subversion Hinder the development

Source: Author

However, there is no mechanism in place for 'feedback' on policies therefore, every government start a new experiment with economy and other matters of the state but as they start understanding the political and economic situation of the country, the government tenure is over or the government is turned over! Or, the individuals who wish to contribute to the policy and practice in the country, is transferred as a result of political influence. For example, read the following comment of an interviewee.

> *'By the time, bureaucrats start understanding the problem of a department, say health department, say in 2-3 years by that time the secretary health starts understanding what health department is and how it works, he gets transferred out'. (Case C)*

It has also been reported that policy review process is not allowed to take place because there are certain pressure groups that are stopping the country from development. They create an air of mistrust among people, when a political leader wants to bring revolution and people look at the plans of leader with suspicion. This kind of attitude is developed among people deliberately because it will not allow the country to prosper, which is the ultimate aim of these pressure groups. The aim of the pressure group is to keep the nation in a state of under-development for long period of time so that they forget their national identity. This has been noted in 3 sections i.e 4.3.2.1, 4.5.2.1 and 4.3.2.4.

The following table 5.5 summarises the above discussion on 'policy' aspect of Institutional support for creation of a KBE.

Table 5.5   Institutional support for creation of a KBE

Category: Institutional support for creation of a KBE		
Sub category	**Properties**	**Sub category**
Policy Formulation	Competency of policy makers	Highly competent
		Incompetent
	Composition of the policy making team	Bureaucrats
		Intellectuals/Experts in the field
	Direction	Politically influenced
		Public opinion based
	Policy based on	Based on ideology
		Adopted/foreign influence
	Time period	Short lived
		Completed its tenure
	Nature	Short Lived
	Resources	Available
		Unavailable
Policy Implementation	Funds	Funds embezzled
		Resources utilized
	Fully implemented Un-implemented	Implemented in foreseeable circumstances
		Unimplemented in unforeseen situations
Policy Outputs	Public satisfied Public unsatisfied	Positive feedback
		Negative feedback
Feedback	Intended outcomes	Positive feedback
	Achieved/not achieved	Feedback unknown
	Failed policy	Presence of Pressure
	Purpose	Ideological subversion
		Hinder the development

Source: Author

Table 5.6 depicts the failed governance system of the country. The political history of Pakistan is full of political turmoil. Martial laws were imposed and political governments had to be overthrown on the basis of failed policies and public demands/agitation. In the interests of the welfare of the state, the army reluctantly took the control. However the army is an institution whose role and duty is to protect the state (defence) rather than take the responsibility of national governance. This confusion of roles between the two institutions has caused political instability in the country for decades. The dimension, 'Tenure and relation with other actors of institutional set up', 'mode of governance' refer to this infringement of roles. The table 5.5 shows that the country is in the dire need of a visionary leadership, who can take the economy on the path of growth and development.

Table 5.6   Governance and Management

Category: Institutional support for creation of a KBE		
Sub-category	**Properties**	**Dimension**
Governance and Management	Mode of governance: Democratic government Military/Martial law	All institutions performing their role or infringing roles and duties? Economic growth
	Leadership	Visionary/dynamic/ Progressive Orthodox
	Regulatory framework	Developed Undeveloped
	Influence on society	Positive Negative
	Country's projection in the global world and impression on its people	Good image Bad image
	Tenure and relation with other actors of institutional set up	Short time (in conflict with other actors) Completed its tenure (good relation/no infringement of roles)

Source: Author

Military regime is not the solution to the bad governance, on the other hand, the politicians are neither competent nor trust worthy. The educational degrees of 51 Members of the Parliament in 2010 are forged and those of another 251 are suspect (probably also forged, they refused to submit the required documentation) and yet they continue to serve in the Parliament with no action taken against them! Corrupt political leaders appoint such people on key positions in the National Accountability Bureau (NAB) and other organisations who can easily become the part of the game. Therefore, the heads of institutions responsible for checking corruption have become part of the massive corruptive practices rather than checking it. Every new government designs its own policies according to its own vested interests and the public interests and demands remain unfulfilled. In this manner, regulatory framework could never fully emerge as independent organisations and laws/rules remain un-implemented. These circumstances gave an opportunity to the politicians in each major political party to plunder the country's resources each time that their party wins the elections. This game, which is called as 'the vicious circle of politics of Pakistan' or a 'musical chairs show of the corrupt' by some cases, has been played for decades. The academics prefer to have a democratic system of governance but they regretfully claim that governance and economic growth are invariably better when military regimes overthrow such civilian governments. Indeed the GDP growth of Pakistan has always been much better under every military regime than under any proceeding or subsequent 'democracies'. These findings of the study are consistent with findings of a study conducted in the context of Brazil by Almeida (2008). Military governments in Brazil continue to apply science and technology polices so that the country can develop. The creation of a KBE requires 'regulatory framework', rules for intellectual property and incentives for science and technology, in order to create research culture, however, in the context of Pakistan, table 5.6 shows the influence of democratic governments or political will has always been negative on academia. During military government's regime, dictators are able to utilise all resources of the country judiciously and in a disciplined manner. Due to their strict adherence to policy (which the military generals have developed in consultation with the technocrats for immediate solutions to the failing socio-economic conditions, and based on reality check) country is usually saved from being defaulter. These are merits of military government that the resources are allocated appropriately and policy is fully implemented but in the state of emergency or military regime, institutions cannot develop. Education sector is developed during military government's regime but as democratic government takes over, funds are also diverted from the education sector to other sectors.

The international community sees the effect of poor governance on society and economy of Pakistan. Case B, Case D and Case E have pointed out unanimously that their universities produce the best graduates (doctors, engineers, scientists) with the necessary subject knowledge but if they lack moral sense, ethical thinking and lack of patriotism then the

country will not progress (as is the current state). This is a common situation in all developing countries. For example the study conducted by Nanal (2007) advocates for developing countries to develop an ethical culture based on transparency before, moving towards the mission of transformation into a KBE.

5.2.2 Perceptions about the KBE: An academic perspective

Most of the academics consider the Knowledge Based Economy could possibly be the new direction that the country/people are looking for and become the part of paradigm shift towards global KBE due to the increasing unpopularity of politicians and increasing awareness spread by the media about socio-economic development in other parts of the world due to technological and knowledge revolution. The aim of the academic community is to collaborate with international universities and companies for knowledge and cultural exchanges and transform the economy into a KBE. Their understanding about the knowledge economy is clear: it will lead to socio-economic development. Table 5.7 shows the category 'Perception about KBE' which has one main sub category i.e socio-economic development. It has its spill over effects, which are shown in the 'properties' i.e Knowledge flow will be created between the actors of society and it will lead to development of a scientific approach among people. This is also promulgated in the aim and vision of all the current policies of the HEC that the organisation wishes to foster such values and attitudes among people by virtue of which they can recognize science and technology as critical factor to their future prosperity (HEC website). To achieve this aim, Case A suggests that education should be affordable and every citizen should have access to basic, secondary and higher education. A KBE is an economy, which is based on human, social and intellectual capital, which can only be accumulated if the level of education is increased and epistemic cultures are developed in every organisation and sectors of the society of Pakistan.

Table 5.7   The KBE as viewed by academic leaders of Case A

Category: Perception about the KBE		
Concept	**Subsidiary concept**	**Properties**
Perceived understanding of the KBE (Case A)	It improves socio-economic conditions, therefore, it is a means to socio-economic development	Knowledge flows easily between the actors of society Scientific approach Standardisation Merit prevails Positive attitude towards work
		Products (Commercialised Incubated High tech industry)
		It gives power to every sector, by fulfilling needs of industrial sector, farmers, business needs
		Education will be affordable
		Human intellectual Social capital is produced

Source: Author

Case A considers that the creation of KBE in Pakistan will lead to a chain of positive events. It will help in the development of a scientific approach and mind-set among the people of Pakistan. For instance the development of technology-based farming could be one of the many consequences, leading to poverty alleviation among the rural communities of the country. It is assumed that economic development leads on to social development, so it will have a positive impact on the development of the society as a whole. It is also suggested by Case A that the needs of every sector of the economy can be fulfilled if a merit based competitive system, that is an integral part of KBE, is introduced and rewards/punishments are given on the basis of competence. In the current scenario, reported by the case accounts, the 'powerful' or the 'rich' can violate law without being punished.

In line with the above stated consequences, the study suggests following definitions and consequences of the KBE derived from Case A.

> *'KBE improves the overall society: its effects are positive both for industry, government and hence for every sector of the economy' (Faculty, Case A).*

Hence, the KBE improves all sectors of an economy. Another aspect is derived from the interview with the Vice Chancellor University A:

> *'Any segment of society, whether it is an industrial sector, business community, farmers, etc., for all of them the KBE makes perfect sense because Knowledge is Power' (Vice Chancellor, University A).*

It is apparent that both these academic leaders have referred to the application of knowledge in society and its spill over effects on the common man. Any invention or innovation process, which is out of reach of the use of common man, will not be appreciated in a developing country. The 'power' refers to a) availability of human resource and, b) availability of opportunities, services and products, which increase the means to a comfortable life through better socio-economic conditions.

In the context of Case B, table 5.8 shows that the concept of a KBE is related to survival of the smartest. This is consistent with the aspirations of the university to empower the society through science and technological education.

Table 5.8   The KBE as viewed by academic leaders of Case B

Category: Perception about the KBE		
Concept	**Subsidiary concept**	**Properties**
Perceived understanding of the KBE (Case B)	A society and economy based on the principle of the Survival of the smartest	Universities as part of economy and works for welfare of society
		Create wealth
		Raise IP
		Knowledge if power. Physical strength is replaced by skills and intellectual capacity of multitasking
		Efficient and effective education system
		Survival of the 'smartest'
		All mechanisms are in place such as
		Intellectual property is protected
		Patents are produced
		Commercialisation of products is easy
		Linkages are formed with industry to foster innovation
		Competition between universities is needed. Just 5 best universities can do nothing
		All universities should be competitive (university is an important player / actor)
		KBE is a result of collaboration between different disciplines / fields in various public and non-public organisations

Source: Author

In this respect, the following definitions are presented to support the above given statement about the perception of KBE in the context of Case B:

> 1) *Universities should create two facets of knowledge: one is to strengthen the fabric of the society which is environment, tradition, culture, national character and this happens through sociology, anthropology, philosophy, human psychology, logic, critical thinking, music, sports; all of these are extremely important. The other aspect of a university is to (acquire the) use of scientific knowledge to help industry, in order to improve productivity, products and services, through research, entrepreneurship and innovation. Once this happens, it will create the financial resources to enhance the standard of living. So this is the model, which we are trying to pursue with our faculty members' (Director General, School of Electrical Engineering and Computer Science, University B).*

The above quotation shows that the human resource, which is well prepared and highly trained in various fields, can help different sectors of society. Hence, developing a scientific approach or the mind-set among people can bring about a major cultural change.

The second definition of KBE emerges from the statement:

> 2) 'All the major initiatives start from universities. Universities play a major role in first conducting research, which is ultimately utilised for the development of technologies. Moreover no nation can survive without education and good universities produce good education and inputs to society.' (Deputy Commandant, University B).

The above statement emphasises the fact that universities play a fundamental role in the development of a robust KBE because these organisations are equipped with the necessary human resources and up to date knowledge to conduct research, develop products and deliver services to society. Hence, the need of smart and educated people in a knowledge-based society is a vital prerequisite. Universities can fulfil this need and hence the debate of knowledge economy seems to be rising among academia of Pakistan. It is a very positive development or a step towards the creation of a KBE in developing country like Pakistan that universities and faculty members have volition to bring change in the conditions of the country. The universities in Pakistan are part of the society and the leaders of academia think that their society has suffered for sixty-four years. This realisation has provoked the universities to adopt a proactive role in development of their society.

How does Case C perceive KBE? Table 5.9 illustrates KBE is perceived to be a mode of governance in which the government has the major share of responsibilities towards society and economy. The following three statements/definitions reflect their ideas about KBE:

1)   A system in which people work according to certain agreed standards; they take initiatives and their efforts towards national development are rewarded accordingly.

2)   A system based on people with knowledge and information of all sorts, accurate perception of reality, and awareness of their weaknesses and strengths. These people have positive attitude towards work. They rely on their (own) strengths and hence they are more self-reliant and manage their resources efficiently.

3)   Government plays a more effective role in the development of a country (if it is) based on Knowledge Economy. Individuals, such as corporate leaders, or organisations, such as universities, may develop the society and economy but basically (it is) the government that makes the strategy and implements it.

Table 5.9   The KBE as viewed by academic leaders of Case C

Category: Perception about the KBE		
Concept	**Subsidiary concept**	**Properties**
Perceived understanding of the KBE (Case C)	Good governance	A system in which people work according to certain agreed standards, ,people take initiatives and their efforts towards national development are rewarded
		'A system based on informed opinions of reality, awareness about strengths and weaknesses, a positive attitude towards work, self-reliance and management of resources in efficient ways is called as Knowledge Based Economy.
		Government plays effective role in the development of a country. Individuals / corporate leaders and universities may contribute in development but the direction/ strategy of development must be devised by the Government

Source: Author

In this way, according to the above stated definitions and the concept presented in Table 5.9, all actors of a state are required to perform their respective roles and individuals follow the same set of rules i.e. work efficiently, capitalise on strengths and try to remove their weaknesses.

According to Case D, KBE is not just a mode of governance or a way to develop an economy, but it is also associated with the culture as well. Table 5.10 illustrates KBE as an essential ingredient to change the social behaviour of a nation and move towards civilisation.

The definitions of KBE according to perceptions of academia of Case D are as follows:

1)   KBE leads to cultural development, once the basic needs of the society are fulfilled. It allows developing higher values once the people's basic requirements are met and as knowledge flows in the system it spreads awareness among people about the cultural, moral and ethical aspects. KBE in developing countries, particularly, Pakistan should differ from the KBE in West because those societies are very individualistic; however, family ties and human values make the basic fabric of the society of Pakistan, which shall remain intact in the new economy.

2)   KBE is a mode of governance i.e. effective policy frameworks are developed and implemented, so that the welfare state delivers its duties and citizens receive all basic human rights.

So the summary of the above statements is the role of government and society towards creating a socially acceptable behaviour in people is vital. The government can create a civilised society, with the implementation of a strategy of knowledge-based economy, hence the people have their rights and prefer to live in the society.

Table 5.10 The KBE as viewed by academic leaders of Case D

Category: Perception about the KBE		
Concept	**Subsidiary concept**	**Properties**
Perceived understanding of the KBE (Case D)	Civilised society Developed on the basis of knowledge	Civilised nation (in every sense)
		Moral, ethical, spiritually demonstrating high values (compassion, kindness, care for each other)
		Civic Sense
		Basic needs are fulfilling
		Population is controlled + educated
		Value for knowledge
		Logical approach life
		Education
		Healthy
		Employed + earning
		Good socio economic conditions
		Good mental approach towards life
		Food / Clothing / employment
		Employment

Source: Author

How could a KBE create a civilised society? The case account D illustrates that knowledge increases the understanding of people about 'what is right' and 'what is wrong' according to norms and value system of a society, hence, people with knowledge and acumen, make informed decisions in life.

Case E envisages a KBE as *a strategy of visionary leaders*, in which the leaders if the state attempt to remove all weaknesses of their society so that equality prevails and the society becomes a better place to live as table 5.11 shows:

Table 5.11 The KBE as viewed by academic leaders of Case E

Category: Perception about the KBE		
Concept	Subsidiary concept	Properties
Perceived understanding of the KBE (Case E)	A strategic, dynamic approach to steer the society and economy	The Government has to come forward and create industry, introduce land reforms, abolish feudalism and create an enabling environment feasible for business and economic development
		Every Development in a KBE depends on the 'Political will' and direction / Goal set by the government
		Under a visionary leader, management of resources (Land, social, irrigation system, four seasons, human resource, talented youth, expert researchers in various fields) by the will of Government to bring about socio-economic development is called as KBE

Source: Author

The definitions of KBE according to University E are as follows:

1) *Every development in a KBE depends on 'political will' and directions set by the government.*

2) *First of all, God is the supreme commander of the state. There should be no doubt about it. After God, the government/ parliaments are the caretaker of the people and society. Under a visionary leader, management of resources (traditional and modern) by the interim government, to bring about socio-economic development is KBE.*

3) *The government has to remain at the forefront, to create industry, introduce land reforms, abolish a feudal-mind-set through education and create an enabling environment feasible for socio-economic development.*

The above stated concept in Table 5.11shows that academia understands the importance of creating a KBE. In order to attain the KBE, major initiative start from universities in Pakistan. How universities are proactively helping the society to adopt this huge transformation, it is explained in the next category i.e 'Socio-Economic Development through universities'.

5.2.3 Socio-economic development through universities

This category is generated by the roles and mission of universities in Pakistan explained in sections 4.2.2.1, 4.3.2.1, 4.4.2.1, 4.5.2.1 and 4.6.2.1.

Table 5.12 Socio-Economic Development through universities

Category: SOCIO-ECONOMIC DEVELOPMENT THROUGH UNIVERSITIES							
Property1: Community Development (Intended outcomes): SOCIETY'S SPHERE							
Public		Agriculture sector (Farmers, industrialists)		Science & Technology based work force	Business Community		HRD Defence industry
Health	Physical And mental fitness	Use latest technology to do farming	Increase the productivity of crops etc	Educate Students on futuristic vision	Successf-ul Business	Provide them good business leaders	Defence and Security
Property 2: Society's Development: WELFARE SPHERE							
Parents and Families		Government		Industry or Business Sector		Non-Governmental organisations	
Transmission of Culture		Provide expert opinion on policy		Innovation		Non-Governmental organisations	
Transmission of Values		Provide human resource		Consultancy			
Property 3: Global Development: GLOBAL SPHERE							
Project soft image of the country; Regional development							

Source: Author

The category, 'socio-economic development through universities' have three sub-categories i.e Community development; society development and global development as shown in table 5.12. The academia perceives that universities have a mission to serve community. For example, Case A has targeted the farming community in order to educate, provide with modern technological knowledge to implement knowledge in everyday farming to increase productivity. Case B's mission is to educate students in a futuristic vision and prepare them as a science- and technology-based workforce. A goal is also set for the faculty to continuously enhance their skills of teaching and research, incorporate the latest classroom teaching in the university and use state-of-the-art facilities in laboratories.

Case C imparts business education and helps the business community acquire good human resource (especially corporate leaders) for their companies, businesses and industry. The University provides an enabling environment to the faculty as well to the commercialisation of products and services and conducts case studies of small and medium businesses that are regularly published in the university journal. The mandate of University D is to provide healthcare education to its students and prepare them to serve society. The doctors who qualify from this university serve all over the world. The goal and mission of imparting education and training of future doctors has always been the priority of this university, but the lack of proper knowledge infrastructure and soft infrastructure impede its services. University E is a unique university established by the government for special purposes and, to date, it has fulfilled the role for which it was designed, that is, producing human resources for the defence sector.

In the light of this role of university it is clear that each university has set a targeted for itself i.e helping a certain set of communities (farmers; businessmen; doctors; engineers; science based workforce) to meet their specific needs. In this way, all universities can be harnessed to use their potential to solve the local issues such as electricity shortages, clean drinking water, production of bio-diesel, formation of a fool proof security system, development of small businesses to create more job opportunities, thereby participating in community building. These are the intended outcomes of universities.

The second sub-category 'society's development' means that universities recognise their role in transmission of culture and values. Also, their aim is to help the government in decision-making or development of policy framework for the country in addition to extending their consultancy services to industry and NGOs. These three roles are related to the development of the society in general. At global level, universities in Pakistan are ambitious to project the soft image of the country, and play their role in regional development. Case C and Case B are regional universities where students from the South Asia region and Middle East are recruited in various courses. The aim to perform constructive, pro-active role on the part of universities is found among all universities in the sample but they approach this problem very realistically. They have indicated that transformation into KBE is not a task, which a few universities or a few corporate sector members can do. Government has to play its role by creating an enabling environment. In other words, neither the government, nor the universities/ corporate sector or NGOs, can solely create a KBE. Creation of a KBE requires distribution of responsibilities and demands that each actor/agency perform its desired role. However, universities have to perform their role as well as, sometimes, these organisations have to extend their role to other actors' role.

5.2.4   Fostering a KBE, achieving sustainability

Transformation into knowledge economy is perceived as a strategy of the administrators of some of the sample universities, while others reacted to this shift with cynicism. Reflecting on the issues discussed by the cases and the solution to these problems (as presented in 4.2.2.5, 4.3.2.5, 4.4.2.5, 4.4.2.5, 4.5.2.5 and 4.6.2.5) it seems that the problems outnumber the solutions. The single motivating force in the phenomenon of creating a KBE in Pakistan, according to universities, is the newly established commission for the higher education. The commission has provided the impetus to universities to adopt proactive roles in development of their society as well as extend their services of knowledge sharing to international community. Other solutions presented by academia to the current host of problems are related to making a policy shift and installing a visionary leadership that can devise and implement these policies ruthlessly. During data analysis, these questions were constantly in my mind: 'Are universities ready for this shift, in a situation in which there are a host of problems, but their solutions lie with academics, who can not and these cannot be communicate these solutions to the government or policy makers? Even if these opinions/advices are communicated to the government through various sorts of Commission reports or roadmaps, the guidelines remain unimplemented. Universities have certain structural and functional constraints (shown in Table 5.13), which hamper their role in the society, community and global community development. A welfare state creates a management and governance system in which all actors of the state perform their role

according to national goals, strategy or vision. However, the state in Pakistan has not been able to achieve economic growth. Since there are many problems identified by academics in this research, the state has to help these universities to determine the future of the nation and decide where it wants to see Pakistan in 2030 or 2050.

The subcategory 'structural requirements' of 'fostering a KBE' pertain to regulatory framework, which is currently missing in the universities (See Table 5.13). Faculty members explained that if they go to industry, to work with them, it is not considered as part of their duty. This is just an example, which shows that few faculty members form linkages with industry on informal basis. Universities need 'financial support' for research, which drains out and research projects of faculty members remain unfinished for long time. It is affected by the political instability in the country. Political will is esteemed as most important factor in research and development. At the moment the political government is not supportive of higher education initiatives. Institutions are weak in Pakistan. In the last decade, the HEC has emerged as an independent and fair institution (second to the 'army' which is another so-called strong institution) but at times, the commission was also attacked that its powers should be devolved among provinces. The overall, socio-economic condition of the country is poor. More than 2/3 of the population live below the poverty line and can hardly earn, one dollar per day for subsistence. These are grim realities which universities are now addressing by out-reach programmes and seminars. The people are trapped in vicious circle of fulfilling their basic needs of life. The structural requirements of fostering a KBE also include, some cultural impediments. The culture of Pakistan is mostly of a pessimistic mind-set. Partly due to vicious circle of living in which most of the people hardly achieve economic wellbeing, and partly due to the fact that it is a predominantly religious society, which has instilled fatalism among people. A logical worldview is lacking in people. The facts have resulted in the lack of a scientific approach among people.

Structural issues are also related to the attitude towards work. People have illogical approach and they lack scientific mind-set or positive attitude towards work. If they work, they want to achieve high grades, while, those who work for the development of society and universities, do not receive any incentives. Due to lack of incentives research culture could not flourish in the country. To combat the structural and functional issues, the strong strangle hold of the feudal lords and bureaucrats have to be defeated and broken. These do not allow the minds of the people to think out of the box. Therefore, it is the responsibility of the government to develop entrepreneurial mind-set among people by funding entrepreneurship, science and technology related projects. This step will help the nation to overthrow the feudal slavery and develop a scientific mind-set.

Table 5.13 Fostering a KBE (A)

Category: Fostering a KBE		
Subcategories	**Properties**	**Dimensions**
Structural Requirements	Regulatory framework	In place Not in place
	Financial Support	Enough (no need to .. Less (require investment)
	Political Will	Supportive Non supportive
	Society/Attitudes and culture	Pessimistic Optimistic Logical world view Illogical perception World view Research based knowledge Research culture in universities
	Institutions	Strong Weak
Functional Requirements	Organisational Culture	Bureaucratic Feudal Merit Based Network Competence based Attitude towards work
	Directions from Government (national goals to be achieved)	Progressive society Knowledge Based Economy Productive relationship with international community

Source: Author

The table 5.13 also shows that the 'functional requirements' of universities to foster KBE are related to the 'organisational structure' and lack of 'direction' from government. The universities wish to help the society by developing its community and forming linkages with other sectors of the economy but other organisations and institutions are bureaucratic, hence, universities are working in isolation. Similarly, the industrial sector is also working in its own sphere. The government is supposed to bridge the gap between universities and industry but no such 'directions' are available, as where the country is heading? Is the country going to be a progressive society, develop a knowledge economy, and maintain international linkages with other communities in the world? No—vision, strategy or roadmap is available at this stage. Universities want to solve the local issues but the government is not ready to work for the welfare of the society.

Table 5.14 illustrates that all is not bleak. The facilitators for creating KBE are 'leadership' and 'resources' as identified by the academia. If a visionary leadership takes control of the government, the nation might move forward in less time period. The country has all kinds of resources required for socio-economic development. The academia points out; only 'willingness' to carry out visionary plans is needed for transformation into KBE.

Table 5.14 Fostering a KBE (B)

Category: Fostering a KBE		
Sub-categories	**Properties**	**Dimensions**
Facilitators	Leadership	Visionary
		Dynamic and Competent
	Resources (other)	Land
		Water
		Seasons
		Agriculture Sector
		Industry
Limitations towards this goal (fostering a KBE)	Pressure groups	National Level
		In every organisation
	Lack of Ethical and moral values	Corrupt
		Dishonest
		Incompetent
	Governance	Weak
		Strong
	Rules and laws	Followed
		Not followed

Source: Author

The table 5.14 also indicates that on the other hand, if the current situation prevails in which the 'pressure groups' are working to stop any developmental plans, weaken the governance, law and order situation and create a chaos, then, there is no hope for transformation. Rather, the country might face dis-integration. This is aim of the pressure groups that people should not receive their basic rights, because, if they do, they might ask for leading the country as well. So, until the common people are un-educated, less fed and unemployed, the feudal lords and the cartel groups will dominate the political stage.

5.3 Core Categories

The underpinning philosophy of the study is social constructionism, which advocates our understanding of the world is context specific (Hosking and Green, 1999). Secondly, a social constructionist researcher searches for the meaning of phenomenon in the present, by tracing the factors in the past and builds an understanding of the social world and its phenomena. After conceptual ordering, the researcher gained three core categories, from which the story line is generated. These core categories are ideological foundation, vision and policy, b) national eco-system of education and university industry collaboration. These categories are explained one by one:

5.3.1   Ideological foundation, vision and policy

If the problems stated in section 5.2.1 which are related to the policy framework, governance and management of the country, are solved; academia rise to the occasion by rendering community development services then creation of KBE will require some efforts on the part of government as well. State or the government is the main actor, which can lead this socio-economic change in a society. The case accounts evidence the fact that individuals and corporate sector alone cannot drive the society and economy towards the KBE. Certain regulatory frameworks, policies and direction have to be provided by the government. The phenomenon is now clear. The nation has to decide: 'what are its ideological foundations, based on its ideology, such vision should be developed which can help the society and economy to progress in the global knowledge economy.

The ideological foundation of the country can be strengthened if the brain drain issue is resolved. The academia claims that politicians have created an environment in which highly educated citizens of the country are forced to live abroad. They contribute in the development of economies of other countries. This is evidence to the fact that the country lacks a roadmap for development, incentives for retaining its social and intellectual capital and vision among the leaders. In this way a few political parties in Pakistan describe a vicious circle of turn-taking and working for personal interest rather than the welfare of the state. In other parts of the world, generally political parties have agendas to govern the state, mostly based on education, employment, health systems or other issues related to the country's welfare. Politics 'refers to the participation of citizens in public activities aimed at dialogue, critique, and deliberation on existing or new policies' (Moutsios, 2010, p. 123).

Pakistan needs coordination between policies, as the cases have evidenced. For example, eminent scholars have suggested that educational policy should be linked with industry and innovation policy (the first innovation policy was formulated in 2010 by the Executive Director of the HEC); law and order policy (security is the biggest issue preventing FDI and international collaborations) should be linked with foreign policy of the country (to negotiate trade, increase the export of items and access to open market); and a national ecosystem of education should be developed (section 5.3.2). Education in Pakistan has suffered from lack of priorities on the part of the leaders apart from a spectacular six-year period from 2002 to 2008 when remarkable progress was made in the higher education sector, as chronicled by all the case accounts. The case accounts claim they produce the best graduates. If they are allowed to govern the state, these brilliant students can design farsighted, efficient policies that reflect public opinion, but the feudal lords and the current politicians will not let such young geniuses to enter the political arena. Another point raised by academia is that those currently serving in the key leadership positions of the country are a product of the old educational system of the country. Some have huge achievements recognised all over the world, such as Dr. Abdus Salam, Dr. Abdul Qadeer Khan, Dr. Sammar Mubarik Mund, and Dr. Atta Ur Rahman, but others lack moral sense, ethical thinking and do not work on merit. Those who do not follow principles and merit are more numerous than those with authority and dignity. These heroes have repeatedly made efforts to keep the policy formulation and implementation process fair and efficient, but incompetent people have developed a domination of the country.

In simple words, a country needs national vision, based on which short term; achievable goals should be set to achieve socio-economic development. The strategy developed for the next 5-10 years should be strictly monitored by sincere and visionary leaders of the country. The study asserts that good political leaders can only be created if the whole political system is reformed. Its roots lie in the educational system of a country. A study by Mustakova-Possardt (2010) clearly guides what the purpose of education might be. She claims that holistic education across the educational system should cultivate the character of students, their moral sense should be strengthened and also their sense of identity should be strong. She maintains that education has its implications during childhood, adolescent and adult period. She states:

'Until education focuses on the cultivation of character and development of a moral sense of identify and moral imperative, until it begins to purposefully emphasise models of authentic moral authority and to foster moral responsibility and agency, until it makes central the cultivation of expanding levels of empathy, progressively embracing the human race and until it is willing to entertain and explicit spiritual conversation about truth and meaning in life, it cannot really fulfil its responsibility to human potential'.

In the context of Pakistan different types of experimentations (western, Islamic etc) has lead the people into an identity crisis. It calls for reviving the educational system as the future of the country depends on a national eco-system of education.

5.3.2 National Eco-System of Education

Most academics believe that Pakistan is on the runway of knowledge economy. The return of expatriates to the country in the past four to five years is a sign of change and hope for the people of the country that the economy is on its way to development. Indeed, in 2007 Pakistan was classified among the 'next eleven' or N-11 emerging economies after the BRIC (Brazil, Russia, India, China) countries (Sachs, 2007). Pakistan and the ten other emerging economies (Bangladesh, Egypt, Indonesia, Iran, South Korea, Mexico, Nigeria, the Philippines, Turkey and Vietnam) have striking similarities, according to Goldman Sachs (2007). These countries have potential to move from being under-developed or developing states to becoming powerful economic states. It might take ten to fifteen years for Pakistan to completely transform the country into KBE, but it is achievable target. At least the higher education sector can develop into an internationally recognised system of higher education if the government actively pursues the policies implemented in 2002–2008 in the higher education sector. This sector understands the importance of knowledge and how to use it in order to create wealth through intellectual property, technology incubation and innovation. In the context of UK, a study conducted by Warren, Patton and Bream (2009) illustrates how firms are benefiting from the incubation facilities provided by the University of Southampton. The study shows that such facilities provide a rich networked environment for specialist knowledge to be produced and applied in various ways by companies. Similar trend is observed in the context of Pakistan.

Some universities are moving towards self-reliance, where their only demand from the government is to produce an enabling work environment, provide financial security by allocating a fixed amount of GDP to education sector irrespective of political turmoil. They already meet about 40% −80% of their budget requirements, on average, from their own sources. These are some of the achievements, which indicate Pakistan has the potential to move towards the KBE but to develop a good educational system the basic education should receive attention of the state. Academics argue that there is no central committee at school, college or even university level to make decisions, implement them and provide feedback on previous policies so that new policies may be crafted in the light of lessons from the past or in the light of opinion of experts in the field.

Figure 5.1 Holistic educational system for Pakistan's transformation into KBE
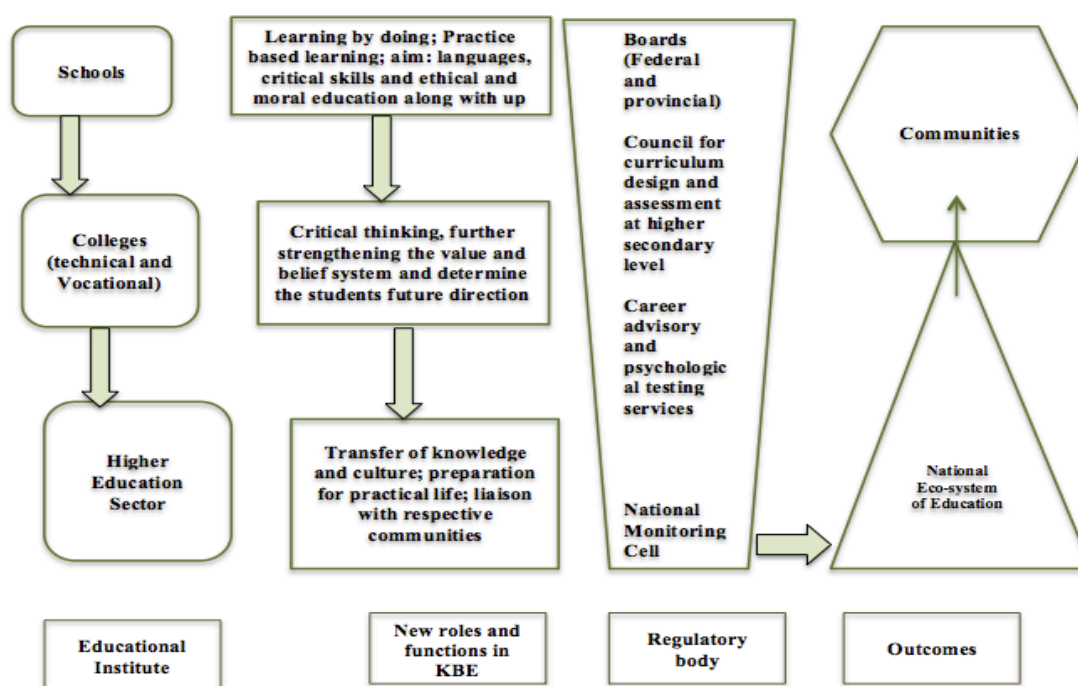
Source: Author

The above given figure 5.1 shows that objectives might be set at each level of education. The aim of school education, according to the case accounts, is to inculcate 'learning by doing'. At the moment, it is just based on theory and the critical thinking is not inculcated among students. Colleges should prepare students for professions by further developing critical thinking. Secondary education strengthens the belief and value system of students and determines a direction for them according to their aptitude and capabilities.

The higher education sector, the most important part of the national ecosystem of education, should transfer knowledge and culture to their students. This is the final stage where the educational system can prepare citizens for development of Knowledge Based Economy. How? Universities perform various roles and making linkages with other sectors is one of the functions. The aim of universities is to provide human resource to various sectors, but, it is a traditional role. Under the current circumstances, universities are encouraging students to become job-creators, instead of seeking jobs. Few universities are creating entrepreneurial mind-set among students and these universities form start-up companies, but most of the universities are still following the traditional model of universities. Furthermore, figure 5.1 shows, at each stage, a regulatory body should keep a check on whether the objectives are achieved or not. In this way, the educational system might be linked with the socio-economic development of country and a pre-determined number of graduates produced for each sector of economy. Who will assess the need? It is the responsibility of the government to assess needs, and all educational institutions should be directed towards fulfilling them.

If the national educational system is revamped, the case accounts predict that the society will start working on new lines, such as, the national character of the people of Pakistan will develop and values of honesty and integrity would be reinforced; equality will prevail and systems will operate on the basis of merit; The attitude towards work will be positive, logical and scientific. In Pakistan the problem faced by academia are two-fold. Firstly the overall financial allocations to education are only 1.7% of GDP. Secondly, in spite of increases to higher education under the previous government, the share of higher education as a percentage of the total education budget reached only 13%, with 87% going to the lower level education. These facts indicate that education has never been a priority for successive governments, and within the education sector, the higher education sector has been constantly being neglected, reaching a maximum of 13% of the total education budget, instead of being in the range of 25-30% of the education budget. As a result over the decades, the universities had largely deteriorated to low level colleges with little or no emphasis on research or innovation/entrepreneurship. Due to these facts some leaders of academia were cynical about Pakistan's prospects of transformation into a KBE because the country is already under financial burden and basic facilities of life are not available to the people of the country. Their cynical and ironic attitude was mainly due to rampant corruption at the highest level and their concern for the country. They have a strong desire to change the system of academia but the system has inertia in it that does not allow rapid progress. Moreover, all academics perceive that government or society expect quick results for investment in higher education; however, it will take some time before actually the country can transform into KBE.

The benefits of higher education will trickle down to other areas, such as industry, schools, colleges, government organisations and non-government organisations. Terrorism will be curbed if higher education is injected into regions in which terrorism prevails due to greater job opportunities. It is not a ready-made solution – it will take ten to twenty years – but it will have long-lasting effects in such areas. If people receive education in tribal areas of the country, their perception of reality will be changed and it will not be so easy for the terrorists to brainwash them, particularly the most vulnerable youth. There is no formula for eradiation of terrorism apart from illuminating the minds of the people whose thoughts are easily moulded.

As the security situation improves, the higher education sector can make profitable, sustainable, long-lasting linkages with local (such as other universities, industries and NGOs) and international players.

By creating an entrepreneurial environment in the universities of Pakistan, businesses will flourish and innovation will take place, opening up new vistas for the rest of the world to explore the wealth (intellectual and cultural) of the country.

'Brain exchange' with international institutions will further improve the soft and enlightened image of the country.

Very few universities have achieved the above-mentioned unintended outcome, but for a deeply embedded social and cultural change, all universities must work in the same manner as these model universities.

5.3.3 University Industry Linkages

The concept of university industry linkages is novel in the context of Pakistan. To attain an understanding of the context, and what kinds of linkages are formed in between academia and industry, a detailed commentary is provided in linkages. First of all, industry is defined as what kind of industry exists in the country and what are its major problems (problems are focused in this section; because, it has emerged from the data as a pattern that industry is dysfunctional). Next, a detailed view of problems of academia is presented and in table 5.17 solutions to these problems are stated. These solutions are recommended by academia. Finally in this section, the prospects of linkages are discussed between academia and industry in the context of Pakistan.

The category, 'University Industry Linkages' have five sub-categories i.e 'Ownership', 'Attitude towards Society', 'Linkage with Academia', 'Other factors' (affecting the performance of Industry positively or negatively), and 'major industry issues' as shown in table 5.15 and table 5.16. According to the case accounts, Pakistan is an agricultural economy, yet 24% of its GDP is attributed to industrial sector. Major industries in Pakistan are cotton and textile production and small industry includes food processing, plus fertilizer, tobacco, chemicals and edible oil manufacture. Two major industries could be mining and fuel extraction, but there are forces that apparently cannot be identified that stop any kind of developmental projects, so no policies are made and no work is carried out in this regard. Currently, due to massive electricity shortages in the country, most industries are not functional. Workers and trade unions protest against these conditions but the government and the industrialists do not pay any heed. Other problems of industry in Pakistan include: low productivity, and a lack of transport and communication infrastructure. The middlemen have a strong role in market. If there is a greater productivity of agriculture products, it exceeds the storage capacity of the farmers and industry hence most of the products are wasted. The industry does not have quality human resources available to use computer-assisted technology in industry nor laws of copyright are implemented in the country. It has emerged as a vital issue that copy rights and intellectual property are not protected. These malpractices need implementation of a strong intellectual property regime in Pakistan.

Table 5.15 University industry linkages (A)

Category: University Industry Linkages		
Category	**Properties**	**Dimensions**
Major Industry Issues	Issues related to the type of industry in Pakistan	Out dated or old fashioned Low Value Added Dysfunctional Based on Loans Not Creative Not Innovative
	Funding or Profit or Turnover related issues	Low turnover
		Industrialists strive to return the loan but remain unsuccessful
		Industrialists try to write off the loan but again remain unsuccessful in achieving the goal
		File false claims and cause damage to the economy instead of strengthening it
		Low cost of labour and material, still unable to develop
		No culture of investing in research or consulting Universities for expert opinion
	Innovation and constant development through research	Do not want to invest in research {Basic (very costly)} { Applied (industry does not support technology creation)} Fifty to Sixty years old mechanisms and procedures

Source: Author

The common issues of industry are: 1) Business is not high value added 2) industry is established on loans 3) most of the industry and businesses are not functional because the country is facing shortage of electricity. Moreover, the service sector is not innovative. The funding related issues are various: 1) industry does not have a bigger turnover so that industry can pay back to society through social responsibility measures such as building schools, colleges and universities. Feudal lords who claim falsely that they had losses in their profit (so they try to make the country defaulter on purpose) keep their industry dysfunctional and yet at the same time gain profit from the government. The low cost labour and raw material is of great advantage to other multinational companies, but they too do not invest in the community.

Table 5.16 illustrates, there is no culture of investing on education or society in general in Pakistan. Political instability affects the market and the value of rupee. The critical infrastructure is not available so that industry can flourish. No such polices are made which can help business to grow while small and medium enterprises can solve most of the issues of the society such as unemployment and illiteracy.

Table 5.16 University Industry Linkages (B)

Category: University Industry Linkages		
Category	**Properties**	**Dimensions**
Issues of industry	Ownership	Un educated
		Land lords / Feudal mind set
		Political leaders
		Very powerful
		People – usually the Elite Class
	Attitude towards Society	ON the receiving end
		Never paying back
		Do not follow regulations
	Linkage with Academia	Informal links
	Other factors affecting the performance of Industry positively or negatively	Low Cost Labour and Land
		Power Outage
		Corporate Law and Business related Policies
		Political Stability
		Security
		Protests of Workers / Traders
		Critical Infrastructure (roads, storage, capacity, transport)

Source: Author

The issues faced by universities are also several and mostly their solution is linked with industry and government. Universities have some other problems, which are presented in the table 5.17. These problems include funding issues, lack of mind-set for research, culture of positive attitude towards work, security issues in the country, lack of direction from the government as what are the priority areas on which universities should focus their researchers to solve them, and political instability.

Table 5.17 Structural and functional issues of academia and their solutions

Sr.No	Issues faced by academia	Solutions as per perceptions of academics
Case A	Provision of funding; Lack of faculty with research skills; Lack of research culture; Neglect of local research And Lack of incentives for local journals; Cultural impediments: Lack of mind-set for research; Negative attitude towards work; low interest in taking risks and lack of scientific or logical thinking among masses and people	Public private partnership; University Industry Linkages; Research and pedagogical training of staff Incentivise teaching system Bring local journals to international standards HEC should focus on local issues and local research Improve the basis education and focus on learning by doing Increase the access to higher education; Improve the economic conditions and social conditions will improve by itself
Case B	Lack of mid-set, lack of research culture; Feudal mentality, bureaucracy , wayward research	Reformation of educational system of the country; remove the barriers
Case C	False perception; Bureaucracy; Attitude towards work; Feudal mid-set; Mistrust on major institutions and major initiatives	Need reality check; Remove the bureaucratic barriers, educated the middle class; improve the management and the governance system of the country; provide incentives; increase marketing education and start teaching entrepreneurship
Case D	Lack physical infrastructure; Workload (teaching responsibilities and emphasis on research; Poor incentives for the health sector; Brain drain; no time for research and sometimes lack of skills for research, directionless research	Improve the salaries and hire doctors on permanent basis; incentivise the health sector; employ your doctors and stop the brain drain; improve the security situation in the country so that doctors
Case E	Security issues; lack moral and ethical training; lack of visionary political leadership; moulding policies for personal interests; low quality higher education and human resource; lack of political will	Prioritise education; revise foreign policy; appoint dedicated leaders at key organisation to strengthen the system but once the person's tenure is finished, continue the policy so that output can be achieved; HEC should emphasise on local issues

Source: Author

As table 5.17 shows, there is a solution to every problem but the government has to make such changes in the education and industry sectors, which allow them to work collaboratively for the socio-economic development. Under the current circumstances, the sample of universities proactively aims to develop linkages with the business community and industries in Pakistan. Their mission is two-fold: first to help the businesses to grow, and second to find an alternative to public sources of funding. In the context of research university–industry linkages are considered as a collaborative partnership that can alleviate poverty, generate employment and fulfil the requirements of universities to develop their infrastructure. Industry needs to rise again by the support of academic experts. The cases accounts have provided an example of Bhutto's policy of 'nationalisation' that destroyed the desire of industrialists to invest in Pakistan, and many leading businessmen migrated. Major industries such as fertilizer and steel were nationalised and, as a result, their quality decreased and the industrial sector could not flourish. Once, the trust of industry and businessmen is restored on the abilities of faculty members, industry can raise again, besides bringing more FDI.

In short, academics are aware that industry in Pakistan is very limited and it is not a developed sector. Industry has mostly been established on loans and industrialists do not want to invest in education or welfare of the society, as CSR is a very new concept to them. Whilst it is beneficial to both industry and universities, most do not know what it actually entails. The company owners are not innovative or creative and they are unable to fund basic or applied research in universities that needs funding for several years in order to develop a product. Moreover, local industry does not generally use the latest technology and prefers to acquire technologies from abroad on a turn-key basis rather than invest in R&D effort by them. What is needed, as indicated by academics, is that the universities should develop the necessary expertise to deliver and solve industrial problems, yet government too must develop policies that lead to self-reliance and allow businesses and industry to flourish. These policies could include provision of land at low cost, creation of industrial clusters, a reduction in taxes on certain priority high-tech industries, and further incentives to businessmen so that local investors can invest in Pakistan. The security situation in the country should improve so that foreign investors may also invest in the country. University faculty members complain that they have no idea of the number of graduates needed in various fields such as Medicine, Engineering, Law, History and Humanities. They also insist that the industry should share ideas as to what types of graduates are needed so that universities can upgrade their curricula accordingly. Government has to deal with major issues of industry and universities to foster linkages between these two institutions i.e the corporate sector and academia.

5.4 Theorising

What is theorising? It is the last step of analysis in grounded theory study, as discussed in Section 3.7.3. Theorising is achieved when core categories are discovered and paradigm starts to emerge. A story line is generated that explains actions and reactions in the context, strategies of academics to deal with challenges, condition in which universities co-exist with other actors. The three core categories, which explain the central phenomenon, are explained in the previous section. Here, in this section my aim is to explain the substantive theory in the following three steps.

1. Phases of the Model of symbiosis
2. Spatial disposition of the model, and
3. Activities.

5.4.1   Phases of the Model of Symbiosis

5.4.1.1   Institutional development

The first phase of the model is 'institutional development' which focuses on the fact that institutions are building blocks of a society. Strong (judicious and active) institutional set up ensures economic well-being of citizens of a state which leads to formation of a civilised society. Institutions such as political, economic, social, judicial and educational institutions work in a symbiotic manner in a technologically advanced society/economy. Among all institutions the role of the government is vital in designing a visionary roadmap for the welfare of its citizens. Educational institutions have equally important role in this model. They prepare workforce for economy and in the configuration of the new world order of the KBE, these institutions participate in development of economy through training of highly skilled/technological workforce. In other words, educational institutions no more work in isolation rather these institutions develop a symbiotic relationship with all actors/institutions of the state. If the leaders of the state, or organisations are visionary, they can help a country to leap frog and catch up with other fast developing nations by delineating visionary policies and working on the knowledge roadmap until the objectives are achieved. It is suggested that if competent individuals (knowledge workers or educated citizens) are selected as leaders of institutions and state, then a system can be developed which resembles a welfare state. For this, an effective law and order system is a pre-requisite. Such a system rewards those who build the nation and ultimately knowledge workers will try to achieve technological development through fostering a KBE in developing countries. At government level, transparency of actions is the key for the institutional development of a country. In addition, self- assessment and external audits and quality

assurance systems should be an important part of the systems operating and institutional performance. Every organisation in an institutional set up is supposed to play its 'own role' rather than 'adopt' and infringe on the role of other organisations and institutions. This leads to peace, harmony and smooth operations of the system. If this principle is not followed then chaos is created.

5.4.1.2 Governance and Management

The second phase of the model is 'governance and management'. Under normal circumstance, governance issues do not arise but when the central command and control system is not working or it is weak, then policy cannot be properly implemented. Policy is the tool to execute strategy but if major policies such as employment policy, educational policy, knowledge economy policy, foreign policy etc. are not developed/implemented, then a state is bound to fail and transformation into KBE will be just a distant dream. More importantly, if there are no policy guidelines at the national level, the direction of the national development cannot be identified. Hence, a nation needs to develop effective policy framework, ranging from establishment and implementation of policies for domestic issues to the foreign policy. For transformation into KBE, the science, technology and innovation (STI) policy must be developed and implemented. It is important that while developing any such policy or implementing it, all the stakeholders must be properly consulted, and its objectives must be clearly drawn. This will ensure that all the relevant parties are committed and involved in its implementation later and there is a broad consensus on the objectives to be achieved. STI policy should be developed according to a country's natural and human resources, the aspirations of its people and its position in socio-economic development under the prevailing geo-political circumstances. Developed economies and societies set a benchmark for others and always fascinate the less developed countries, therefore; the latter often try to blindly follow the former while they lose the sight of their national ideology or national needs. A nation must maintain its own identity and fulfil its needs. Self-sufficiency and development of indigenous industry, technology, education system, research and development etc. can put an economy on the path of development. Surplus social and human capital will lead towards development of a sound knowledge base required for fostering a KBE. Self-sufficient institutions (especially universities) and economically independent (independent from foreign loans and foreign intervention in policies) governance and management is connected to the national character of the people as well. If the government is judiciously performing its role and the people of the country are satisfied with the standard of life, then, citizens prefer to live in their own culture. This can stop the migration, and brain drain phenomenon, which is very harmful for development of a KBE. By retaining knowledge workers, a country can attract more knowledge workers and a network society can be formed. Moreover, if cultural foundations are strong, then the people manifest their identity it in all possible ways (culture, traditions, habits, history). The

epistemic cultures and the culture of a country together nurture an environment where knowledge can be created and disseminated. If the roots are strong, the tree will grow in the same manner no matter where (context/country) it is planted and it will exhibit the same characteristics as the parent tree.

Imbalance of power between military and civil government does not allow development to occur. These perturbations (martial laws) in the institutional setup lead to chaos in society and effect the economic development. Therefore, in order to foster a KBE, the role of each institution should be clearly defined by the constitution and constitution should be revised with the help of experts in the relevant areas. The next step after developing an effective regulatory system is the implementation of rules by the government and the law enforcing agencies. The paradigm in figure 5.2 shows that to ensure peace and security in the country, the actors of state such as the Forces, Police, State agencies, Customs and Aviation, and the Central Board of Revenue need to work closely together to ensure peace and social order in the country. These actors have to work together to implement the policies, cope with national disasters, eradicate corruption, control other evils of the society, ensure transparent trade across the borders, generate revenues, and protect the national image of the country so that citizens come out of the state of denial and take pride in being citizens of the nation. These roles of the actors of the state are called as 'peace paradigm' in this study. Furthermore, a realistic assessment of the resources of the country and re-designing the economy will help the country to work on areas which need improvement.

Figure 5.2 Peace paradigm
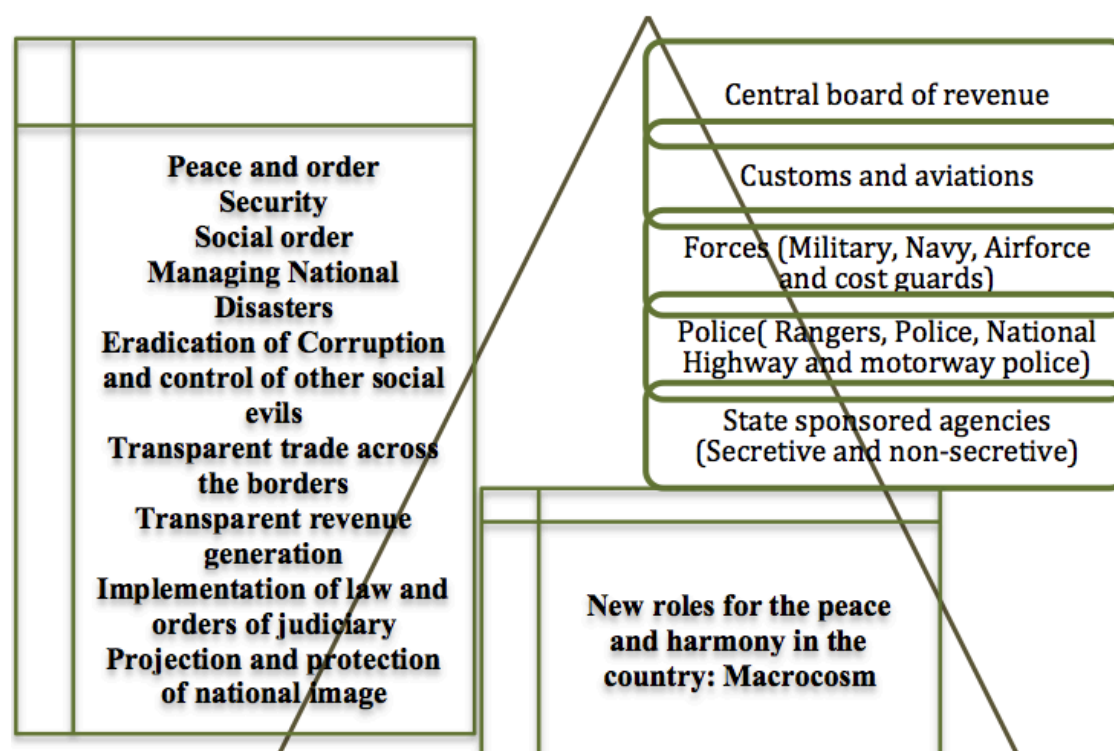
Source: Author

5.4.1.3   Synergy

Synergy means the positive energy, which is created by chain of development or by networking of different actors of the state in order to take the nation towards development of a KBE under certain ideology. The approach adopted in this model is a 'top to down' approach or 'high to low' approach in which the greater the position in an institutional setup, the greater will be responsibilities. Hence, the leaders of state should be honest and competent to perform their roles honestly. The direction of this top to down approach is determined by the ideology of the state, which in turn, determines the national character of a nation. Furthermore, the value system (honesty, sincerity, discipline and justice) should also be determined by ideology. Based on ideology and value system, governments should be elected, but then there should be an executive wing of government, which keeps a check on the implementation of polices and provide feedback on completion of policies. By following these procedures a 'chain of national development' is created which is represented in figure 5.3:

243

Figure 5.3 Chain of development: Top-down approach
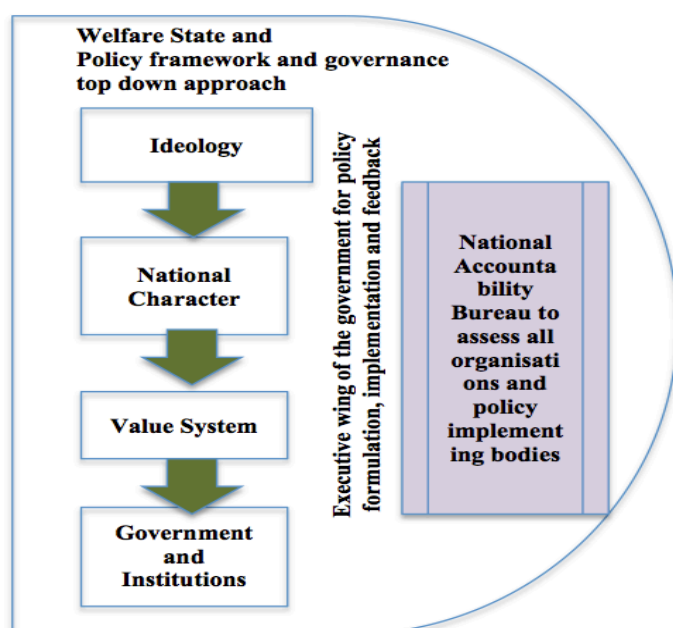
Source: Author

It is ideology that determines the national character and value system, as mentioned above, but the government is the institution that supervises all institutions so it has huge responsibility for the welfare of its citizens in the Model of Symbiosis. It determines the trajectory of development.

In the figure 5.5 three types of symbiosis are created in the model. A symbiosis emerges between government and national eco-system of education on the basis that the state directs universities for certain community development projects and provides the requisite infrastructure to ensure that their structural and functional requirements are fulfilled. Similarly, universities in the national eco-system of education form a symbiotic linkage (SY1) by providing human resource to various sectors of the state and provide input in the policy framework or economic and social issues. The second symbiotic relation is observed between national eco-system of education and communities (local community/society, regional and global) represented by SY2. Education system renders various services to communities ranging from transmission of culture to strengthening the communities, while, communities provide a breeding ground for these universities to produce knowledge and suggest ways to use that knowledge for the welfare of communities. Last but not least symbiosis is formed between national eco-system of education and the corporate sector while the former provides basic knowledge and applied knowledge (on the basis of which corporate sector can maximise its profit) and corporate sector invests in society/community

and the national eco-system of education. Hence, SY3 represents relation between communities and corporate sector.


5.4.1.4   Normalisation and leapfrog

At this phase of the model, all the institutions are working according to their mandate and the output is positive/high. Following this model and the above stated actions, a nation can transform into KBE if a welfare state is developed. A welfare state is one, which is economically developing on a macrocosm level, and an enabling environment is produced at the microcosm level, (such as for the higher education institutions allowing them to perform their roles). In other words, normalisation is the next step to development of an effective democratic system in the country. After catching up with the speed of development in knowledge economies in terms of institutionalisation (once institutions are developed and these are working towards national development) and synergy is created then the government can develop a strategy for leapfrogging. It means that all polices which are designed under national vision need to be implemented in a coordinated manner and the output is achieved in every sector of the society. In particular I will elaborate the role of universities, government and the corporate sector in the normalisation phase. As the figure 5.4 shows, these institutions have to faithfully undertake their respective roles. The role school is to educate students on the learning philosophy of John Dewey i.e learning by doing. When students pass out from schools they should be able to think critically and then they should be guided as which career they can choose depending on their abilities while no such psychological tests are conducted in developing countries. The role of colleges is to prepare the students for practical fields and provide them skills in a specialised area. Besides professionally preparing the students, colleges have to develop the value system of individuals so that they can practice universal values of ethics when they enter their professions in later stages of life. Higher education institutions play the key role in all the institutions because these transfer knowledge and prepare the individuals at a stage of life where most of ethics and skills are developed. Universities transform individuals into well-rounded personalities as well as good workforce.

In order to ensure that these institutions are performing their roles, federal and provincial boards should monitor schools and colleges; a council for curriculum design and assessment should be designed which can develop curriculum for Higher Secondary School education; and a career advisory committee should advise students to enter a particular professional college/ university. Last but not least, a national monitoring cell should regulate the role and functions of universities.

5.4.1.5 Feedback

All organisations and individual should be assessed and rewarded for their performances. It will change the attitude of individuals towards work and it will also create a sense of contentment among the people. However, if the policies are not working, they should be changed after assessment and in the light of old policies new policies should be designed. An important aspect of policy structure is that every policy should complete its tenure before it is assessed, evaluated and re-implemented. Figure 5.4 explains that the national education system is indirectly linked to all institutions hence, universities assume greater and vital role in creation of KBE in this model. If the citizens passing out of these schools, colleges and universities have passed through well-rounded educational and personality development then these institutions will be strong.

Figure 5.4 Normalisation
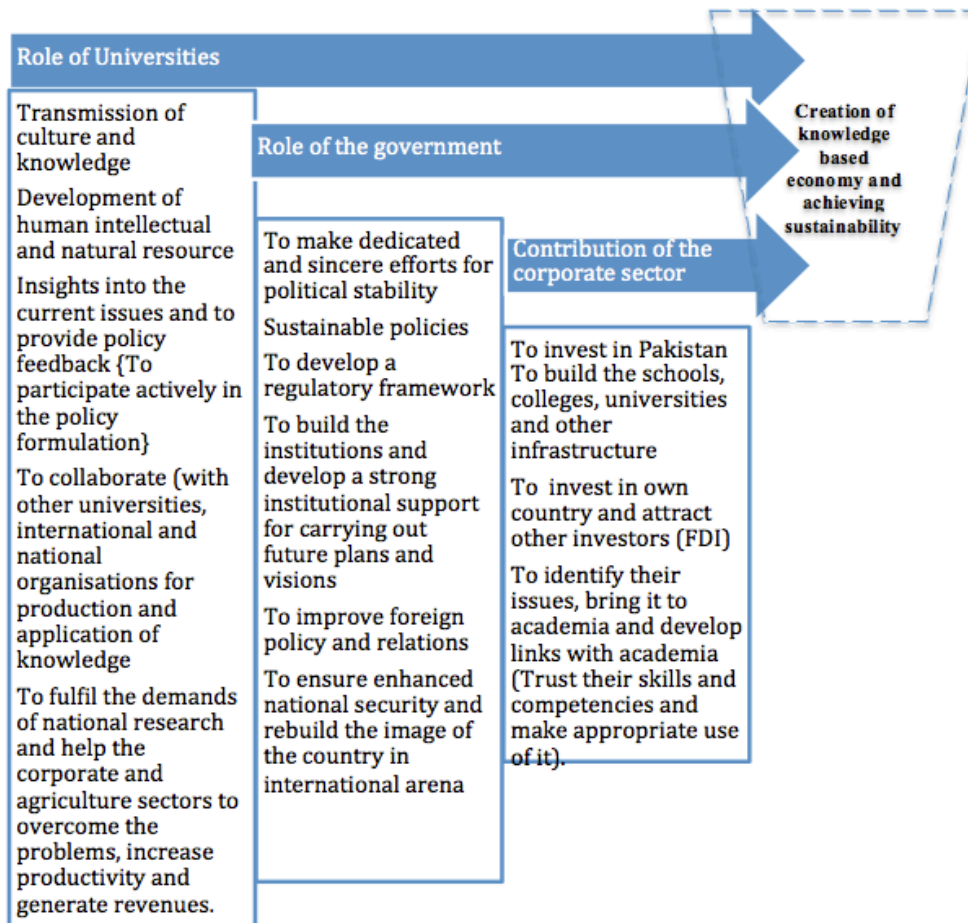
Source: Author

Changing policies time and again does not allow a fair assessment or feedback on the process of policy implementation. Policies may be changed from time to time through a learning process, but they should be designed according to the national vision of the country. Last but not least, an effective incentive based system should be developed in all organisations of the state.

5.4.2 Spatial disposition of the Model

The model is located along three spheres: welfare, societal and global. Under the normalisation phase, the interaction of the welfare sphere with the societal sphere is interlocked. This means that the roles of government, higher education institutions and the corporate sectors are clearly marked and the three institutions work in collaboration for the socio-economic development of the country. However, universities are the institutions, which lie at the centre of the debate on KBE. Hence, if the aim of the nation is to transform into KBE, then the flow of information and knowledge should be facilitated and universities can function as anchors to project the nation in the international global world and as engines of socio-economic development. In KBE universities have to be actively involved and directly engaged with the economy and other organisations. Currently universities in Pakistan are not ivory towers and they look beyond the walls of the institutions. They perceive that development of communities is one of their new roles and some of them have taken up the responsibility of working as regional actors/players.

The welfare sphere is related to education and learning while the societal sphere is associated with the practical demonstration of the learning in the form of different professions. It includes government and non-government organisations including the market community. In other words, the welfare sphere is related to universities and the local communities (farmers, businessmen, politicians, social scientists, natural and physical scientists and rest of the general public etc.). When the knowledge exchange relationship between the knowledge giving agents (educational institutes) and the knowledge utilising agents (different professions, industry, business etc) extends the borders of the country or region and the international community is benefited from this relationship (exchange of knowledge), and then individuals and organisations enter the global sphere. In this way, the model is spread over three dimensions: local, societal and global.

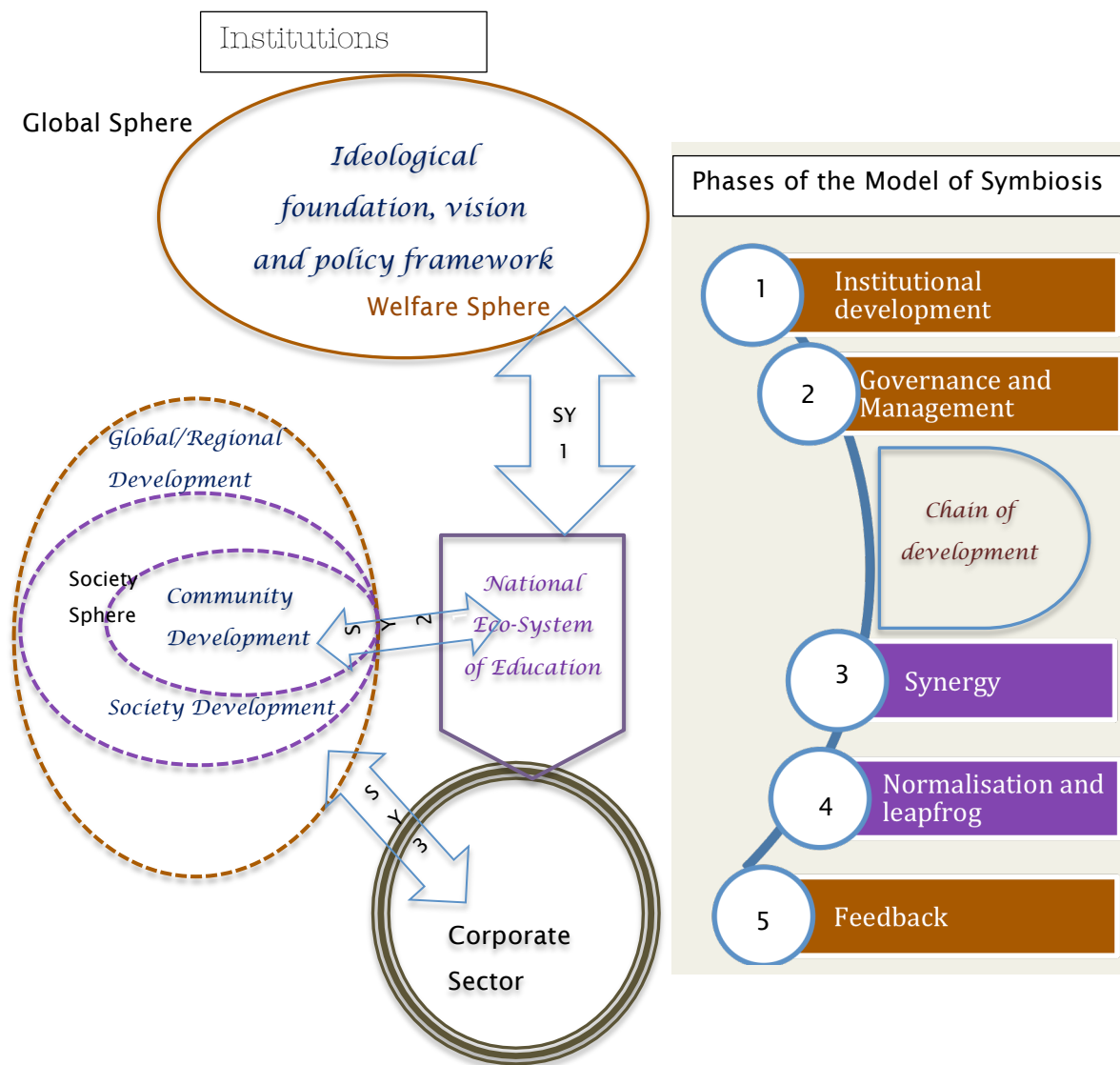### 5.4.3   Activities of the major actors of the Model

The model suggests some practical steps for the three actors or institutions in the model, that is, the state, universities and the corporate sector. In other words, it is in the integration of phases and spheres that activities are generated. To introduce reforms on a large scale can be quite risky if not planned by the joint strategy of government, policy makers and practitioners. It is a fact that Pakistan was created in a state of emergency and since then, at national level, no efforts have been made to determine the direction for the country to follow. The main effort has always been to protect itself from neighbouring countries and a major part of GDP is used for defence while agriculture, education and health are ignored. Here a suggestion is given to the stakeholders, that if universities are assigned the task of determining direction, the government will find it easy to execute policies and business will share the responsibility for development of the country. With the help of the corporate sector and the universities, government can create an enabling environment based on peace, security and trust. At the moment, all major initiatives are either doubted by the citizens or fail due to lack of vision on the part of both citizen and government.

Strengthening the institutions and implementing all its policies in both letter and spirit can regain trust of the nation. Involvement of the citizens in major decisions will also help the government in establishing its authority and acting as central commanding authority. Some of the questions that the government should consider and discuss with its experts are how to increase the liquidity of the economy? How to encourage people to pay their taxes, because if money is not generated then how can the financial structure of the country function? The a) educational policies b) science and technology policy c) foreign policy and d) law and order and intellectual property-related policies are very important for sovereignty and prosperity of the economy. Public opinion must be involved in developing these policies.

The above discussion on phases, spatial disposition of the model and activities is presented in the Model of Symbiosis in figure 5.5

Figure 5.5   Model of Symbiosis

Institutions

Global Sphere

Ideological
foundation, vision
and policy framework

Welfare Sphere

SY 1

Global/Regional
Development

Society
Sphere

Community
Development

Society Development

National
Eco-System
of Education

SY 2

SY 3

Corporate
Sector

Phases of the Model of Symbiosis

1 Institutional development

2 Governance and Management

Chain of development

3 Synergy

4 Normalisation and leapfrog

5 Feedback

Source: Author

The model suggests that it takes time to institutionalise the system and develop the economy and society from scratch, but that it is not impossible to rebuild an economy on sound foundations. If the suggestions provided in this study are followed, Pakistan might be able to foster KBE in a few years. However, if the external and internal factors are not controlled, it might be difficult for the nation to develop socially and economically. The external factors include good governance, political stability, an effective policy-making and implementation process and strengthening the judicial, educational and financial institutions, while the internal factors are the structural and functional requirements of universities for physical and knowledge infrastructure so that knowledge can be transferred to different sectors of the society.

5.5 Summary

This chapter has presented key themes that emanated from the cross-case analysis, building on grounded theory procedures (Struass & Corbin, 1990). Conceptual ordering of the key themes has brought about the development of the 'Model of Symbiosis', which is the theoretical framework emerged from this study. This forms the major contribution of the study and it was the aim of the researcher to generate a new substantive theory which is achieved in this chapter. The emergent theory allows for deepening understanding of the role of universities in developing economy, by highlighting complex dynamics of relationships between national eco-system of education; national, economic and political systems/institutions; and society.

6. Concluding remarks and policy implications of the study

6.1 Introduction

This is the concluding chapter of the thesis. The aim of the researcher is to answer the research questions leading to the resolution of research problem through a sustained argument that persuades others that the study has made significant contribution to knowledge (theory, practice and methodology). Chapter Four and Five have fulfilled the task of explaining how a Knowledge Based Economy is emerging in the context of higher education sector of Pakistan; reasonable interpretations are made on the basis of the data and presented as clearly as possible. The processes lead the researcher to develop a model by applying inductive logic. Now, the task at hand is to see if these interpretations have answers to the research questions that were suggested at the beginning of the study in Chapter One. The researcher has embraced social constructionism paradigm (Chapter Three) that advocates that universities do not work in isolation in society. Hence, all the actors who could externally or internally influence the role of universities are discussed in the Model of Symbiosis. Moreover, the research philosophy suggests that researcher and research phenomenon intermingle to produce good results, so that the observations by the researcher have helped to gain deep insights. In this chapter the research questions are revisited and the contribution of the study is highlighted. The chapter concludes with limitations, scope for future research, and a final comment.

6.2 Revisiting the research questions

Research Question 1: How do academics and leaders of key institutions such as the HEC and the IPO in Pakistan conceptualise the KBE? What are the perceived challenges for developing a KBE in Pakistan?

The leaders of academia and key institutions such as the HEC and the IPO conceptualise KBE as a cultural and economic change, which can contribute in the wellbeing of the society, and wide scale changes will be seen in mode of governance and management in Pakistan. It is the desire of academia to participate in this challenge and proactively contribute in development of community and society so that the basic foundation for a KBE is laid down. However, there are numerous challenges faced by academia. Most of these challenges are embedded in the culture and economy of the society of Pakistan and cause structure problems and impediments in the functions of universities.

A common view among all academic leaders in Pakistan is that the universities are willing to play a proactive role but only a handful of universities cannot meet the mammoth challenge. They perceive that the country should address the global challenges of fostering a KBE but their institutions are lagging behind other developed countries or knowledge economies in scientific and technological development. Universities in Pakistan lack the basic facilities such as infrastructure, human resource, and venture capital for start-up businesses, seed money for initiating research projects, research culture, and scientific mind-set and positive attitude towards work. These problems have existed since the country was established. A few research centres of international repute are working in the country but the academia thinks the government should play the major role.

It is worth mentioning here that the government's regulatory body for higher education, the HEC inherited a faulty education system, in 1999 but in a short period it has reformed it to a great extent so far. The HEC has initiated three hundred projects, which aim to develop a competitive environment in the higher education sector of Pakistan. This study is based on empirical evidence from five high-ranking universities in fields, which are crucial for socio development of the country (i.e. medicine, agriculture, engineering, science and technology, and business and management). In these areas, the HEC has played vital role in development of science and technology and creating a mind-set for research based and knowledge based development. The basic infrastructure for any future plans such as creation of a knowledge economy (through linking the higher education sector with industry; small and medium businesses; and multinationals) in Pakistan has been dynamically initiated since its inception.

Other than the above-mentioned areas of improvement, the Commission has paid special attention to upgrading the facilities of universities so that they can work with the international universities. Hence, while striving to make the universities of Pakistan engines for socio-economic development, major achievements of the HEC include the formation of various on-campus science parks, TICs and TTOs. Many other such projects are on-going that will ultimately create an enabling environment for the higher education sector to work on national development and be a part of a national ecosystem of innovation.

A word of caution at this huge scale investment into higher education sector would be that directionless education or bad quality basic and secondary level education is of no use to the country. Now the Commission needs to prioritise research activities in these universities and task the universities according to their areas of specialisation. Research centres or centres of excellence in various areas will strengthen the bond between universities and industry. The Commission needs to facilitate the traditional universities to entrepreneurial universities by making them more self-reliant. By encouraging institutions/universities to develop flat structure of organisation which is free from bureaucratic hurdles and streamlining the administrative units in the structure of universities so that knowledge related activities can be performed easily. In this way, the new entrepreneurial universities will not be fully dependent on just one agency or source (i.e. government/HEC) and the cutback in HEC funding due to political instability would not be able to adversely affect the universities in performing their role.

Political stability is of course needed for the socio-economic development of the country, as transformation into KBE can be assigned as 'a task' to either the education sector or the corporate sector. The academia, HEC and IPO perceive that there is a need for reviving the ideology of the country so that all organisations can work towards the achievement of this mission, which are currently disconnected. This gap of communication is seen in the form of chaos in the society. If the government does not create a welfare state (pay attention to the education sector, health sector and employment) then the chaos might lead into disintegration of the country. With respect to the huge investment made into the higher education sector in the last decade, if these reforms are not continued then the efforts of the recent reforms in the higher education sector since 2002 might not deliver the expected results and the investment of the last 10 years in higher education might not bear fruit.

The key stakeholders of KBE (universities and the IPO) also think that chasing a knowledge economy is just like chasing a moving target and it needs visionary policies (and fair implementation) to achieve this target. They have emphasised on the concept of KBE which is tailored according to the needs of their country. How can the government customise this concept? The answer lies in an example of adopting international criteria and employing it in Pakistan as the HEC has done. The incentives (such as tenure track system) structure, are lucrative, but some faculty members commented that these incentives are available only to researchers who participate in international research while publications in local journals are not rewarded. They argue that these are purely Western criteria and the HEC needs to focus on research journals published in Pakistan to raise their quality to international standards. It may be mentioned in this context that although the HEC recognises many local journals provided they meet certain quality criteria but there is clearly a need for a balanced approach towards all research activities initiated by the Commission. Besides, introducing incentives for researchers, the commission must find a way to appreciate the teaching staff who specialise in teaching.

In order to establish partnerships between universities in Pakistan and in other parts of the world, centres of excellences should be established in all the four provinces of Pakistan. The plan to build six international engineering universities in Pakistan could also improve the knowledge based development in the country after these centres of excellences are associated with technology parks, designed in collaboration with Germany, France, Italy, Sweden, Austria, Korea and China. All these activities will change the landscape of higher education in Pakistan if these suggestions of academia are implemented in letter and spirit.

It also needs to be understood by the society that higher education is vital for socio-economic development of the country. For example, the student, researcher and resource can help in creation of knowledge economy in Pakistan and project an enlightened image of the country. The case accounts show that the Commission went through hard times after the change of government in 2008, with the accompanying shift in the policy to support higher education. Funds were stopped and the students who were sent abroad for higher studies faced difficulties. The release of scholarships to these students in foreign countries was suspended in September 2008, triggering the resignation of its founding Chairman. All the universities across the country were closed for one day as a mark of protest because even the faculty members did not receive any salary. Under these uncertain conditions, higher education cannot deliver its intended results. It is important to continue the policies of the Higher Education Commission to uplift higher education in Pakistan and continue investment in the higher education sector because the results are very positive so far (Osama et al. 2009; Fuyuno & cyranoski, 2006; Naidoo, 2009).

In fact, investment in education is inevitable if the focus of the government is on innovation, research and technology transfer to industry. Science, technology and innovation play an important part in the creation of a knowledge economy. The current science and technology scenario, as depicted by the Pakistan Council for Science and Technology (2009), (abbreviated as PCST) is positive and can be further strengthened by allocating public money to science, research and technology, states Dr. Tariq Rahman (2009). The Council reports that currently three independent ministries are working for creating an enabling environment for innovation i.e. Ministry of Science and Technology, Ministry for Information Technology and Telecommunications, and the Higher Education Commission, Pakistan. Besides, 85 science and technology organizations with 224 research institutes/centres and research labs are functional. If these organisations collaborate with universities and the universities develop linkages with industry for developing products, services and technology, then a national eco system for education can be developed. The biggest challenge for the country is depicted by Shakeel and Khan (2007, p.79), as they state:

> 'There is a weak university-industry linkage, and a high volume of brain drain. The R&D in Pakistan lacks competitive edge in the market and lacks the capacity to transform knowledge into products. Most of the universities and R&D centres of our sample have linkages with foreign organizations/universities for the purpose of training and R & D and very few introduce new processes/products annually'.

As suggested in the Model of Symbiosis, the government should focus on knowledge creation, innovation and socio-economic development by formulating such policies in which all of these organisations can work in collaboration. Furthermore, the pace of such activities should be further enhanced instead of creating hindrances and hampering such activities. The investment made will pay off in the next 10-15 years when a change of mind-set is achieved and a research culture is fostered in universities of Pakistan. In this process of knowledge creation and application, universities will continue to play a central role, as Shakeel and Khan (2007) expressed:

> 'The universities will need to play a central part in this transition through knowledge creation, its use and diffusion of new knowledge into the society through establishment of technology parks, business incubators, access to venture capital and other such schemes'.

257

So, the basic infrastructure is developed and traditional universities in Pakistan have to adopt the new roles. As suggested in the Model of Symbiosis, the government should focus on knowledge creation, innovation and socio-economic development. This investment will pay off in the next ten to fifteen years when a change of mind-set is achieved and a research culture is fostered in the universities of Pakistan.

A pragmatic approach towards the development of a KBE is to realise that Pakistan is an agricultural economy and innovation should initially take place in this sector. The role of universities is to solve the problems of the society by developing the capacity for any such transformation in the future. The agriculture sector should be developed. Some basic problems of the country that need to be resolved besides solving the problems of agriculture sector, are unemployment, sanitation, poverty, gas and electricity cuts or shortages, corruption, political instability, low access to primary, secondary and tertiary education, nepotism, double standards: all these problems are widespread in developing countries. These problems are related to the daily life of the people of Pakistan and negatively affect their national psyche and development of the country. In a KBE, innovation and technological development determine the economic health and well-being of peoples. If a country is economically sound and its economy is knowledge-based, it will be a genuine, active trading partner and will be looked at with respect in the international community. Feudal mentality and bureaucracy have, however, hampered socio-economic development in the context of this study. Academia believe that unless the people are empowered through a uniform high quality system of education for all, irrespective of cast, creed and status in society, a knowledge economy will remain a *wishful thinking.*

Research Question 2: Which functions of universities foster knowledge economy? What are the ways in which academia can collaborate with industry and business sector in Pakistan, now (for transformation into KBE) and in the future (for sustainable development)?

Universities have been working for the welfare of their community and are now beginning to realise that they need to link their efforts to the industrial and financial sectors. It means that while they have been imparting education to the society, they now need to do more than this and move towards innovation and entrepreneurship. The establishment of a number of Offices of Technology Transfer and developing various Technology Parks in these universities is evidence for the trend. The educational system from nursery to higher education level needs to be revamped and developed again under certain overall strategic directions at the national level, so that a questioning and problem-solving approach is developed among students (the citizens).

The following figure 6.1 shows the yearly increase in the number of universities from 1999-2008.

Figure 6.1 Establishment of universities in Pakistan (1947-2008)
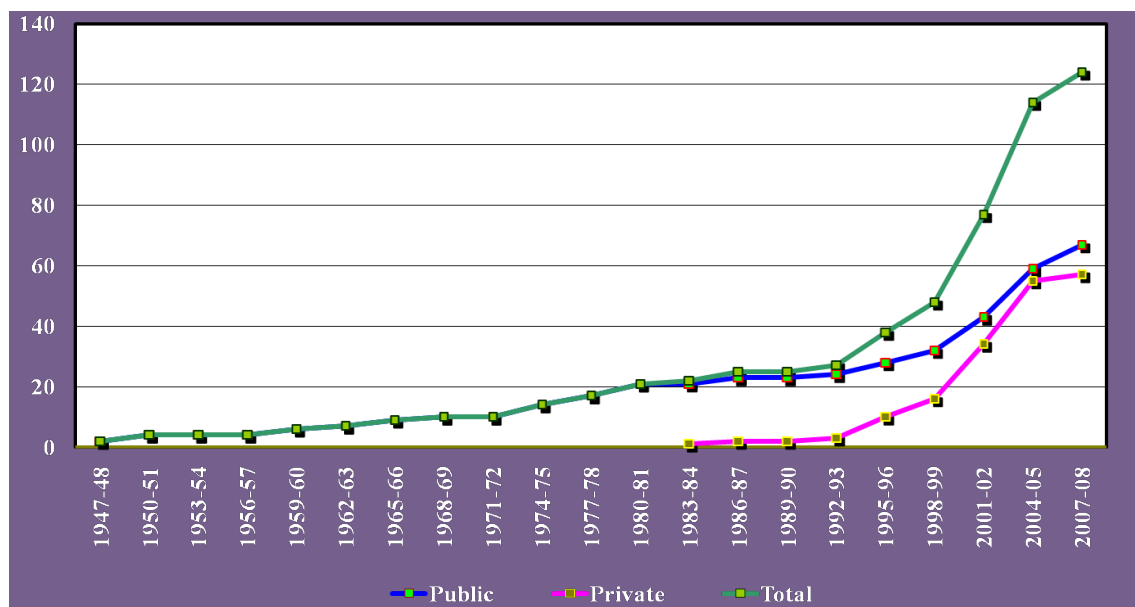
Source: Tariq-Ur-Rahman (2009)

The curriculum at the primary, secondary and college level education has failed to produce graduates with critical thinking and other skills necessary for a knowledge economy, such as research and problem-solving skills as well as communication skills. The two media of instructions, Urdu and English, further divide the society into layers. According to the faculty members in a number of universities, the existence of two kinds of educational institutions, that is, public and private schools and colleges in the country, divide the society into 'haves' and have-nots'. Technical colleges are merely certificate awarding institutions. The primary reason for this is the method of instruction which is based on rote memorisation that can never produce critical thinkers or good technicians.

Expressing their views about the challenges faced by the academia for a knowledge economy, the faculty members rightly complain who they can collaborate with when 80% of industry in Pakistan is dysfunctional. Business is not flourishing due to the security situation in the tribal areas, in particular. Industries in Pakistan are established on loans, and political influence is later used to write off those loans, so that the process of industrialisation is often another avenue for corruption. Furthermore, massive smuggling, through containers ostensibly destined for Afghanistan and through other means, has damaged local industry badly, but the government is not taking steps to stop goods coming from across the border because of the vested interests of high level officials. Foreign investors prefer to invest in neighbouring countries instead of Pakistan due to rampant corruption and political instability. Multinationals operating in Pakistan encounter problems with intellectual property, as many of their products are soon copied and forged.

The liberation of trade and the free flow of goods are considered to be of benefit to the countries. In fact it has had adverse effects on developing countries that lack trained human resource, medium and high-technology industries, and strong innovation policies. They cannot compete openly because of their inability to manufacture high quality goods needing technological abilities competitively. Since most of the labour in Pakistan is unskilled, it is difficult to consider the country establishing a strong knowledge economy in the near future (Torres, 2001).

Under these circumstances when the industry is paralysed, trade is limited, no foreign direct investment is coming into the country, how can a knowledge economy be created in the country? Some of the faculty members suggested that Pakistan has a variety of resources: cultivable land, water, large coal deposits, solar energy potential, and a demographic edge over many other countries through a young human resource. However, the country does not have an effective leadership to steer the economy and society through visionary policies and institutions are weak so most of the policies are not fully implemented. Foreign aid can also become a huge burden if it is not judiciously invested. Reports from universities show that

students in Pakistan are against taking foreign aid and foreign loans because then Pakistan becomes shackled. Its national independence is compromised if it is submerged in foreign debts and it becomes a stooge in the hands of others who exploit this weakness. The current rise in terrorism has also caused a significant decrease in the exchange of scholars with international universities.

It is essential for the universities specialising in business studies, management, medicine, and engineering and information technology to collaborate with industry. Their lectures and classroom teaching are of no use if students do not find the opportunity to work with banks, companies, government organisations and other corporate sector institutions during their course of study as internees. Therefore, some of the students actively work with the corporate sector and many of the faculty members at these universities have wide corporate exposure both in foreign countries and within Pakistan. On a general note, following the rules and regulations of the HEC and aiming for achieving good ranking in HEC criteria, all universities in Pakistan are striving to increase their research profile so that they can develop the intrinsic strengths. This will enable them to then come forward to find solutions to the problems of industry.

Universities are proactively establishing links with industry. Some of the universities are conducting research for the corporate sector, talking to them, making necessary changes in the curriculum and providing incubation facilities for new and small businesses. The academics are making links with industry, businesses and non-governmental organisations, but so far these links are few in number and mostly informal. There are no policy directions as to how they should interact with other sectors of society and no reward system in place to encourage such links.

Universities are looking forward to industry, business and the multinationals to help them in developing appropriate infrastructure, because the government cannot do everything on its own. The heads of the universities encourage their faculty to do contract research and this is an indirect source of income. The main issue for academics is financial constraints on their research, but if industry is paying for their services then the enabling environment can be created in universities to collaborate with industry. The private sector university faculty members complain that if their papers are accepted abroad, few faculty members have the chance to present their work. Few have complaints about the commercialisation process; they invest their funds in making machines but the investment is never reimbursed. The procedure in other countries is different.

The final analysis of the interviews shows that some faculty members in universities have reservations about adopting Western criteria of research (such as publications in high impact factor journals) and its applications in Pakistan. In the view of the academic leadership, the approach is beneficial for leapfrogging strategies as it sets benchmarks for the development of universities in Pakistan but it also causes frustration among the faculty members unable to come up to the requisite standards. If the universities are expected to work to these international standards, an international environment should be provided for researchers, or at least they should be given an exposure to international markets and universities. Spin-offs are too few and the regulatory framework for intellectual property is not yet developed in the country.

The HEC is supervising projects that claim to be of benefit to the country. The scholars can apply for seed money or venture capital and if the proposal is accepted then the researcher works on the projects. To promote university-industry linkages, HEC also offers a programme in which industries and universities can submit a joint project to solve a specific problem faced by industry. Such programmes of HEC however need to be more widely publicised so that the impression created among some faculty members that researches funded by HEC lack direction can be dispelled. As in most universities of the world, what the researchers may or may not work on in a research project in universities in Pakistan is at their discretion, subject to positive peer review. Some faculty members felt that guidelines should be provided by HEC and the Ministry of Science and Technology regarding what kind of research they should focus on.

Mere monetary benefits cannot create a working environment that fosters university industry linkages. Presently, working with industry on joint research project is only motivated by monetary factors. However, the case accounts illustrate that research culture and knowledge culture should be developed first. In order to create universities like Harvard, Oxford, Cambridge etc. research capability of the faculty needs to be developed by partnerships with industry but the creation of competitive markets and high-technology industry is also necessary. At the moment industry in Pakistan is not high-tech. Despite a humble beginning, the HEC and universities are trying their best to create a KBE in Pakistan.

According to Dr. Tariq-Ur-Rahman (2009) the biggest achievement of the country in recent years has been the move towards Knowledge Based Economy and sustained investment in research and development activities through HEC. This has helped the country to develop the basic infrastructure for creation of KBE. He adds that incentives for research and development have been revised. A new salary structure for scientists and researchers has been introduced in which a Tenure Track appointee in universities can earn up to US$ 3000 p.m. (now $ 4,000 per month). It is also worth mentioning that they also receive 75% income tax waiver. In addition, a research productivity allowance is given to researchers. These incentives have resulted in five-fold increase in the international research publications in impact factor journals (increase is ten-fold between 2000 and 2011). In his study, Dr. Tariq-U-Rahman supports this data with evidence collected from the Pakistan Council for Science and Technology survey (2008-2009):

Figure 6.2 Research out of universities in Pakistan
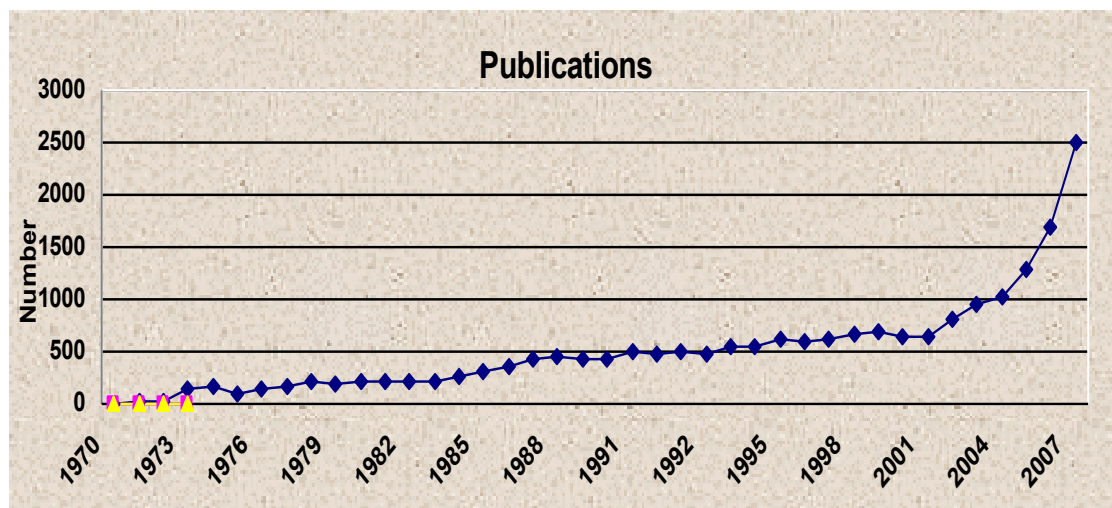
Source: PCST Survey (2008-2009)

Recently in April 2011, SciVerse Scopus, initiated a forecasting exercise to predict, the scientific outputs in 2018. The results of this exercise show that the research outputs of Pakistan from 2003 - 2010, is expected to rise. Its current position is 43 and it is predicted to rise up to 27 in 2018. SciVerse scopus is a citation based analytical tool similar to Web of Science (Impact Factor) which analyzes data from nearly 30,000 international journals (http://www.scimagolab.com/blog/wp-content/uploads/2012/04/forecasting-excercise.pdf). This rise in the research output and development of human resource in the country requires political will to continue. The investments in science and technology also need to be substantially increased since the share of GDP spent on R&D is still very low (0.59%) as compared to other countries, as shown in the following figure. The survey reports that Japan is spending 3.4 % GDP on R&D.

Figure 6.3 Percentage of R&D in Pakistan and other countries
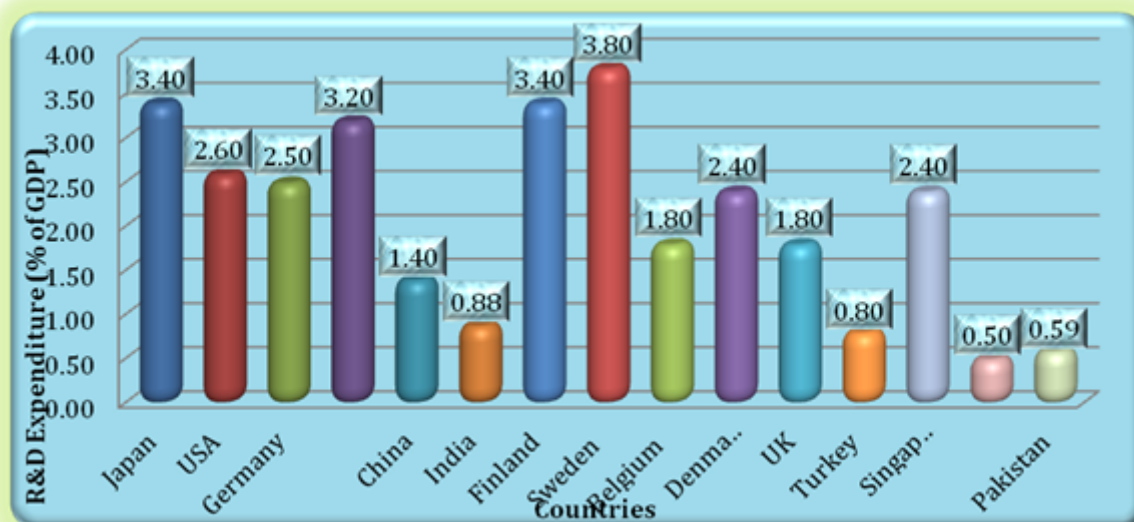
Source: PCST Survey 2008-2009

Figure 6.3 shows that although the percentage of GDP spent on R & D is still very low as compared to the other countries (as shown above) but it has risen considerably during the period after the year 2,000 largely due to investments in universities through HEC. Similarly, Figure 6.4 shows the expenditures on developmental and non-developmental plans from 1999-2008 were increasing each year.

Figure 6.4 Expenditure on development and non-development plans
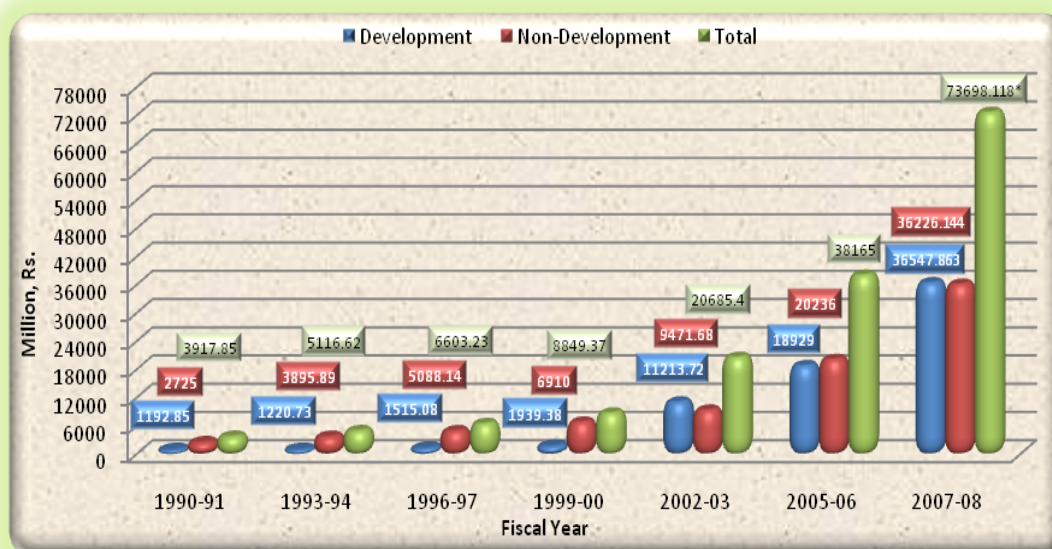
Source: PCST Survey 2008-2009

Scholarship programmes, faculty development programmes, foreign faculty hiring schemes, encouragement for international publications, establishment of TICs and many other similar activities help to strengthen the base for the development of knowledge economy. The HEC has made it compulsory to all universities in Pakistan to establish ILO offices and develop their own incubation facilities. This has helped to improve the university environment. However if the university–industry partnerships are viewed closely in the context of Pakistan, of the five case accounts none claimed that they have a durable partnership with business or enterprise apart from the engineering university working on national defence and the private university (angel venture of a leading industrialist of the country). All the faculty members are of the opinion that since the industrial sector of Pakistan is not very developed and the country faces many problems, these present opportunities for universities to work and solve such problems. The universities in Pakistan should be evolving an entrepreneurial model that is also a home-grown, indigenous model focusing on addressing local problems and issues. The sector wise human resource developed in the country is presented below with respect to male female ratio.

Figure 6.5 Sector wise human resource and male female ratio in Pakistan
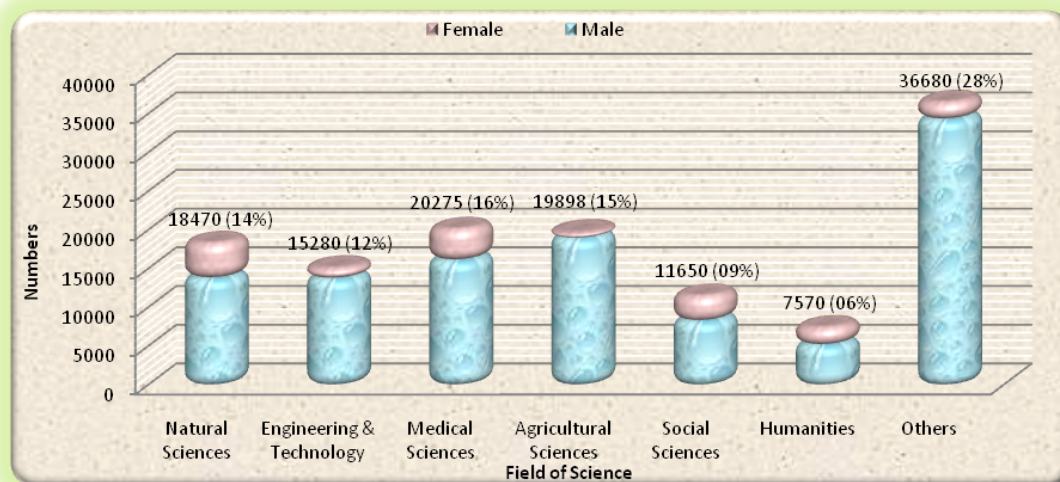
Source: PCST Survey 2008-09

Research Question 3: How can the policymakers possibly help in making an interface between universities and industries in order to support the creation of a Knowledge Based Economy?

There are several issues which the policymakers address in order to foster a KBE in Pakistan. The first *relates to having a national vision, strategy and action plan for socio-economic development* as it has been iterated repeatedly in this study. One such strategic plan was approved by the Cabinet in August 2007 after a Foresight plan was developed but has not been implemented. The vision developed in this foresight study is linked to having a national science, technology and innovation policy that is implemented by integrating it into the national development programs. The implementation of such policies which are developed by visionary scientists of the country need implementation and the policy makers need to make sure that their policies are consultative and well informed, besides, the policies are implemented in letter and spirit.

The second issue that the policy makers might like to address relates to the sustainability of such policies that can only be achieved if there is a broad consensus on them between the government and opposition political parties. Otherwise with each successive government, new plans and policies are initiated and none are properly implemented before the next government is installed.

The third and more difficult issue is the feudal system prevailing in Pakistan that prevents the development of holistic education system. The education policy and its ruthless implementation should be given a *national priority* since a large number of Parliamentarians and Ministers in the Cabinet are the products of the feudal system so they do not wish to contribute to the development of education sector. Such mechanisms should be devised which can abolish the feudal-mind set in the country through developing a holistic education system which can produce visionary leaders, effective administrators, and dedicated individuals who are dedicated to the national cause (vision) and prefer the interest of the country over their own/self-interest.

The government is not playing its role in developing a welfare state, in fact, the country has turned into a war-zone, and therefore, universities are working proactively in order to improve the economic and social conditions of the country. In order to continue this attitude towards development, universities need a stable political system and good governance in the country. The military generals overturn governments and emergencies are announced in the country which might hamper these proactive measures taken by universities. The political leaders that eventually replace military dictators are invariably corrupt, and the army is forced to intervene in governance matters of the country. The politicians have large

assets illegally owned in foreign countries, and they have no stake in the development of Pakistan. This is the general perception about the political leadership of the country and case accounts illustrates that political instability is the biggest challenge which is hampering knowledge exchange activities. Universities across the world, recognise that Pakistan has talented researchers and some of best research centres but due to uncertain situation in the country, these universities are reluctant to work with them.

The empirical analysis shows that university faculty members hold poor opinions about most politicians. They know that these politicians cannot be called as *leaders of the state*, because they work from vested motives and when their interests are achieved, new politicians appear. This vicious circle needs to be changed into a virtuous circle of development. In order to do this, the study suggests that all governments should complete their tenure of five years because the lack of stability in political system has caused insecurity among the people. The people of Pakistan desire for a quick recipe for development that is not to be found anywhere in the world, so the people have to wait and watch, and allow the political system to evolve and find its own solutions through elections. This will allow all institutions of the country to develop simultaneously. The educational policies in particular cannot deliver results so soon, so the government should dedicate greater portion of GDP to education which shall continue to increase irrespective of these political changes.

The Model of Symbiosis states that government should prioritise its tasks. There is much to be done to put the country on the path of sustainable development or knowledge economy, but three areas need the government's immediate attention. First, a clear national vision, a guiding star for all institutions and individuals, should be developed as stated above. Second, the law and order situation must be improved. It will improve if all institutions of the country improve and coordinate for the single cause of national development. Third, most importantly, the government should give highest priority to the improvement of the education sector of Pakistan.

Research Question 4: What will be implications of a newly created KBE on the higher education sector of Pakistan, the socio-economic conditions of the country and for the region, if any, taking into account the recommendations generated in the study?

It is clear that the country's governance system is very poor, which poses a huge challenge for the universities of Pakistan. The universities have taken a proactive approach to improve their functions, spurred on by the Commission with targets and funding. Recently, the media has started openly discussing the multitude of problems faced by the country, and the massive corruption that is preventing development, on talk shows and in the printed media. This has created mass awareness among the people. The current government is the first democratic government, which will soon complete its tenure of five years, but it is a pity that it could not deliver any results. People, at least in the cities, are looking for a change and they are determined not to vote for the politicians who have already governed the country in the past but did not succeed in developing a welfare state. Those in the rural areas are under the yoke of the feudal landlords and are mostly illiterate. They may once again just follow what their master's order. The uncontrolled inflation, which is often more than 20%, lack of job opportunities due to collapsing economy and decrease in industrial production, as well as the serious law and order situation combine to create a very dismal scenario. Food prices, in most cases have more than doubled in the last 2-3 years, as have the prices of fuel. Suicides are reported on an almost daily basis. Cities like Karachi have turned into a jungle with the crime rate having shot up, and hordes of young men roaming around with guns on certain roads, snatching cell phones on the point of a gun. Doctors, protest for their rights and they demand increase in salaries and regularisation of their appointments in public hospitals. Lawyers have faced many issues in the past 8 years. Teachers and students were forced to launch nation-wide protests actively to save the HEC from being disintegrated by the present government. Masses have protested on a regular basis against the rising inflation, electricity shortages and the terrorist attacks on civilians. This is an evidence for poor, rather failed governance and a failed democratic system. As a result the socio-economic conditions in Pakistan are poor.

The value of currency has fallen (from Rs. 60 per dollar to Rs. 92 per dollar presently) and investors are not targeting Pakistan as a safe country for businesses etc. The industrial sector of the country stands paralysed and in cities such as Faisalabad, the textile hub of Pakistan, more than half the industry has closed down. Agriculture can prove to be a sector to contribute in formation of KBE. In fact, in order to transform into a knowledge economy, Pakistan must invest in developing modern agriculture methods and invest in value added agriculture so that the farmers can benefit significantly. This can contribute to the reduction of poverty in rural areas. However, it is a pity that the agriculture sector is largely contributing financially to the feudal landlords, and very little benefits trickles down to the

common farmer working in the fields. They own large tracks of land and employ workers at fairly low wages. As a result the field workers in the farms suffer from poor living conditions and their children remain un-educated (which is the main aim of feudal lords) as most of the rural areas do not have enough schools and colleges. Agriculture has remained tax free to protect vested interests of the feudal lords. In fact, the burden of tax falls on the salaried class, while a strong 'black economy' exits that goes undetected and untaxed.

The present political leadership does not have any developmental agenda and all that it is interested in is to perpetuate its regime and powers indefinitely. 'Power' is preferred over 'knowledge'. Masses/ people do not realise that with knowledge comes the power. This chaos is likely to continue unless, a culture is developed where knowledge, learning and education is given precedence over power and wealth. The power in the society of Pakistan has created imbalance and hence inequality prevails in the country. The people of Pakistan have no other choice than to vote for the existing political parties due to the stranglehold of the feudal system on democracy and government. The Supreme Court of Pakistan has recently convicted the Prime Minister on contempt charges, but he continued to serve for a while.

The media has tried in vain to highlight the evils of society and reveal the true faces of these political parties, but the population cannot do anything about the prevailing conditions. Furthermore, this inability to change the circumstances has also had some detrimental psychological effects on the overall psyche of the people. The nation lives in an insecure environment where inflation, world recession and the poor law and order situation has created an environment of depression and bred intolerance among the people towards each other. The overall society has been disintegrating into a state of chaos. The people of the country hope for an honest dedicated leadership to move the country on the path of development and sustainability, but due to massive rigging of elections and whole scale stuffing of ballot boxes, fair elections are a distant dream. The current corrupt system needs to be reformed by grass root level steps such as educating children and developing well-rounded citizens, equipped with skills and knowledge to differentiate between 'good' and 'bad'; 'virtuous' and 'evil' and make them practice the universal values of honesty (curb dis-honesty), truth and humanity (curb selfishness).

Universities, after silently watching the power games and failed governance system in the country, are now responding to the situation. As mentioned earlier on, universities were supported by the Commission to undertake new missions to develop their community and foster linkages with industry, but these functions are newly adopted. These roles require the support of the Commission, until, the universities are fully independent and self-reliant and they have formal and informal links with other organisations in the country and beyond the

269

borders. Unfortunately, the process of socio-economic development through universities is halted. The education sector, particularly, universities are not receiving their share of funding, so the prospects of KBE appear bleak under the current democratic governance and political system, although five years ago, the country was 'on the launching pad' or 'runway of the KBE'. Under these circumstances, the academics think that although all universities aim to transform the economy into a Knowledge Based Economy but in reality it has become a trend to use the term 'knowledge-based economy' in mission statements (while actually not taking any substantial steps towards this goal). It cannot improve the image of the country unless substantial steps are taken with respect to Pakistan's faulty foreign policy that has turned the country into a 'wasteland' and 'a war zone'. These steps include the development of the basic infrastructure of the country, implementation of proper policies in a sustainable manner after consultation with the key stakeholders, and incorporation of a proper feedback mechanism on policy implementation. The study reveals that Pakistan has to adopt a science, technology and innovation policy closely linked to its agricultural and industrial policies so that national self-reliance can be promoted.

Only essential imports should be allowed so that local industry is protected and it can develop. The country also needs to exert strong border controls to reduce smuggling. The major institutions of the country such as the judicial, military, and political governance system should perform their desired roles conscientiously. Most importantly, the government should realise that instead of spending the major share of GDP on defence, the mind-set should be changed and education should be considered as the strength of the country through investment in education sector. An educated population is the biggest strength of any country in the global knowledge economy era. Now, it is up to the political leadership of the country to create a vision and assign tasks to all organisations in order to achieve the vision. Keeping in mind the circumstances of the country, the most important requirement for KBE is *good governance* – only honest and dedicated leadership can steer the country in the direction of a knowledge economy. It is important to mention that the universities of Pakistan have significant potential to contribute in knowledge based development by providing human and intellectual resource. Once the situation has normalised, the brain drain phenomenon can be stopped because the country will offer better opportunities to its citizens. Indeed this phenomenon will be replaced by brain-exchange, contributing to sustainable development of the KBE in Pakistan.

Last but not least, the current study proves that a knowledge economy is largely considered from an economic perspective in other parts of the world. In the existing knowledge economies an effective system is in place, so studies may ignore the moral and social aspects and focus on economic aspects. However, the study suggests that it should also encompass the social and ideological development of the society that warrants a fair and equitable distribution of wealth and resources. Such a society should guarantee equal opportunities for everyone. Social and moral dimensions of economic development cannot be divorced from ideological and religious underpinnings embedded in the culture of society, as Pakistan is largely a religious society. Pakistan has an institutional infrastructure and societal structures that can contribute to the development of a KBE, provided that those structures and policies are designed and implemented in a sensible and ethical manner.

In short, the implications of knowledge economy for Pakistan and international community are three-dimensional. First, the systems of governance will improve and central direction and command will be established. Political stability and a strong institutional set-up will be formed. This has been one of the biggest challenges of Pakistan after the lack of vision at national level. The military coups and resulting political instabilities can be avoided if the universities play their role hence; the fostering of a knowledge economy socio-economically strengthens the economy. Second, a knowledge-based Pakistan shall have a positive impact on not only the region but the international arena and global politics. All neighbouring countries in South Asia need an economically sound Pakistan. Third, an enlightened image of the country will be projected. There are 4000–5000 scholars who have returned to the country after completing their doctoral and postdoctoral studies. This knowledge exchange programme was very successful as these scholars have created a good impression of Pakistan in the countries where they were sent for higher education/further education; they have established links with universities in foreign countries which can be further strengthened if they continue working with them in future; they represented their country in foreign countries where usually the perceptions about the country and its people are judgemental, so those perceptions are dispelled. This is evidence of change that a researcher can bring to a university and it depicts the change at a very small scale. On a larger scale, these scholars have received education in the world recognised best universities so it is hoped that the performance indicators of the country will improve due to return of these scholar, as they constitute the social and intellectual capital of the country, which is a pre-requisite for transforming traditional universities into entrepreneurial universities by developing research culture and enhancing the knowledge base of the country.

These major and minor changes will develop the economy and society of the country and the country will be projected as a developed and civilised country. If Pakistan can develop a knowledge economy and society, it will be a role model for other developing economies in the region and it will be beneficial for the country because the perceptions of the world towards the developed country will be positive.

6.3 Contribution of the study to practice, theory and methodology

The contributions of the current research to knowledge is three-fold: Firstly, the research makes a theoretical contribution to the scholarly debate on the role of higher education in driving the KBEs, particularly in the context of developing countries by offering the Model of Symbiosis that highlights five phased approach to the development of a KBE. The model proposes that the key institutional actors i.e the national eco-system of education, the state and the corporate sector, can play a vital role in developing a welfare state which has its positive spill over effects on the global sphere as well. Secondly, the study makes a methodological contribution through a rigorous application of grounded theory approach in executing empirical study in an area where there is a call for rigorously conducted empirical research. Thirdly, the research has significant practical and policy implications for higher education institutions, and other institutional agents such as the state, the regulatory bodies such as the HEC and the IPO.

6.3.1 Theoretical contribution

The theoretical contribution of the study is the application of the Model of Symbiosis in Pakistan in the context of generating a KBE. The model explains the complex phenomenon of overlay of relationships among institutions, pertaining to KBE by highlighting their role and interaction in different phases of the transformation to a KBE. It begins with an ideological vision, designed by the government, in respect of developing KBE by the year 2030. The ideology of a nation determines the national character of its people. The value system prevailing in the system is also influenced by the governments' command and control system of governance and management. When institutions are well developed and good governance is in practice in a developing country, the process of development can occur. It implies that the government is the key authority to trigger the needed actions by universities, industries and other institutions. In the hierarchy of relationships or overlay of relationships, currently there is disconnect between these major actors due to lack of effective communication mechanisms and lack of clarity as to their role, function and specific tasks. Once the synergies are established between government and the national higher education system, and the corporate sector, and the community, and then their

positions and actions will change. Therefore, it should be highlighted that the government is the institution in a developing country such as Pakistan that has the power to supervise all institutions so it has greater responsibility for the welfare of its citizens. In the Model of Symbiosis its (government's) role and function is emphasised in providing an enabling environment in which universities can pro-actively develop the community in a given society. The definition of community according to this model is novel. It ranges from the local communities such as farmers, businessmen, and technical workforce to the large industry or corporate sector. It is a holistic model which begins with a top down approach but it has the capacity to develop from the inside (local community) to the outside (global community).

6.3.2   Methodological contribution

The methodological contribution of the research is that rich empirical data is generated through grounded theory application in the context of Pakistan. These research findings and hence the conceptual model offered in the study are 'grounded in data'. This is the major methodological strength and contribution of the study. The HEC has displayed studies (See Appendix C) on its website (Ph.D Directory). The Ph.D repository shows that there are only a handful of studies in the field of higher education; and their focus is not on the role of higher education in driving a KBE. Unlike India, Bangladesh and any other developing country, the higher education sector is not yet fully developed in Pakistan and there has been a pressing need for empirical research that is conducted through robust methods with a large sample. This doctoral study has addressed this gap and paved the way for further studies that can apply grounded theory approach. Moreover, none of the studies given on the HEC's website have researched any contemporary issue. This is evidence to the fact that the by researching on the on-going debate of the KBE, the current study has the element of currency.

It is worth mentioning that fifty academics of Pakistan (who are working at key positions in universities, the HEC and the IPO) have been interviewed for this research project. These resource persons carry a wealth of information, besides a lifelong experience in the academia and industry of Pakistan; hence, they have enlightened the researcher in the context of this study. Without the help of these academics, leaders and administrators, quality data could not be obtained.

The data gathered in this project is huge and it can be viewed from many different perspectives. The scope of the study was limited to investigate the perceptions of academia regarding challenges faced by academia and any factors that facilitate transformation into the KBE. However, the same data can be utilised in the future for investigating the intended and un-intended outcomes of the education sector of Pakistan. Many themes emerged from

the data, such as male, female inequality in academia; women academics as administrators of the academia; performance indicators of universities; ranking system and the response of universities to ranking criteria; and curriculum design and evaluation; but, these do not fall under the scope of this research therefore, the researcher intends to take these research issues in future for further exploration. Moreover, the culture and context of Pakistan is different from many other developing countries. Therefore, new insights might be generated regarding the challenges faced by academia in Pakistan under the locally prevailing conditions. As far as the current study is concerned, achieving rigour and ensuring quality in respect of the data acquired make a methodological contribution. Moreover, the study addresses a pressing issue on which there is a serious lack of empirical research i.e. how universities can function as socio-economic engines of the society.

In the coding process, the researcher felt that certain terms couldn't be translated into the English language. A glossary of such terms is added to Appendix D. The study may also be considered as a tacit contribution to knowledge, since it helps to understand the perceptions of academia of Pakistan, which may differ from those of other developing countries. For example, the case accounts report that the function of a university in Pakistan should not just be the imparting of quality education since 'higher education and higher values of intellect and character cannot be separated'. This is the literal translation of 'Alaa Taleem kay sath aala kirdar ki bhi zaroorat hy' (Urdu). In fact, this term is difficult to be translated as; it advocates some characteristics of culture and personality development that are an integral part of an eastern education system.

### 6.3.3   Contribution to practice and policy

The study has a number of implications for higher education policy and practice in Pakistan. First of all, it offers insights for policy makers in developing effective governance and management mechanisms that would facilitate and operationalize the links between key actors (such as the HEC, universities, business and community organisations including corporations). Secondly, it has implications for those academics that hold leadership positions in higher education in terms of reflecting on their current approach and practice of fulfilling all three missions of a higher education institution (i.e. teaching, research and collaboration with enterprises). The overall recognition of research-led education and enterprise activity is there but it is still in its infancy stage. Thirdly, it has practice implications for academics that are research-active, who should be thinking seriously about how to develop useful projects from their science and knowledge base in order to address a particular social, technological or environmental need in their community. Despite the challenges due to macro-environment factors i.e disorder in the country and mismanagement of resources, academics should keep their aspirations high and should

motivate and educate next generations of knowledge workers (i.e. their students and fellow junior colleagues) as such. In order to develop epistemic culture in academia it is very necessary that the process of knowledge creation and utilisation is continued.

Since the results of the study are specific to Pakistan, therefore, it has implications for practices largely in Pakistan. The study vividly illustrates that Pakistan faces huge challenges in the creation of a knowledge economy. Countries that have emerged with strong KBEs have experienced a complete transformation in almost every sector. Sweden, Finland, Singapore, Korea, and UK can be cited as some examples. Pakistan, inspired by these developments, can transform into a KBE but the country has to bring about some major changes. Pakistan certainly has the strength of a large young population (about 90 million out of a population of 170 million are below the age of 19) to propel this change. This is a huge demographic advantage, as compared to many countries such as Japan and Korea that are concerned about the burden of ageing populations.

The study suggests that it needs a competent leadership for the development of a national vision to meet the challenges of the KBE. This needs to be accompanied with short term, medium term and long-term policies and action plan that should then be implemented by strong institutional systems. In developing countries, economic and political situations are often very volatile and unstable. As a result institutions are not very developed. A recent study in the Iranian context suggests that even under uncertain conditions, the development of a virtuous cycle of technology transfer from universities to other sectors can occur in order to transform the country into KBE. The minimum time required for a policy to show results is 10-15 years (Kharazmi, 2008). In the context of Pakistan, Shahid (2010) suggests that well thought out investments in the higher education sector of Pakistan, focusing on the triple challenges of quality, access and relevance, during the last ten years have changed the human resource scenario in a positive manner. The study states that the number of researchers per million populations is 334 (head count) currently, whereas human resource growth in all sectors has also increased as shown below:

Figure 6.6 Human resource in Pakistan
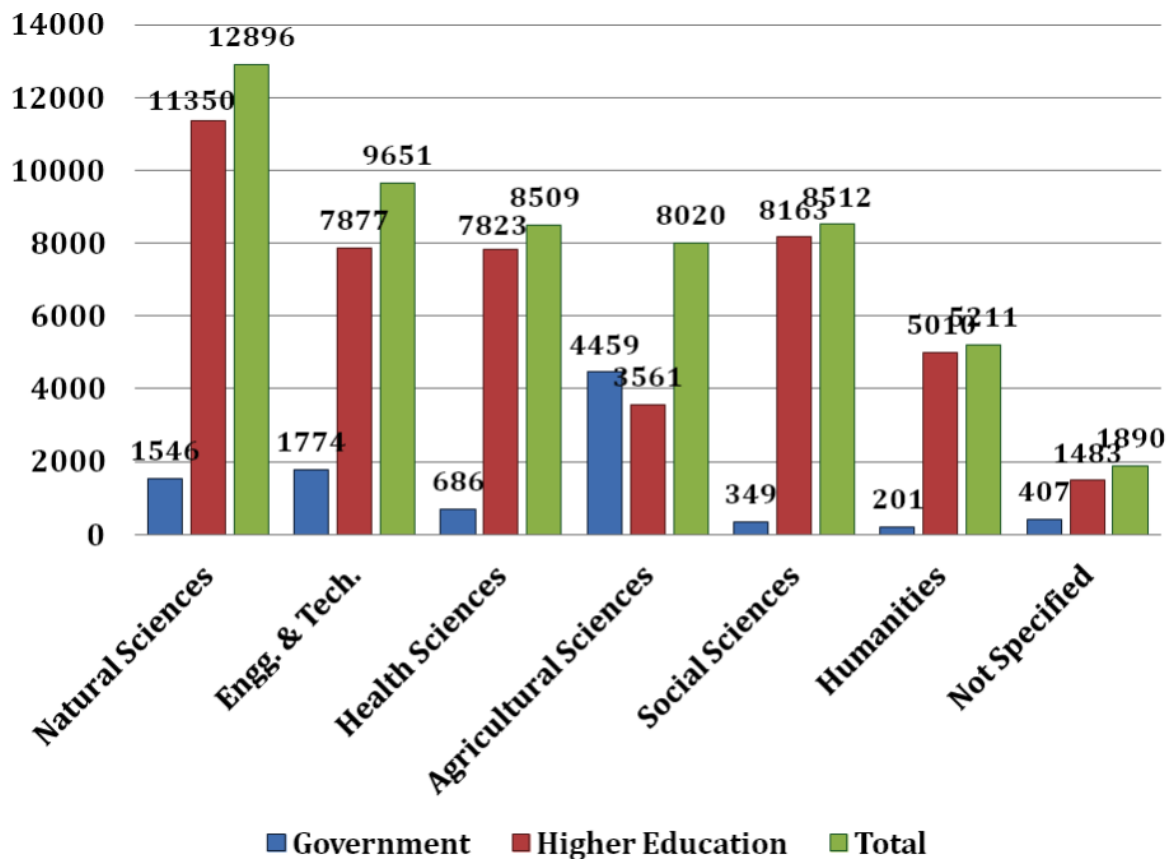
Source: Based on Mohammad Shahid (2010)

The current research advocates that the major contribution of the higher education sector in marching towards the KBE is that universities are now largely capable of producing well trained human resource for various sectors. These findings are consistent with the conclusions drawn by Shahid (2010). Figure 5.6 shows that in the health (12,896) and engineering (9,651) sectors, human resource is high as compared to the other sectors. Natural sciences (12,896) also appear to be one of the major focus areas of higher education institutions in the country (Shahid, 2010). However, the industrial sector does not, as yet, have the capacity to absorb this human resource, or absorb the latest technologies, which might be produced by the universities in the years to come since the industry carries out very little R & D.

Emphasis should be placed on the strengthening of small and medium size firms and on the development of high technology based industrial clusters such as those that exist in Italy where, as indicated by Porter (1998), industrial districts have been set up. The science parks and technology incubation centres within university premises can also significantly contribute to the development of industries, businesses and markets in Pakistan. Small and medium sized businesses need to flourish if the economy of a developing country is to grow and transition into a value-added knowledge economy.

University-industry linkages as described by Clark (1998) can be applied in the context of Pakistan. It can help the universities to benefit from a third stream of funding and the industry can symbiotically benefit from the expertise of academia in order to develop the capacity for innovation. Scholars have suggested that industries that can maintain strong linkages with academia have higher productivity rates than comparable industries which do not make partnerships with universities. Therefore, improvement in the quality of the education sector can lead to a positive impact on the quality of products and services (Malairaja, & Zawdie, 2008).

A KBE is developed when knowledge is produced and properly utilised. This knowledge production through research can be done at the universities or it can be carried out within research and development units within industries. There should be no gap between knowledge production and utilisation if a KBE is to be fostered. Furthermore, Crouch (2000) advocates that once industrial clusters are developed, the industrial districts provide geographical proximity of related industries. Networking capability is then developed between firms and universities. However, no such culture is seen in the context of Pakistan because industry is not a well-developed sector.

Although, entrepreneurial universities drive a KBE, according to Etzkowitz et al. (2000), but very few universities in Pakistan have adopted a proactive approach towards entrepreneurial activities. Therefore, it is a prerequisite that before adopting the KBE, the government has to create conditions to remove the gaps in knowledge related activities. This includes the provision of the requisite infrastructure, in line with the Triple Helix model of overlapping spheres, so that universities can fully emerge as entrepreneurial universities (Etzkowitz et al., 2000). Next, the government should determine what kind of products are to be developed in the country, and for which markets. This role of the government may be performed according to several models. The three types of capitalist models indicated by Schmidt (2003) are as follows: a) market capitalist model, as practiced in the UK; b) managed capitalist model as exhibited in in Germany; and c) state governed capitalism. The universities in this study have made an explicit demand that the government is the main institution in Pakistan, which should play its pivotal role in developing a knowledge

economy. It is not possible for a few angel or venture investors or a few universities to alter the mode of economy of a developing country. According to the perception of academia, the KBE requires changes at macro-level, which can only be undertaken by the government. Governments in developing countries such as Pakistan are often inefficient. This reflects a striking contrast with the other knowledge economies where good governance structures exist both within the government and in the public and private sector institutions. In the terminology of Triple Helix Model, the overlay of relationships is developed between the universities and industry/business on their own, without the intervention or support of the government.

Moreover, blindly following any capitalist model after the recent recession, whose effects can still be seen, may not be advisable. The results of the study are consistent with the findings of a study conducted in the context of Nigeria, in which governments have a strong monopoly on the economy, and where the economy is not research and development oriented or high technology based (Nwagwu, 2008). Both studies conclude that the current configuration of university, industry and government is not fit for the application of a Triple Helix Model in the context of the two countries, i.e. Pakistan and Nigeria.

The conceptualisation of the KBE emerging from case accounts demonstrates that in the context of Pakistan, knowledge economy is an economic strategy in its own rights. At the moment, the concern of many policy makers is the end of capitalism in its present form, and the need for change for the development of a new model for the economies (Sen, 2009). Without going further into the debate of capitalism as a successful mode of economy or not, the study reveals that a key reason behind the success of the knowledge economies is the good governance that has ensured the continuity of successive polices for long periods, often extending over centuries (Claros & Mata, 2009). The study emphasises that developing countries should continue pursuing such polices in which basic needs of their people are addressed, in addition to pursuing the steps needed for transformation into KBE (Claros & Mata, 2009).

Also, there is need to build a society based on ethics, human values and justice. Sen (1999) argues that when a government's priority is public welfare and it transparently performs this role, then businesses pay taxes, which ultimately improve the social and economic conditions. Therefore, evils such as dishonesty and corruption should be removed through an effective justice system in which the violators are quickly caught and punished. When people see the fruits of these efforts, trust in the government is reinforced and the country enters into a 'virtuous cycle of development' (Claros & Mata, 2009, p.10). Hence, a new form of knowledge economy might emerge in developing countries if efforts are made as directed in the study.

It is also worth mentioning that poor governance and the absence of mature markets, or the absence of triple helix may be a blessing in disguise in the sense that the resulting greater flexibility allows a new forms of governance or economy, tailored to the needs of the country, to emerge more easily. The academia in Pakistan claim that for basic research, sustained funding is required which might come from industry if a symbiotic relationship is formed. In Sweden the business sector is a strong driving force for R&D and for fostering public private partnerships (Claros, 2009; 2010).

A problem with policy studies is that these studies generally focus on successful cases instead of drawing lessons from failed cases; therefore, comparison with developed countries at this stage may only partly provide policy insights. The developing countries should realistically assess their requirements according to their local conditions, and develop directions suited for their own/regional needs. Not every university in a developing country can transform itself into an institution such as the Massachusetts Institute of Technology, nor does entrepreneurship 'float in the air' as it is the case in Stanford. These are stark realities. Globalisation makes the distant things appear very fascinating but the ground realities must also be faced and developing countries should first rise to the occasion by solving their specific local problems before moving towards global issues. Hence, I will compare the findings of this study with those of other developing countries.

In the complex global knowledge economy, developing countries need to focus on factors affecting the key decisions at national level and sub-national level (Kharazmi, 2008). Some external and internal factors have been identified in the Model of Symbiosis. Now, these findings can also be transferred to other developing countries to see if these are valid and an eco-system of innovation can be developed in the region.

If we look at the application of the triple helix strategy in developing countries we realise that 'institutional and organizational fragmentation' is a major factor that hampers home-grown technology development, technology transfer processes and development of innovation culture states (Saad et al., 2008, p.431). Secondly, it is thought that due to 'lack of economic growth, most developing economies do not have the capacity or institutional infrastructure to be able to effectively absorb and learn from the technologies acquired from abroad' (Saad et al., 2008, p.431). Both these statements are applicable to the economic situation of Pakistan; this is also true for all those developing countries that they are still lagging behind in the race of innovation. Evidence collected from Algeria and Malaysia demonstrated that the triple helix culture, as suggested by Etzkowitz, could not be replicated in these two countries due to lack of suitable conditions for universities to practice their entrepreneurial role. In the words of the author, the system should be

'liberalized enough to enable them to be entrepreneurial, risk-taking and innovative' (Saad et al., 2008, p.441). Last but not least, 'governments in these countries tend to be overtaken by short-term preoccupations' which does allow the THM of innovation to be fully implemented (Saad et al., 2008, p.441). But, what is the difference in the role of universities in developed and developing countries? Schiller (2006) advocates, in the context of developing countries, universities must build up intellectual and social capital, so that the experiences of the developed economies can be transferred to the developing countries.

Hence, a contribution of the study is that understanding of role of universities in Pakistan is further enhanced. The emerging Model of Symbiosis might be helpful to upgrade the quality of education, transform the industry into one based on high technology, strengthen the service based sector, and generate a culture which is suitable for implantation of the Triple Helix Strategy. Nanal (2007) has also indicated that the ethical and cultural base of the society must be strong so that public transparency can thrive in order to lead into entrepreneurial activities and free flow of knowledge. All the studies in developing countries have similar findings as they state that a weak triple helix exists in developing countries (Saad, Zawadie& Debral, 2005; Nanal, 2007; Lee and Chen, 2007; Gonzalez, 2007; Marques, 2007). However these studies did not identify that the basic prerequisite for all knowledge based development is firstly the national vision and then a mechanism through which major institutions can be linked in such a way that these institutions can function in coordination. Creation of a KBE cannot be made possible by any single agency. In practice, following a top down approach, visionary leaders can drive a KBE but such leaders can be produced only if the whole education system is revamped with emphasis on holistic development of students.

In short, the above discussion proves that this research has implications for both theory and practice. The researcher has gone beyond the disciplinary debates of relevant literature in the field of study and she has tried to fill the gaps in literature. To summarise, the study demonstrated the ineffectiveness of the Triple Helix Model (Etzkowitz & Leydesdorff, 2000) in the context of Pakistan. The basic proposition of the Triple Helix Model is that 'the network overlay of communications... shapes the institutional arrangements among universities, industries and government agencies'. This does not apply to the context of the present study. Since the academia perceives that the government has not played its due role in socio-economic development, universities have to, therefore adopt a proactive role to create synergy for innovation and sustainable development. This premise is based on the data collected by a grounded theory strategy.

Hence, the Model of Symbiosis:

a)   Presents a substantive theory

b)   Presents solutions to the issues faced by academia and industry, and

c)   It is an empirical contribution to knowledge on higher education and management as well as contribution to practice in Pakistan.

Last but not least, the newly developed theory helps to lay the foundations for the future implementation of the Triple Helix Model in Pakistan.

6.4 Limitations leading to future research

The study was methodologically robust and rigorously designed and executed. Despite this, there are ways in which it could be improved. These are also linked to opportunities for future research.

6.4.1   Limitation related to the research sample

One limitation of the study is that it while it focused on universities, it could not involve interviews with the third main player in KBE: business and industry. This has both advantages and disadvantages. The advantage was that it allowed an in-depth study of the perceptions of the academic leadership in the universities to be recorded and a very clear picture emerged regarding their aspirations and their views on the challenges that lie ahead. However, if the sample included some interviews with industry, that could be a daunting and time consuming task because multinationals and industry in Pakistan do not provide time for researchers and academia is more convenient sample as opposed to industry. Moreover, the research sample then it would have taken a lot of time leaving less time for in depth interviews with academia. Furthermore, the very wide range of entities involved in various categories of small and large businesses and industries, would at best have allowed only a small cross-section to have been interviewed thereby not a representative of whole population. However, in the future, it will be interesting and useful to include views of business and industry in order to identify their perception of opportunities and challenges for transforming Pakistan's economy to a KBE, through effective collaboration between industry, academy and government. This would generate a more holistic understanding of the subject and enhance the model of symbiosis. Therefore, this forms a direction for future research.

Related to the first limitation, the study focuses mainly on the interface of macro and meso-dimensions of the topic i.e. it highlights the role of such institutions (i.e. government, universities, intermediary organisations, such as the IPO) structuring the field and therefore setting the context for the development of a KBE. The micro-individual aspects, such as motivations of academics, their cultural, social capital and transformations between different forms of capital (Karatas-Ozkan and Chell, 2010), could be explored in order to demonstrate significance of individual academic profiles and levels of education and training, particularly in the area of innovation and enterprise. This could be another line of research that can be pursued in future endeavours.

6.4.2   Limitation related to the research approach resulting from the sample

Another limitation of the study is that interviews with the student community were not taken. However this aspect was at least partly covered since most teachers and academic leaders interviewed also gave a clear picture of the facilities needed by the students in terms of library and laboratory needs as well as programmes to foster innovation and entrepreneurship.

In the current research the researcher has adopted a top down approach in which the universities have identified what the government must do in order to develop a KBE. This involves the formulation of a clear vision, strategy and action plan that then needs to be implemented professionally. This will allow the three actors of the Model of Symbiosis i.e. state/government, national education system and the corporate sector to act in synergy, an important pre-requisite for the socio-economic development. While the researcher has adopted a macro-view of the research problem but in the future, it will be interesting to see how results of the studies are affected if a bottom-up approach is adopted and applied to the research problem investigated in this study. Mello and Renault (2006) have researched on such an approach and in their study they found out rise of community universities but no such studies are carried out in the context of Pakistan.

6.4.3   Limitations related to the research design

This grounded theory study resulted in a new substantive theory, the Model of Symbiosis, which delineates five stages to build the foundation of a KBE in a developing country and presents a cross-sectional view of the phenomenon. The results of practically applying the Model of Symbiosis cannot be known with clarity at this stage as it lays out a five-phased roadmap, which will take time in completion and in creation of a KBE. Hence, a longitudinal study might be undertaken in the future to see which phases, activities and elements of the model have worked well and what are its weaknesses.

Another opportunity for further research lies in further applications of the model of symbiosis through a longitudinal or comparative study. Longitudinal approach would allow for generating empirical evidence for all five phases of the model. In this way, the model could be modified reflecting on practices and associated challenges and opportunities. Comparative study could be in the form of extending the model to other developing country contexts and providing comparative insights into scholarly debate on the role of higher education in developing a KBE.

6.4.4 Limitations related to the context specific results

The results are specific to Pakistan but the study may also be applicable to other developing countries facing similar problems and challenges. Therefore, it is suggested that a comparative study might be conducted in the future to better understand the phenomenon and characteristics of a KBE emerging in developing countries. The development of a KBE involves a number of other factors that have not been considered in depth in the context of this study due to constraints of time and lack of authentic data. These are:

a) The legal infrastructure to support KBE: This includes the Intellectual Rights Regime, the laws that facilitate quick access to justice in order to solve legal disputes, and the laws that facilitate establishment of new start-up companies.

b) The lack of Venture and Angel Capital: The access to Venture Capital that will support entrepreneurs to start up new companies based on innovative ideas. This has been mentioned in passing at several places in the thesis but the issues behind the lack of VC funding have not been discussed in depth.

c) Some other structural adjustments: The need for Science and Technology Parks supported by legal and financial services and professional managers to facilitate new start-up companies has also been mentioned but not discussed in depth.

d) Absence of research culture in industry: The absence of private sector Research and Development units in Pakistan, and the lack of government incentives to facilitate their development through tax and other incentives, another major hurdle in the emergence of KBE, has not been discussed in depth.

e) Industrial districts and industrial clusters: The need for Industrial Clusters where similar industries can be co-located and have access to similar basic services to minimise cost of production, needs to also be analysed.

These are some examples of the missing gaps that need to be considered in order to derive deeper understanding of a KBE in developing countries.

6.5 Final comments

The overall aim of the study was to investigate the perceptions of academia regarding transformation of Pakistan into a KBE and the role of universities in creation of new economy. Writing is 'intuitive, inventive and interpretive, not merely a reporting of facts, or in the case of grounded theory, causes, conditions, categories, and consequences – or an outline of processes that depict a main concern' (Charmaz, 2006, p. 183). The researcher has reported the findings as they are, in the form of direct quotations from transcripts of interviews but analysis is co-constructed between researcher and the researched phenomenon. This is the result of social constructionism and grounded theory that a model is generated which depicts the situation of higher education sector in Pakistan. The researcher acknowledges that 'we may indeed be in error in some or all of what we conceptualize and put forward. However, the possibility of erroneous conclusions is logically independent from the objective existence of the state of affairs under investigation, and does not in principle negate any knowledge we may obtain of them' (Crouch & McKenzie, 2006, p.489). The researcher was conscious of the fact that no research can be carried out objectively as there is always a degree of bias involved but this aspect has contributed towards the richness of the study. It is worth mentioning that in the context of this study no claims are made that findings of the study are an absolutely true but the researcher hoped that most of the aspects of the phenomenon of the KBE in the context of higher education sector of Pakistan are reported in this study and that the understanding of the phenomenon is increased.

The study has implied that while the academia in Pakistan fully understands the importance of creation of a knowledge economy in Pakistan with its implications for the country and global community and that while the academia is adopting a proactive approach to deal with national, university, and industry issues but still there is a long way to go before this dream can be cherished. Fostering a KBE requires coordination between major actors of the society such as education system, governance system, and corporate sector but over and above there is a need for vision based on ideology, clear policy framework, and its determined implementation and evaluation, if a KBE is to be achieved.

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