The Knowledge Economy of the City Region – How Dubai and Liverpool Seek to Connect to the Global Knowledge Economy

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Abstract

This research examines the drive to establish a knowledge economy in the contrasting cities of Dubai and Liverpool. The resulting analysis looks at a city region from an older industrial economy and a city region from a new economy where in both instances local agencies that represent the city region economy are seeking to engage their place with the knowledge economy. This research aims to consider why and how this is happening with a particular emphasis on the role and contexts in which governance institutions prepare their place. We also look at what makes an ideal type city region knowledge economy. We use a number of key indicators that characterize the important aspects of an ideal city-region knowledge economy. We look to utilise these key indicators along with the case of Cambridge as an exemplar ideal type to contextualise both cases under consideration. This allows us to look at both cases, one from an older industrial economy (Liverpool City Region) and the other from a newer economy (Dubai City Region), evaluating their operational readiness to connect with the global knowledge economy.

The city-region institutional infrastructure needs to be of a density that will enable connection. This is the means by which planners, policy makers, politicians and entrepreneurs (to categorize but a few) operationalise the concept of a city-region knowledge economy. In much the same way as Castells and Hall (1994) explained the need to develop the then innovative notion of a technopole, those actors in important institutions see the knowledge economy as a strategic initiative based on a combination of innovation, technological know-how and entrepreneurship. Effective support and meaningful interventions from local agencies facilitate entrepreneurship, which is key to replenishing the ecosystem of a knowledge economy. Thus the local institutional infrastructure has to be ‘thick’ enough (Amin and Thrift, 1995) to stimulate and capture level of innovative entrepreneurship that enable the city-region to connect to the global knowledge economy.

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PhD Dissertation: Declaration Form

I certify that the entire content of this research is the result of my own individual effort in accordance with University Regulations. The work has not been submitted for any previous award and all sources and quotations have been acknowledged in the text.

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List of Abbreviations 1

ADCO Abu Dhabi Company for Onshore Oil Operations

AED Emirati Dirham

AIMES Advanced Internet Methods & Emergent Systems

AST International Centre for Accelerator Science & Technology

BBC British Broadcasting Corporation

BEST Research Centre for Built Environment & Sustainable Technologies

BT British Telecommunications

CHaSCI Centre for Health & Social Care Informatics

CMSHE The Centre for Medical Statistics & Health Evaluation

CNBC Consumer News and Business Channel

CNN Channel News Network

CR City Region

CTRC Clinical Trials Research Centre

DCMS Department for Culture, Media and Support

DCR Dubai City Region

EIS Enterprise Investment Scheme

ERDF European Regional Development Fund

ESRC Economic and Social Research Council

FACT Foundation for Art and Creative Technology

FT Financial Times

GCC Gulf Cooperation Council

GDP Gross Domestic Product

GERI General Engineering Research Institute

GRE Government Related Enterprise

GVA Gross Value Added

HEI Higher Education Institution

HSBC Hong Kong and Shanghai Banking Corporation

List of Abbreviations 2

HQ Headquarters

IBM International Business Machines

ICD Investment Corporation of Dubai

ICT Information Communication Technology

IP Intellectual Property

IT Information Technology

KE Knowledge Economy

KEP Knowledge Economy Plan

KHDA Knowledge and Human Development Authority

LCR Liverpool City Region

LEP Local Enterprise Partnership

LJMU Liverpool John Moores University

LSOA Lower Layer Super Output Area

MAA Multi Area Agreement

MIT Massachusetts Institute of Technology

MNC Multinational Corporation

NHS National Health Service

NVQ National Vocational Qualification

NWDA North West Development Agency

NWOP Northwest Operational Programme

NWPHO North West Public Health Observatory

OECD Organization for Economic Co-operation and Development

ONS Office of National Statistics

PHD Doctor of Philosophy

PI Petroleum Institute

R&D Research and Development

RFM Radio & Microwave Frequency Group

SCEE Sony Computer Entertainment Europe

SEIS Seed Enterprise Investment Scheme

SGI Silicon Graphics Inc

List of Abbreviations 3

SIC Standard Industrial Classification

SME Small and Medium Enterprise

SMMT The Society of Motor Manufacturers and Traders

SPA Social Policy Association

SRF Strategic Regeneration Framework

UAE United Arab Emirates

UK United Kingdom

UKTI United Kingdom Trade and Investment

UNESCO United Nations Educational, Scientific and Cultural Organization

USA United States of America

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Chapter One

The Knowledge Economy of the City Region – Dubai and Liverpool City Region Looking to Connect?

1.0 – Introduction

In recent times, we have seen advanced industrial nations transitioning from a manufacturing based to a services driven economy. Increasingly city regions are seeing the knowledge economy as a strategic opportunity. This new economy is characterized by an increased focus and dependence on knowledge intensive sectors that use R&D and skilled labour most intensively (Abramowitz and David, 1996). As regions look to increase employment within these high value industries, it is important to increase the sophistication of local products and services (Porter and Ketels, 2003). In order to achieve this, key sectors within modern economies are increasingly more reliant on knowledge generation and dissemination (Powell and Snellman, 2004). Technological evolution has also played a key role in connecting businesses and local institutions (Kenway et al., 2006). In addition, local governments have also increased their focus on developing policies and regulations that enable firms to invest in research and development whilst at the same time appropriating the return on such investment (Lucas, 1988; Romer, 1990).

This research looks the drive to establish a knowledge economy in the contrasting city regions of Dubai and Liverpool. We have here a city region from an older industrial economy and a city region from a new economy where in both instances local agencies who represent the city region economy are seeking to engage their place with the knowledge economy. Local agencies in both Dubai and Liverpool are trying to position their respective regions as a global city with increasing attention being paid to knowledge intensive sectors. This research aims to consider why and how this is happening. We also look at the contexts in which governance institutions prepare their place for a role in the global knowledge economy. We take into account the relevance of the knowledge economy to the city-region and how

governance actors are keen to support supply-side initiatives around for instance, education, skills and enabling more entrepreneurial behaviour in the drive for a high skilled, high wage local economy. Similarly, we see city-region policies that provide backing to particular knowledge intensive sectors along with wider diffusion of innovation in both services and production, these regarded as key elements in what Audretsch and Thurik (2001) refer to as the entrepreneurial economy. We utilise the case of Cambridge as an exemplar ideal type to contextualise both cases under consideration. We look at how the strong presence of a number of key indicators found within the economy of Cambridge has allowed the region to develop and capitalise on its knowledge economy profile. Our discussions with key governance actors, from the public and private sector provide contrasting perspectives on how the knowledge economy can add value to their respective city-region. We also analyse how local agencies in both Dubai and Liverpool City Region are attempting, as stakeholders of their respective local knowledge economy plans, to evaluate best practice examples such as Cambridge as well as the factors responsible for its success. It is also important to note that whilst local agencies have increased their focus on this connection to the global economy, the history of each city region has meant that they are coming to the knowledge economy and its global affects from different starting points which is an intriguing aspect of each case. We see that not only is each city region coming to the knowledge economy from a different starting point, they are also at a disadvantage given the global competition between places for seeking to attract new forms of knowledge intensive inward investment along with stimulating indigenous knowledge intensive activities.

In chapter two we define and problematize the knowledge economy in the context of the city region through a review of relevant literature. We look at why a city region would seek to connect to the global knowledge economy and what this connection would look like. We also look at how the history of any city region, particularly its local economy, would be an important factor in enabling this connection with the global economy. We also look at other key aspects of significance, such as the strength of the local institutional infrastructure including governance, research and development, support for innovation particularly within small businesses amongst others, to enable effective connection. We analyze the growing influence of

knowledge on the global economy as we try to understand why increasingly local economies are trying to connect with the global knowledge economy. We see how the emphasis has shifted to the quality of ideas and capabilities rather than their geographical source with knowledge intensive sectors becoming increasingly global (Dahlins et al, 2005; Audretsch et al, 2009). Local institutions play a key role in helping commercialize local innovation with the economy shaped by enduring collecting forces, which include formal and informal institutions, all of which provide stability in the context of uncertainty as well as templates for future development (Mulberg, 1995; Hodgson et al., 1993; Amin, 1998). This plays a key role in helping local businesses connect with the global economy by improving their operational readiness to a level that is acceptable and comparable to their international counterparts. We also look at knowledge as intellectual capital and how modern societies have increasingly emphasized effective utilization of information to be just as important as knowledge of certified events and tested theories (Machlup, 1962; Godin, 2008). Local agencies also recognize the importance of increasing investment in education and training in order to improve the efficiency of the local human capital (Becker, 1964). This depth of skills and talent within a region is not only important for it to compete with its counterparts, it also has a significant influence on its absorptive capacity (Cohen and Levinthal, 1990). This would mean that local entrepreneurs and businesses have the ability to recognise the value of new information as a result of their own knowledge and relevant experience. We also look at the role of clusters which can be seen as a market based approach to economic policy that develops new roles for government and companies as well as other regional stakeholders including universities, research institutions and trade associations (Kettels, 2008). We analyse how clusters can develop not only organically but also because of targeted efforts by policy makers and practitioners. These efforts from policy makers within local institutions enhance the competitiveness of their region and facilitate connection with the global knowledge economy.

Chapter three details the methodological approach that has been taken. This research has employed a mixed methods approach with a predominantly qualitative emphasis with secondary source quantitative data taken from the Financial Times

bespoke database FDI Benchmarks, local agency research and consultant reports as well as region specific knowledge economy plans. Secondary source data has been used to contextualize and inform the empirical data collection and resulting findings. The utilisation of a mixed methods approach also complements the concept of paradigm relativism where any philosophical or methodological approach can be chosen as long as it works for the research problem under investigation (Tashakkori and Teddlie, 2008). Semi-structured interviews have been conducted with senior executives who continue to play a key role in the development and promotion of the knowledge infrastructure for both city regions being investigated. The researcher adopted an elite interviewing approach in relation to the selection of interviewees. When conducting elite interviews, Cochrane (1998) explains how membership is defined by the individual's role in the organisations whereas McDowell (1998) explains how the elite classification represents a group of people that are highly skilled, professionally competent and class specific. The researcher was able to utilise existing membership and affiliations within each region as a practitioner to establish the local reputation and scope of engagement of interviewees selected within their local knowledge economies. The chapter also details how we have drawn on the work of Weber (1973) to develop an idealized type of knowledge economy to use it as a contextual bridge and develop the two empirical cases for Dubai and Liverpool city region. This is an important aspect as this research makes a methodological contribution by drawing on the work of Max Weber to develop the idealized type of knowledge economy as an exemplar to understand the two cases under consideration.

The framing of research questions is in part shaped by epistemological assumptions but is also influenced by the need to find theory that fits a specific set of cases or contexts (Brannen, 2005). In Chapter three, we look in greater detail at the interplay between posing key research questions, listing the type of data collection and analysis as well as making explicit the world view of the researcher during the research design process. During the initial literature review process, we review various theoretical positions in existing literature around the subject matter (Drucker, 1969; Bell, 1973; Porat, 1977; Noyelle, 1990; Garicano & Rossi-Hansberg, 2005).

The author analyses the composition of the term “knowledge economy” concluding that it represents a global economic system driven by demand for economically significant information, ideas and theories that are easily transferrable through the efficient use of technology (Machlup, 1962; Cowan et al., 2000), resulting in the creation of replicable mechanisms and processes directly influencing competitive advantage and value added activities. Economically significant in this case refers to all knowledge, utilization of which results in GDP growth helping sustain long-term economic independence for nations. Having identified the main concept, a number of research objectives emergent to be explored to help streamline the focus of the research were identified which include:

a) Role and function of knowledge as an economic commodity.

b) Understanding the role of institutions who aim to maximize the “knowledge affect" on city region economies.

c) How an old and new city region seeks to overcome the barriers to the global knowledge economy.

In chapter four, we look at what makes an ideal type city region knowledge economy. We use a number of key indicators that characterize the important aspects of an ideal city-region knowledge economy. We look to utilise these key indicators along with the case of Cambridge as an exemplar ideal type to contextualise both cases under consideration. This allows us to look at both cases, one from an older industrial economy (Liverpool City Region) and the other from a newer economy (Dubai City Region), evaluating their operational readiness to connect with the global knowledge economy. We look at how the strong presence of a number of these indicators within Cambridge has allowed the region to develop and capitalise on its knowledge economy profile. There is a significant amount of social and economic literature that looks at key knowledge based indicators (please refer to Table 1) and has served as a reference point to construct Table 2 highlighting key characteristics expected to be present in an ideal type of knowledge economy. Arundel et al. (2007) highlight how many of the economic analyses of the knowledge based economy accentuate the differences between the new and the old economy. This is

exemplified by the recurrence of technology, innovation, R&D and ICT as key indicators in the majority of literature on the subject. The American State Technology and Science Index ranks the 50 states in terms of their technology and science assets, and their ability to leverage those resources to achieve economic growth. The five categories that the index utilizes to measure how well a state will perform in a knowledge-based economy include research and development inputs, risk capital and entrepreneurial infrastructure, human capital investment, technology and science workforce and technology concentration and dynamism (DeVol et al., 2008). On the other hand, the Australian Bureau of Statistics (ABS) has developed a similar framework which concluded that to analyze a knowledge based economy would require investigation into three core dimensions which include innovation and entrepreneurship, human capital, and information and communications technology (Trevin, 2008). To compliment this framework, two supporting dimensions have also been added to include a context dimension and an economic and social impacts dimension (ABS, 2002). The context dimension incorporates aspects of the business environment such as effective competition policy, stable regulatory and legal frameworks and an open environment for trade and investment (ABS, 2002). Similarly, the OECD (2001) highlights four classes of indicators for the “new economy” which include the role of human capital (understood as the skills and competencies embodied in workers), innovation and technology diffusion (with increased competition and globalization spurring a greater market orientation of funding, resulting in strong growth of business R&D, and scientific research which now has a direct impact on innovation in key areas such as biotechnology and ICT), seizing the benefits of ICT (spurring innovation in services and making manufacturing and design more efficient resulting in reduced transaction costs and rationalization of supply chains) and firm creation and entrepreneurship (increase in the pace of business formation particularly those utilizing ICT and other new technologies responsible for increasing share of the growth in private R&D and patent activity). The Progressive Policy Institute also outlines five main categories to evaluate the impact of the new knowledge based economy on regional economic growth which include knowledge jobs, globalization, economic dynamism and competition, the transformation to a digital economy and technology innovation (Atkinson, 2002).

Arundel et al. (2007, p. 2) also argue how *"human capital is the new scarce resource in the knowledge economy compared to financial capital in the old economy, while innovation is thought to be continuous and systemic instead of linear".* We utilize Cambridge as an exemplar, showing how it has been successful in connecting with the global knowledge economy. It is this ideal type exemplar that is utilised for comparison with each empirical case, one in a newly emerging economy, Dubai and another city-region in an older industrial nation in the north of England, Liverpool. We see how Cambridge has been successful in harnessing the entrepreneurial talent within the region by increasing private sector involvement within key programs as well as making commercialization of research and new ideas inherent to its institutional infrastructure. Local agencies display flexible thinking when it comes to supporting business expansion along with the associated logistical infrastructure that it requires. We also look at how Cambridge contains the key characteristics that we expect to see in an ideal type knowledge economy.

Study	Included indicators
DeVol et al., 2004: State Technology and Science Index, Milken Institute	Provides five classes of indicators: R&D inputs, risk capital and infrastructure, human capital investment, technology and science workforce, and technology concentration
Australian Bureau of Statistics (ABS), 2002: Measuring a knowledge-based economy and society	Three classes of indicators for drivers: innovation and entrepreneurship, human capital, ICT
Progressive Policy Institute (PPI), 2002: The State New Economy Index, Washington, DC	Five classes of indicators: knowledge jobs, globalization, economic dynamism and competition, digital economy, technological innovation capacity
Room, G., 2004: The scope of the new economy. NESIS final report	Four classes of indicators: microeconomic, innovation, digital economy, public investments
OECD, 2001a: The new economy – Beyond the hype	Four classes of indicators: ICT, innovation and technology diffusion, human capital, firm creation and entrepreneurship
European Commission, 2005: Towards a European Research Area: Key Figures 2003-2004	Two classes of indicators: investment in a KBE and performance of a KBE
OECD, 2003: Science, Technology and Industry Scoreboard)	Three classes of indicators: investment in knowledge, investment in ICT, and trends in trade and investment flows
DG Enterprise, 2004: European Innovation Scoreboard	Four classes of indicators: human resources, creation of new knowledge, transmission and application of knowledge, innovation finance, output and markets

Table 1: Key Studies on Knowledge Based indicators / Adapted from Arundel et al., 2007

Chapter five is the first of two empirical chapters. We analyze the fieldwork conducted in Dubai City Region and review the attempts made by local agencies to connect their place to the global knowledge economy. We show in this chapter

through the contexts in which governance institutions in Dubai City Region prepare their place for a role in the global knowledge economy. We take into account the relevance of the knowledge economy to the city-region and how governance actors are keen to support supply-side initiatives around for instance, education, skills and enabling more entrepreneurial behaviour in the drive for a high skilled, high wage local economy. We look at how Dubai compares to our ideal type exemplar by reviewing the current position of its knowledge economy by evaluating its progress and key competencies relating to the key characteristics identified which constitute an ideal type knowledge economy.

Chapter six is the final empirical chapter in which we analyse the fieldwork conducted in Liverpool City Region. Our discussions with key governance actors, from the public and private sector provide contrasting perspectives on how the knowledge economy can add value to Liverpool City Region. We adopt a similar approach to the first empirical case, by comparing Liverpool City Region's knowledge economy against the ideal type exemplar as well as the key characteristics listed in the ideal type chapter. We also consider the role of higher education institutions and how they differ and we are able to contrast the role and responsibility of the central state vis a vis the local state.

Chapter seven provides a synthesis of research findings and provides an analysis for each of the three key themes identified at the outset of this research which include analyzing the role and function of knowledge as an economic commodity, understanding the role of institutions who aim to maximize the "knowledge affect" on city region economies and finally looking at how an old and new city region seeks to overcome the barriers to the global knowledge economy. We analyse these key themes in the context of the empirical cases under consideration looking to compare both cases to an ideal type of city region knowledge economy as detailed in Chapter Four. We find that there are barriers to an ideal type connection to the global knowledge economy. We evaluate these weaknesses and short comings in relation to both Dubai and Liverpool City Region, using the ideal type construct as detailed in

Table 2 which characterizes the important aspects of an ideal city region knowledge economy.

In conclusion, we review the key findings of this research which indicate:

a) There exists variety in the way a city region will connect to the global knowledge economy.
b) The role of local institutions (or national institutions that operate locally) are critical.
c) The city-region institutional infrastructure helps to facilitate connection providing a means by which planners, policy makers, politicians and entrepreneurs operationalize the concept of a city-region knowledge economy.

We also confirm that this research adds to the body of knowledge in the following ways:

a) Develops the concept of knowledge economy ‘connection’ as city regions seek to engage with the global knowledge economy.
b) Makes a methodological contribution by drawing on the work of Max Weber to develop the idealized type of knowledge economy as an exemplar to understand the two cases under consideration.
c) Provides two empirical cases, one of an older industrial city region and one of a new emerging economy city region, to show how city regions seek to connect to the global knowledge economy.

Chapter Two

Understanding the Knowledge Economy of the City Region - Literature Review

2.0 - Introduction

It is difficult to imagine a major city in any developed or emerging nation that does not regard the knowledge economy as a strategic opportunity. The concept of the knowledge economy is itself subject to debate and while some clarity has emerged in recent years, there is evidence to demonstrate that in the quest for a city wide knowledge economy outcomes are by no means certain to be uniform (DeVol et al., 2004; Room, 2004). For instance, the popularised term of knowledge economy places the idea of knowledge as a key factor of production, an integral unifying component for other factors of production including land, labour, capital and entrepreneurship. In this sense there are contemporary industries and businesses that are not simply knowledge centric, using knowledge to differentiate their products and services, they rely heavily on knowledge assets to add value to all associated activities and processes. These types of business are distinct from the lower value added enterprises that are often more visible in the local economy. It is also expected from local agencies operating within an established knowledge economy that they play a key role in developing an environment that is conducive to the development of knowledge intensive businesses (Hausner, 1995; Amin, 1998; Docquier, 2014). The efficacy of local institutions in helping shape enduring collective forces that provide stability in the real economic context of market uncertainty and knowledge boundedness (Amin, 1998) plays a key role in facilitating the connection of a region with the global knowledge economy.

The quality and competence of local institutions along with innovation driven knowledge intensive businesses based within close proximity play a major role in developing clusters that help regions connect with the global knowledge economy (Pitelis, 2001; Malmberg and Power, 2003). These clusters can be seen as a central structuring element of economic activity for regions (Njøs & Jakobsen, 2016). In the

new knowledge driven economy, clusters can be seen to assist with increasing the sophistication of the regional offer by helping reach a critical mass of knowledge assets and workers (Malmberg and Power, 2003; Njøs & Jakobsen, 2016). There is increasing evidence to show that modern clusters do not only develop organically but also because of targeted efforts by policy makers and practitioners (Njøs & Jakobsen, 2016). Local agencies through supportive regional policies and a robust business and institutional infrastructure raise the competitive profile of these clusters to facilitate market development and increase regional attractiveness for new investment (Porter, 2000).

This research looks to evaluate the drive to establish a knowledge economy in the contrasting city regions of Dubai and Liverpool. The resulting analysis looks at a city region from an older industrial economy and a city region from a new economy where in both instances local agencies that represent the city region economy are seeking to engage their place with the knowledge economy. This research also focuses on the contexts in which local institutions enhance the competitiveness of their region and facilitate connection with the global knowledge economy. More specifically we look at the role and impact of clusters in achieving this objective which can be seen to develop both organically as well as through targeted efforts by policy makers and practitioners. This research is underpinned by the tenets of regional studies literature particularly looking at the role of local institutions in making their regions competitive in a knowledge based economy resulting in economic development and better connection with the global knowledge economy (Best, 1991; Coe et al., 2007; Kettels, 2008). In addition to conceptualising the role of local institutions as agents of change as well as the development of clusters as a consequence of increased policy focus to enable a high level of interaction between entrepreneurs and innovators (Best, 2001), we utilise the ideal type as the conceptual framework in which to explain the phenomenon of regional economic development through a competitive knowledge economy comprising of strong knowledge networks and clusters.

This chapter examines a number of concepts to help understand why a city-region would seek to connect to the global knowledge economy. A critical review of the major themes will pay attention to why the global knowledge economy is important to the city-region and what 'connection' would look like. It also takes into account how such connection is sought and the role played by clusters in making this happen. Important to this would be the history of a city-region, particularly its local economy as for instance, we may expect to see an older industrial city-region with a different set of difficulties and objectives than a city-region from a newly emerging economy as connection is pursued. In addition, there may be generic aspects of significance, such as the strength of the local institutional infrastructure including governance, research and development, support for innovation particularly within small businesses amongst others, that appear to play a key role in helping a city-region connect to the global knowledge economy and these should help us to reflect on how important indicators such as the quality of labor, land and capital are to the process of connection. Towards the end of the chapter a clear proposition for the research will be articulated, one that explicitly outlines the gap in knowledge that is to be addressed in this thesis.

2.1 - Why does the City Region want to Connect to the Global Knowledge Economy?

2.1.1 - Knowledge as an Economic Commodity

Drucker (1969) popularised the term *knowledge economy* highlighting its growing influence on the global economy. This initial assessment sparked a rapid evolutionary process that has led to knowledge being branded as the one factor of production (Drucker, 1995). This is predominantly due to the fact that knowledge has become an integral unifying component for other factors of production including land, labour, capital and entrepreneurship. Drucker (1969) predicted that future economies would actively utilize knowledge as a source of competitive advantage. Industries and businesses in the 21st century utilise the quality and volume of economically significant knowledge as a tool to differentiate and promote their products and

services. A key driver of innovation and creativity within the global knowledge economy has been the rapid technological evolution that has led to the development of new knowledge intensive sectors including video gaming and digital media (UKIE, 2014). Whilst there has been a substantial increase in the knowledge intensity of traditional sectors such as the automotive industry (which has become the largest investor in research and development in Europe with an investment of nearly €20 billion) (SMMT, 2015), other relatively new sectors such as video gaming and low carbon have become increasingly relevant in the regional economic context (Evans and Garnsey, 2008). Whilst there is an increased emphasis on the growth and development of both logistical and technological infrastructures in modern economies (Gilbert and Nadeau, 2002), the level of skills and professional competences of the local workforce operating in major sectors within the region are also of central importance to both innovation as well as economic and productivity growth (Arundel et al., 2007). Whilst pockets of this technical and professional expertise dispersed across a region with an overarching focus on competences at firm level is economically beneficial (Birkinshaw, 2000), there has been a concerted effort by regions in this new knowledge based economy to look at increasing the concentration and commercial viability of these skills and knowledge existing at firm level (Birkinshaw, 2000; Coe et al., 2007). Policy makers look to sharpen the focus of economic policy and harness these vitals skills and knowledge by streamlining regional strengths and key sectors by creating an environment that would facilitate the development of clusters (Kettels, 2008; Muro and Katz, 2010). These clusters in turn help to improve the quality and profile of local products and services making the region a more attractive proposition for inward investment as opposed to priorities that exist at firm level (Birkinshaw, 2000; Coe et al., 2007; Kettels, 2008).

In the new knowledge based economy, due to the rapid evolution of technology and increasing global structuring of businesses, we see increased rates of immigration and emigration of scientific, engineering and technically skilled individuals (Arundel et al., 2007). This has led to businesses becoming more aware and accepting of the opportunities presented by cultural diversity within companies (Holden, 2002). This has a direct impact on the effectiveness and scope of knowledge linkages between firms i.e. firms developing products, brands and services that attract the widest

possible market segment with culturally diverse teams making better use of international market information (Milliken et al, 2003; Dahlins et al, 2005; Audretsch et al, 2009) enabling a region to better connect with institutionally distant target markets. There is a greater focus on the quality of ideas and capabilities rather than where these are sourced. It can be argued that the increase in growth and relevance of the global knowledge economy is intrinsically linked with the increasing rate of globalization in international markets. However, from a regional perspective, it has become harder for smaller local firms to compete globally as major market players tend to be more inward looking keeping their firm level competitive advantage mostly insular which limits the development of regional competencies (Kettels, 2008). This also has an impact on the supply side function of a knowledge based economy as firm priorities such as those focused on increasing productivity and profits are prioritized over regional priorities (Coe et al., 2007; Kettels, 2008) impeding successful connection with the global knowledge economy.

A substantive gap in understanding the implications of the knowledge economy concept has allowed for different schools of thought to emerge (Drucker, 1969; Bell, 1973; Porat, 1977; Noyelle, 1990; Garicano and Rossi-Hansberg, 2005). For instance, Bell (1973) argued that all societies evolve moving from pre-industrial to industrial to post-industrial. As a result, labour activity also evolves becoming more mind based than muscle based. The main emphasis of Bell's (1973) work was to capture and analyse the types of theoretical knowledge vital to the making of societal decisions and leading social change. This led Drucker (1993) to stress how the main economic challenge of post-capitalist society is the productivity of knowledge work and the knowledge worker. Bell's (1973) work had a broader macro-economic perspective highlighting the increasing substitution of theoretical knowledge for property as the basis of the new social order, which he would later utilise to rationalise society's ceaseless searching for a new sensibility. On the other hand, Drucker (1999) explored in detail the role of knowledge worker as a professional who is responsible for the evolution of business management through effective application of knowledge. Drucker (1969) also emphasised how major responsibility lay with senior management and leaders to create an environment in which knowledge workers would be most productive.

The challenge here is to define the knowledge economy as a key component of the wider economy. However, it is vital to understand and appreciate how knowledge is contingent to context. Different scholars and economic commentators have approached the subject matter differently, their definitions and interpretation of knowledge and its influence on regional economies being relevant and relative to their audience. The oldest approach focused on the rise of new science-based industries with some analysts including professional services and other information-rich industries in this category given the growth in employment and their relevance to the regional/global economy (Machlup, 1962; Porat, 1977). The wide and generalised scope of this approach is the very reason why not much of a consensus has emerged over the years as to the exact function, determinants and variables comprising the global knowledge economy. A core idea unifying this strand of work is the centrality of theoretical knowledge as a source of innovation (Bell, 1973; Snellman & Powell, 2004). This view is supported by the current global concern for supporting science, technology, engineering and mathematical research. In this research a working definition of the knowledge economy is as follows:

The knowledge economy is a global economic system driven by demand for economically significant information, ideas and theories that are easily transferrable through the efficient use of technology (Machlup, 1962; Cowan et al., 2000).

This results in the creation of replicable mechanisms and processes directly influencing competitive advantage and value added activities. *Economically significant* here refers to all knowledge utilisation that results in GDP growth and sustains longer-term economic opportunity at the national level. Economic opportunity in the knowledge economy would refer to a nation's ability to service and supplement those significant aspects of its knowledge value chain. This would comprise of knowledge hubs (academic institutions, businesses and clusters) transferring knowledge onto knowledge workers, knowledge workers applying acquired knowledge to fulfil their professional responsibilities and business and industry sectors absorbing this manipulation of knowledge into their work streams. The various elements of the knowledge value chain interact on a regular basis to

create knowledge networks that are both responsive and flexible in nature. Powell (2001) explains how a knowledge value chain comprises of two main activities, knowledge acquisition and knowledge application. Knowledge acquisition in its simplest form refers to receiving information that has the potential to create new knowledge (Machlup, 1983). At this stage, the information flowing through existing knowledge networks may or may not be economically significant. It is only when the knowledge receiver utilises the acquired information in a practical setting (Nonaka, 1994) when it becomes applied knowledge and makes the acquired knowledge economically significant. Economically significant knowledge should ideally also have a competitive component that distinguishes it from other types of knowledge. This competitive element is strongly influenced by the sophisticated levels of skills available in a knowledge economy. In order to optimise the acquisition and application of economically significant knowledge in a region's knowledge value chain, it is vital to understand the importance of variables such as skills. More specifically, this would entail assessing regional readiness in combining enterprise with training, learning development and research. This would also include an emphasis on workplace learning as well as developing ease of access and availability of vocational education and training. For a region to connect with the global knowledge economy it is vital that its skills infrastructure meets the required threshold where global knowledge intensive businesses see it is a credible option for investment (Friedman, 2005; Brown and Lauder, 2006).

Bell (1973, p. 175) defined knowledge as *"a set of organized statements of facts or ideas, presenting a reasoned judgement or an experiment result, which is transmitted to others through some communication medium in some systematic form"*. This highlighted the need for developing meaningful knowledge structures and networks that would add value to the knowledge transfer exercise. An emphasis on "organized statements of facts or ideas" supports the argument in favour of efficiency in commercialising existing knowledge rather than solely concentrating on producing new knowledge. It is also important to understand the transformative value of combining existing units of knowledge through increased investment in research and development, cultural change and increased efficiency in the utilisation of resources. Romer (2007) explains how economic growth occurs whenever people take

resources and rearrange them in ways that are more valuable. This would imply that the key to knowledge development and growth lies in understanding ways in which to optimize the application of knowledge. In order to achieve this objective, it is important to understand the varied geographies of tacit and codified knowledge that play an important part in determining the value of knowledge transfer and the associated global demand for this knowledge. It is argued that while codified knowledge can be dislocated from its originating setting and made ubiquitous, tacit knowledge is context-dependent, spatially sticky and socially accessible only through direct physical interaction (Morgan, 2001; Amin and Cohendet, 2003). Effective support and meaningful interventions from local agencies play a key role in harnessing local knowledge and innovation by providing an infrastructure that assists knowledge transfer at a global level. Hence, in order to harness this economically significant tacit knowledge the city-region institutional infrastructure needs to be of a density that will enable connection.

In a broad sense institutions can be defined as any form of constraint that human beings devise to shape human interaction that can be separated into informal constraints and formal rules and of their enforcement characteristics (North, 1990). Where on one hand, formal rules in the shape of laws, economic policies and business codes of conduct can be measured and to an extent quantified, informal institutions and constraints are considerably harder to codify as a result of being based on implicit understandings, being in most part socially derived and therefore not accessible through written documents or necessarily sanctioned through formal position (Zenger et al., 2001). The interaction between local businesses and institutions is vital in connecting the related knowledge intensive products and services to the global market. In an ideal type of knowledge economy, which we look at greater detail in the chapter four, the institutional infrastructure naturally translates local business ideas, products and services into global market propositions. From old institutional economics comes the idea that the economy is shaped by enduring collective forces which include formal institutions as well as informal or tacit institutions such as habits, routines and norms, all of which provide stability in a context of uncertainty, as well as templates for, or constraints upon, future development (Amin, 1998; Hodgson et al., 1993; Mulberg, 1995).

2.1.2 - Knowledge as Intellectual Capital

Machlup (1962) can be credited for moving away from the positivist view that implies all knowledge is true knowledge. True knowledge in this case refers to knowledge of certified events and tested theories. This in Machlup's (1962) view was restrictive and limited the number of ways in which society could take advantage of all the information available to them. Information can only be classified as knowledge if it is utilised (Machlup, 1962; Godin, 2008) whereas true knowledge comprising solely of proven facts and concepts provides little scope for creativity, that is, the incentive for knowledge users to search for novel combinations of existing, at times untested, units of knowledge that may not have a strong empirical premise but could result in tangible or intangible benefits. Most of the theoretical debate preceding Machlup's analysis positioned knowledge as a philosophical by-product. The term knowledge was at times synonymous with intellect – information that had a significant perceived value associated with it. Machlup's work was instrumental in analysing the interaction between the basic and applied forms of knowledge. Basic knowledge is created and transferred as a result of curiosity on the part of individuals from different parts of the community looking to add to their understanding of events. Their aim at the very outset may well not be to inform an immediate practical issue, but how can one be certain that this initial activity may not result in the creation of economically significant knowledge? In the new knowledge based economy, the distinction between basic and applied research and between science and technology has become somewhat blurred (OECD, 1996). There is an overlap between basic and applied knowledge that is of greater significance to the way modern day societies operate, as increasingly knowledge economies are fuelled by creativity and innovation. These knowledge societies have now moved away from being predominantly driven by traditional sectors [i.e. agriculture, manufacturing and construction] to those with higher creative, innovative and technological content [i.e. digital and creative, advanced manufacturing, telecommunications and life sciences/biotechnology] (Pinch and Henry, 1999; Keeble and Nachum (2001). As a

consequence, there is no longer a meaningful distinction between science and technology in the knowledge-based economy (Gibbons et al., 1994).

Mill (1848, p. 347) states that *"the aim of all intellectual training for the mass of the people should be to cultivate common sense; to qualify them for forming a sound practical judgment of the circumstances by which they are surrounded. Whatever in the intellectual department can be superadded to this is chiefly ornamental; while this is the indispensable groundwork on which education must rest. An education directed to diffuse good sense among the people, with such knowledge as would qualify them to judge of the tendencies of their actions, would be certain, even without any direct inculcation, to raise up a public opinion by which intemperance and improvidence would be held discreditable".* Therefore, at the very core of knowledge acquisition is the need for individuals to better understand their own ability to process information adding value through either application (utilising it to facilitate other related activities) or interpretation (creating value through applying knowledge to generate outcomes for unrelated activities). This is what makes the education system an extremely important infrastructural component of knowledge economies. Education provides a constant standard for the general population, equipping individuals with an awareness of how things are done. Even though, both Mill (1848) and Marshall (1879) present knowledge as the key to enhanced intellectual awareness, lesser emphasis is placed on the utilisation of this enhanced awareness to identify problems rather than only solve them. In this modern era, knowledge economies are led by individuals who are able to pre-empt problems operating in an environment that is conducive to information sharing and partnership working. These functions are more often than not the responsibility of local institutions that are tasked with ensuring the operational readiness of their region.

Machlup (1962) addressed these abstract inter linkages between knowledge functions by claiming that in many cases knowledge transmission results in knowledge production. This might not always be the case as knowledge creation depends on the affect that a knowledge transmitter has on a knowledge receiver. If the receiver utilises the knowledge communicated industriously enhancing his or her

productive capacity, knowledge transmission in this case would have led to knowledge production i.e. the knowledge receiver would have utilised good sense (Mill, 1848) rearranging units of information “in ways which are more valuable” (Romer, 2007, p. 21). By acknowledging the strong bias favouring applied knowledge, Machlup (1962. p. 16) provides arguably the sharpest critique on the varying nature of knowledge explaining how it might be of greater value to understand the source and application of knowledge rather than “seek an objective interpretation according to what is known”. Machlup (1962) addressed this interpretation conundrum by highlighting five major classes of knowledge which included practical knowledge, intellectual knowledge, small-talk and pastime knowledge, spiritual knowledge and unwanted knowledge. Each of these sub-headings represents knowledge as a resource based on the holder’s application and environment. Modern society might put a premium on practical knowledge sighting it as most economically significant. However, on closer inspection the correlation between these different classes provides a compelling argument for knowledge synergies. The applicability and usefulness of intellectual knowledge might not be as simple or productive in the short run compared to practical knowledge, but in the long run practical derivations of intellectual knowledge may become widely applicable and in turn more economically significant. Spiritual knowledge lies at the core of an individual’s value system – based on the premise that spiritual salvation is vital for contentment – and in some cases supersedes the parameters of religion. Once again, an overlap might exist between spiritual and intellectual knowledge – spiritual salvation for some might require an extensive amount of intellectual engagement.

Both Machlup (1962) and Bell (1973) cite Scheler’s (1926) classes of knowledge in their analyses of knowledge as an economic resource, which include Herrschaftswissen (knowledge for the sake of action or control), Bildungswissen (knowledge for the sake of non-material culture) and Erlösungswissen (knowledge for the sake of salvation). Modern society is driven by Herrschaftswissen as individuals utilise knowledge to assert themselves. Knowledge here is *perceived wisdom*, which is deemed to have greater economic significance informing actions that have a meaningful consequence. It is also important to note that knowledge

here affects and influences all aspects of an individual's lifestyle. People still seek religious and spiritual knowledge that motivates them to strive for economically significant knowledge. Individuals who are able to strike the right balance between these essential knowledge forms are the ones who profit most from knowledge economies. Therefore, greater value lies in understanding the process of knowledge transmission as a whole rather than taking a narrower component view. A knowledge economy is not solely about systematic transfer of economically significant information or data, nor is it centred on a deeper philosophical understanding of how things are done. An ideal knowledge economy is driven by an increased investment in knowledge capital uplifting the knowledge capability of every factor of production. Paul Romer (one of the pioneers of new growth theory) highlights the importance of idea flows particularly emphasizing its role in poverty reduction and catch-up growth (Jones and Romer, 2010). A knowledge driven economy, propelled by the need for efficient utilization of resources through creative and sustainable solutions, would be likely to add value to several aspects of the economic infrastructure. One way of achieving this is by developing clusters promoting idea flows and information exchange whilst at the same time developing stable social structures that would allow the region to adapt to environmental changes and sustain itself over time (Saxenian, 1994).

These efforts by policy makers within local institutions create a critical mass of skills and talent with a high level of interaction between entrepreneurs, researchers and innovators (Best, 2011). Local institutions create the environment through organized efforts to promote cluster growth and competitiveness through collaborative activity amongst cluster participants along with building an infrastructure that would encompass access to education and training activities, encourage relationship building as well as facilitate market development through joint market assessment (Scott, 1988; Amin and Thrift, 1994). As a result of globalization and increased influence of advanced logistical as well as information and technological infrastructure, agglomeration became more likely since it was increasingly more affordable to service the peripheral communities from a centralised manufacturing belt (Krugman, 1991; Schmutzler 1999). It is important for policy makers who are looking to connect their region with the global knowledge economy to understand the

impact of centrifugal forces that could negate the advantages of agglomeration. Negative externalities include the impact of emergence of large centres driving up housing costs due to increasing demand and competition for available land, economic impact on business as a result of having to increase wages to compensate for these additional costs, increased congestion, commuting times, environmental degradation and reduced quality of life (Smith, 2012). Therefore, in an ideal knowledge economy, key characteristics such as technological intensity, institutional backing, knowledge intensity, quality of R&D, supply of finance and labour along with proximity to growth cities all play a vital role in ensuring that the infrastructure of the region is capable of mitigating the burden created by the negative externalities detailed above. In order to achieve sustainable growth, policy makers must ensure that their focus remains on enablement and bolstering of existing regional competences as opposed to stimulating sector growth through implementing a cluster design that has not emerged organically through local entrepreneurial activity and both formal and informal collaboration between local networks (Hospers et al., 2009). This also reinforces the importance of indigenous competencies within a region which influenced how sticky or slippery a place was within the context of a global economy (Markusen, 1996). Markusen (1996) characterized regions within the global economy that were able to retain specialist firms and jobs as sticky places. On the other hand, regions that lost established specializations with production relocating to alternate locations in search of efficiencies as slippery places (Markusen, 1996).

It can be argued that technological spillovers and other networking events most likely are the consequence of a region's unique practices rather than the best practices of the firms present in that region (Hospers et al., 2009). This would include transfer of knowledge and expertise through both formal and informal interaction between professionals, policy makers and businesses (Manasco, 1996; Goh, 2002) looking to invest or expand their interest within the region. A business environment conducive for such information exchange to take place increases the potential of the region to commercialise local ideas and innovation (Datta et al., 2013). The value added to local products and services as a result of this interaction helps promote commercialisation of innovation not just through unique firm level capabilities existing

within local business but also through enhancing the external environment within which the firm operates (McGrath et al., 1996; Teece et al., 1997). This in turn raises the competitive profile of the region as well as interest from investors in local start-ups enhancing the self-sufficiency of the region's supply chain (Michelacci and Silva, 2007; Audretsch et al. 2012). Furthermore, studies have shown that the most powerful predictor of future entrepreneurship for industries within a region is the strength of incumbent firms within the city industry (Figueiredo et al., 2009; Glaeser and Kerr, 2009). There is a higher propensity for skilled professionals employed in knowledge intensive sectors (such as high-tech firms within technology clusters) to start their own companies (Gompers et al., 2005) which leads to persistence by local entrepreneurs enabling the region to reach a critical mass of skills and expertise allowing it to connect with the global economy.

It may also be more beneficial for policy makers to focus on developing policies that facilitate cluster emergence rather than forcing a particular cluster design with the onus on cluster stakeholders to ensure effectiveness while the government may advertise the success of clusters that have passed the market test (Hospers et al., 2009). It is important to emphasize the value created by the interaction within these networks existing in clusters as a result of economic relations between firms (Scott, 1988; Porter, 1998). If information and ideas are expected to be the most important commodity in the new world economic system, networks and clusters can be seen as the best institutional forms for creating that commodity (SE, 1998a). This is particularly the case in a knowledge driven economy where the most valuable commodities are not material and assets, but information and innovation (SE, 1998a). As a result of globalization, regions increasingly use local factors to increase competitive advantage. As the regional economy becomes more knowledge intensive, the source of this competitive advantage shifts from tangible resources to intangible resources driven by tacit knowledge considered by some as most important for economic development (Lundvall and Johnson, 1994; Burton-Jones, 1999). This shift to intangible assets such as knowledge, competence, skill and organizational culture increases policy focus on clusters that can harness these resources at the regional level (Morgan, 1997). This provides developing regions

who do not have the same favorable inheritance as compared to their more established and developed counterparts (Porter, 1998).

2.2 Why do you get Different Types of Connection to the Global Knowledge Economy?

Lane (1966) was among the first to highlight the existence of a knowledge society that had its roots in epistemology and the logic of inquiry. It can be argued that this is a society providing greater scope for intellectual knowledge – inhabited by individuals driven to know more (even if it does not influence the immediate outcome of their actions). A knowledge society - not to be always confused with societies driven by increased investment in advanced technologies to enhance outputs and efficiencies – is driven by curiosity with members seeking information out of freewill rather than compulsion. Lane (1966) argued that members of a knowledge society are more likely to collect, organise and interpret their knowledge in a constant effort to extract further meaning from it. These individuals are also more likely to employ this knowledge to illuminate and modify their values and goals as well as to advance them (Lane, 1996). This constant optimisation of the application of knowledge allows individuals to better deal with social and economic challenges whilst at the same time raising the quality and sophistication of human capital within a region. Knorr-Cetina (1999, p. 7-8) explained how a *"knowledge society is not simply a society of more experts, more technological gadgets, and more specialist interpretations. It is a society permeated with knowledge cultures, the whole set of structures and mechanisms that serve knowledge and unfold with its articulation".* In an ideal type of knowledge economy, the institutions and actors involved become part of the 'learning' city-region through reflecting on what works which in turn informs long term strategic direction for the region. The role of the state, as well as the institutional infrastructure that it encompasses, is to be the prime collective organisation with societal reach and legal power that provides the necessary resources for local business to thrive, arbitrate between decentralised authorities, secure collective results and establish long term strategic goals within a frame of plural and autonomous governance (Hausner, 1995; Amin, 1998). This implies that local

institutions within progressive knowledge economies help create an environment that allows local businesses to connect to the global knowledge economy rather than serving as central planners or market facilitators (Amin, 1998).

This century has been characterised by increasing knowledge intensity in the production system with sectors that use R&D and skilled labour most intensively growing most rapidly (Abramowitz and David, 1996). Economic commentators have increasingly placed the ability of firms to learn as a key factor behind commercial and economic success. The speeding up of change reflects the rapid diffusion of information technology, the widening of the global marketplace, with the inclusion of new strong competitors, and deregulation of and less stability in markets (Drucker, 1993; Lundvall and Johnson, 1994; Lundvall and Archibugi, 2001; Lundvall, 2003). In this context, learning is defined as a process, the core of which is the acquisition of competence and skills that allow the learning individual to be more successful in reaching individual goals or those of his/her organisation (Lundvall, 2003). Knowledge societies provide a hospitable environment for creativity and learning which in turn helps produce products and services that are not only novel and imaginative but also useful and of good quality (Hemlin et al., 2004). Even though, creative products are vital to the development of knowledge economies, there is often less attention paid to creative processes that led to the creation of the creative product. By focusing on the creative product rather than the creative process (Allwood and Selart, 2001), the market faces a continuous risk of missing out on the ingenuity of individuals who specialise in developing processes that facilitate knowledge activity. In an ideal type of knowledge economy, we would expect to see systems, policies and procedures contained within the local institutional infrastructure that would harness and absorb this ingenuity into the local economy. Developed knowledge economies make commercialization of research easy and organic (Kenway et al., 2006). In other words, entrepreneurs are conditioned to treat the commercialization process as the logical next step in the conversion of concepts and ideas into products and services. Local clusters within the region may also be able to serve as a medium for professionals and policy makers to create value through their interactions within local networks (Scott, 1998).

Regions with well-established clusters characterized by strong networks between key knowledge assets would be expected to enhance the local economic performance as well as increase regional attractiveness for new investment (Porter, 2000). Amin and Thrift (1994) highlight the ability of institutional arrangements to guide collective action in successful regions which they refer to as “institutional thickness”. However, as the neo-classical approach highlights competition between firms as the key economic driver, the concept of clusters recognizes that interactions between various economic agents may involve the elements of both competition and cooperation (Scott, 1988). As the global economy has become intensely competitive, the importance of location and the identity of place has not necessarily eroded. Porter (1998) further emphasizes this point by highlighting how world class knowledge assets continue to be associated with place and how these hubs have continued to flourish even as the global economy has significantly evolved.

Whilst in the initial stages new clusters aim to harness the core competencies of local businesses, it is important for cluster policy approaches to be open to new developments in technologies and international markets to ensure that local businesses and institutions have the necessary infrastructure to allow the region to connect to the global economy (Boekholt and Thuriaux, 1999). Scott (1999) argues that clusters can only create knowledge and new products if they have linkages with external markets and utilize a mix of local and non-local transactions. For regions to connect with the global economy and compete outside of local markets, keeping pace with innovation and the varying demands of international markets is vital. With the advent and rapid progress in the field of information and communication technology, resources such as databases, electronic libraries, new media etc. do not just embody knowledge, they are in fact knowledge and behave as such (Feldman, 1994; Karlsson and Rouchy, 2013). This leads to the argument that if the new type of global economy is indeed “weightless” containing products that are non-excludable, infinitely replicable and electronically transportable costlessly through space (Quah, 1999), the benefits of clustering activity would not be significant. Karlsson and Rouchy (2013) explain how the development of this weightless economy is not

subtractive of existing economies, but rather enhances them through diversification and replacement. Whilst some of the factors that drive the evolution of regional economies and clusters include those that are either inherited or externally given such as physical location, natural endowments and chance events, from an economic policy perspective cluster initiatives would look to focus on improving the underlying competitiveness of agglomeration economies for creating value (Ketels, 2008). These factors play a critical role in enabling meaningful connection with the global economy particularly by organizing such economies through cluster initiatives (Ketels, 2008).

For businesses to compete in a modern knowledge economy, it is also important to cultivate a supportive and sophisticated institutional infrastructure that adds value to the products and services provided by local businesses. Established high growth knowledge economies have long moved away from an era of stereotypical regional policy that was standardized, incentive based and state driven (Amin, 1999). Businesses looking to relocate or expand into these regions have strategic ambitions not solely dictated by financial incentives. High growth businesses look to embed themselves and exploit the potential within the local business environment in search of sustained profitability rather than an initial subsidy. Regions with well-developed and viable formal and informal networks between firms and other educational, research and political institutions have been shown to aid the circulation of tacit knowledge between firms (Lundvall and Johnson, 1994; Maskell and Malberg, 1999). In order for these networks to be both efficient and relevant in the long run, a shared vision is necessary. All parties will stand to benefit from a strategic plan, primary aim of which is to develop a competitive *offer* for the region. Meaningful and efficient collaborative networks here need to serve as a source of competitive advantage to raise the regions profile to enable it to connect and compete globally.

Alvesson (2001, p. 863) explains how *"the ambiguity of knowledge and the work of knowledge-intensive companies means that 'knowledge', 'expertise' and 'solving problems' to a large degree become matters of belief, impressions and negotiations of meaning. Institutionalized assumptions, expectations, reputations, images, etc.*

feature strongly in the perception of the products of knowledge intensive organizations and workers". It is important to clearly communicate these institutionalized assumptions to a global customer base by building a brand image that translates effectively across different cultures, customs and beliefs. Developed knowledge economies through the effective utilization of local institutions and agencies are able to create brand loyalty by utilising novel communication and distribution strategies that mitigate the liability of foreignness (Sethi and Guisinger, 2002). Within the global knowledge economy, the value of a company is not simply determined by the value of what it produces, but on its reputational capital (Brown & Hesketh, 2004). This is also the reason why developed knowledge economies hold a competitive edge over their counterparts having built this reputational capital through sustained collaboration and contributions to local communities over a significant period of time.

2.3 How does the City Region Connect to the Global Knowledge Economy?

2.3.1 - Role of Local Institutions within Knowledge Economies

The main focus of this research project is to look at a city region from an older industrial economy and a city region from a new economy where in both instances local agencies that represent the city region economy are seeking to engage their place with the knowledge economy. As discussed in earlier sections, for businesses to compete in a modern knowledge economy, a supportive and sophisticated institutional infrastructure is vital (Acemoglu et al., 2005; North, 2005). Amin (1999) highlights how regional policy for a long period of time had been firm-centred, standardized, incentive based and state driven. Local institutions were tasked to perform the role of delivery agents implementing these policies and attract investment to develop the regional offer as well as promote regional economic growth. From the perspective of a business looking to make a location decision in a developing region, significant emphasis is laid on the value added by local institutions with a particular focus on the financial impact of general or sector specific subsidies. In a world class knowledge city such as Cambridge, businesses buy into

tacit factors such as credibility, quality and network access and there is a greater emphasis on profitability and long term potential growth rather than short term cost savings. If one were to theorize the knowledge economy concept within the field of institutional economics, it would involve entertaining the idea that the economy is shaped by enduring collective forces (Amin, 1999). These in turn are strongly influenced by the efficacy of local institutions and their impact on the economic performance of regions (Acemoglu et al., 2005; North, 2005). As a region progresses, local institutions also experience changes as a result of this success. This includes higher demand for higher quality institutions with greater transparency and accountability as well as creating new agents of change demanding new institutions (Chang, 2010).

To understand the role of institutions within an economy driven by knowledge, it is important to understand the interplay between its core constituents. Amin (1998, p. 4) whilst analysing the mechanics of economic governance within institutional economics argues how it is important to *"develop an understanding of the economy as something more than a collection of atomised firms and markets driven by rational preferences and a standard set of rules. Instead the economy emerges as a composition of networks and collective influences which shape individual action; a highly diversified set of activities owing to the salient influence of culture and context; and subject to path dependent change due to the contribution of inherited socio-institutional influences".* Economic governance can be defined as the structure and functioning of both social and legal institutions that support economic activity by providing functions such as the protection of property rights, enforcing contracts, as well as taking collective action to provide physical and organisational infrastructure (Dixit, 2009). Several empirical studies have found a positive relationship between the quality of institutions and governance structures and economic growth (Knack and Keefer, 1995; Clague, 1997; Alesina, 1998). Standard growth theories have also shown that development depends on the accumulation of human capital, physical capital, access to modern technologies (Docquier, 2014). Docquier (2014, p. 2) explains how the *"accumulation of these factors is likely to be affected by institutional characteristics such as the organization and functioning of the productive sector, the distribution of political and civil rights, the quality of the legal system, government*

effectiveness, etc. However identifying a causal effect of institutions on development, quantifying its size, and understanding the technology of transmission of institutional quality to growth are challenging issues". The effectiveness of these local institutions determines both the readiness of a region to compete internationally as well as the attractiveness of the region as an investment opportunity.

Acemoglu et al. (2005) defined institutions as a combination of three interrelated concepts including economic institutions, political power and political institutions. The interactions between these key variables govern institutions growth and development. Acemoglu et al. (2005) argue that political institutions and the distribution of political power in society are determined by the distribution of resources. They govern the design of economic institutions, which in turn determine the level of development and the dynamics of the distribution of resources. The priorities and strategic vision of political institutions must align with those of economic institutions through good governance and proactive planning. Generally, good governance indicators have six dimensions including voice & accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption (Kaufmann et al., 1999). The stability and strength of these indicators is of great significance to international businesses and plays a key role in making the location decision as markets performing well on these indicators are synonymous with low levels of risk and active implementation of law. Hence, a robust institutional infrastructure would help in improving investor confidence and increase the likelihood of crossover success for local products and services allowing the region to connect with the global knowledge economy. Economic institutions matter for economic growth because they shape the incentives of key economic actors in society, in particular, they influence investments in physical and human capital and technology, and the organization of production (Acemoglu et al., 2005).

Where some economic commentators view the role of the state, as well as the institutional infrastructure that it encompasses, to be the prime collective organisation with societal reach and legal power that provides the necessary resources for local business to thrive (Hausner, 1995; Amin, 1998), others highlight

the influence of Keynesian legacy on regional policy in the 1960s comparing it to more recent pro-market neo liberal experiments (Amin, 1999). Where on one hand Keynesian economics promotes the use of welfare policies as well as the offer of state initiatives to stimulate demand in less favourable regions, economic neo-liberalism advocates reduction in public expenditure for social services, deregulation and privatization. The relevance of these theories has been revitalised by the recent credit contraction in the global economy and the resulting economic pressures of austerity. Local institutions particularly those within the public sector have had to rethink their investment support strategies due to funding limitations and a greater emphasis on high-growth sectors. Amin (1999, p.365) explains how the neo liberal approach *"placing its faith in the market mechanism, has sought to deregulate markets, notably the cost of labour and capital, and to underpin entrepreneurship in the least favourable regions through incentives and investment in training, transport and communication infrastructure, and technology"*. It can be argued that the common assumption in both approaches is that top-down policies can be applied universally to all types of regions.

2.3.2 - Role and Importance of Technology in a Knowledge Economy

As the global economy has become more knowledge intensive, the trajectory of growth and innovation within the ICT sector has been acute. This has had a direct impact on both the constraints and the costs in the collection and dissemination of information. The new global economy is interconnected giving the knowledge based economy a new and different technology base which radically changes the conditions for the production and distribution of knowledge as well as its coupling to the production system (Lundvall and Foray, 1996). Whilst there is no doubt that rapid technological progress has significantly influenced the scope and architecture of modern economies, some argue that modern technology limits the free flow of ideas with systematic inter-linkages between businesses and local institutions (Kenway et al., 2006) strongly influenced by a common desire to commercialise knowledge. Creativity, in this case, is hindered by an expectation of premeditated outcomes inhibiting the commercialisation of ideas that do not fit the needs of the regional

knowledge systems and networks. Furthermore, whilst there is a degree of consensus that the rapid development in ICT has altered its role within the production and distribution of knowledge within the global knowledge economy, it can be argued that this is a reorganization of the technical and financial terms on which a resource (information) is available (Smith, 2000). Within this evolving economic ecosystem, to connect with the global knowledge economy and compete at the international level, it is important for regions to develop a technological infrastructure that is of a standard that can globally translate local products and services.

The technolization of knowledge links, networks and systems has arguably led to the most significant addition to the balance sheet in a knowledge driven global economy - tacit knowledge. The UK is an ideal example of a nation positioning itself higher up the value chain with increased focus on employment in high value industries. This is a strategy vital to high cost economies – higher cost of manufacturing goods and services – where it is not financially feasible to compete with global competitors on the basis of price. This requires a substantial increase in the sophistication of products and services (Porter and Ketels, 2003). This is not to suggest that knowledge intensive economies do not have room or scope for manufacturing. On the contrary, the UK is the sixth largest manufacturer in the world and has an industry that accounts for nearly 15 % of GDP (UKTI, 2010). It is vital to understand the importance of a changing "sectoral composition of manufacturing, away from the traditional areas and towards high value knowledge intensive goods" and as the "production, sale and service of manufactured products is the principal route by which wealth is realised from new technology…the continuing development of manufacturing is therefore strategically important in the UK to deriving benefit from new technology" Technology Strategy Board (2011, p. 7). This is however a narrow generalization in terms of understanding the role of technology as a key economic determinant that underpins all major sectors revolutionizing the way in which modern day businesses operate. Technology here serves as a medium facilitating knowledge networks to form, develop and consolidate.

Knowledge networks are predominantly channels of communication, both formal and informal, allowing individuals and groups with similar interests to exchange information that either adds value or eliminates some or all of the complexities faced by the recipient. Seufert et al. (1999, p. 186) define knowledge networking as “a number of people, resources and relationships among them, who are assembled in order to accumulate and use knowledge primarily by means of knowledge creation and transfer processes, for the purpose of creating value”. It is after this value is created that knowledge becomes economically significant. Highly sophisticated and interlinked knowledge networks have become increasingly precise in their ability to capture, retain and transfer economically significant knowledge. In addition, genuine creativity leading to innovative and commercially viable products is rewarded with a longer shelf life through patents and copyrights. Patented knowledge is increasingly marketable making it economically significant through the restrictions imposed on competitors. The major goals underlying the patent system include the promotion of research and development as well as encouraging the disclosure of inventions so others can use and build upon research results (Gallini, 1992). It can be argued that these goals are both conducive to the development of economically significant knowledge based products whilst at the same time maximizing the return on investment for the individuals and firms involved in the innovation and product development. However, conversely an increase in patenting could be blamed for impeding future progress as the incentives to innovate and conduct further research may decline with increases in patent life (Heller and Eisenburg, 1998; Koo and Wright, 2001; Gallini, 2002).

Castells (1996) highlighted what could be termed as a technologistic approach to globalization by identifying key determinants that led to the rise of the network society. In Castell’s (1996) view the network society represented the social structure resulting from the interaction between the new technological paradigm and social organization at large. These key determinants of a network society include the development of new information technology, particularly major development in computing technology as well as the reach of the Internet, as well as the utilisation of this new technology to create a new system of information capitalism, which Castells (1996) also referred to as the new economy. Castells (1996) argues how the new

global economy cannot accurately be described as a knowledge or information society. The central argument here is not about contesting the importance of knowledge and information to the new economy, as both have been continuously historically relevant and important to regional growth, rather Castell (1996) argues that networks – a by-product of networking technologies that provide new capabilities to an old form of social organization – are the real driving force of the new economy. Solow (1956) highlights how economists have always viewed the engine of economic growth to be technical progress. Solow (1957) also proved how technological change was the most significant influence on long term economic growth as seven-eighths of the increase in gross output per hour of work in the US economy – which incidentally doubled between 1909 to 1949 (a period of significant technological progress) – could be attributed to technological change in the broadest sense. Key components of this technical progress included technical change in the narrow sense and a more knowledgeable workforce. These findings did not only mark the beginning of a new era for growth economics, they also validated the role of knowledge as a key driver for economic growth. This does not imply that global economists - prior to these findings - were not aware of the importance of these variables. Rather, it was the over emphasis on the role played by increased investment in labour and capital (Harrod, 1939; Domar, 1946) that led to their inaccurate treatment as constants. These findings also initiated a shift from quantity to quality as capital and labour were proven to have finite positive relationships with economic growth (this was due to diminishing returns to capital which meant that at some point increased investment in labour would become unproductive). This also marked the incarnation of the knowledge economy as we know it today – “driven by the demand for higher value added goods and services created by more sophisticated, more discerning, and better educated consumers and businesses” (The Work Foundation, p. 21, 2008).

It can be argued that the knowledge economy concept lacks theoretical parameters – there is no constant universally accepted definition or understanding of either the knowledge economy concept or key variables comprising it. There are however certain drivers of modern economies that are widely associated with knowledge economies, technology being amongst the most prominent ones. Quah (1999, p. 47)

was amongst the first to explore the increased weightlessness of production in knowledge economies. By the weightless economy, Quah refers to that part of the economy comprising the following four categories,

- *Information and communications technology*
- *Intellectual property, including not only patents and copyrights but more broadly, namebrands, trademarks, advertising, financial and consulting services, health care (medical knowledge), and education.*
- *Electronic Libraries and databases, including new media, video entertainment, and broadcasting.*
- *Biotechnology, which includes carbon-based libraries and databases, as well as pharmaceuticals.*

Economic development practitioners might disagree with the implied elitist slant where knowledge is quantified based on the quality of experience, data, and information skewing the resulting distribution. However, there is to a certain degree consensus on the component expansion of the concept to engulf almost all economic functions existing in the current global economy. Cynics might argue that knowledge economies serve as signposts for operational developments that have altered the dynamics of business – simply put, new way of doing things rather than new things themselves. Powell and Snellman (2004, p. 204) explain how *"critics have argued that although considerable technological change is afoot, the upsurge in patenting is due to changes in the legal and regulatory environment that have increased the propensity of organizations to patent inventions"*. This increased propensity leads to value retention for a longer period of time as genuine innovation is rewarded commercially. This would also imply that modern day knowledge is more economically significant in monetary terms due to the fact that ownership and use is limited and protected by law. Patents and copyrights have truly helped put a value on tacit knowledge as more and more businesses nowadays differentiate their offerings on "what they know" rather than "what they make". Furthermore, commercialisation of tacit knowledge is not limited to products and services, tacitness in relationships (Henry, 2008) can lead to the creation of distinct capabilities that are even harder to duplicate. These relationships define successful knowledge economies as often

products and services produced rely on insight, which is the result of interaction between experts specialising in each aspect of the product's value chain.

Knowledge value chains are now better equipped to handle the additional emphasis on knowledge sources compared to knowledge outputs. Knowledge practitioners cannot undermine the influence of technology on knowledge economies especially in fields generating the highest level of economically significant knowledge (i.e. biotechnology and nanotechnology). One can argue that technological evolution has played a vital role in bringing down barriers to knowledge convergence affecting the size and scope of knowledge economies. Virtual links between knowledge intensive businesses have helped develop clusters with no geographical limits. Snellman (2004, p. 205) notes how *"recent collaboration across institutional sectors are greatly assisted by fundamental changes in the technologies of knowledge and information production"*. In order for the outcomes of these cross-border collaborations to be internationally significant, efficient communication channels are required to deliver information from one knowledge network to the other. Modern day knowledge is not necessary *better knowledge*; it is purely relevant to a greater number of people because every unit of knowledge has a larger target market at its disposal.

Archibugi and Michie (1995) have identified three broad categories under which globalization of innovation can be assessed including the international exploitation of technology produced on a national basis, the global generation of innovations and global technological collaborations. Dougherty (1999) highlights how efficient knowledge transfer is based on connection rather than collection, with the key to success lying in understanding the behavioral choices of people. Developing highly sophisticated knowledge transfer systems alone does not guarantee contribution from knowledge holders. As with most business functions, the knowledge transfer process needs to be incentivized at each level to attract economically significant units of knowledge. Successful knowledge economies are characterized by efficient communication networks that replenish the innovative content of regional knowledge systems regularly. Increasingly, these knowledge networks are driven by cross

border industrial value chains connecting developed and developing knowledge economies.

Hoff and Stiglitz (2001, p. 393) note how “neo-classical economics argued that neither institutions nor wealth distribution mattered for efficiency; productive resources always gravitated through market exchange into the hands of the person who valued them the most”. This argument does hold merit while analysing knowledge as a productive resource. Economically significant knowledge that can be converted into a product or service will tend to command a higher price secured through copyrights and patents. Even though these copyrights and patents might be filed by individuals who have “created” this economically significant knowledge, the value of this intellectual property is directly proportional to consumer demand. Once this consumer demand is proven to exist, there will be individuals willing to pay a premium price in order to own these knowledge resources, resulting in the creation of supplier demand for knowledge. Once again, technological intermediation is vital in the development and promotion of these knowledge products and services. Quah (1999) explains how knowledge displays infinite expansibility making it one of the most reliable economic commodities especially when compared against other exhaustible resources. The growing interrelation between knowledge and technology – where technology serves as a facilitating medium that assists in the communication of knowledge outputs – has fuelled the development of knowledge clusters across the world. These knowledge clusters are defined through the productivity of knowledge interaction rather than proximity alone.

2.3.3 – Clusters within Knowledge Economies

The theory of clustering is intertwined with the theory of economic geography with the former focusing more on agglomeration of economic activity within a particular and related industry rather than across industries (Schmutzler 1999). Clusters can also be seen as a market based approach to economic policy that develops new roles for government and companies as well as other regional stakeholders including

universities, research institutions and trade associations (Kettels, 2008). An economic-geographical approach puts spatial concepts such as space, place and scale at the center of the analysis (Coe et al., 2007). The concept of space allows one to look at questions such as where a particular process is happening through the lens of key elements such as territoriality, location, flows across space and the concept of uneven space as a necessary condition of a capitalist system (Coe et al., 2007). The concept of place also captures the uniqueness of particular places by exploring the richness and complexity of particular places and economic processes which are always embedded in environmental, social, cultural, institutional and political contexts (Coe et al., 2007).

Gordan and McCann (2000) highlight how a new emphasis on the public policy role in local economic development can be credited for the increased interest in modern forms of spatial clustering. Within sociological literature, this interest has been driven by the increasing significance of the relationship between an individual's environment and the development of embedded social networks of communication and influence (Granovetter, 1992; Gordan and McCann, 2000). Gordan and McCann (2000) also explain how substantial changes in the economic environment over the past 25 years including internationalization, greater instability in product markets and more intense competition with a greater emphasis on quality/variety have increased the importance of flexibility, encouraging greater reliance on external than internal economies of scale. Another important factor to consider involves the significant macroeconomic and structural development in recent years requiring innovative strategies to stimulate endogenous growth in redundant or marginal areas (Gordan and McCann, 2000).

Markusen (1996) whilst evaluating the role of different cluster members and the interaction between them utilized a typology comprising four models of clusters. Marshallian districts comprise of groups of equal firms competing with one another that may engage in arm's length transactions with each other but do not intentionally cooperate, Italianate industrial districts consist of firms that are roughly equal but can be seen to both compete and cooperate, hub and spoke districts are dominated by a

single large firm that creates a substantial market for local suppliers and satellite platform districts which include collections of branch plants, usually larger, autarkic, tapping low-cost labor, or getting closer to markets (Markusen, 1996; Cortright, 2006). Markusen (1996) also identified state-sponsored districts which largely owe their existence to government spending, usually military spending or government research laboratories. Given the vast array of competing theories about clusters and what makes them work (Cortright, 2006), a number of conclusions can be derived in relation to their impact on a region's ability to connect with the global knowledge economy. Cortright (2006) highlights how the success of the Silicon Valley cluster has been attributed to an array of factors by different theorists including defense spending and government procurement (Markusen, 1991), impact of higher education institutions (Rogers and Larsen, 1984), unique business culture and resulting relationships (Saxenian, 1994), vision of an extraordinary business leader (Krugman, 1991) and a long history of radio and television entrepreneurship (Sturgeon, 2000). These are factors featured within key characteristics of the ideal type exemplar utilized for this research.

Clusters can develop not only organically but also because of targeted efforts by policy makers and practitioners. These efforts from policy makers within local institutions enhance the competitiveness of their region and facilitate connection with the global knowledge economy. Whilst the different externalities driving clusters such as supplier relationships, the use of common factor inputs like specialized labour markets, or knowledge spillovers may occur naturally, their dynamics can be fostered through a mix of networking, collaboration and competition (Best, 2001; Kettels, 2008). It is the interplay between these factors that adds value to existing core competencies which increases the competitive advantage of the region. The strength and effectiveness of a cluster would depend on the state of development of the local regional economy. In developing clusters, there is a tendency for local firms to operate value chains that are focused on key primary activities with most supporting functions provided in-house (Kettels, 2008). These clusters are more generalized in nature and serve as support networks for firms by reducing primary costs through reducing the burden of expenditure on logistics and infrastructure (Scott, 1999; Best, 2001; Kettels, 2008). Kettels (2008, p. 379) explains how as

economies get more advanced, *"clusters usually deepen to include suppliers of specialized material and intermediary inputs, machinery and services; specialized infrastructure emerges from public and private investment; and institutions arise that provide specialized training, education, information, research and technical support".* It is at this stage where the cluster is able to look past its immediate needs and shift from an existentialist focus to embrace a more aspirational and competitive outlook.

Njøs & Jakobsen (2016) highlight how clusters can develop not only organically but also because of targeted efforts by policy makers and practitioners. From a policy perspective, policy makers utilize the planning and development of clusters as a framework for refocusing economic policy. This involves identification of regional strengths and the sectors that they exist within. This also impacts the distribution of state funding into priority areas that are critical to the development and progress of the regional economy (Best, 1991; Coe et al., 2007; Kettels, 2008). Cluster development as a function of local policy is also useful in providing a bigger picture view for stakeholders within the region by providing more meaningful insight into factors such as quality and level of skills and talent within the region, efficiency and operational readiness of local supply chain, standing of local institutions and connectivity with the wider global economy. By focusing on policy development around clusters, policy makers are able to increase the attention and relevance of the local regional offer outside of the priorities that exist at firm level (Coe et al., 2007; Kettels, 2008). These priorities are more often than not focused on increasing productivity and competitiveness at firm level and can at times conflict with the needs of the region i.e. developing a larger pool of skilled individuals and networks that are more inclusive allowing small and medium sized businesses to scale up. This also allows companies and research institutions to build connections that facilitate learning and innovation with the cluster environment lowering the cost of experimenting (Kettels, 2008). As one of the key factors that inhibits local firms from aspiring to connect to the global economy is the fear and cost of failure.

On the other hand, cluster frameworks also look towards exploiting distinct economic advantages unique to a region that can add to the local offer and raise its

competitiveness. This also provides the opportunity to unify different strategies being deployed at the local level by delivery agents within local institutions that may be following a firm or sector first approach as a result of their private sector subscribership or local affiliations. It also provides the opportunity for increased efficiency through policy coordination (Muro and Katz, 2010). It is a recurring trend amongst lower and middle tier regional economies that heavily rely on state funding and associated programs to prop up their economic offer. This is more the case for regions lacking dynamic entrepreneurship spearheaded by rapid commercialization of research and ideas. We look at this in greater detail in later chapters covering the ideal type and the Cambridge case study. In economies such as Liverpool city region which is the focus of this research, decades of disjointed state programs and generic assistive funding schemes have resulted in what Mills et al. (2008) would classify as a wildly adhoc, idiosyncratic and uncoordinated approach providing little support to increase competitiveness of clusters within regions.

There is consensus over the key role played by modern technology in rapidly dissipating and transferring information globally (Bell, 1973; Polanyi, 1973; Pitelis. 2001). However, it is important to highlight the distinction between knowledge and information to better understand how knowledge becomes economically significant to contribute to economic growth in regions. David and Foray (2001) argue that, as knowledge is fundamentally a matter of cognitive capability, it is considerably more expensive to reproduce compared to information, as cognitive capabilities are not easy to articulate explicitly or transfer to others. A key challenge to the supply function of knowledge is the fact that at times knowledge holders know more than they can say (Polanyi, 1976). This tacit nature of knowledge, which the author has looked at in greater detail in earlier sections, is what makes interpersonal interactions within a network valuable (Castell, 1996; David and Foray, 2001). Professional communities in most knowledge intensive sectors play a vital role in adding to the vitality of knowledge exchange within a region through collaborative projects, research and development along with widening the reach of the sector. These communities are vital for knowledge reproduction, which takes place through interpersonal transactions among members of the same community of practice (David and Foray, 2001). In other words, knowledge reproduction involves

articulating cognitive capabilities that are vital to the development of skills that facilitate complex decision-making and resolution of non-standard challenges. To maximize the volume of such knowledge, it is important to create and maintain an environment conducive to promoting knowledge reproduction and development whilst at the same time mitigating the risk of professional communities losing their capacity to act in stabilizing, preserving and transmitting knowledge (David and Foray, 2001). It can be argued that clusters foster the retention of this capacity in professional communities. Closer proximity enables more meaningful interaction between industry practitioners through dense knowledge flows and spillovers (Swann and Pervezer, 1998). In studies analysing mature established clusters, the influence of large firms who themselves benefitted from clustering advantages has been highlighted (Nadvi and Scmitz, 1994; Humphrey and Schmitz, 1995). However, it can also be seen that large firms over time and increasing scale start reducing their reliance on local sources of competitiveness (Schmitz and Nadvi, 1999). Njøs & Jakobsen (2016) highlight how clusters can develop not only organically but also because of targeted efforts by policy makers and practitioners. As a result of globalization, regions increasingly use local factors to increase competitive advantage which includes networks of public and private agencies which play a key role in industrial upgrading (Esser et al., 1995; Messner, 1997). Similarly, in order to deal with the influx of new competition, modern firms are altering the content and scope of their global sourcing networks (Gereffi, 1999). This has resulted in certain support functions being reassigned to suppliers (Gereffi, 1999) and regions that are able to resource these functions within their local networks are better positioned to connect with their global counterparts.

Pitelis (2001, p.2) defines clusters as “agglomerations of firms in a particular activity, usually with a geographical dimension, with horizontal and (preferably also) vertical intra – and (preferably) inter-sectoral linkages in the context of a facilitatory socio-institutional setting, which co-operate and compete (co-opete) in inter (national) markets”. The concept of agglomeration has been of interest to economic practitioners particularly from an improved access to resource standpoint (Marshall, 1920, Porter, 1998). It can be argued that the quality of skills, talent and professional engagement should be expected to improve when firms operating in the same sector

voluntarily or involuntarily cluster closely together. However, an essential pre requisite here is that this engagement takes place in an environment conducive to collaboration and open dialogue. The argument that competition inhibits meaningful collaboration is one that needs to be deconstructed within an appropriate context if it is to be factored into the knowledge economy debate. Porter (1998, p. 78) questions "if location matters less, why then, is it true that the odds of finding a world-class mutual fund company in Boston are much higher than in most any other place? Why could the same be said of textile-related companies in South Carolina, of high-performance auto companies in southern Germany, or of fashion show companies in northern Italy". This is an observation that shines the light on the importance of place and what makes it different and more competitive than its counterparts. It also raises two key questions. Firstly, if economic growth can be guaranteed by the presence of a certain type of knowledge within all businesses operating in a region, why would local institutions not simply "buy in" this knowledge? Secondly, how would businesses distinguish their products and services in a market where all industries can employ advanced technology and be knowledge with which firms compete. The perception of place and the local institutions within it are fast becoming a critical factor in the location decision for businesses.

James (2005) argues how low transaction costs of data, information and knowledge seem to invalidate the theory of agglomeration and the spatial clustering of firms. Evers (2008, p. 5) provides a counter argument by stating how "industries well versed in ICT, outsourcing and cooperation via the Internet still tend to cluster and form industrial agglomerations. Proximity increases a company's innovative capacity when firms can share ideas, products and services". This can be best explained by understanding the evolutionary characteristic of knowledge. Small businesses with cutting edge highly promising concepts and technologies might find it hard to survive and launch in a market dominated by big monopolistic players. These businesses might also lack the resources and commercial acumen to refine their offer in order to grab the attention of distributors and suppliers. In this case, being based in a specialist cluster with support functions and existing supply chains might prove decisive with an instant platform for access to market.

However Evers (2008) does to a certain extent ignore the role of big industry players monopolizing sectoral activity, proximity in this case again would more or less be irrelevant especially if the product or service being offered is differentiated on the basis of product image and branding rather than unique functionality. In addition, extremely low transaction costs of data and information would not facilitate business-to-business interaction if there were a lack of intent on part of the knowledge source (business owning economically significant information) to transfer relevant knowledge to the knowledge seeker. Malmberg and Power (2003) explain how contemporary views on the correlation between economic geography and industrial competitiveness in knowledge based economies can be summarised under four broad assertions – innovation supersedes cost as the key factor affecting long term economic prosperity, noteworthy innovations are the result of interaction between numerous variables rather than solitary genius, spatial proximity enhances interactive learning activity and there are "reasons to believe that the knowledge-enhancing structures of a given geographical territory are more important than other characteristics when it comes to determining where we should expect economic growth and prosperity in today's world economy" [Malmberg and Power (2003, p. 417)]. There is merit behind the emphasis on innovation as new technologies, products and services have been proven to generate greater profit margins. This innovation process, however, is riddled with complexities and both logistical and operation hurdles that could potentially derail a project. Spatial proximity in such cases would facilitate communication where individuals with similar backgrounds interact in an environment conducive to problem solving. Virtual advances no doubt have made it easier to share problems with a larger number of people, however, in order to generate long lasting solutions (keeping in mind the covert nature of a lot of modern day innovation activity) spatial proximity is vital.

This however depends on one's definition of a knowledge economy in a broad or narrow sense. It is easier to claim that businesses operating in the same sector at close spatial proximity tend to cluster forming agglomeration economies. This however can only be the case where one defines a knowledge economy in the broad

sense i.e. all businesses and jobs with economically significant knowledge components with little emphasis placed on the sophistication of resources and knowledge output. Even though this approach is more inclusive, as it implies that most modern economies are knowledge economies, it is difficult to apply this understanding to practical scenarios where competitive advantage is the main ambition of every stakeholder. This would require defining the knowledge economy in a narrow sense i.e. comprising of high-tech knowledge intensive sectors with high value jobs influenced by a demand for specific skillsets that is not readily available in the labour market. To be competitive in this type of a knowledge economy, businesses may be more guarded and less willing to interact with their counterparts in the same sector regardless of being in the same cluster. Any intellectual engagement that takes place within this environment would be at a superficial level. Alcacer and Chung (2010, p. 1) state that "geographically concentrated industry activity created pools of skilled labour and specialized suppliers, and increases opportunities for knowledge spill overs". It is however important to note that these knowledge spillovers, where surplus knowledge output is spread outside cluster boundaries, influence business activity that may or may not be directly related to the cluster itself. This does not imply that these knowledge spillovers are the result of increased interaction between businesses operating out of a cluster; it is highly likely that each organisation over the passage of time is able to develop sufficient reservoirs of specific knowledge unique to itself that spills over outside the geographical boundaries of the cluster. An alternative theory would involve the interaction between businesses located in a well-defined cluster – where the role and specialism of each constituent organisation is clearly stated - having complimentary business activities but a different consumer base or target market. This would have a significant influence on the very nature and usefulness of interaction that takes place i.e. recruitment companies specialising in digital media and video gaming professionals (system developers, coders, games design and content managers) may have extremely productive mutually beneficial relationships with limited or no barriers to communication.

These inter-sectoral linkages create a snowball effect where common functions across unrelated clusters serve as the interface leading to closer proximity and

multiple synergies. Porter (2000, p. 253) noted how “clusters are a striking feature of virtually every economy, especially those of more economically advanced areas”. Clusters provide economies of scale for ideas and innovation through the sheer amount of complimentary activity that takes place when the entire value chain of an industry or sector is bundled together. These inter-linkages may not always be direct and simplistic in nature due to the increased diversity in modern day business operations. However, there are no assurances with regards to the success of clusters, especially those that are formed as a result of government intervention. Knowledge links in clusters cannot be forced or manufactured; they stem from genuine curiosity and intrigue fostered by members of these knowledge communities as well as key organisational aspirations.

Marr and Spender (2004, p. 23) provide arguably the most comprehensive body of analysis on the evolution of knowledge in business. They define knowledge as a “fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information”. It is interesting to note that knowledge here is not merely a by-product of educational attainment; it is the cumulative sum of a number of variables that drive business. Clusters are created when each of these variables interact effectively creating a critical mass of activity that result in synergies affecting economic prosperity across regions. Clusters are not merely a number of similar businesses operating out of a single geographical region; they are in fact knowledge hubs that add another dimension to a region’s value chain. These clusters have economic significance above and beyond that created through commercial activities of its residents. It is this tacit value that attracts investment – at times from relatively unrelated quarters. Therefore, in order to understand the influence of knowledge clusters on regional economies, it is vital to understand the impact of investment in knowledge intensive sectors using tangible variables including capital expenditure, job creation and project numbers. These clusters can also be considered as the launching pad for commercial districts that directly influence economic prosperity across regions.

In an ideal type knowledge economy, the ability of a network of firms to connect with the global economy is not limited to their size or number of people they employ. For businesses operating in fast moving sectors such as digital media, most of the firms in these clusters are young but serve larger established media firms even though they themselves are normally small in terms of employment (Karlsson and Rouchy, 2013). This interdependency allows clusters to further develop through interaction between networks comprising of small and medium sized companies (Ketels, 2008). In an ideal type knowledge economy, we would expect to see a strong presence of suitable geography, avenues for value creation and a conducive business environment which have been identified as the three key pillars of the cluster concept (Ketels, 2008). In more established clusters, there is a higher likelihood for dynamic entrepreneurial activity to take place through spreading the cost of failure as entrepreneurs are able to fall back on local job opportunities within a number of other firms operating within the clusters (Wennberg and Lindqvist, 2008). This not only increases the resilience of a cluster to shifts in market factors and sector performance, it also makes clusters more attractive partners for leading companies because they reach higher productivity that isolated companies find hard to match (Ketels and Memedovic, 2008). In addition, closer proximity enables more meaningful interaction between industry practitioners through dense knowledge flows and spillovers. In several studies analyzing mature established clusters, the influence of large firms who themselves benefitted from clustering advantages has been highlighted (Schmitz and Nadvi, 1999; Martin and Sunley, 2011; Leclar et al., 2015). However, it can also be seen that large firms over time and increasing scale start reducing their reliance on local sources of competitiveness (Schmitz and Nadvi, 1999). This in turn increases the importance of the role of SMEs within a cluster. However, clusters alone cannot solve the complex problems and constraints encountered by SMEs (Dasanayaka and Sardana, 2010; Osaremkhoe and Fjellstrom 2017). More importantly, by simply focusing regional policy on developing a geographical concentration of businesses that operate in the same sector is not sufficient and other factors such as ease of “information exchange, identification of common strategic objectives, and agreeing on a joint development strategy and its systematic and coherent implementation, are of paramount importance for building an efficient cluster” (Osaremkhoe and Fjellstrom, 2017, p. 182).

2.4 Knowledge Economy and Its Importance to the City Region – Putting Theory into Practice

Having identified the main concept at the outset and following the literature review exercise, a number of research objectives emergent to be explored to help streamline the focus of the research were identified which include:

a) Role and function of knowledge as an economic commodity.

b) Understanding the role of institutions who aim to maximize the "knowledge affect" on city region economies.

c) How an old and new city region seeks to overcome the barriers to the global knowledge economy.

We have looked at evaluating relevant literature pertinent to the concept of knowledge as an economic commodity and implications this has for knowledge economies. We look at how knowledge has increasingly become a unifying component for key factors of production and modern economies increasingly rely on knowledge intensive sectors as a source of competitive advantage. It is also evident from the preceding discussion that in order to understand the impact of knowledge, understanding its constituents – the nature of knowledge itself - is essential. This chapter examines a number of key concepts to help understand why a city-region would seek to connect to the global knowledge economy and the increased emphasis on knowledge as the one factor of production (Drucker, 1995). We look at knowledge as an economic commodity considering its impact on economic and productivity growth for a region. We also look at the role of knowledge as intellectual capital highlighting the importance of understanding that a knowledge economy is not solely about systematic transfer of economically significant information or data, nor is it centred on a deeper philosophical understanding of how things are done. An ideal knowledge economy is driven by an increased investment in knowledge capital uplifting the knowledge capability of every factor of production. We also highlight how a key driver of innovation and creativity within the global knowledge economy has

been the rapid technological evolution that has led to the development of new knowledge intensive sectors including video gaming and digital media (UKIE, 2014). As the rate of technological innovation has increased, it has made it easier for information and ideas to be dispersed with knowledge intensity in the production system with sectors that use R&D and skilled labour most intensively growing most rapidly (Abramowitz and David, 1996).

In addition, we also look at the reasons why different regions get different types of connection to the global knowledge economy with an emphasis on the role of local agencies and institutions within the state. The state plays a key role as the prime collective organisation with societal reach and legal power that provides the necessary resources for local business to thrive, arbitrate between decentralised authorities, secure collective results and establish long term strategic goals within a frame of plural and autonomous governance (Hausner, 1995; Amin, 1998). In trying to analyse the role of local institutions within modern knowledge economies, we highlight how regional policy for a significant period of time has been standardized and state driven. More specifically, we look at critical factors such as an increased emphasis on the growth and development of both logistical and technological infrastructures within local institutions in modern economies and the role they play in organizing and commercializing knowledge activity taking place within a region. We analyse how local agencies play the role of delivery agents by implementing key economic policies and strategic plans developed for the city region (Hausner, 1995; Amin, 1998; Docquier, 2014). Local agencies also facilitate the development of regional offers and market propositions for key knowledge intensive sectors. This in turn assists with attracting investment and enabling connection to the global knowledge economy. We highlight how in developed knowledge economies commercialization of research is considered to be the logical next step in the evolution of start-ups aided by local clusters which serve as a medium for professionals and policy makers to create value through their interactions within local networks (Scott, 1998; Kenway et al., 2006).

We also analyse how the concept of clusters recognizes that interactions between various economic agents may involve the elements of both competition and cooperation (Scott, 1988). Competition may also impact the ability of a cluster to create knowledge and new products through linkages with external markets and utilising a mix of local and non-local transactions (Scott, 1999). We also evaluate the role of clusters and how they can be seen as a market based approach to economic policy that develops new roles for government and companies as well as other regional stakeholders including universities, research institutions and trade associations (Kettels, 2008). We look at how in an ideal type knowledge economy, we would expect to see a strong presence of suitable geography, avenues for value creation and a conducive business environment which have been identified as the three key pillars of the cluster concept (Kettels, 2008). We highlight how policy makers within local institutions play a key role in sharpening the focus of local economic policy by streamlining regional strengths and assist in the development of key sectors vital to the local knowledge economy. These clusters in turn help to improve the quality and profile of local products and services making the region a more attractive proposition for inward investment as opposed to priorities that exist at firm level (Birkinshaw, 2000; Coe et al., 2007; Kettels, 2008).

Finally, we have looked at how policy makers along with other regional stakeholders are increasingly focusing on the skills and professional competences of the local workforce to raise regional economic productivity (Arundel et al., 2007). It is important for policy makers within local institutions to look past stereotypical regional policy that is standardized, incentive based and state driven (Amin, 1999). Modern businesses have become increasingly sophisticated to cope in a dynamic economy that is a composition of networks and collective influences which shape individual action and is subject to path dependent change due to the contribution of inherited socio institutional influences (Amin, 1998). Given both Dubai and Liverpool city region are looking to prepare their place to connect with the global knowledge economy, they both still require a sustained focus on the quality, scope and depth of their local institutions. We highlight how several empirical studies have found a positive relationship between the quality of institutions and governance structures and economic growth (Knack and Keefer, 1995; Clague, 1997; Alesina, 1998). We

look at how local agencies and stakeholders in two very different types of economies, Dubai an emerging city-region and Liverpool one from an old industrial order, have earmarked the knowledge economy as a key long term strategic priority. We also look in later chapters how both city regions aim to counter both internal and external barriers through investment in both physical and institutional infrastructure as well as through the development of an effective policy framework to facilitate connection with the global knowledge economy.

Chapter Three

Methodology

3.0 Introduction

This research has employed a mixed methods approach. It has a qualitative emphasis with secondary source quantitative data taken from local agency research and consultant reports, Financial Times database, as well as region specific knowledge economy plans. Secondary source data has been used to contextualize and inform the empirical data collection and resulting findings. It is important to note that whilst a key contribution of this research is to add to the body of knowledge by developing the concept of knowledge economy 'connection' as city regions seek to engage with the global knowledge economy, it also makes a methodological contribution by drawing on the work of Max Weber to develop the idealized type of knowledge economy as an exemplar to understand the two cases under consideration.

This research looks at the contexts in which governance institutions prepare their place for a role in the knowledge economy. In this chapter, we look at the selection of the two sites in which the primary research is based; Liverpool City Region and Dubai City Region. We also look at the selection of a mixed methods approach by evaluating the major research paradigms it falls within; positivist paradigm and constructivist/interpretivist paradigm. This chapter also details how we have drawn on the work of Max Weber to develop an idealized type of knowledge economy. By adopting an ideal type as a contextual bridge, we are able to develop two empirical cases, one of an older industrial city region and one of a new emerging economy city region, to show how city regions seek to connect to the global knowledge economy.

3.1 Adopting a Mixed Methods Approach

Mixed methods research is both a method and methodology for conducting research that involves collecting, analyzing, and integrating quantitative and qualitative research in a single study or a longitudinal program of inquiry (Creswell and Plano Clark, 2007; Creswell, 2008). The main assumption behind this approach is that a combination of qualitative and quantitative research would help provide a better understanding of a research problem than either research approach on its own (Creswell, 2008). The origins of a mixed methods approach lie in two major research paradigms, positivist paradigm (using quantitative research methods) and constructivist/interpretivist paradigm (qualitative research methods) (Terrell, 2012). The type of mixed methods approach depends on a range of factors including the explicit or implicit nature of the theoretical perspective, priority of research strategy (equal, qualitative or quantitative), sequence of data collection (quantitative first, qualitative first or no particular sequence) and the point at which the data is integrated (at data collection, at data analysis, at data interpretation or with some combination) (Terrell, 2012).

Prior to analysing the choice of research methods, it is important to understand the research paradigm which refers to the basic set of beliefs defining the nature of the world and the range of possible relationships to the world and its parts (Guba, 1990; Lincoln et al., 2011). This paradigm influences the choice of methods as well as ontology. Ontology refers to the nature of reality, a study of what exists and in turn the identity of it. It deals with the nature of reality while epistemology deals with questions about how and what is possible to know (Birnik, 2007). The tacit characteristics of knowledge provide substantial scope for building theory utilizing what is known to be true, thereby building upon existing theoretical frameworks to study issues pertaining to the subject matter in greater detail (Patton, 1991). A close examination of the literature in economics indicates, however, that the function of knowledge and information in economic activity is, for the most part, ignored by economists (Stehr, 1994). Either that, or they introduce knowledge as an exogenous variable, as an expense and generally treat it as a black box". In much of the

literature concerning the knowledge economy, there has been an absence of a sustained discussion concerning definitional issues (McLennan, 2003). From a methodological standpoint, these issues provide scope for a genuine contribution to the study of knowledge about knowledge.

In this research we used both qualitative and quantitative data to facilitate the investigative process within a single study (Creswell, 2002). A predominantly qualitative emphasis using interview data along with secondary source quantitative data taken from the Financial Times bespoke database, local agency research and consultant reports as well as region specific knowledge economy plans were used. The secondary source data has been used to contextualize and inform the empirical qualitative data collection and resulting findings. Qualitative research is an "inquiry process of understanding" where a researcher "reports detailed views of informants, and conducts the study in a natural setting" (Creswell, 1998, p. 15). The natural setting in this case is the direct source of data and the researcher is the key instrument. The researcher in-situ needs to understand the context in which knowledge creation and distribution takes place. In qualitative research, the more descriptive nature of data collected has to provide greater scope for interpretation (Filstead, 1970; Peshkin, 1993). In this research, we aim to add to the body of knowledge by developing the concept of knowledge economy 'connection' as city regions seek to engage with the global knowledge economy. This connection is described through the prism of personal beliefs and practical experiences of interviewees. Also how these experiences shape their understanding of the context in which the institutions they are part of prepare their place for a role in the knowledge economy.

The utilisation of a mixed methods approach also complements the concept of paradigm relativism where any philosophical or methodological approach can be chosen as long as it works for the research problem under investigation (Tashakkori and Teddlie, 2008). This is consistent with the argument that the choice of methods is mainly driven by the ontological and epistemological assumptions made by the

researcher (Brannen, 2005). There is a degree of consensus that sound methodological practice involves choosing a method appropriate to the research question (Blaikie, 2000; Creswell, 2003). The framing of research questions is in part shaped by epistemological assumptions but is also influenced by the need to find theory that fits a specific set of cases or contexts (Brannen, 2005). Creswell (2008) highlights that the key steps to designing a mixed methods study include posing key research questions, listing the types of data collection and analysis as well as making explicit the world view of the researcher. An essential component of the research design process is to identify “who or what” is being studied. Once this is ascertained, the researcher needs to identify what strategies of enquiry will be used. The final step of research design involves the selection of methods and research tools to analyze the data collated (Gubrium & Holstein, 1997; Janesick, 2000). During the initial literature review stage of the research project, the author reviewed various theoretical positions in existing literature around the subject matter (Drucker, 1969; Bell, 1973; Porat, 1977; Noyelle, 1990; Garicano & Rossi-Hansberg, 2005). The author analysed the composition of the term “knowledge economy” concluding that it represented a global economic system driven by demand for economically significant information, ideas and theories that are easily transferrable through the efficient use of technology resulting in the creation of replicable mechanisms and processes directly influencing competitive advantage and value added activities. Economically significant in this case refers to all knowledge, utilization of which results in GDP growth helping sustain long-term economic independence for nations. Having identified the main concept, a number of research objectives emergent to be explored to help streamline the focus of the research were identified which include:

a) Role and function of knowledge as an economic commodity.

b) Understanding the role of institutions who aim to maximize the “knowledge affect" on city region economies.

c) How an old and new city region seeks to overcome the barriers to the global knowledge economy.

While the key research question or questions in a piece of research may be

underpinned by realist assumptions, some research questions may be underpinned by interpretivist assumptions, for example concerning how people make sense of their actions (Brannen, 2005). A quantitative researcher may be more concerned with the actions and behavior of interviewees while they may also have an interest in interviewees' meanings, framed in terms of attitudes. Moreover, a focus on meaning within quantitative research is often inescapable since researchers typically study people's behaviour via self-reports of behaviour (Brannen, 2005). Researchers of both quantitative and qualitative persuasions may assume that reports of behaviour have some close semblance to actual behaviour.

It is important to understand the distinction between the pragmatic researcher and one that is paradigm oriented. In the paradigmatic vision of the world the former is more interested in ideas and their origins, in the ideas which drive the research and the ideals upon which research should be founded. The concern of the pragmatist is more to open up the world to social enquiry and hence to be less purist in terms of methods and preconceptions (about theory and method). Such researchers are oriented to the production of research results that they seek to link to practical and policy ends (Hammersley 2000). Thus a pragmatic rationality will more readily embrace a mix of methods if the research questions and practicalities of the research context suggest it. With a key contribution of this research being an addition to the body of knowledge by developing the concept of knowledge economy connection as city regions seek to engage with the global knowledge economy, it also makes a methodological contribution by drawing on the work of Max Weber to develop the idealized type of knowledge economy as an exemplar to understand the two cases under consideration.

3.2 Nomothetic, Idiographic and Ideal Types Research

Nomothetic research is quantitative. It is an experimental strategy which involves administering a series of measures to a sample of individuals at a single time point

(Castro-Schilo and Ferrer, 2013). This approach seeks to establish generalizations by analysing average responses of a chosen sample in an attempt to attain statistically significant results (Epstein, 1994; Molenaar, 2004). Windleband (1980, pp. 175) explained how *"in their quest for knowledge of reality, the empirical sciences either seek the general in the form of the law of nature or the particular in the form of the historically defined structure. On the one hand, they are concerned with the form which invariably remains constant. On the other hand, they are concerned with the unique, immanently defined content of the real event …. scientific thought is nomothetic in the former case and idiographic in the latter case".* The argument against nomothetic research mainly focuses on the lack of in-depth and highly contextualized data with comparisons generated from aggregated data from groups of individuals being largely superficial. Alternatively, an idiographic approach focuses on investigating individuals and social phenomenon in personal, in-depth detail to achieve a unique and contextualized understanding of them. This approach tends to predominately utilize qualitative methods such as a case study approach which provides a more complete understanding of the concept/phenomenon under investigation. There has been a preoccupation over the years with the nomothetic approach as it is seen to offer more scientific respectability (Epstein, 1994; Molenaar, 2004) however human behaviour is complex and multi-dimensional requiring an approach that is able to provide suitable depth and flexibility to analyse this complexity (Castro-Schilo and Ferrer, 2013). In order to counteract the generalized aspect of the idiographic approach, some argue that this can be done by repeating single subject designs to gather information that applies to multiple individuals (Jones, 2007; Castro-Schillo and Ferrer, 2013).

Windleband (1980) coined the terms nomothetic and idiographic in order to refer to the different methodologies that disciplines employed at the time. The concept was reintroduced by Stern (1911) in an attempt to organize psychological science around the individual. The preconceived notion at the time was that the nomothetic approach provided more reliability and had the potential and scope to be applied to a larger group of subjects (Jones, 2007; Castro-Schillo and Ferrer, 2013). Over the years there has been some effort to integrate nomothetic and idiographic approaches

grounded within the context of its origin. Windleband (1980, pp. 175) in his seminal work had explained how *"In their quest for knowledge of reality, the empirical sciences either seek the general in the form of the law of nature or the particular in the form of the historically defined structure".* Therefore, the nature of reality in this case would be contingent to context providing scope for an idiographic approach that could interrogate the true nature of reality of a subject. Windleband (1980) also argued that in the pursuit of true knowledge of reality the empirical sciences are both concerned with the form which remains constant and the unique immanently defined content of the real event. In this context, *"scientific though is nomothetic in the former case and idiographic in the latter case"* (Windleband, 1980, pp. 175). Therefore, it can be argued that both approaches are overlapping and a compete study of the phenomenon will embrace both approaches (Allport, 1937).

One of the main issues of utilizing idiographic research methods is the issue of generalization. Idiographic methods cannot use statistical inference as a method of generalization since each person or case is viewed as unique (Velicer, 2010). One potential solution is systematic replication. However, this approach ignores the individual and therefore has an impact on the richness and substantive depth of information that is being gathered. Methods that result in an intermediate level of generalizability, such as the attempt to identify homogeneous groups based on similar patterns of change over time, represents an intermediate compromise (Velicer, 2010). An ideal type exemplar could develop an individual level analysis for each subject under consideration. The question would then arise about how an individual level analysis can provide a direct answer to the interest and generalization at the group level and what practical purpose could this serve (Velicer, 2010). This being said, an idiographic approach is invaluable in understanding the uniqueness of the individual organism (Allport, 1962), with Skinner (1966, p. 21) arguing how *"instead of studying a thousand rats for one hour each or a hundred rats for ten hours each the investigator is more likely to study one rat for a thousand hours"*. Similarly, in relation to policy research, there are several examples of an idiographic approach being utilised to understand the true nature of the phenomenon under investigation (Mintzberg, 1973; Mintzberg et al., 1976).

In studies of personality, it has been argued that nomothetic research relying on between-person comparisons of personality overlooks important idiographic, or within-person, comparisons that may also determine behavior (Chatman et al., 1999). Similarly, idiographic orientation is relevant in organizations because selection and socialization processes tend to increase the homogeneity among members' personalities (Schneider, 1987; Chatman et al., 1999). This would mean that the social structure and culture of the organization would serve as a homogenizing filter making it harder for an investigation to capture uniqueness in practice as well as the context in which related activities and processes take place. Burrell and Morgan (1979, p. 6) state that the idiographic approach *"is based on the view that one can only understand the social world by obtaining first-hand knowledge of the subject under investigation. It thus places considerable stress upon getting close to one's subject and... emphasizes the analysis of the subjective accounts which one generates by "getting inside" situations and involving oneself in the everyday flow of life-the detailed analysis of the insights generated by such encounters with one's subject and the insights revealed in impressionistic accounts found in diaries, biographies and journalistic records" (1979, p. 6).* In the case of this research project, as we look at the contexts in which governance institutions prepare their place for a role in the global knowledge economy, we take into account the relevance of the knowledge economy to the city-region and how governance actors are keen to support supply-side initiatives around for instance, education, skills and enabling more entrepreneurial behaviour through effective policy development that takes into account the unique core competencies of the region.

In this research, an ideal type exemplar is used to analyze the motivation of city regions to develop their knowledge economies. Table 2 details the implications of using both the idiographic and nomothetic approaches with a more specific emphasis on characteristics included within an ideal type exemplar utilised in this research. The idealized type case is able to provide important context for the two cases under consideration. This is done by analyzing the socio-economic benefits of developing characteristics synonymous with the ideal type and by looking at the

interplay between these characteristics. As we see in the table below, the ideal type approach allows us to draw out the nuances of organizational and agency infrastructure, those actions and influences that key actors impose or engage in. We can then examine how they continue to affect the knowledge economy "connectivity" in each case. However, there are barriers to such ideal type connection to the global knowledge economy. Cooke (2002) argues that the limitations of regional innovation systems include the lack of funding for basic and applied research as well as limited availability of venture capital and other sources of investment capital. It is however, important to note that a sustainable knowledge economy would require these support functions to be both accessible and accountable. What often appears to be an insurmountable barrier is in relation to the quality of research produced, and market prospects for products and services from new knowledge intensive businesses as they are developed. For Cooke (2002) the fact that accomplished regional economies tend to display certain common features including institutional learning, associative governance, proximity capital and interactive innovation are critical to success. Also, proximity to a specific high growth region or city appears significant. Proximity and supply chain connections to London, as well as the pull of the "London offer" which international investors attribute significant intangible value to, could provide an advantage to Cambridge as developers and businesses seek to take local innovation to market. It seems then that it is important to focus the growth ambition of a city region knowledge economy within important sectors that have the credibility and are situated (in a social and cultural sense) in relation to the robustness of its institutional infrastructure. The table below seeks to characterize therefore, the important aspects of an ideal city-region knowledge economy.

Characteristic	Emphasized Detail	Idiographic Approach	Nomothetic Approach
High-tech economy	Evidence of embryonic start-ups that transform into larger businesses	In-depth analysis of strategies employed by successful start-ups focusing on distinct business propositions and unique selling points.	Tracking growth within the sector through number of jobs created, average market capitalization of firms as well as FDI flows into the region.

Institutional backing	The 'thickness' of state and quasi-state institutions that through their connections, provide the environment for knowledge intensive business growth	Evaluating the robustness of checks and balances in place by speaking to industry experts as well as established businesses. What characteristics make the institutional sector attractive to global investors.	Reviewing location rankings including tracking indicators rating factors such as logistical readiness, skills availability, availability of office/incubation space etc.
Knowledge intensity	Evidence of clusters of knowledge intensive businesses, R&D, and supplier networks	Reviewing the nuances of supplier networks and analyzing their organic growth and the factors that enable this to happen.	Reviewing number of patents as well as revenues generated through their commercialization. Reviewing number of spin offs coming out of cluster groups and their quantitative impact such as jobs created, amount of investment and resulting turnover.
Quality of R&D	Evidence of this in sectors identified as globally important, such as biotech, life sciences and software	Understanding the rationale and drivers behind high level of R&D investment in certain sectors. Why are certain sectors preferred and how is this determined?	Tracking sector based investment in R&D. Tracking FDI flows in R&D intensive sectors as well as success rates of patent applications and clinical trials.
Supply of finance	Includes the density and sustainability (of supply) of finance to support innovation and knowledge creation, such as Venture Capital finance	How does the region commercialize its research and innovative ideas? What institutional systems and agencies are in place to support this.	Tracking volume of investment in startups by venture capitalists and seed funding agencies. Statistical evaluation of uptake of local/federal government grants.
Supply of skilled labour	In particular, a supply of in-demand graduates but also skilled tertiary labour provision	Understanding the initiatives in place to attract, develop and enhance the local workforce. Analyzing local market conditions as well as understanding the	Analyzing skills availability using generic models such as the SIC criterion. Analyzing graduate attainment and industry placement

		influence of factors such as the depth and quality of local clusters.	statistics.
Proximity to growth cities	Such as London to allow access not only to markets, but state provision such as transport systems; also note debilitating effects on 'quality of life' issues when growth overheats	Mapping the logistical dependencies of growth cities to the region including supplier networks and access to resources. Teasing out the specific/unique *pull factors* influencing the decision making of actors (specifically high skilled workers) which factor in both quality of life and career progression.	Measuring the level of investment from growth cities as well as flows of labor and the resulting impact on housing, education and social services.
Ability to self-reflect	As part of the institutional thickness the institutions and actors involved become part of the 'learning' city-region through reflecting on what works	Analyzing what measures have been taken by local institutions to bolster their performance and global standing. Reviewing and building case studies utilizing sector/industry success stories.	Comparing current trends with historic periods utilizing a limited number of variables (i.e. comparative job creation, comparative business growth, comparative skills availability etc.)

Table 2: Key Characteristics of an Ideal-Type City Region Economy

From a philosophical point of view, we have looked at both the idiographic and nomothetic approaches. In relation to this research project, we have utilised a mixed methods approach. The primary work has been qualitative. This has allowed for new information to be garnered about Dubai and Liverpool City Region. The quantitative work has been important but has been derived from questions that we did not set. Therefore, the precision of the qualitative methods is better because it has been designed around specific research questions. The secondary source quantitative data has been helpful in contextualizing the empirical qualitative data collection and

resulting findings by highlighting factors such as the unique demographic constitution of Dubai city region, distribution of skills within different sectors in both Dubai and Liverpool city region along with shift in employment within knowledge intensive sectors in recent years. Where on one hand quantitative data provides a snapshot of the economic position of each region, we rely extensively on qualitative data to interrogate the case for connection with the global knowledge economy. An idiographic approach has also provided more scope to analyse the contexts in which the knowledge economy of each region has taken shape including an assessment of strategic ambitions against the ground realities. We analyse the reach and impact of local competencies through comparison with the ideal type exemplar and examine their impact on connectivity with the global knowledge economy.

3.3 Relevance of Using "Ideal Types" – A Weberian Approach

By drawing on the work of Max Weber we can develop the idealized type of knowledge economy. This can serve as an exemplar to understand the two cases under consideration. Weber viewed human beings as animals oriented towards meaning (Watkins, 1952; Weber, 1973; Wolff, 1980), so by arguing that knowledge is contingent to context meaning is sought by actors, or research subjects, that will be subjective. Weber does not see culture in a deterministic way arguing that economic and cultural interests are motivating factors that are controlled by material interests of people. Of particular interest is the relationship between culture values/beliefs, social structures and the psychological orientations of the actors (Weber, 1973; Doty and Glick, 1994; Allan, 2005) and the value based motivation of actors. In other words, a researcher is bound to place substantive value on a topic or area that he/she is interested in studying while at a broader level, these questions are driven by the value society places on certain issues for a variety of reasons. For example, an increased emphasis on debating the pros and cons of staying in or leaving the European Union prior to a referendum or debating the importance of increased regulation and additional legislation following a tragedy. In the case of this research, utilizing an ideal type exemplar allows us to analyze the motivation of city regions to

develop their knowledge economies. The economic and social benefits of developing characteristics synonymous with the ideal type serve as a motivating force behind the aspiration of local actors to connect to the global knowledge economy. Hence, the idealized type here provides an important comparative context to the two cases under consideration.

Weber (1949) argued that only a small portion of existing concrete reality is colored by our values and they alone are significant; significant because they reveal relationships that are important to us, due to their connection with our values. The challenge presented in creating a social science by the assumption that scientific knowledge can be defined as being empirical and non-evaluative, raises this point about human reality being meaningful, not empirical (Allan, 2005). Social research is historical and thus concerned with unique configurations of values, and all the questions we ask are strongly informed by our culture and thus are value laden (Allan, 2005). These unique configurations serve as the lens from which we view objective realities and hence why the resulting understanding is open to human influences. Human behavior can be predicted to a degree in the form of thinking and response patterns but the probability and possibility of narrowing this down to one single response is unrealistic. Allan (2005, pp. 148) explains:

"Weber is also convinced that a social science is possible, but there are certain caveats. Because human existence is a subjective one, creating an objective science about people is difficult. Knowledge about people must be based upon an interpretation of their subjective experience. And because people are self-aware free agents, the law-like principles that science wants to discover are provisional and probabilistic at best (people can always decide to act otherwise). So the kind of knowledge that we produce about people will be different than that produced in the laboratory, though Weber feels that objective knowledge is still possible. One key in creating this objective-like knowledge is that social scientists have to be reflexively and critically aware of their values in forming and researching their questions".

3.3.1 Capturing an Ideal Type of City-Region Connecting to the Global Knowledge Economy

One way that societal knowledge can be made object like is through the use of ideal types. Ideal types are mental constructs which are formed by a one-sided accentuation of one or several perspectives, and through the synthesis of a variety of diffuse, discrete, individual phenomena, present sometimes more, sometimes less, sometimes not at all; subsumed by such one-sided, emphatic viewpoints so that they form a uniform construction in thought (Weber, 1973; Aronovitch, 2012). Ideal types provide a logical touch stone to which we can compare empirical data and measure differences in the social world (Allan, 2005). By existing outside the historical contingency of the data being analyzed, we are able to obtain an objective measurement through the utilization of an ideal type. In the case of this research, the level of connection of each city region's knowledge economy to the global knowledge economy is analyzed through the prism of an ideal type. The assumption made is that the characteristics highlighted within the ideal type exemplar are not time dependent and it would be rational to assume that they could be utilized to analyze data from any era.

A significant amount of empirical material constituting sociological concepts looks at making a causal explanation of historically and culturally important phenomenon (Weber, 1973). An event may be unique to an extent, in that it reflects the actions and views of actors in a given time faced with a certain set of circumstances. However, it may be helpful to analyze this event through the lens of an ideal construct to review the motivations and reactions of those involved. As explained earlier, given that it is challenging to predict human behavior with a scientific level of accuracy, the ideal type would serve as a measure of rationality i.e. can the behavior and responses of actors be considered rational by comparing actual outcomes against expected outcomes. Therefore, the ideal type would serve as an exemplar highlighting the logically consistent features of social institutions or behaviors. In the case of this research, it would involve understanding the importance of developing a

city region institutional infrastructure that would enable connection with the global knowledge economy (Doty and Glick, 1994; Morgana, 2006). The ideal type would also determine the features of a social institution that would be present if the institution were a logically consistent whole, not affected by other institutions, concerns and interests (Doty and Glick, 1994; Elwell, 2003; Morgana, 2006). Whilst it may be possible to devise an ideal type framework based on this rationale, it would not be realistic to separate these concerns and interests from the institutions in question given that *"it is necessary for the sociologist to formulate pure ideal types of the corresponding forms of action which in each case involve the highest possible degree of logical integration by virtue of their complete adequacy on the level of meaning. But precisely because this is true, it is probably seldom if ever, that a real phenomenon can be found which corresponds exactly to one of these ideally constructed pure types". Weber (1973, pp. 20).*

In trying to analyse the different kinds of human action, Weber (1973) devised four ideal types through which a variety of complex behaviours can be compared (please refer to table 3 below). The intent here was to create an objective measure that exists outside of the content (Allan, 2005).

Social Action	Description	Action in the Context of a Knowledge Economy
Instrumentally Rational	Means and ends of action are rationally related to each other. There is a causal relationship between action and result determined by set expectations of behaviour of objects in the environment and other human beings.	CR officials/elite need to CR to become part of a global KE to ensure economic growth and cohesion amongst citizens.
Value-rational	Based on the values and morals of an actor and the level of emphasis placed on these by the actor independently of its prospects	CR officials/elite develop value-rational beliefs that imply how through CR connection (to a global KE) then their own CR economy

	of success.	will be able to grow in a certain way, a way they are committed to.
Affectual	Based on the feelings and emotions of an actor in a particular set of circumstances with limited to no consideration of resulting consequences.	CR officials/elite believe that through collaboration (amongst local institutions) they can be affectual in securing connection of their CR to the global KE.
Traditional	Actions heavily influenced and motivated by traditions, habits and customs.	CR officials/elite assume that through the pursuit of the connection strategy, local economic growth will be 'good', beneficial to local stakeholders (businesses, citizens…)

(Table 3: Weber's Ideal Types / Adapted from Weber, 1973)

Weber's typology is arranged along a diminishing scale of rationality where instrumentally rational action is at the top given it entails a conscious and deliberate selection of means with an understanding and regard of consequences of the actor's behaviour (Schluchter, 1981). In terms of value-rational action, it can still be considered as rational due to a degree of conscious decision making by the actor in contrast to affectual action. Affectual action is driven by emotions which are largely irrational given the large deviation in responses to the same challenge under different circumstances making outcomes impossible to predict, thereby lacking rationality. It can be argued that affectual and traditional action lie *"very close to the borderline of what can justifiably be called meaningfully oriented action"* Weber (1968, pp. 25).

In his methodology Weber emphasizes the importance of contextualizing meanings of actions through the use of Verstahen (meaning "to understand") Allan (2005). The motivation of actors performing any action is important rather than an isolated focus on the consequence of an action. In the case of this research project, this would

involve understanding reasons that motivate local agencies to connect to the global knowledge economy and to help analyze the rationale for selection of Liverpool and Dubai City Region for this research. An ideal type is not a self-encompassing concept as the very characteristics chosen to develop an ideal type are influenced by a researcher's cognitive interest and the objectives selected for enquiry. This inevitable selectiveness implies that it is indeed the researcher who determines which segment of reality becomes the object of enquiry. Kedar (2007, pp.9) explains:

"….Weber's social scientific outlook is permeated with what we may easily designate as hermeneutical principles: the values and presuppositions inescapably guiding the scholar's work, and the perpetual transformation of these horizons over time; the inability to grasp the totality of human existence, entailing a significant limitation (if not rejection) of generalizations as a viable aim of the social sciences; the construal of social phenomena as imbued with significance, coupled with Weber's characterization of the social sciences as dealing with "psychological and intellectual (geistig) phenomena" amenable to "empathic understanding". Upon all this may be added as well the historicization by Weber of science itself as a product of modern Western civilization".

The subjectivity involved in this selective approach also highlights how the ideal construct is a reflection of what the researcher sees as significant and pursuit worthy at any given time driven by personal beliefs and interpretation of what is deemed as social realities. In order to achieve a better understanding about the possibility of attaining knowledge about human experience, philosophical hermeneutics can be utilized to understand the nature, conditions and limitations of the human sciences (Kedar, 2007). Here both the scholars and their object of study is seen to be bound up in their linguisticality and historicality which calls for the adoption of interpretive procedures for the study of social life (Hoy, 1978; Kedar, 2007). Therefore, by adopting an ideal type as a contextual bridge, the researcher is able to develop two empirical cases, one of an older industrial city region and one of a new emerging economy city region, to show how city regions seek to connect to the global knowledge economy.

3.4 The Case Study Approach in this Research

A case study approach will facilitate our understanding of knowledge economies in two cities: Dubai and Liverpool City Region. The emphasis is on understanding the role and function of knowledge as an economic commodity in each case. A case study can be defined as an empirical enquiry that investigates a contemporary phenomena within its real life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin, 1994). As understanding the context in which the phenomenon exists in both regions of interest is amongst the main aims of the research project, a case study approach facilitates a deeper scrutiny of existing knowledge infrastructure and institutional relationships. A case study approach allows *"investigators to retain the holistic and meaningful characteristics of real life events"* (Yin, 2009 p. 4).

The relevant context and background embedded within the cases under consideration help us to understand issues that are complex, situated and problematic (Denzin and Lincoln, 2000). The knowledge economies of both Liverpool City Region and Dubai City Region are made up of several components responsible for its operational sustenance. These include public and private sector investment support agencies, regional soft landing centers, sector support groups and knowledge intensive businesses producing the economically significant knowledge as discussed earlier in the literature review section. When applied as a research method, case studies are usually carried out to generate findings of relevance beyond the individual case (Fidel, 1984). Case studies enhance the scope of an investigation by looking at the phenomenon in action, mostly within a specific context that serves as a point of interest to the researcher (Yin, 1984). Of particular significance to the research project is the focus on detail and analysis of relevant initiatives and action plans in both regions in relation to the key research questions. Interviewees were not just asked for their view on the current status of their regional knowledge economy, rather particular emphasis was given to understanding the key elements that define each regions knowledge offer.

The methodological trinity of reliability, validity and generalization play an important role in ensuring methodological rigor in research (Tobin & Begley, 2004). Qualitative research has been criticized for producing findings that are not generalizable (Lincoln & Guba, 1985; Wainright, 1997; Creswell, 1998). This in turn directly affects the perceived validity and reliability of research output. This would imply that qualitative research would only produce meaningful analysis if the framework employed can be transferred to other cases. However, validity in the qualitative research paradigm is dependent on the richness of information collected to represent accurately those features of the phenomena that it is intended to describe, explain or theorise (Hammersley, 1987). Findings of research projects utilizing case study methodology can be validated using techniques such as triangulation of data sources, theory or primary investigation (Denzin, 1978). Proponents of qualitative research argue that its true value is best achieved beyond the confinements of generalization. A qualitative investigation does not aim to standardize phenomena through statistically measurable outcomes and transferable concepts. The true value of qualitative research is to dwell deeper into the subject matter looking for answers that are novel but can still be linked to existing or new theory. Pyett (2003, p. 1170) explains how *"although in quantitative research, validity is related to accuracy, relevance, and reliability of measurement, in qualitative research, we seek not to measure but rather to understand, represent, or explain something, usually some fairly complex social phenomenon".*

However, in order to understand the true value of a research project deploying a predominantly qualitative method, an evaluation within the context of the investigation's purpose is vital (Knafl & Howard, 1984). For instance, it is of little significance to report that there is lack of strategic and procedural rigour in the knowledge development plans of Dubai City Region. However, by providing evidence of how this frailty has hindered the growth of up and coming knowledge intensive businesses in the region provides a causal link meriting further research. Qualitative researchers also face a tougher challenge in obtaining true informed consent as the nature of the investigation constantly evolves through the data

gathering and analysis process (Forchuk & Roberts, 1993). Also, amongst the criticism of qualitative research projects is their lack of ability to produce analysis backed by scientifically observable facts making qualitative research a “subjective assertion supported by unscientific method” (Ballinger, 2006, p. 235).

As interpretive research is based on a different set of ontological and epistemological assumptions than functionally based research, the traditional notions of validity and reliability do not apply in the same fashion (Lincoln and Guba, 1985; Shah & Corley, 2006). This does not imply that outputs resulting from qualitative research have varied standards: rather the “credibility, transferability, dependability, and confirmability” (Lincoln & Guba, 1985) of qualitative research output are vital to ensure the trustworthiness of qualitative research. As discussed in earlier sections, an essential prerequisite to access the global knowledge market is to establish knowledge competencies at the regional level. The researcher does not aim to prove or disprove the validity or impact of the phenomenon – the knowledge economy in this case. The sheer expansiveness of the concept makes it challenging to delimit the phenomenon into measurable units that can be applied to similar situations (Winter, 2000).

3.5 Case Selection in this Work: The Old and New City Region

We look at a city-region in a newly emerging economy, Dubai and a city-region in an older industrial nation in the north of England, Liverpool. Dubai city-region grew as a natural harbour and became identified as an important seaport in the Persian Gulf. However, the discovery of oil in the 1960s displaced the activities associated with a traditional regional port and laid the foundation from which a period of rapid infrastructure developed that transformed this city-region and beyond. In contrast Liverpool, it too a maritime city, suffered a long period of decline from a position of global importance in the 19th Century. During the 20th Century its deterioration as a port coincided with various regional policies and post-war corporatism, giving rise to

interventions that led to a branch plant local economy that by the 1970s was becoming unsustainable. These two places seem to have reached a crossover point in their development at roughly the same time and contrast not only from each other but from the idealized types of knowledge economy often reported on, such as Cambridge in the UK or alternatively those well-known technology-driven cases of Silicon Valley on the West Coast and the Boston phenomenon, Route 128 on the East Coast, USA. An examination of a city-region with aspirations to be a global city and presenting to the world a diversified local economy with new opportunities for investment, and a city-region seeking to overcome negative perceptions within its host nation while competing with other similar places for the same inward investment are rarely seen to be exemplars of knowledge economies. Dubai and Liverpool therefore provide the basis from which we can witness the aspirations, objectives and manifest reality in how and why a city-region would want to develop its local economy in this way.

Dubai City Region was selected as a case for this research due to its evolution as a globally significant city region economy. Dubai is one of the major and most identifiable cities in the United Arab Emirates. The United Arab Emirates was formed in 1971 as a federation of seven states (Ajman, Abu Dhabi, Dubai, Fujairah, Ras Al Khaimah, Sharjah and Umm al Quwain). The region experienced a rapid transition from an economy driven by a modest fishing and pearling industry to become one of the key players in the global oil industry. In order to capitalize on existing opportunities at the time, all available resources were directed towards developing suitable support infrastructure for the oil industry to ensure the financial independence of the region. Dubai's economic history dates back to a tribal creek settlement in the 1830s with a population of 800 people (Department of Economic Development, 2012). The creek's economic impact grew, as the natural harbor became a centre for the fishing, pearling and sea trade. Dubai at the turn of the twentieth century was a successful regional seaport. As population rose to 20,000, the creek began to silt struggling to deal with the stresses of high capacity (Emirates News, 2012). The decision to have the waterway dredged was vital in ensuring economic stability for the region. The move helped substantially increase the trading and re-export activity at the port. The economic impact of these initiatives started

decreasing in the 1950s as the pearl industry faced decline.

The region had to face a period of economic hardship until oil was discovered in 1966. It was from this point that we see rapid infrastructure development that in essence, has transformed the city-region. Dubai City Region's economic growth post this period has led to the creation of a tourism economy that was at the core of national development strategies during the 1980s and 1990s (Jaber and Batori, 2009; Bingeli, 2010). At the same time, we see an increase in concerns over the availability and longevity of natural reserves and policy makers and key economic stakeholders have turned to other avenues to reduce long-term economic risk. One consequence has been attempts to capitalize on its global destination status and here Dubai has turned to ideas about knowledge development and growth in an effort to diversify opportunities for global investors. Universities and academic institutions have been at the forefront of this campaign recognizing the importance of a sophisticated repertoire of teaching programmes. Many institutions have increased their focus on including research-based programmes in their latest course offerings. The Masdar Institute of Science and Technology for example, claims to be the world's first graduate level university dedicated to providing real-world solutions to issues of sustainability (Masdar, 2014). This initiative is yet to be a proven success but shows a two-fold strategic ambition, which includes developing research collaborations with established global players as well as focusing on the development of local intellectual capital, both of which have been a major weakness of Dubai city region. Of significance is how the institute was created in collaboration with the Ivy League Massachusetts Institute of Technology (MIT) in an attempt to integrate theory and practice to incubate a culture of innovation and entrepreneurship (Reuters, 2012). The Institute is currently running the region's most significant collaborative research project comprising of the Abu Dhabi Company for Onshore Oil Operations (ADCO), Petroleum Institute (PI), Massachusetts Institute of Technology (MIT) and the Masdar Institute of Science and Technology, into carbon sequestration.

The National Bureau of Statistics has recognized the need to collate socio-economic data to make a meaningful contribution to the national development strategy. It is now responsible for collecting, classifying, storing and analyzing economic, social, demographic, agricultural, environmental, energy and other data, in cooperation with government agencies and local statistical centers (National Bureau of Statistics, 2010). This has been an important exercise in establishing a baseline to compare the success of initiatives and intervention from local agencies. The region has benefited from establishing formal structures to establish, monitor and regulate regional knowledge assets and optimize the exposure of growing businesses to the international market. The establishment of the Knowledge and Human Development Authority (KHDA) is one such initiative created to improve schools and other human resource sectors in Dubai.

On the other hand, Liverpool sits at the center of a city-region that grew on the basis of trade between one country and the rest of the world. In this sense it is a city-region that has been connected to a wider global economy since the seventeenth century through the activities of the port and trade with key strategic locations as part of a broader imperial past. While many other cities build up their wealth through industrialization in Liverpool we see a growing intensification of global trade through the eighteenth and nineteenth century. What this means is that the wealth of the city comes through the merchants who are able to act as the gatekeepers to imports and exports via their control of the dock and maritime systems and their influence on financial institutions. The connection of Liverpool to other global ports across the Atlantic, Pacific and Indian Oceans is the basis for an increase in population, through the availability of work in the port and in the related industries that grow up around the docks (Smith, 1953). The port acts as a gateway to new opportunities in economies such as the USA, while immigration into Liverpool provides the basis for a multi-cultural city with seafarers from Asia and Africa joining the strong Celtic connection from Wales, Scotland and particularly Ireland (Belchem, 2007). And despite the wealth that was concentrated in Liverpool, this type of global connection was also associated with the poverty of the city and surrounding region.

At the beginning of the twentieth century Liverpool reaches its peak as a contemporary global city. The port and docks remain vibrant as international trade expands while the local population continues to increase. The city economy is established around maritime, transport, commerce and financial services although employment remains precarious for many. A key moment for the city comes with the Great Depression and the actions by national governments across the world to protect their domestic economy at the expense of trade with other countries. This impacts on the port and Liverpool generally and while unemployment and poverty become entrenched, at this moment the population of the city peaks. Part of the reaction from the UK government to the Depression is through policy aimed at stimulating regional economies, including that of Merseyside. Yet as other parts of the UK slowly emerge from the weak national economy the local economy of Liverpool struggles. This period of the city's development is then significant for two reasons. First, after the Wall Street Crash in 1929 and the end of the gold standard the period of global economic activity that brought with it wealth to Liverpool and its city-region, tails off. Secondly, the problems facing Liverpool were different to the rest of the UK and the structure of its local economy could only be partially supported through the efforts of national government and Regional Selective Assistance. The significance of the maritime industry to Liverpool at this time was its dominance at a time of global crisis.

The post-war period brought reconstruction and in time, prosperity to many towns and cities in the UK. International trade was re-established, primarily facilitated through the agreement at Bretton Woods and there were ambitious plans to enhance the port of Liverpool. Although now the strengths of the Liverpool port system seen in the eighteenth and nineteenth centuries became a source of weakness, still locked into an older trading system and lacking the engagement with European countries that other ports could exploit. Chronic poverty plagued Liverpool and its population declined while the UK economy grew. Not only was it the waning of the docks that was visible in the last three decades of the twentieth century, but the city and its surrounding region overall was castigated as a problem to be managed in a period of decline. Most severely as a new era of globalization began, were the branch plant closures from companies who set up supported through government grants before

and after World War II (Coleman, 1975; Merseyside Socialist Research Group, 1980). It was a perfect storm as the docks declined, investment from the private sector collapsed and new cuts in public finance were implemented to important funds that the city felt it needed, leading to confrontation between the government and local authority. These only the backdrop to high levels of structural unemployment and riots that added to the negative perception of the city.

Now the city looks to reconnect to a new international economy standing next to other cities in the competition for global resources. Liverpool with a Super-Port, Liverpool as a knowledge economy, Liverpool as a tourist destination and Liverpool as a place to do business and to live, each illustrating in a boosterist sense, how the comeback city can once again be a productive part of an international order of cities. Even so, there is much to address as indicators of deprivation demonstrate with poverty remaining stubborn and many of its inhabitants unable to be included in new international opportunities for work and consumption. The story of Liverpool shows how internationalization and globalization can impact on a city. This is a narrative of global connection, retreat in the face of protectionism that led to long standing structural problems for the local economy. Only now are there signs of this being overcome and while Liverpool may be a unique case, it shows that different types of globalization can impact on localities in ways that appear beyond the control of local people.

3.6 Data Collection and "Context" for Analysis

The next stage of the research involves designing strategies of enquiry to collate data relating to the ley research themes. This was done through semi-structured interviews (please refer to Appendix A for Interview Protocol) with Senior Executives who continue to play a key role in the development and promotion of the knowledge infrastructure for both city regions being investigated. The researcher adopted an elite interviewing approach in relation to the selection of interviewees. When

conducting elite interviews, Cochrane (1998) explains how membership is defined by the individual's role in the organisations. He highlights the pitfalls associated with over extending the boundaries of what constitutes a member of an elite (Ibid). This could mean including individuals such as local managers and executives who may on the surface appear to be in the know and well informed (Peck, 1995), but in reality have limited exposure and awareness of long term agency specific and regional strategic plans. Attention has been paid here to the role played within the local knowledge economy by each interviewee selected for this research, as well as evaluating the nature of their subscription to the local knowledge economy by their local reputation. With the researcher's existing membership and affiliations within each region as a practitioner, it was more manageable to establish the local reputation and scope of engagement of interviewees selected within their local knowledge economies (Stoker, 1994; Cochrane, 1998). Cochrane (1998) explains how identifying local elites through their local reputation is one way of dealing with the definitional problem raised. The tables below detail the job titles of local elites identified by the researcher in both Liverpool City Region and Dubai City Region. It was important for interview questions to be structured to ask multiple participants the same questions, without which it would have been hard to reach data saturation as it would be a constantly moving target (Guest et al., 2006). These measures also assisted in avoiding the shaman effect where someone with specialized information on a topic can overshadow the data (Bernard, 2012). This also streamline the focus of the interview process generating data pertinent to the main research themes. As these themes looked at specific aspects of the knowledge economy with the interviewee's and their firm's engagement with the concept, it would have been hard to interrogate these themes utilising a quantitative analysis approach.

LCR 1	Head of Sector Development (Creative and Digital Industries) – Local Public Sector Agency
LCR2	Head of Investment - Local Public Sector Agency
LCR3	Vice President, Strategy and Planning – Private Sector MNC
LCR4	Sector Manager - Creative and Digital Media – Local Public Sector Agency
LCR5	Managing Director – Private Sector Local Firm
LCR6	Managing Director – Private Sector Local Firm
LCR7	Chief Executive Officer – Local Public Sector Agency
LCR8	Vice Chancellor – Local University

(Table 4: Job Titles of Interviewees – Liverpool City Region)

DCR 1	Director (Energy Wholesale Transactions) - Federal Agency
DCR2	Senior Automation Engineer – Private Sector MNC
DCR3	Managing Director (Energy Services) – Private Sector Local Firm
DCR4	Senior SAP FICO Consultant - Federal Agency
DCR5	Senior Operations Manager – Private Sector MNC
DCR6	Technical Affairs Specialist – Private Sector MNC

(Table 5: Job Titles of Interviewees – Dubai City Region)

These elite interviewees were identified through key documentation, recommendations by those in the sector, and a cross referencing snowball technique that provided triangulation of their status. This exercise provided information based on their engagement with the phenomenon (knowledge intensive global economy) and their interpretation of key variables affecting it (technologization of knowledge

based sectors or cluster development through proximity of location). “No theorizing, however ingenious, and no observance of scientific protocol, however meticulous, are substitutes for developing a familiarity with what is actually going on in the sphere of life under study” (Blumer, 1969). The emphasis of the data collection exercise was to collate “soft” data that explains the phenomenon and generates understanding through building theory that can be transferred to similar situations affecting other regional economies. The research was conducted using semi-structured interviews to provide scope for an open structure for dialogue. This would allow the researcher to respond to opportunities generated during the interview process i.e. aspects of the discussion with an interviewee that may inform any of the four central themes or provide compelling evidence to challenge the researcher’s views on either location of interest. A full record of the interview was compiled as soon as soon as the interview had taken place (Healey & Rawlinson, 1993; Robson, 2002; Saunders et al, 2003).

A large amount of region specific literature around the knowledge economy has a quantitative premise. This has been useful in exploring relationships in “hard” data that has helped generalize key attributes of the knowledge economy. However to uncover meaningful relationships from amongst this hard data (Mintzberg, 1979), it is to vital generate theory from empirical patterns to increase depth of understanding. While analyzing the impact of knowledge on regional economies, it is important to understand the composition of knowledge as an economic commodity as explained below:

“While new knowledge will generally increase the economy's potential output, the quantity and quality of its impact are not known in advance. There is no production function, no input-output “recipe” that tells, even approximately, the effect of a “unit” of knowledge on economic performance. Knowledge, unlike conventional capital goods, has no fixed capacity. Depending on entrepreneurship, competition and other economic circumstances, a given new idea can spark enormous change, modest change or no change at all” (OECD, 1996).

The role of technology as a facilitating component of the global economy is well

documented (Nonaka, 1994: Wenger, 1998; Cohen & Levinthal, 1990). From a data collection and evidence-gathering standpoint, this was captured by calling upon the experience of the interviewees and the impact of technology as a facilitator of knowledge development and distribution in their respective sectors. Clusters provide an interface for knowledge transfer that assists in value creation as knowledge and creativity capacity of regions expand. The research project also looks at the role and impact of cluster development on economic activity (Pitelis, 2001; Malmberg & Power, 2003; James, 2005). The interviewees representing each region were required to describe their interaction with peer networks existing within their industry assisting in knowledge development and transfer. This would assist in providing for a more reflexive and joint authored approach between interviewer and interviewee (Gordon, 1998). The selection of interviewees and the emphasis on data collection through semi-structured interviews is aimed at extracting more than statistical trends in knowledge intensive sectors. The goal as explained is to utilize the tacit awareness held by interviewees through their experiences working in industry. The information and explanations provided by the interviewees will also contribute to the theory development aspect of the research project. Walters (1995) describes this contribution as consistent with phenomenological research traditions that requires the participants to be viewed as co-authors and not merely repositories of data.

The main purpose of the phenomenological approach to research is to identify phenomena through how they are perceived through actors in a situation (Lester, 1999). Phenomenology is concerned with the study of understanding perception through increased focus on the validity of subjective experience. To ensure validity in phenomenological findings, the development of general theories needs to be done transparently (Lester, 1999). This would imply that the researcher thoroughly analyzes the information trail (which includes evidence gather through various methods) to ensure reliability. It is important to understand how building a research project through scrutinizing interpretations does not constitute bias. The researcher's role here is not limited to solely being an impartial observer (Wise, 1993), rather, there is a need to be "active" in engaging with the interviewee where there is an opportunity to gain a deeper understanding of the subject matter. The

methodological approach in this form of research should aim at facilitating the process of discovery and understanding the key elements of the phenomenon under investigation. Hycner (1999) suggests that by limiting the scope of phenomenological research, a researcher would do a great injustice to the integrity of a phenomenon.

Economic independence in the case of knowledge economies would refer to a nation's ability to service and supplement all aspects of its knowledge value chain. This would comprise of academic institutions transferring knowledge onto knowledge workers, knowledge workers applying acquired knowledge to fulfill their professional responsibilities and businesses/industries absorbing this manipulation of knowledge into their work streams. The interaction between key research variables along with the specific aims of the three central themes makes this research project predominately inductive (Boddy, 1951; Lee, 1991; Miles & Huberman, 1994; Adcock & Collier, 2001). In theory, building key analysis utilizing an inductive process allows the researcher to generalize beyond the findings of a particular study or research. In the case of the research project in question, this would imply providing an analysis around the role of knowledge as an economic commodity utilizing Liverpool and Dubai City Region as testing environments hosting the phenomenon being investigated. Therefore, at the very core of the research project the author aims to develop the understanding of knowledge as an economic commodity, understanding in this case itself being the phenomenon (Schwandt, 2007).

Our classification of the main research activity as inductive - post identification of the initial themes - centers on the project's conceptual premise. The main research aim is not to prove the presence of regional knowledge economies that exist within a wider global knowledge economy, nor does the author aim to present a case for the evolution of knowledge as the main factor of production. Rather, the four central themes are the result of a comprehensive literature review exercise that aimed to establish parameters that would allow for relevant theory to be constructed (Anfara & Mertz, 2006; White & Klein, 2008). Leedy & Omrod (2005, p.4) define theory as "an organized body of concepts and principles intended to explain a particular

phenomenon". The phenomenon in this case is a knowledge intensive global economy whereas Liverpool and Dubai City Region are localized representations of the phenomenon. In qualitative research, the main focus of the researcher is to examine "and interpret the constructive aspects of the social world" (Mcleod, 2001). In most cases, research is initiated due a lack of theory or detailed understanding of the interaction between key variables. The research project aims to fill this gap in theory by looking at the phenomenon within selected regions. By analyzing the phenomenon having limited its exposure through geographical spread, it provides the researcher with a better chance to understand the significance and impact of each variable i.e. technologization of knowledge based sectors for each select region or cluster development through proximity of location and relevance of product/services in select regions. The utilization of structured interviews as the primary mode of data collection requires a similar approach to further develop understanding of the phenomenon in question. It is vital that the participant's perspective on the phenomenon of interest unfolds as the participant views it (the emic perspective), not as the researcher views it (the etic perspective) [Marshall & Rossman, 1995]. The direction of the interview should not alter if the interviewee has strong feelings towards certain aspects of the phenomenon that contradict the parameters of the research project. The aim of the project is not to prove or disprove any of the main hypotheses; therefore, impartiality and an emphasis on actively listening to what the interviewee has to say constitute a vital part of the research plan.

The data transcriptions were carried out utilising a three stage procedure starting with preparing the data for analysis by transcribing, reducing the data into themes through a process of coding and representing the data (Miles and Huberman, 1984; Creswell, 2007). Initially the data from Liverpool City Region was collected and transcribed followed by the same for Dubai City Region. Full attention paid to each city region has helped to develop a close familiarity with the data collected for each city region. On completion of transcription, the data was anonymized and coded which involved identification of concepts and themes when reading the interviews (Merrill and West, 2009). The coding process was aided by a familiarization and

close attachment to the data through the transcription process (Bernard, 1994). Analysing text involves several steps which include discovering themes and sub themes, winnowing themes to a manageable few and deciding which are of more importance to the project, building hierarchies of themes and consequently linking these themes into theoretical models (Ryan and Bernard, 2003). The researcher also utilized the constant comparison method as detailed by Glaser and Strauss (1967) which involved searching for similarities and differences by making systematic comparisons across units of data. This technique focuses on increasing the level of understanding by developing a close familiarity with the data collected. Once the common themes were teased out, they were saturated with examples from the interview data. Fusch and Ness (2015, pp. 1409) explain how it is better to look at data in terms of rich and thick rather than the size of the sample by highlighting how:

> *"the easiest way to differentiate between rich and thick data is to think of rich as quality and thick as quantity. Thick data is a lot of data; rich data is many-layered, intricate, detailed, nuanced, and more. One can have a lot of thick data that is not rich; conversely, one can have rich data but not a lot of it. The trick, if you will, is to have both"*

During close review of the interview texts, different sections were highlighted relating to the category that they fit which has had a significant influence on the writing of this thesis. The review process including coding of interview data looked at extrapolating key themes within the text. During this stage of analysis, specific attention was paid to statements representing some level of patterned response or meaning within the data set (Braun and Clarke, 2006). Whilst we have been able to identify key themes and patterns within the data collected, we have also been able to better understand the context in which these themes have been discussed and how different realities have been constructed. It can be argued that the process of data analysis that leads onto the development of theory should consider an interactive process of abstracting theories based on immanent critique and the grounding of abstractions in concrete data (Yeung, 1997).

3.7 Ethical Considerations for this Research

A clear understanding of research ethics is essential for a researcher working in any field. Researchers working in academia enjoy a number of privileges supported by the fundamental principle of academic freedom (UNESCO, 1997). This affirms that the right to education, teaching and research can only be fully enjoyed "in an atmosphere of academic freedom…the open communication of findings, hypotheses and opinions lies at the very heart of higher education and provides the strongest guarantee of the accuracy and objectivity of scholarship and research (UNESCO, 1997, p. 26). However, where researchers constructively benefit from the openness resulting from the principle of academic freedom, it is important for them to comply with high ethical standards to ensure the credibility of their work. In addition to reviewing and complying with the University of Liverpool's ethical guidelines having successfully obtained ethical approval for the research, the researcher has also fully reviewed the Social Policy Association (SPA) Guidelines on Research Ethics. These guidelines identify and address the different kinds of ethical issues which may arise in the conduct of social policy research. Amongst the key constituencies identified by the SPA towards whom social policy researchers have ethical responsibilities are the research participants. SPA (2012, p. 3) guidelines highlight how "it is important to ensure wherever possible that all participants in social policy research, regardless of their status, understand and consent to the consequences of taking part in the research. Researchers should be aware at all times that a commitment to the advancement of knowledge does not entitle them to over-ride the rights of others".

The researcher obtained written, informed consent from the interviewees at the very outset of the fieldwork process. In this participants confirmed that they had read and understood the participant information sheet provided to them. Participants were also informed that their participation was voluntary and that they would be free to withdraw at any time. In addition, it was confirmed that, under the Data Protection Act, they could at any time ask for access to the information provided by them as

well as request for the destruction of this information if they wished. In addition, this research has also complied with the ethical guidelines developed by the Social Research Association, British Sociological Association and American Sociological Association.

3.8 Conclusion

In this chapter, we reviewed the selection of the two sites in which the primary research is based; Liverpool City Region and Dubai City Region. We look at the selection of a mixed methods approach by evaluating the major research paradigms it falls within to get an extensive and intensive picture of the two cases. This chapter also details how we have drawn on the work of Max Weber to develop an idealized type of knowledge economy. By adopting an ideal type as a contextual bridge, we are able to develop two empirical cases, one of an older industrial city region (Liverpool) and one of a new emerging economy city region (Dubai), to show how city regions seek to connect to the global knowledge economy. We have used elite interviews to collect information based on the interviewees' engagement with the phenomenon (knowledge intensive global economy) and their interpretation of variables affecting it (technologization of knowledge based sectors or cluster development through proximity of location).

In the next chapter, we look at developing an idealized type knowledge economy which serves as an exemplar to understand the cases under consideration. This is drawn from city regions across the world and we aim to utilize this ideal type of city region knowledge economy to compare the two cases. Many places have sought to explicitly connect to the global knowledge economy with varied success. Often success is related to the focus local places have on developing local infrastructure. This brings into the debate about the knowledge economy an importance attached to structures of local governance and other agencies acting at the scale of the local who are able to support local infrastructure particularly within knowledge intensive sectors that can be globally connected and competitive. Local agencies, whilst

motivated to achieve outcomes that justify the feasibility of their own interventions, are often better equipped to deal with the challenges that their place presents. Based on its performance over the last few decades, Cambridge can be considered as an internationally significant knowledge economy. In fact, not only is Cambridge held up as an exemplar in this field, methodologically speaking it provides the academic critic with a Weberian ideal type of knowledge economy to study, from which other attempts at connection can be evaluated.

Chapter Four

Ideal Type of Knowledge Economy

4.0 Introduction

In this chapter we look at what makes an ideal type city region knowledge economy. As detailed in earlier chapters, from a methodological perspective, we have drawn on the work of Max Weber to develop an idealized type of knowledge economy. We also use a number of key indicators that characterize the important aspects of an ideal city-region knowledge economy. We utilize Cambridge as an exemplar, showing how it has been successful in connecting with the global knowledge economy. This has been achieved by developing structures of local governance aided by local agencies acting at the scale of the local who are able to support local infrastructure. We look at how in an ideal type city region knowledge economy such as Cambridge, commercialization of research and new ideas is relatively easier and organic supported by a robust institutional infrastructure that provides clear pathways for startups and microbusinesses. In such an ideal type city region knowledge economy, entrepreneurs are conditioned to treat the commercialization process as the logical next step in the conversion of innovative concepts into products and services. We look at specific examples from Cambridge as a way to operationalize the ideal type concept which has been adopted as a contextual bridge for this research and through which we have been able to develop two empirical cases, one of an older industrial city region and one of a new emerging economy city region, to show how city regions seek to connect to the global knowledge economy.

4.1 What is that makes an Ideal Type City Region Knowledge Economy?

As explained in earlier chapters, there is little consensus in relation to a universally accepted definition of a knowledge economy. The oldest approach focused on the rise of new science-based industries with an increased emphasis on innovation, technological advancement and increased sophistication in the quality of skills

needed by regions to connect with the global knowledge economy. In addition, the increased emphasis on technological change and innovation is a result of their effects on production methods, consumption patterns and the structure of economies (OECD, 2001). Similarly, the knowledge economy can also be defined as a newly emerging economic structure where economic success is increasingly based on the effective utilization of intangible assets such as knowledge, skills and innovative potential as they key source for competitive advantage (ESRC, 2007). In the case of the United Kingdom, policy makers have for a considerable period of time highlighted the need for developing a knowledge based economy by specializing in innovative, high value added goods and services produced by highly skilled knowledge workers (James et al., 2011). Given that in this research we have used a working definition of the knowledge economy as below, we have utilized the key traits set out in Table 2 to characterize therefore, the important aspects of an ideal city-region knowledge economy.

The knowledge economy is a global economic system driven by demand for economically significant information, ideas and theories that are easily transferrable through the efficient use of technology (Machlup, 1962; Cowan et al., 2000).

Characteristic	Emphasized detail
High tech economy	Evidence of embryonic startups that transform into larger businesses
Institutional backing	The 'thickness' of state and quasi-state institutions that through their connections, provide the environment for knowledge intensive business growth
Knowledge intensity	Evidence of clusters of knowledge intensive businesses, R&D, and supplier networks
Quality of R&D	Evidence of this in sectors identified as globally important, such as biotech, life sciences and software
Supply of finance	Includes the density and sustainability (of supply) of finance to support innovation and knowledge creation, such as Venture Capital finance

Supply of skilled labour	In particular, a supply of in-demand graduates but also skilled tertiary labour provision
Proximity to growth cities	Such as London to allow access not only to markets, but state provision such as transport systems; also note debilitating effects on 'quality of life' issues when growth overheats
Ability to self-reflect	As part of the institutional thickness the institutions and actors involved become part of the 'learning' city-region through reflecting on what works

Table 6: Emphasized Details of Key Traits in an Ideal-type City-region Knowledge Economy

In an ideal type knowledge economy, we would expect to see a strong presence of a majority of the characteristics detailed in Table 6 above. These have been primarily selected reviewing the relevant literature particularly the key studies on knowledge based indicators (please refer to Table 1). There have been a number of efforts to elaborate the characteristics of the knowledge economy (OECD, 1996; Smith, 2002; Brinkley, 2006; Roberts, 2009). One of the key traits of an ideal type city region knowledge economy is high quality R&D activities supported by an established and up to date technological infrastructure. The European Union sees information and communication technologies as the major factor affecting economic growth and innovativeness (European Union, 2007). It can be argued that the information technology revolution is central to the increased emphasis being placed on knowledge in economic activity (Castells, 1996). New technology has significantly increased the capacity to codify knowledge (Roberts, 2009), which has increased the scope and geographical reach of knowledge based products and services. It can be argued that the current technological evolution *"is not the centrality of knowledge and information, but the application of such knowledge and information to knowledge generation and information processing/communication devices, in a cumulative feedback loop between innovation and the uses of innovation"* (Castells, 1996, p. 32). Therefore, in an ideal type city region knowledge economy, we would expect to see productive exploitation of opportunities presented by technological

advancements to assist regions in connecting with the global economy. The rise of the network society could be attributed to this connection which represents the social structure resulting from the interaction between the new technological paradigm and social organization at large (Castells, 1996).

It has been argued that the creation, sharing and storage of knowledge within knowledge societies requires coordinated management and exchange of tacit and explicit knowledge (Park, 2005). Whilst meaningful engagement between sector professional creates value through the resulting problem solving applications and concept development that may take place, tacit knowledge is a lot harder to dislocate from its originating setting (Morgan, 2001). By being context dependent and socially accessible mostly through direct physical interaction, tacit knowledge is harder to capture due to several factors including firm level competitiveness leading to an insular approach to professional networks and idea sharing (Schmitz and Nadvi, 1999; Becattini et al., 2003). In modern knowledge economies, technology enables the flow of explicit and tacit knowledge through various models of conversation including socialization, externalization, combination and internalization (Park, 2005). In order for knowledge and idea exchange to take place, the business environment needs to be guided by the fundamental reciprocity norm (Turner, 2006). In order for this reciprocity to flourish, businesses within a region need to be open to communicating as a subscriber of their local network overcoming hurdles such as competitive concerns, intellectual protection of ideas and pipeline products that have had significant R&D investment but are not completely ready for market. There are longstanding businesses that need to reinvent themselves to seek efficiency and discover the successes from cooperating within a network (Czakon, 2012). In an established cluster within an ideal type of knowledge economy, we would expect to see viable formal and informal networks between firms and other educational, research and political institutions facilitating the circulation of tacit knowledge between firms (Lundvall and Johnson, 1994; Maskell and Malberg, 1999). This can be achieved by closer proximity by operating within a cluster that facilitates meaningful interaction between industry practitioners (Swann and Pervezer, 1998).

There are barriers to such ideal type connection to the global knowledge economy. Cooke (2002) argues that the limitations of regional innovation systems include the lack of funding for basic and applied research as well as limited availability of venture capital and other sources of investment capital. It is however, important to note that a sustainable knowledge economy would require these support functions to be both accessible and accountable. What often appears to be an insurmountable barrier is in relation to the quality of research produced, and market prospects for products and services from new knowledge intensive businesses as they are developed. For Cooke (2002) the fact that accomplished regional economies tend to display certain common features including institutional learning, associative governance, proximity capital and interactive innovation are critical to success. Also, proximity to a specific high growth region or city appears significant. Proximity and supply chain connections to London, as well as the pull of the "London offer" which international investors attribute significant intangible value to, could provide an advantage to Cambridge as developers and businesses seek to take local innovation to market.

Proximity is also an important aspect of sound network functioning due to critical factors including stimulating possible cooperative activity, initiating channels that stream information, constituting necessary conditions for obtaining and transfer of data, information and knowledge as well as facilitating learning processes and raising the level of innovativeness through innovation spill overs (Klimas, 2011). In an ideal type of knowledge economy such as Cambridge, we see the development of an economic environment conducive to network development spearheaded by a technology cluster employing 54000 people within 1500 technology based firms (Cambridge Network, 2014). This is well complimented by the largest concentration (88.6%) of micro businesses in the UK (ONS, 2013). It can be argued that for such a large percentage of microbusinesses to successfully operate within a local economy, there is a sizeable dependency on the local institutional infrastructure to support sustainability and growth. These include entrepreneurship support centers, innovation centers, service providers and financial institutions all supporting the development of innovative activities of small businesses (Matusiak, 2010).

The thickness of local institutional infrastructure is another important characteristic of an ideal type city region knowledge economy. Local agencies within these city regions are responsible for promoting growth and providing pathways to development (Amin and Thrift, 1995). The 'thickness' of state and quasi-state institutions that through their connections, provide the environment for knowledge intensive business growth is important to the development of local startups and small businesses. On the other hand, some argue that regions can have too much institutional thickness, with agencies and government agencies crowding each other out and distracting growth efforts (Beer and Lester, 2015). This is more likely to be the case in city regions where local agencies have multiple sources of funding which makes it challenging for them to develop an identity and structure that is unique and conducive to the requirements of potential investors and local startups. Institutional thickness is not simply about the volume of local agencies operating in a city region, it is more important to have the correct mix of effective institutions (Rodriguez-Pose, 2013). Institutional dynamics can be separated into two components, institutional structure and institutional arrangement (Rodriguez-Pose, 2013). Institutional dynamics relate to the type of institutions within a region, their organization, size and competitive position in relation to attracting businesses to the city region. On the other hand, institutional arrangement refers to how well these local institutions relate to each other and whether they are fit for purpose from the perspective of the wider community (Rodriguez-Pose, 2013). Within key knowledge intensive sectors, entrepreneurs are eager to commercialize their concepts and ideas but are often hindered by limited resources and lack of industry connections (Rodriguez-Pose, 2013). Given these challenges, it is important for regions to develop structures of local governance aided by local agencies acting at the scale of the local who are able to support local infrastructure. Within an ideal type city region knowledge economy, commercialization of research and new ideas is convenient and organic with local institutions and agencies providing a supportive environment and assistance with specialisms that may be out of reach of start-ups and microbusinesses (Kenway et al., 2006). In such an ideal type city region knowledge economy, entrepreneurs are conditioned to treat the commercialization process as the logical next step in the conversion of innovative concepts into products and services.

Another characteristic of an ideal type city region knowledge economy is the supply of finance to support innovation and knowledge creation, such as venture capital finance. Some argue that venture capital is a key driver of economic development in advanced economies and a major source of finance for innovative, high-growth firms and their entrepreneurial owner-managers (Reynolds et al., 2000; Gompers and Lerner, 2001). This is also amongst the key needs of start-ups as they transfer from the seed phase to the start-up phase (Harding, 2000; Oakey, 2003). An ideal type city region knowledge economy would have an established pathway of support where new ideas and young entrepreneurs are able to seamlessly transition from idea to product and from product to market (Oakey, 2003). An economic environment that contains individuals who understand the market potential of new ideas and technologies is also more conducive to indigenous growth. Entrepreneurs operating within start-ups and microbusinesses rely heavily on this financial and technical expertise to help them navigate through and deal with competitive market forces. These competitive forces could pose an existential crisis to a new start-up particularly within high tech and knowledge intensive sectors where speed to market and scaling up are important challenges. City regions with a track record of local start-up success find it easier to develop a culture where commercialization of new ideas and innovation is natural and supported by the local institutional infrastructure. This in turn facilitates better connection with the global knowledge economy as local start-ups are better equipped to get involved in cross border collaborative projects as well as engaging with new business coming into the region with a view to work on joint ventures.

In an ideal type of knowledge economy, we would also expect to see a steady supply of skilled labour that meets the needs and requirements of local businesses as well as promoting entrepreneurial activity. It can also be argued that competition within modern economies forces businesses to continually invest in skills and knowledge to survive (North, 1995). In this new economy, the skills requirement is not only limited to traditional skills such as functional linguistic literacy but also basic numerical and computer skills (Boljanovic et al., 2014). This has been the result of advanced

democracies undergoing a major technologically driven structural transformation since the 1970s where *"the post-WWII era was built on the dual pillars of mass production and mass consumption, and was supported by collective bargaining, a generous welfare state, and Keynesian demand management policies"* (Hope and Martelli, 2017, p. 9). Over time, as a result of globalization, de-unionization and technological change, this system was replaced by a new type of knowledge based economy in which manufacturing receded in importance being replaced by service sectors (Hope and Soskice, 2016; Hope and Martelli, 2017). Within this new knowledge based economy, there is a higher demand for college educated workers proficient in new technologies commanding a higher wage (Katz and Autor 1999; Goldin and Katz 2008; Acemoglu and Autor 2011; Hope and Martelli, 2017). There is also a demand for specialist management and leadership skills within knowledge based economies which is reflective in the significant increase in remuneration for CEOs across knowledge intensive sectors (Murphy and Zabojnik, 2004). There is increasingly more emphasis on general transferable skills covering areas such as management, accounting, economics and computing as opposed to firm specific knowledge which was the central focus of the pre-digital era (Hope and Martelli, 2017). In addition, we would expect to see high levels of supply of vocational skills such as NVQs in an ideal type of knowledge economy. This would assist in meeting the requirements of sectors such as digital media, pharmaceuticals, advanced manufacturing and green technology all of which require a large number of technicians holding level 3 and level 4 vocational qualifications (Clifton et al., 2014). This is an increasing area of concern for several developed economies including the UK where it is predicted that a shortage of 3.4 million workers qualified at level 3 will present a significant economic challenged by 2020 (Humphries, 2010).

There are also institutional factors such as de-commodification, trade union density, wage coordination and collective bargaining that are of significance to a region including impact on labor market inequality (Brady et al., 2003; Brady and Leicht, 2008; Kenworthy and Pontusson, 2005; Pontusson et al., 2002; Wallerstein, 1999). In examples such as the Silicon Valley, supply of labour is aided by hiring qualified workers from low wage economies with limited recruitment costs (Saxenian, 2000). However, this could potentially have a negative impact on a regions ambitions of

becoming a knowledge based economy as businesses have little incentive to invest in the training of indigenous workers (Saxenian, 2000; Brown et al., 2001). In an ideal type knowledge economy, there would be an expectation for the income inequality gap between high and low skilled workers to be reduced. This is a trend even in developed clusters such as the Silicon Valley where average earnings of the top 20% households have risen steadily while earnings of the bottom 20% has fallen over time (Finegold, 1999).

It is important to understand how the level of knowledge intensity depends on the ability of a region to exploit its existing stock of knowledge. Schiliro (2010) argues that exploiting the existing stock of knowledge will depend on the efficiency and cost of access to knowledge. A combination of institutional and technological factors determines the level of these access costs with open knowledge societies displaying lower access costs compared to societies in which knowledge is kept secret or confined to a limited group of insiders (Mokyr, 2005). Higher access costs do not only hinder knowledge intensity within a region, they also hamper cluster development due to the insular nature of such economies with limited social and economic networks. Therefore, economic institutions play a critical role in stimulating the accumulation of knowledge and its application to the development of new technologies (Mokyr, 2005; Schiliro, 2010). Competitive forces and legal protections awarded to intellectual property through patents may present challenges for a completely open knowledge society, however, Schiliro (2010, p. 40) highlights how *"the ethos of open science is supported by an institutional infrastructure, that is, a constellation of differentiated institutions shaping the conduct of scientific and technological research".* The main aim here from a regional perspective is to have an institutional infrastructure that provides a balance between financial productivity for businesses creating knowledge based products and services through application of new technologies and innovative practices. This would entail enabling institutions to create a stable external environment in which organizations and individuals operate, by reducing uncertainty and producing stability whilst at the same time adapting themselves to the changing environment (Schiliro, 2004). Therefore, in order to facilitate meaningful interaction between different sectors in a knowledge based economy, an appropriate framework of economic incentives and institutional regimes

is necessary (Schiliro, 2010). It seems then that it is important to focus the growth ambition of a city region knowledge economy within important sectors that have the credibility and are situated (in a social and cultural sense) in relation to the robustness of its institutional infrastructure. Table 6 seeks to characterize therefore, the important aspects of an ideal city-region knowledge economy. Knowledge economies with these characteristics are able to not only successfully connect with the global knowledge economy but they are also better positioned to sustain economic growth and prosperity.

4.2 What Makes Cambridge an Ideal Type of Knowledge Economy?

Many places have sought to explicitly connect to the global knowledge economy with varied success. Often success is related to the focus local places have on developing local infrastructure. This brings into the debate about the knowledge economy an importance attached to structures of local governance and other agencies acting at the scale of the local who are able to support local infrastructure particularly within knowledge intensive sectors that can be globally connected and competitive. Local agencies, whilst motivated to achieve outcomes that justify the feasibility of their own interventions, are often better equipped to deal with the challenges that their place presents. Based on its performance over the last few decades, Cambridge can be considered as an internationally significant knowledge economy. In fact, not only is Cambridge held up as an exemplar in this field (Cooke, 2002; Sainsbry, 2002; Gray and James, 2007), methodologically speaking it provides the academic critic with a Weberian ideal type of knowledge economy to study (Granovetter and Swedberg, 2001), from which other attempts at connection can be evaluated. Cambridge has benefited from this dedicated focus sustained for more than three decades now. The 1967 Mott Report suggested that relaxation of green-belt building restrictions could foster the relationship between science-based industry and the University of Cambridge through the creation of the UK's first science park. This resulted in significant growth demonstrated by the movement of large multinationals to the area including for example Microsoft Research, Glaxo and the Department of Pharmacology and the Cambridge Computer Laboratory.

Cambridge is amongst the most economically active cities in the UK. 84.8% (83,600) of the Cambridge local population (153,300) is economically active. This is 7.4% higher than the national average supported by one of the lowest unemployment rates in the country (2.7%) [NOMIS, 2014]. During the period between 2004-2013, Cambridge experienced a growth in population of 14,300 supported by a 15.7% (12,400) increase in number of jobs during the period (Cities Outlook, 2015). 49.6% of the population in Cambridge holds an NVQ Level 4 qualification or above, which is 13.6% higher than the national average (NOMIS, 2014). This provides a greater depth of talent for local businesses along with supporting the supply function of skilled labour. The higher level of skilled labour is also the reason behind a significant difference between the gross weekly pay for full time workers in Cambridge (£623.30) compared to the national average (£520.80). Cambridge also generates a high level of economy tax per worker (which covers labor, consumption, land and property, and capital taxes) whilst at the same time consuming low levels of government expenditure (Centre for Cities, 2016). The city has the largest proportion of micro businesses in the UK [88.6% (6540)] along with the highest national survival rate (65.2%) for startups (ONS, 2013). Cambridge is also home to one of the largest technology clusters in UK employing 54,000 people in more than 1500 technology-based firms with more patents were granted per 100,000 people in Cambridge then in the next six highest cities combined (Cities Outlook, 2015). A recent survey ranked Cambridge as one of the top three innovation ecosystems in the world (MIT Skoltech Survey, 2013).

4.3 Role of Institutions – Is there a Cambridge Formula?

As discussed in earlier sections, for businesses to compete in a modern knowledge economy, it is important to cultivate a supportive and sophisticated institutional infrastructure that adds value to the products and services provided by local businesses. Established high growth knowledge economies have long moved away from an era of stereotypical regional policy that was standardized, incentive based

and state driven (Amin, 1999). Businesses looking to relocate or expand into these regions have strategic ambitions not solely dictated by financial incentives. High growth businesses look to embed themselves and exploit the potential within the local business environment in search of sustained profitability rather than an initial subsidy. Regions with well-developed and viable formal and informal networks between firms and other educational, research and political institutions have been shown to aid the circulation of tacit knowledge between firms (Lundvall and Johnson, 1994; Maskell and Malberg, 1999). In order for these networks to be both efficient and relevant in the long run, a shared vision is necessary. All parties will stand to benefit from a strategic plan, primary aim of which is to develop a competitive offer for the region. Meaningful and efficient collaborative networks here need to serve as a source of competitive advantage to raise the regions profile to enable it to connect and compete globally.

The city-region institutional infrastructure needs to be of a density that will enable connection. This is the means by which planners, policy makers, politicians and entrepreneurs (to categorize but a few) operationalise the concept of a city-region knowledge economy. In much the same way as Castells and Hall (1994) explained the need to develop the then innovative notion of a technopole, those actors in important institutions see the knowledge economy as a strategic initiative based on a combination of innovation, technological know-how and entrepreneurship. Effective support and meaningful interventions from local agencies facilitate entrepreneurship, which is key to replenishing the ecosystem of a knowledge economy. Thus the local institutional infrastructure has to be ‘thick’ enough (Amin and Thrift, 1995) to stimulate and capture level of innovative entrepreneurship that enable the city-region to connect to the global knowledge economy.

Local institutions were tasked to perform the role of delivery agents implementing these policies and attract investment to develop the regional offer as well as promote regional economic growth. As regions began to prosper and achieve, these strategic goals were revised to develop key knowledge assets that have the potential to be internationally significant and help connect the region to the global knowledge

economy. Amongst the key strengths of Cambridge's knowledge economy is its technology cluster with around 54000 people employed within 1500 technology based firms (see Cambridge Network, 2014). Of vital importance is a sustained focus on the development of start-ups and small businesses and the high tech industry in Cambridge is driven by these small businesses alongside larger firms that have achieved scale such as ARM, Domino, Autonomy and Cambridge Silicon Radio. It can be argued that start-ups and small businesses are the main beneficiaries of an institutional environment that is conducive to the exchange of tacit knowledge upon which economic competitiveness is increasingly based as codified knowledge becomes ubiquitous through more effective communications technologies (Gray and James, 2007). A stable and supportive institutional environment helps keep the entrepreneurial focus on activities that create true value rather than a disproportional investment of time on activities that have little or no link with product development.

Developed knowledge economies make commercialization of research easy and organic. In other words, entrepreneurs are conditioned to treat the commercialization process as the logical next step in the conversion of concepts into products and services. Abcam, a Cambridge based startup, went from its founder selling antibodies to Cambridge labs from an ice bucket to being valued at almost £1 bn. employing 200 staff with PHDs (BBC, 2014). There are strong linkages between academic institutions and the private sector driven by proactive investment by the private sector. Abcam has invested £3 mn. in a new engineering department at the Cambridge Regional College which is around the corner from its head office (BBC, 2014). To the north-west of the city, the University of Cambridge is working on a £1bn development including new research facilities, 3,000 new homes, space for 2,000 post-graduate students, new schools and a nursery, shops and surgeries (Independent, 2014). Cambridge University is at the heart of the Cambridge offer provided a well networked robust infrastructure for local innovation. The university serves as a giant incubator encompassing a significant number of start-ups amounting to £4 bn. in long term investments as well as owning the IP on more than 1000 patents (Independent, 2014).

It has also long been argued that the presence of clusters and firm agglomerations is amongst the main sources of competitiveness for localities (Becattini et al., 2003; Porter, 2003). However, due to competitive market forces and commercial protectionism, this ambition is harder to achieve particularly in developing knowledge economies. As highlighted in earlier chapters, developed knowledge economies offer aspiring entrepreneurs the freedom to network and collaborate without the risk of compromising the ownership of their intellectual property. This allows ideas to develop and improve giving the final iteration that reaches the consumer market a better chance to succeed. A collaborative environment with a proven track record of commercialization of research and innovation serves as a vital pull factor for businesses making location decisions. Cambridge has recently been confirmed as the most innovative city in the UK, with 341 patent applications per 100,000 of population (Cities Outlook, 2017). This high level of innovative activity is supported by a high percentage of high level qualifications (NVQ 4 and above) amongst the local population (ONS, 2016). A number of start-ups have identified both access to as well as the ability to attract technical specialists to Cambridge as the main reason for choosing Cambridge (The Guardian, 2013). Cambridge is not only an attractive proposition for highly skilled workers just because of its robust local infrastructure, it also provides proximity to the London market along with the associated European corridor which is vital for taking local products to the international market. Proximity to London is also a vital pull factor that plays a key role in attracting international highly skilled talent who place a significant emphasis on quality of life factors (The Guardian, 2013).

It has been a longstanding practice of local agencies to offer financial incentives to multinational enterprises in a bid to link localities to global markets. This is more of an incentive to established large firms and is not as accessible or available to startups or SMEs (Harding, 2000; Oakey, 2003). Cambridge's success story is underpinned by a robust localized support system that is able to help startups navigate through their toughest initial period of operation. In order to connect a place to the global knowledge economy, it is important to understand the changing

dynamics of modern day business. There is an argument in support of firms clustering within close proximity to similar businesses with the knowledge enhancing structures of a given geographical territory considered to be more important than other competing factors i.e. internalized interactive learning (Malmberg and Power, 2003). A key assumption here is that clustering is extremely beneficial and supportive to start-ups and small businesses that have limited resources and restricted R&D budgets. In addition, political and cultural considerations are also an important aspect of the location decision for any firm hence there may a hesitation to operate in complete isolation from other players within their sector. Supply pressures in relation to relevant skilled labour may be another consequence of a non-existent cluster. On the other hand, James (2005) argues that low transaction costs of data, information and knowledge to a large extent invalidate the theory of agglomeration and spatial clustering of firms. This argument is built on the assumption that the need for innovation supersedes the competitive forces that restrict knowledge workers from truly collaborating.

Cambridge is an example of a city that has built a knowledge economy on the credibility and potency of its institutions, particularly the university, who have developed a supportive environment with sources that lie in the character of locally embedded social, cultural and institutional arrangements (Amin, 1998). Storper (1997) highlights the importance of relational assets or untraded interdependencies which include local tacit knowledge, quality of local institutions, long standing social habits and norms along with local conventions of communications and interaction. Through the quality of research along with the support system available to assist with its commercialization as well supporting and promoting entrepreneurship, Cambridge was able to establish a successful knowledge economy that was both scalable and sustainable. Companies in Cambridge were also able to make a faster transition to being able to finance themselves by getting trade contracts, rather than repeatedly having to look at the investor capital option. This allowed businesses to absorb the pressures of scale as well as the demands for an early sale so that investors could realize their gains in a relatively short period of time.

This is in line with the established “Cambridge blueprint” where entrepreneurship is encouraged and promoted through a clear structure of support. Cambridge University has been able to consolidate its position having built on its existing reputation by acknowledging decades ago that future success would significantly depend on its connections with its external environment. Cambridge Consultants, initially set up to facilitate the commercialization of local research as well as facilitate transfer of knowledge between the university and knowledge intensive startups, has been able to support startups at the most critical phase of their operational life. It is important to note that whilst local agencies such as Cambridge Consultants have been successful in helping startups with their survival and scalability, there are not a lot of distinctively different or unique strategies that have been implemented to achieve this. The idea of seed funding and local agencies supporting local businesses is one that is frequently adopted by regions nationally and internationally to achieve business growth (Oakey, 2003). However, there is a great degree of variation in the effectiveness of these strategies, as well as the growth trajectories of businesses in different regions following a similar ideology. This is where the emphasis shifts to the quality and efficacy of the institutions themselves (Rodriguez-Pose, 2013).

Due to the political upheaval and neo-liberal politics of the Thatcher governments in the 1980s, the uneven social division of labour led to bottom-up institutional development and initiatives (Papaioannou, 2009). A large number of established companies were forced to downsize leading to a number of highly qualified individuals with scientific and managerial skills to set up their own technology based businesses. Support from local agencies and institutions, particularly the university, allowed these businesses to compete nationally as well as maintain a stable growth trajectory. The local cluster steadily developed benefiting from the substantial investment in the technological and logistical infrastructure of the city region. Today twelve of these cluster companies are worth $1bn or more and two more than $10bn each. Arm, which designed the chips that power more than 90 per cent of the world’s mobile phones, is worth $22bn, while Hewlett-Packard paid $11bn for Autonomy, the software maker (Independent, 2014).

Cambridge University has been successful in bridging the gap between the research and business community, which is highlighted by the fact that twelve university departments were the source of forty companies in the biotech sector (Garnsey and Heffernan, 2005). The organic development of these highly knowledge intensive businesses are reflective of the organic growth of the city region itself. It has been the focus of substantive research to look at what makes a knowledge-based economy successful (Schumpeter, 1942; Cohen and Leventhal, 1990; Shane, 2000), however there has been a lesser focus on the factors that prevent regions from transitioning to successful knowledge economies. Most cities use their business heritage and past success as a unique selling point to bolster inward investment and business growth. This also shapes the view of the world and external agents. However, for cities such as Liverpool whose dominance in the past was driven by traditional manufacturing industries, the transition to a knowledge based high-tech economy has posed a greater challenge compared to the likes of Cambridge whose limited industrial sector was built predominantly on niche areas including consumer/broadcasting technology and scientific instrumentation. This meant that Cambridge had virtually no legacy industries which in turn meant that it was not held back by the baggage of its past. Companies such as Pye (subsequently wholly owned by Philips) and Cambridge Scientific Instruments set the foundations on which Cambridge University built upon through its pioneering commercialization of research in high tech and knowledge intensive sectors.

4.4 How does Cambridge Build on its Ideal Type Blueprint

As an ideal type of city region knowledge economy, Cambridge displays most of the key characteristics as identified in Table 2. Due to the high standard and global reputation of Cambridge University as well as the quality of R&D taking place in local spin-outs and start-ups supported principally by the university, prospective entrepreneurs are confident that they will be well supported by the local institutional infrastructure. A critical examination of the cluster concept and its varied success

within UK highlights the importance of the quality of R&D, supplier networks and knowledge intensity of high tech businesses in driving economic growth within Cambridge City Region. However, this success presents challenges such as shortage of affordable housing stock as well as increased house prices as more professionals look to relocate to Cambridge (Business Weekly, 2015). In addition, congestion due to the increased burden placed on the existing transport system has required increased investment and strategic planning through road engineering schemes as well as speeding up buses on radial routes into the city (Cambridge News, 2016). As the high value technology and biomedical sectors flourish, issues exist within the healthcare sector where a local hospital had to recently close a ward for elderly people because of staff shortage particularly nurses who are underpaid and struggle to afford living and commuting to Cambridge (BBC, 2015). As detailed amongst the characteristics of an ideal type city region economy, the ability to self-reflect and learn from what works is of great significance. Through the Greater Cambridge City Deal, an agreement set up between a partnership of local organizations and central government, key infrastructure improvements will be made in priority areas including transport, the environment, healthcare and smart living (Great Cambridge City Deal, 2015; TCS, 2017). The key motivation behind these initiatives is the realization by local agencies that the Cambridge economy has grown faster than its infrastructure and improving the quality and capacity within the priority areas identified would be key to future economic growth.

Growing businesses particularly those that are knowledge intensive require a great deal of support to protect their business models, ideas and concepts to remain ahead of their competitors. An existing infrastructure with expertise to protect intellectual property along with learning and mentoring systems to teach young entrepreneurs about the pitfalls faced by start-ups provides a buffer to small businesses within the city. The university through the Centre of Intellectual Property and Information Law maintains a key position primarily through work being done on various harmonization directives particularly in the areas of copyright and designs, e-commerce, internet content regulation and data protection. A key area where a lot of developing knowledge economies fail is in developing meaningful collaborations between local (mostly public sector and publicly funded) agencies and small

business. A general awareness of market pressures as well as obstacles with being first to market does not help produce meaningful traction for a startup or small business. Cambridge Enterprise is an example of a local agency that has been able to get ideas to market and support young entrepreneurs by finding commercialization partners as well as support these businesses in negotiating with licensees. These have resulted in successes such as Solexa (second generation genetic sequencing firm funded by initial seed capital from Cambridge Enterprise which was sold to Illumina for $650 mn. in 2007) [Cambridge Enterprise, 2015). In order to be successful in the long run, the knowledge economy for a region needs to be future proof. A significant challenge for developing knowledge economies is that as businesses grow and become more visible and better positioned within their sector, they are pressed to look at regions that offer increased sophistication and support for their operations which includes better transport links, academic institutions, local planners being open minded to accommodate and promote business development along with the presence of established accounting and consulting firms to offer venture capitalists the assurance that their investments are safe and in good hands. A recent example is ARM's decision to double its workforce at its Cambridge HQ after the local council agreed to release several acres of greenbelt land to support the expansion (Cambridge News, 2015).

Local agencies have utilized the policy of subsidizing inward investment to bolster local employment as well as increase the visibility of key sectors (Morgan, 1997). This is more prominent in developing knowledge economies such as Liverpool and Dubai City Region where businesses give greater consideration to cost advantages rather than other non-financial factors such as sophistication of local talent pool or established distribution channels. Cambridge currently only has one accelerator scheme – Accelerate Cambridge which supports pre-idea stage businesses as well as established start-ups with a prerequisite for at least one company founder to have a Cambridge connection (student, alumnus, faculty, staff or resident of the town). This localized connection is important as it helps develop local pathways that can be utilized by other firms within the region. For this there are various sources of funding and incentive packages available to those looking to start up a business or invest within the Cambridge area. For example, funding from a combination of the

Enterprise Investment Scheme (EIS) and the Seed Enterprise Investment Scheme (SEIS) has offered tax incentives to people investing in the companies of Cambridge alumni and it is hoped that this will encourage the development of spin-off companies. This supply of finance is consistent with what Shane (2000) argues, for investment in new knowledge and ideas is vital in order for individuals and businesses to capitalize on entrepreneurial opportunities, arguably of greater significance to small businesses and start-ups who have limited financial resources and are disadvantaged due to lack of corporate visibility and business connections. Ideal knowledge economies therefore support and facilitate an environment where knowledge development and sharing can take place and as Acs and Mueller (2006) highlight, lead to a positive impact from new firms on economic growth in advanced economies.

It is not simply the provision of finance however that is important as institutional thickness facilitates the city-region knowledge economy. While many innovative small businesses rely on external sources of finance particularly venture capital, Cambridge over the years has seen the development of early stage business investor groups (including the Cambridge Capital Group) that are functionally linked with other aspects of the local knowledge supply chain. Of specific importance are higher education institutions and the presence of a university that can link research, development and knowledge creation with local industry. Businesses also seem to benefit from the assistance provided by the university in relation to patents and protection of intellectual property (Evans and Garnsey, 2008), with more than 1000 intellectual property licensing, consultancy and equity contracts under management by Cambridge Enterprise, which is the University of Cambridge commercialization group (Cambridge Enterprise Online, 2015). We also know for instance, that Cambridge has amongst the highest success rates in the commercialization of research in start-ups within the UK (Cambridge Enterprise Annual Review, 2013). One important sector of strength is video games where Cambridge currently holds 18% of the national market share namely due to companies such as Jagex, Geomerics, Ninja Theory amongst others (UKIE, 2014). A steady flow of creative talent (including developers, programmers, designers/animators etc.) supported by local initiatives as detailed above has helped Cambridge consolidate its position in

the video gaming sector. A large proportion of the local workforce within the video gaming sector comprises of young graduates (Evans and Garnsey, 2008) thereby bringing to the attention of the policy maker exactly how such talent can be supplied.

4.5 Conclusion

In this chapter, we have looked at the key characteristics of what makes an ideal type city region knowledge economy. We look at how whilst there is little consensus in relation to what truly defines a knowledge economy, there is significant importance attached to structures of local governance and other agencies acting at the scale of the local who are able to support local infrastructure as well as enable connection with the global knowledge economy. We also use a number of key indicators that characterize the important aspects of an ideal city-region knowledge economy. We utilize Cambridge as an exemplar looking at how local agencies within the city region have helped create a productive environment to successfully exploit the opportunities that their place presents. We see how Cambridge has been successful in harnessing the entrepreneurial talent within the region by increasing private sector involvement within key programs as well as making commercialization of research and new ideas inherent to its institutional infrastructure. Local agencies display flexible thinking when it comes to supporting business expansion along with the associated logistical infrastructure that it requires. In addition, detailed strategic plans such as the Great Cambridge City Deal have been devised and implemented to proactively deal with the issues and challenges presented by fast paced economic growth. This chapter provides a framework against which we compare our two empirical cases, one in a newly emerging economy, Dubai and another city-region in an older industrial nation in the north of England, Liverpool.

Chapter Five

The Knowledge Economy of Dubai City Region

5.0 Introduction

As discussed in earlier chapters, it is difficult to imagine a major city in any developed or newly emerging nation that does not regard the knowledge economy as a strategic opportunity. Strictly speaking cities themselves do not do this; we know it is the institutional infrastructure that enables a governance of place often, as Harvey (1989) identified, in entrepreneurial ways to facilitate pursuit of city economic policies. The concept of the knowledge economy is itself subject to debate and while some clarity has emerged in recent years, there is evidence to demonstrate that in the quest for a city wide knowledge economy outcomes are by no means certain to be uniform. For instance, the popularised term of knowledge economy places the idea of knowledge as a key factor of production, an integral unifying component for other factors of production including land, labour, capital and entrepreneurship. In this sense there are contemporary industries and businesses that are not simply knowledge centric, using knowledge to differentiate their products and services, they rely heavily on knowledge assets to add value to all associated activities and processes. These types of business are distinct from the lower value added enterprises that are often more visible in the local economy. The question then, is how does a city-region local economy aggregate such assets to become foremost a knowledge economy? In this chapter we provide analysis of fieldwork conducted in Dubai City Region where there are attempts to strategically facilitate their place as part of the global knowledge economy. We look at Dubai as a city-region in a newly emerging economy. Dubai city-region grew as a natural harbour and became identified as an important seaport in the Persian Gulf. However, the discovery of oil in the 1960s displaced the activities associated with a traditional regional port and laid the foundation from which a period of rapid infrastructure developed that transformed this city-region and beyond.

We show in this chapter through the contexts in which governance institutions in Dubai City Region prepare their place for a role in the global knowledge economy. We take into account the relevance of the knowledge economy to the city-region and how governance actors are keen to support supply-side initiatives around for instance, education, skills and enabling more entrepreneurial behaviour in the drive for a high skilled, high wage local economy. Similarly, we see city-region policies that provide backing to particular sectors such as biotechnology and wider diffusion of innovation in both services and production, these regarded as key elements in what Audretsch and Thurik (2001) refer to as the entrepreneurial economy. Our discussions with key governance actors, from the public and private sector provide insight into how the knowledge economy can add value to Dubai City Region. We consider the impact of a uniquely high level of expatriates within the local population on the level of local skills. We also review the key drivers of the local knowledge economy following efforts from the local government to develop to increase sector diversification backed by substantive investments in regional infrastructure. These initiatives have been backed by an ambition to develop a regulatory framework that both supports key economic sectors as well as encourages emerging sectors by modernizing the legislative framework governing economic activity.

5.1 The Formation of the Dubai City Region

Dubai is one of the major and most identifiable cities in the United Arab Emirates. The United Arab Emirates was formed in 1971 as a federation of seven states (Ajman, Abu Dhabi, Dubai, Fujairah, Ras Al Khaimah, Sharjah and Umm al Quwain). The region experienced a rapid transition from an economy driven by a modest fishing and pearling industry to become one of the key players in the global oil industry. In order to capitalize on existing opportunities at the time, all available resources were directed towards developing suitable support infrastructure for the oil industry to ensure the financial independence of the region. Dubai's economic history dates back to a tribal creek settlement in the 1830s with a population of 800 people (Department of Economic Development, 2012). The creek's economic impact

grew, as the natural harbor became a centre for the fishing, pearling and sea trade. Dubai at the beginning of the twentieth century was a successful regional seaport. As population rose to 20,000, the creek began to silt struggling to deal with the stresses of high capacity (Emirates News, 2012). The decision to have the waterway dredged was vital in ensuring economic stability for the region. The move helped substantially increase the trading and re-export activity at the port. The economic impact of these initiatives started decreasing in the 1950s as the pearl industry faced decline.

The region had to face a period of economic hardship until oil was discovered in 1966. It was from this point that we see rapid infrastructure development that in essence, has transformed the city-region. Before the discovery and export of oil, the economy of the UAE was predominantly reliant on subsistence agriculture, nomadic animal husbandry, the extracting of pearls and the trade in pearls, fishing, and seafaring. This resulted in a simple subsistence economy with essentially no linkages with global markets or economies. Dubai City Region's economic growth post this period has led to the creation of a tourism economy that was at the core of national development strategies during the 1980s and 1990s (Jaber and Batori, 2009; Bingeli, 2010). This led to Dubai becoming one of the fastest growing tourism destinations in the world (Clements, 1998; Crookston, 1998). In addition, Dubai's sharp focus on physical infrastructure development has played a key role in it becoming a logistics hub capitalising on its geographical location. Dubai is located along key trade routes between East and West and has maritime access to the Arabian Sea and Indian Ocean through its Persian Gulf coastline. The discovery of oil led to a significant transformation in the economical, as well as the social life in the UAE. Within a short period, the UAE's GDP increased more than 236-fold from AED 6.5 billion in 1971 to AED 1,540 billion in 2014 (Dubai Government Portal, 2015).

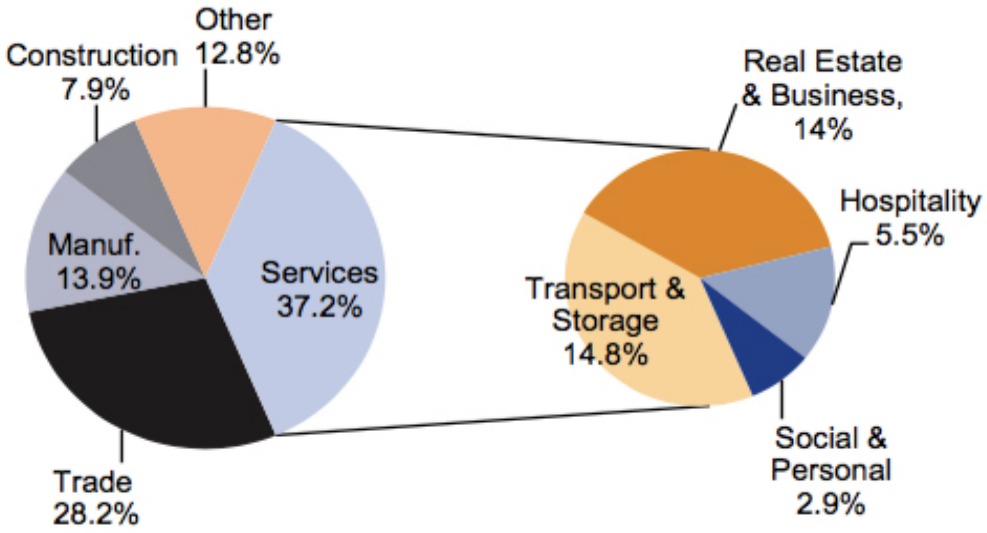
(Figure 1: Dubai City Region – Rapid Transformation from 1970 to present day)

At the same time, we see an increase in concerns over the availability and longevity of natural reserves and policy makers and key economic stakeholders have turned to other avenues to reduce long-term economic risk. One consequence has been attempts to capitalize on its global destination status and here Dubai has turned to ideas about knowledge development and growth in an effort to diversify opportunities for global investors. Universities and academic institutions have been at the forefront of this campaign recognizing the importance of increasing the sophistication and scope of teaching programmes. Many institutions have increased their focus on including research-based programmes in their latest course offerings. The Masdar Institute of Science and Technology for example, claims to be the world's first graduate level university dedicated to providing real-world solutions to issues of sustainability (Masdar, 2014). This initiative is yet to be a proven success but shows a two-fold strategic ambition, which includes developing research collaborations with established global players as well as focusing on the development of local intellectual capital. Of significance is how the institute was created in collaboration with the Ivy League Massachusetts Institute of Technology (MIT) in an attempt to integrate theory and practice to incubate a culture of innovation and entrepreneurship within the region (Reuters, 2012). The institute is currently running the region's most significant collaborative research project looking into the field of carbon sequestration comprising of the Abu Dhabi Company for Onshore Oil Operations (ADCO), Petroleum Institute (PI), Massachusetts Institute of Technology (MIT) and the Masdar Institute of Science and Technology.

The National Bureau of Statistics has recognized the need to collate socio-economic data to make a meaningful contribution to the national development strategy. It is now responsible for collecting, classifying, storing and analyzing economic, social, demographic, agricultural, environmental, energy and other data, in cooperation with government agencies and local statistical centers (National Bureau of Statistics, 2010). This has been an important exercise in establishing a baseline to compare the performance of initiatives and impact of intervention from local agencies. The region has benefited from establishing formal structures to establish, monitor and regulate regional knowledge assets and optimize the exposure of growing

businesses to the international market. The establishment of the Knowledge and Human Development Authority (KHDA) is one such initiative created to improve schools and other human resource sectors in Dubai. There is also an increased focus on developing local institutions such as the Dubai Statistics Center with a major focus on the provision of data and statistical information to government institutions and departments, to the business community, and to individuals within its mandate. There is also a sustained effort to standardize statistical concepts and definitions which are applied in the Emirate in conformity with international standards and classifications, to help the region connect with the global knowledge economy.

The region experienced significant population growth due to the discovery of oil which initiated a period of significant economic growth. A population increase of almost 2.4 million during the period from 1968 to 2015 is indicative of the increased economic pull by the region largely driven by an influx of workers from outside the emirate (Dubai Statistics Center, 2015). It is also important to highlight the unique population constitution where local nationals (Emiratis) only account for 9 % of the total population which highlights the heavy reliance on expatriates to fill the skills gap. Dubai City Region has steadily transitioned to a services economy as seen in the sectoral breakdown below (please see Figure 2). Growth in tourism with steady rise in airport passenger traffic and high hotel occupancy rates, a balanced residential and commercial environment, increased consumer confidence matched with rapidly growing transportation and logistics infrastructure has significantly influenced the transition to a service based economy (Dubai Government Portal, 2015). The traditional employment sectors within the Dubai City Region such as construction, manufacturing and logistics have seen a significantly lower rate of growth over the past few years as compared to knowledge intensive sectors as detailed in Table 7. There has been a significant increase of 82.4% in employment within professional, scientific and technical activities as well as a 51% increase in employment within the education sector for the period between 2011 and 2015 (please refer to Table 7).



(Figure 2: Dubai City Region Sectoral Breakdown – Dubai Statistics Center 2015)

2011	2012	2013	2014	2015	Economic Activity
5,302	5,925	6,330	6,760	6,979	Agriculture, forestry and fishing
4,105	4,389	4,395	4,710	4,657	Mining and quarrying
227,970	239,074	248,596	252,542	261,153	Manufacturing
8,659	9,029	9,400	9,747	10,092	Electricity, gas, steam and air conditioning supply
1,693	1,765	1,903	2,017	2,118	Water supply; sewerage, waste management and remediation activities
497,808	492,728	507,967	513,047	515,612	Construction
543,276	548,709	545,843	577,924	593,256	Wholesale and retail trade; repair of motor vehicles and motorcycles
231,850	233,666	241,808	252,770	263,131	Transportation and storage
121,207	139,141	172,831	191,730	192,364	Accommodation and food service activities
24,762	26,917	28,617	29,789	31,372	Information and communication
45,461	44,386	46,695	47,254	54,682	Financial and insurance activities
34,427	38,563	43,052	44,389	46,843	Real estate activities
61,598	70,858	87,057	99,057	112,370	Professional, scientific and technical activities

158,804	172,608	190,508	208,334	233,751	Administrative and support service activities
89,639	91,078	93,398	96,562	100,593	Public administration and defence; compulsory social security
18,611	21,618	22,237	25,059	28,059	Education
22,511	23,633	26,790	26,659	27,304	Human health and social work activities
4,534	5,205	6,465	7,169	7,961	Arts, entertainment and recreation
25,078	25,797	27,794	29,796	32,034	Other service activities
103,507	108,673	113,207	118,200	123,803	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
2,230,803	**2,303,760**	**2,424,892**	**2,543,515**	**2,648,135**	**Total**

(Table 7: Dubai City Region: Employment Breakdown by Employment Activity / Dubai Statistics Center, 2015)

As part of the fieldwork exercise supplemented by desk based research, we were able to construct a map of key institutions within Dubai City Region (please refer to figure 3). It was interesting to note that virtually all the institutions identified within the list are government backed with government institutions playing a key role in the oversight and regulation of firms based within these clusters. Dubai has a high expatriate population, with expats making up over 88.5 % of UAE's total population (Clements, 1998). This lends itself to brain drain where talent retention is a problem when professionals return home or move on to other regions. Local policy makers have realised the economic risks that this disproportional balance of human resources represents. Recent Emiratisation regulations – meant to increase the participation and proportion of local Emiratis in businesses – have been introduced including Ministerial Resolution 1187 which states that Class 1 companies are required to employ no less than 15% UAE nationals in its professional staff (Gulf News, 2014). The Ministry of Emiratisation and Human Resources recently announced plans to activate Article 14 of the labor law, which states that a non-UAE national should be given approval for employment only when an unemployed national suitable for the position cannot be found (The National, 2018).

In addition to low levels of local participation in professional roles across the region, there is a major disparity in the split between local nationals working for the public and private sector. Locals prefer employment in the public sector because it offers higher salaries, better job security and benefits. Therefore, skills drain is not only taking place through relocation of expats alone as the private sector is losing professionals to the public sector.

> "We have a fundamental issue of commitment here. The divide between policy makers who help create and establish an infrastructure that promotes knowledge development and workers who hold this knowledge is immense. Creativity and innovation has and will always come from private firms, start-ups and individuals looking to be different. Our public sector, like public sectors elsewhere, is built around a traditionalist mind-set. We have the resources to deal with our skills deficit at present but this can no longer be the guarantee it was in the past two or so decades. Recent legislation promoting Emiratisation has put the skills debate on the map for many but many choose to ignore it" (DCR Interviewee 2, 22/06/2013).

The Emiratisation program in itself is widely viewed as less of a success than comparative regional programs such as those implemented in neighbouring Saudi Arabia. Instead of a consistent focus on promoting entrepreneurship and innovation at earlier stages of the region's knowledge supply chain, employers seem to be focusing on meeting the quota set in relation to number of Emiratis employed. The issue here is that as the quotas are not broken down hierarchically or at an organizational level, they are easily met by recruiting Emiratis into management trainee programmes, then keeping them employed in entry level jobs, or in junior positions (Gulf News, 2018). This in turn has a negative impact on skills development and a lack of career progression for Emirati employees. Utilising the ideal type framework, it can be argued that this issue would hamper a region's ability to connect with the global knowledge economy as a result of inconsistency in skill levels within the existing labour pool. There is also a need for local institutions to play

a greater role in harmonising priorities within the Emiratisation program with the long term skill requirements of the city region to ensure that engaging a larger number of Emiratis within the local workforce particularly the private sector does not come at the expense of specialist skills within the private sector. Recent studies have also highlighted the need for GCC countries which includes the UAE to increase R&D spending to improve research quality and output particularly given the significant investments made in state of the art labs and research facilities within the region (Trade Arabia, 2018). This is an area that requires dedicated attention if Dubai is to make a meaningful connection with the global knowledge economy by improving the quality and sophistication of local R&D activity. This would in turn assist in creating a critical mass of specialised assets in highly knowledge intensive sectors such as biotech, digital media and life sciences. R&D spending in the UAE amounts to 0.9 per cent of gross domestic product (GDP) which is significantly lower than the 2.5% spent on the same by OECD countries (Trade Arabia, 2018). There have been positive trends in FDI flows with AED 17.76 billion generated in the first 6 months of 2018 with 248 greenfield projects approved or launched within the period (Gulf News, 2018). The city region has also been able to capitalize on its central location with good accessibility to both the east and west connecting the Middle East and North Africa (MENA) region, Asia, Africa and Europe (The National, 2018). However, more needs to be done to stimulate non-oil trade as despite significant infrastructural investment in free zones, airports and container ports, trade volumes have stalled with the local port operator reporting softer volumes along with a market value slump in large listed property developers making the Dubai Financial Market one of the worst performing bourse in 2018 (Dudley, 2019).

At present an area requiring significant improvement is for local universities to increase their channels of collaboration with international universities as well the legal system which does not effectively protect researchers' intellectual property and provide them with commercialization support (Trade Arabia, 2018). There is also the challenge of dealing with an income inequality gap between expatriate workers and the local Emirati workforce. Where on one hand, expatriate workers have more experience and qualifications along with a willingness to work longer hours for lower

salaries (Isa and Hala, 2001; Lynton, 2001; Stephen, 2001), the local Emirati workforce particularly graduates entering local industry lack technical skills and essential skills like analytical capabilities, communications, core technology skills, critical thinking, collaboration and working in teams as well as the English language (The National, 2018). When asked whether knowledge leaders in their region had been able to identify deliverable targets to encourage knowledge growth and development, the interviewees reported several areas that required further attention such as the role of the academic system and the commercial focus of institutions within it.

> "I think there is a degree of cynicism depending on who you speak to. There are academics who have worked in local universities for decades and are heartened by the creation of strategies that offer a degree of formality for the local knowledge environment. On the other hand, there is the current crop of graduates who are unable to see the impact of initiatives in place to achieve these targets. It is a case of realistic expectations as the academic industry is highly commercial in Dubai. Academic institutions, many believe, are here to make money so quality is not high up the list of requirements. At least not at the moment" (DCR Interviewee 5, 22/06/2013).

The region at present displays a significant variance in the cost of education. Dubai's Knowledge and Human Development Authority (KHDA, 2013) state that 47.8% of Dubai's students pay less than AED 10,000 (£1806) per year in tuition fees while about 18.7% pay more than AED 30,000 (£5418) per year. Private education in the region has become increasingly commercial with the Ministry of Education struggling to manage educational standards in private schools. 148 private schools within Dubai City Region generate AED 3.5 bn. (almost $1 bn.) in tuition fees alone every year. In addition, the region has also struggled to raise the quality and educational standards within government backed universities, which are generally well funded, with the problem permeating through to the increasing number of private universities being established in the region (Goby and Nickerson, 2014; O'Sullivan, 2015).

> “Dubai’s education system has evolved to meet the needs of the largest possible client base rather than set standards to ensure quality. Owners of private schools readily exploit the fact that parents are stuck in the sense that they have limited alternatives and often find themselves in no position to argue with schools. You need to take into account several factors including where you live, format of education - as many parents want their kids to go to schools delivering the curriculum of their home country in case they have to return back home for higher education – and reputation of the institution” (DCR Interviewee 2, 22/06/2013).

This was further reinforced by DCR 1:

> “I think you need to see that quality and rankings of the universities here. You cannot just see them as local stakeholders want to see them. The rankings of universities here including the large number of international universities from all over the world is not very good. It is quite obvious that work needs to be done on this. When you speak about the knowledge economy and how you have presented it in your brief, you talk about knowledge assets. To me this is important to understand when looking at Dubai. Particularly how academic institutions are split. On one hand you have local universities that have their focus on local Emirati students. These universities have to deal with the fact that academic attainment particularly higher education in key subjects such as sciences has been an issue. The comfortable and luxurious conditions that a lot of these kids are growing up in has a direct influence on how motivated they are to excel academically. I am not saying this applies to all local kids but this has been a strong trend in the last many years. I am seeing some positive changes recently. These are small steps. By making legal changes where employers have to employ a proportion of Emiratis in their work force as well as creating an environment through initiatives by local authorities, you are seeing more youngsters aspire to be professionals and have started to look

> towards being more qualified. This positive trend needs to continue and grow to make Dubai a strong knowledge economy. I know you are looking at various elements of a knowledge economy but I think these basic points are important when you talk about the knowledge economy of Dubai. You cannot talk about clusters and networks and things like that till you have an ability to resource them. Where will the local talent come from? What opportunities are there for local entrepreneurs to set up businesses? These are important things." (DCR Interviewee 1, 25/06/2013)

This is another significant hindrance to Dubai's successful connection with the global knowledge economy due to a lack of institutional thickness as a result of weak linkages between state and quasi-state institutions and other economic stakeholders. Local academic institutions can be seen catering to a unique demographic of international students with a vast majority seeking to follow an education pathway not too dissimilar from their country of origin. The highly commercial focus of local universities and related institutions has hampered the ability of policy makers to genuinely self-reflect whilst looking to develop a plan that would enable the region to develop a more sophisticated academic infrastructure that embraces the diverse needs of the local market but is also able to compete with its more established global counterparts through greater focus on research and local innovation. In a recent report examining the region's efforts in research, teaching and student recruitment the quality of its higher education system has been deemed debatable (The National, 2016). Whilst there are several institutions overseeing the delivery of education services across the region (please refer to Figure 3), there are still issues in raising quality and educational standards. Also there seems to be a focus on creating an institutional infrastructure that can meet international standards and be more outward looking which has resulted in a tendency to lose sight of local core competencies as well as harnessing local innovation that may not exist in a format ready for international markets. A majority of the youth in the UAE prefer to work in the public sector, with higher pay and shorter hours listed as the main reasons (Gulf News, 2017). The local youth (Emiratis) are attracted to the stability, familiarity and patriotic pull that is offered when working for the public sector. Whereas on the other hand, a significant proportion of the workforce who are expats, prefer the private sector

which aligns with their financial ambitions of living in the region (Gulf News, 2017). However, this means that the private sector in Dubai has a higher attrition rate with limited alternative long term expectations for a majority of the workforce. Due to the private sector in Dubai being able to readily access skilled expatriate labor, Emiratis have developed a negative perception in relation to employment within it (Al-Ali, 2008). Also policy makers are focused on ensuring that the Emiratisation agenda does not derail the competitiveness of the non-oil economy which is critical to future economic sustainability for the region (Fasano and Goyal, 2004).

Given the composition and distribution of skills and management responsibilities within and across the public and private sector, it is important to improve the quality of leadership skills which are increasingly important to global knowledge based economies including the role of CEOs as industry leaders (Murphy and Zabojnik, 2004). Grant et al. (2007) highlight how it is important to address the attitude of the Emirati population towards work as they tend to seek high wages and managerial positions whilst avoiding menial jobs. As a result, there is limited competitiveness and adherence to a strict qualification criterion that prioritises management and leadership skills as well as industry experience. This in turn has an impact on the long term strategic positioning of local businesses and clusters impeding the regions connection with the global knowledge economy. There is also a strong influence of “wasta” within recruitment practices in the region which refers to a sociocultural factor that entails using family or tribal affiliations to gain unmerited favour (Forstenlecher et al., 2012). This results in significant variation in the quality of skills and management capabilities of those employed through this practice.

Population by Sex - Emirate of Dubai

جـــدول (01 - 01) Table

المجمـــوع Total	إنـــــاث Females	ذكـــــور Males	الســـنـــــوات Years
59,000	...	...	1968
183,187	54,366	128,821	1975
276,301	88,587	187,714	1980
370,788	123,609	247,179	1985
610,926	204,798	406,128	1993
689,420	211,211	478,209	1995
862,387	250,588	611,799	2000
1,321,453	332,148	989,305	2005
1,421,812	348,327	1,073,485	2006•
1,529,792	365,216	1,164,576	2007•
1,645,973	382,843	1,263,130	2008•
1,770,978	401,238	1,369,740	2009•
1,905,476	420,430	1,485,046	2010•
2,003,170	487,400	1,515,770	2011•
2,105,875	558,740	1,547,135	2012•
2,213,845	634,700	1,579,145	2013•
2,327,350	714,175	1,613,175	2014•
2,446,675	743,320	1,703,355	2015

(Table 8: Population Data Dubai City Region / Dubai Statistics Center, 2015)

Dubai City Region - HE Institutions

Emirates College for Management & Information Technology
Dubai Medical College for Girls
Dubai School of Dental Medicine
Mohammed Bin Rashid School of Government
The Emirates Academy of Hospitality Management
Emirates Aviation University
Hamdan Bin Mohammed e-University
Heriot-Watt University Dubai
Hult International Business School
Indian Institute of Management Indore
Institute of Management Technology, Dubai
International Horizons College
College of Islamic and Arabic Studies
Islamic Azad University, Dubai
Jumeira University
London Business School, Dubai Centre
London College of Fashion
London College of Make-up FZ-LLC
London Human Resources Institute, Dubai Centre, Knowledge Village
Mahatma Gandhi University
Manchester University Business School, Middle East International Centre, Dubai
Manipal University
Middlesex University - Dubai Campus
Murdoch University Dubai
Rochester Institute of Technology - Dubai
S P Jain School of Global Management, Dubai
SAE Institute
Shahid Beheshti University, Dubai
Shaheed Zulfikar Ali Bhutto Institute of Science and Technology
Skyline University College
Synergy University Dubai Campus
University of Dubai
University of Strathclyde Business School - Dubai Campus
University of Waterloo

Dubai City Region – Key Clusters

Dubai Media City

DuBiotech

Dubai Outsource Zone

Dubai Industrial City

Enpark

Dubai Studio City

Dubai International Media Production Zone

Dubai International Academic City

Dubai Knowledge Village

Dubai Internet City

Dubai Healthcare City

Energy and Environment Park

Dubai Design District

Dubai City Region – Government Institutions

Dubai Knowledge and Human Development Authority

- Dubai Schools Inspection Bureau
- Dubai School Agency
- National Institute for Vocational Education
- Emirates National Development Program

Dubai Export Development Corporation

Dubai Media Incorporated

Dubai Community Development Authority

Dubai Airport Free Zone

Figure 3: Key Institutions Dubai City Region

(Figure 4: Map of Dubai City Region)

5.2 Why the Knowledge Economy? The Case of Dubai City Region

It is a common misconception that Dubai City Region's economy is dependent on oil wealth at the core of its international offer. As a matter of fact, Dubai has experienced a relatively short growth life span from when it was first discovered in the late 1960s (please refer to table 9 below). This is also supported by the Dubai government budget for 2015 which confirmed that oil revenues are not vital to the government finances of Dubai, as they are to many other governments across the Arabian Gulf (The National, 2015). Oil revenues form only 4 percent of revenue but it should also be borne in mind that the budget only represents revenue and expenditure by central government, and as such amounts to not much more than 10 per cent of total Dubai GDP. The heavy reliance on non-oil sectors is reflective of a dedicated focus of the local government to develop a diversified economy through massive investment in the infrastructure to support tourism, real estate and leisure sectors (Schiliro, 2013).

Oil Timeline:

1966: Oil is first discovered in Dubai at the offshore Fateh field

1969: Dubai starts to export of oil. The first export shipment of oil produced from the field Fateh was around 180 thousand barrels

1972: Oil drilling exploration wells begin operations in the field at Falah. Producation begins June 1978

1973: A new oil field is discovered at Rashid and production begins in March 1979

1982: Another oil field was discovered at Margham, production started in 1984.

1999: Dubai government owned Emirates National Oil Company (ENOC) opens the first oil refinery of the company and follows a fully owned subsidiary. The refinery, which costs around Dh1.5 billion and produces 120 thousand barrels per day.

2000: Dubai joins the Dolphin project, signing a memorandum of understanding to provide the Dubai Supply Authority with Qatari gas through the project (Dolphin)

2007: Dubai Petroleum assumes control of all oil and gas related projects in Dubai, following negotiations with international oil companies.

Future Outlook: Dubai's oil reserves have reduced over the past decade and are now expected to be exhausted within 20 years.

Table 9 – Oil Timeline - Dubai City Region

Source: Gulf News (2010)

The rest of the financial space – dominated by big government-related enterprises (GREs) and sovereign investment groups – is much more important in setting the economic pace. However, the overall reliance on oil revenue remains limited (The National, 2015). UAE Vision 2021 states that the aim is to build a Knowledge-based Economy and to strength the competitiveness of the Emirates and all this requires three thrust areas: i) The first is to promote the participation of national manpower by linking education with market needs in high value sectors. ii) The second is to develop a regulatory framework to support key economic sectors and to encourage emerging sectors by modernizing the legislative framework governing the economic activities. iii) The third is to promote the policy of scientific research – both research for knowledge and applied research – in line with the economic priorities of the Emirates and contribute to the development of a core group of committed UAE national researchers (Schiiro, 2013). It is evident that the long term strategic vision for Dubai City Region centers around a non-oil modern premise. This was also highlighted by one of the interviewees who stated:

> "……And with oil and gas, you can scratch this equation of the Dubai economy. It is ten percent or less, and it is going to go down. Dubai used to produce a quarter of a million of oil equivalents; of oil and gas and liquids and crude oil. About a quarter of a million. But, Dubai is an importer. Dubai imports approximately ninety percent of its oil and gas needs. Ninety percent, all imported, imported from the international market and from neighbouring Abu Dhabi. So, that's for its energy needs. What does it produce now? The equivalent to fifty thousand, whereas it used to be two hundred and fifty thousand, and that was how decline worked" (DCR Interviewee 6, 26/06/13).

Dubai is increasingly being seen as a safe haven for investment. The local government has made a conscious effort to promote itself as a location that can offer geo-political as well as logistical stability (Bingeli, 2010). Stability factors along with intangible factors such as brand projection and brand/lifestyle associations are becoming increasingly important in influencing location decisions for businesses (Dunning, 2000). It can also be argued that to business practitioners as the core

competencies of firms become more knowledge-intensive, yet more mobile across space, so the choice of location in the production, organization and use of those assets is becoming a more critical competitive advantage (Dunning, 2000). As a result of this, we see city-region policies that provide backing to particular sectors such as biotechnology and a wider diffusion of innovation in both services and production, these regarded as key elements in what Audretsch and Thurik (2001) refer to as the entrepreneurial economy. Dubai has seen an increased focus in developing its regional operational readiness for knowledge intensive investment particularly through substantial investment in its technological infrastructure. The local government is looking to invest Dh4.5bn as it aspires to make the emirate an innovation hub for global technology businesses and entrepreneurs. The proposed development in the initiative will include a new center of communications and technology facilities over an area of 150,000 square meters (The National, 2014). As DCR 6 noted:

> "……energy infrastructures now like to invest in Dubai. Not only to escape the heavy tax system they have known, but they also see the positive contribution that they will make to their shareholders. They also see that it is a peaceful environment to invest in, and it is easy, (there aren't many delays) an open system; very clear, and it is developing. Five years ago they made this electronic government system, everything should be paperless through government, everything should be interlinked, and this was successful in Dubai. Many countries tried to implement this, even the US, they tried to implement this system and they failed. Their system is 50/50, they still have many papers, and this is the same in European countries, especially Italy or Spain. We go to Spain to do a lot of foreign affairs issues or investments, but there is too much paperwork" (DCR Interviewee 6, 26/06/2013).

Members of the National Science, Technology and Innovation Committee and their teams have developed the UAE's Higher Policy for Science, Technology and Innovation. The policy includes the establishment of funds for science, research and innovation in the UAE in addition to refocusing investment legislation to encourage

technology transfer, support innovation and establish global contractual industrial partnerships. This includes targets to increase investment on research and development (R&D) in the UAE by threefold and increase the percentage of knowledge workers in the country to 40 per cent by 2021 (Dubai Government Media Office, 2015). The national investment related to the Science, Technology and Innovation Higher Policy is more than AED 300 billion, distributed across investments in clean energy projects amounting to AED 128 billion; AED 72 billion investments in the renewable energy sector; AED 40 billion in aviation research, development and manufacturing; space sector investment of AED 20 billion and AED 31 billion allocated to investment in enhancing R&D across a range of national initiatives. Added to this, AED 6 billion has been allocated to establish innovation incubators and AED 6 billion to develop and establish research centres attached to academia (Dubai Government Portal, 2015). The key ambition behind these initiatives is to develop an economy with a high research and development quotient to help connect the region with the global knowledge economy.

> "So, if this happens in Dubai, and we become a hub for research and development, where you really get the royalty and the licence fees when you are sitting in Dubai, whilst all the world is paying for you. Because this is what the West and the big companies are doing; okay, they manufacture under licensing here, but they are sitting on the money, even Microsoft. What have they done? They've made their latest upgrades to their systems, and after they were looked at, everybody is paying for it". (DCR Interviewee 6, 26/06/2013).

This has been the key aim in developing a number of sovereign wealth funds particularly the Investment Corporation of Dubai which is the principal investment arm of Dubai City Region with a mandate to consolidate and manage the Government of Dubai's portfolio of commercial companies and investments. 33.4% of total investment within the portfolio of 33 companies is focused on the finance and investment sectors (ICD, 2015). These include Emirates NBD (the bank with the largest asset base in the UAE), Dubai Islamic Bank (which is also the holding company for Dubai's two stock exchanges that also owns a significant stake in

Nasdaq Dubai), Borse Dubai, National Bonds and the HSBC Middle East Financial Company. The 4 major holdings within the transportation sector portfolio include Emirates Airlines, dnata, Dubai Aerospace Enterprise and flydubai (ICD, 2015). These sectors are at the core of the long term strategic vision of the city region as detailed in Dubai Plan 2021, with a central focus on developing a diversified knowledge intensive economy.

> "There is another way to do that by the way, economically if the UAE, and the GCC for example, used the current flow of cash by buying into research and development technological companies, buying shares in them, or owning the leading manufacturing, let's say airspace, transportation and medicine technology, that is the attitude they have sent. What will happen? They will benefit from that flow. So anything that they consume will have the dividend, or the profit, flowing back to you by investing again. The best way is to have your infrastructure for research and development. This is where we are. We are a hub with good infrastructure, as we can build, operate and maintain, and modify for improvement, and if we sense an increase we do that. We do that perfectly in all aspects; in an education aspect, in a medical aspect and in oil and gas aspects, and all types of investors will do that. But, we are not the researcher and developer in that. Now we have the ingredient to be there, because we have these people from all over the world who live here, were educated here and have the knowledge; they go out and they come in. You have the ingredient for that, from their brain you could become a technological researcher and developer and you produce that, and that's great. You talk about the example of Microsoft they make revenues of more than that of ten countries, and these are from developing such a technology and everybody is using it". (DCR Interviewee 6, 26/06/2013).

It was also interesting to note that the emphasis was not only building on technological advancement, rather business culture and attitudes have also experienced slow but steady change but the overall infrastructure still lacks sophistication hindering the region's ability to connect to the global knowledge

economy. The majority of the workforce is employed in sectors that are relatively less economically productive and of secondary strategic importance in sustainable development—such as construction and utilities, government, and other services in traditional sectors (Schiliro, 2013). This means that a majority of workers are employed in sectors that are supporting other economic sectors, rather than driving growth themselves (please refer to Table 7).

> "I think it is important to note that different professionals here have different views on what is the knowledge economy. They may not call it a knowledge economy at all but you can routinely see how managers are trying to incorporate aspects of what you have defined as the knowledge economy in your brief into work plans for their teams. For example the use of management information systems has increased significantly in the region as businesses realise that this information is worth collecting and being made part of the corporate memory. You will also frequently see business consultants involved in commercial projects, which is a new trend here as businesses incorporate holistic views of management into what they are doing. Again the impact and significance of this in relation to commercial success and economic growth is something that has not been formally measured or analysed as far as I am aware. This needs to improve, as essentially we need to be able to see which initiatives and policies work and which don't. We really need to establish a baseline to support future plans as it is vital to optimise the use of resources as well as help develop Dubai as a knowledge economy that can be taken seriously globally" (DCR Interviewee 2, 22/06/2013).

The comments by the interviewee highlight the importance of rebalancing the disproportionately large volume of low skill workers within the region as a result of entrepreneurs that favor low cost labor intensive industries as opposed to high value-added skill driven ones (Dubai Economic Council, 2011). In order to translate technological progress into productivity growth, it will be important to develop an

effective labor-market that uses this skill potential. As globalization is changing the distribution of world jobs to reflect stronger emerging market economic growth and new business opportunities, raising the investment and the levels of education will create an increasing array of higher skilled employees and better-paid individuals.

5.3 – Connecting to the Global Knowledge Economy

5.3.1 Perceptions of Connectivity to the Knowledge Economy

It is also important to understand the nuances influencing the skills supply chain in Dubai City Region which makes it a closed environment creating hindrances for knowledge exchange, collaboration and network development (Caldwell, 1967; Reige, 2005; Klein, 2008). The dynamic labour market, with nearly 1.1 million workers classified as temporary residents (Dubai Statistics Centre, 2015), present challenges in relation to developing collaborative networks due to increased competition and focus on skilled employee retention. There are many expert jobseekers migrating to the region for part of their career, in light of the tax-free salaries and to save money, before moving back to their home countries. In addition to this, local employment laws allow labor to move relatively freely between employers and therefore many individuals will work for more than one organization during their time in the GCC (Gulf News, 2018).

> “Information access and sharing is not so much about technological development within the region, it is more about mind-set of managers and business leaders. It is important to understand that there is a lot of commercial activity going on within close proximity and like in most competitive markets; you experience high levels of insecurity from managers who are very guarded about trade secrets. Professionals do meet and hang out at events and exhibitions but there is always the pressure of playing it safe, as you don’t know who hears comments made on these occasions. So in a way, our behaviour as professionals is evidence that knowledge networks

do exist, at senior management level at least...it is important to understand that a majority of knowledge intensive businesses have to recruit and relocate individuals who possess the skillset needed to manage projects within the region. Therefore, businesses are already filling key posts at an expense even before the employee is active within the company. To then loose these individuals locally to competitors is a big hit" (DCR Interviewee 2, 22/06/2013).

Furthermore, it is also important to understand the intricacies of skills development and priorities of the diverse local workforce, a large number of which are second generation children of immigrants who are increasingly seeing Dubai as an immediate medium to long term career choice which has helped stem the level of "brain drain" as the local infrastructure becomes increasingly capable of retaining young graduates. These young graduates, through their diverse cultural background, help promote a far more globalized view that assists with the connection of the region with the global economy.

"The number of international universities setting base in Dubai has increased at a phenomenal rate. For those who criticize the motives behind the setting up of these universities ignore the fact that this is a response to demand, also we are moving past stereotypes, conventional sterotypes! where children of immigrants typically return to their home countries for higher education or go to universities in the UK or the States. The new trend, as the local cluster of universities develops, is for young students to stay in Dubai studying but also developing work skills in one of the fastest moving economies in the world. I am not saying that we have completely figured out our long term economic plan and the role of knowledge in it but we are developing a local infrastructure that is built upon what Dubai as a city is good at rather than just lifting ideal operational models to force the city into programs that have no correlation with its competencies." (DCR Interviewee 4, 23/06/2013).

These views were also supported by DCR 5 who explained:

> "There is a feeling of change, the region has always had opportunities for people with the right skillset but there is an acknowledgement now of the importance of knowledge and skills that exist locally. We are a young country and the new generation of graduates is dealing with two distinct challenges - bridging the gap between existing knowledge and associated systems compared to other developed economies, whilst at the same time preserving their cultural identity, which makes them unique." (DCR Interviewee 5, 22/06/13).

This is more about boosting the profile of Dubai City Region as a non-oil economy with a local work force and infrastructure that can meet the needs of international companies. One such initiative includes the development of Dubai Wholesale City which is a project backed by government owned TECOM group spanning an area of 51 square kilometers and will activate the largest e-commerce platform for wholesale trade in the region (HSBC Global Connections, 2016). By locating the project next to Al Maktoum International Airport and the Jebel Ali Port, two major gateways for global cargo and shipping industries, the city aims to consolidate its position as a hub for advance logistics services making it a critical connection point for international trade.

In some cases, the interviewees explained how media clusters such as the Dubai Media City have put the region on the map as a hot spot for major players in the sector. Since its establishment in 2001, Dubai Media City has been able to attract big names including CNN, CNBC, Reuters, Nokia and Siemens by incentivizing the investment process through creating a 'free zone' allowing for 100% business ownership and exemption from taxes. By enticing these global brands to establish a presence within the region, Dubai has been able to boost its profile as a global destination. Currently, the law requires companies establishing themselves in the United Arab Emirates to have 51% of the business owned by a UAE national or a

firm wholly owned by UAE nationals. The interviewees explained how the Dubai City Region presents a unique case study in sector development where established businesses and brands have set up base even where there has been no existing track record of success.

> "Brand profiling is big in Dubai, and I think simply put we have sometimes had button on and off evolution. One minute you press a button and next minute CNN or Reuters have an office in the Media City. A lot of hard work happens behind the scenes but my point is that sometimes these names are in Dubai just because Dubai has made it really easy for them to be there to raise its own profile. It's a hard one to explain but this would be hard to achieve in other cities" (DCR interviewee 2, 22/06/2013)

This has been the result of numerous incentives offered by the government for working out of free zones and growth hubs including the Dubai Media City and Knowledge Village Dubai. The interviewees explained how this has affected the growth of SMEs who were left disadvantaged because of their inability to match the products and offerings of their more established counterparts as well as the lack of incentives and support available to them.

> "It has a hard place for small business. The local government have invested heavily in attracting blue chip companies but the problems for small businesses have remained. Access to finance is a big issue. A new business will find it very hard to get loans from banks. Also suppliers offer little credit to small and new businesses as they seem as a risky option. This really stops these small businesses from competing in a cut throat market, how can they compete? They are fighting a losing battle from the start" (DCR Interviewee 2, 22/06/2013)

The local government has increasingly struggled to deal with the challenges faced by private companies as between the third quarter of 2015 and the first three months of 2016, 237 small business owners left the UAE as increasingly late invoices forced firms to miss their debt repayments, according to Coface, a credit insurance firm that monitors the trade credit of 20,000 UAE companies (Financial Times, 2016). This has been driven by higher costs of living including rent and inflation, stagnation in salaries in the private sector as well as liquidity issues with small business (Financial Times, 2016). Increasingly there is also a shift from the traditional model of employment with a fixed employer towards freelancing in favour of the flexibility and autonomy the latter brings (Haziq and Gokulan, 2018). This has been facilitated by changes to visa rules particularly focused on technology, education and media sectors to allow permits to be grated at an affordable cost (Khaleej Times, 2018). Not only does this promote a greater level of interest from graduates and start-ups within these knowledge intensive sectors, it also improves the chances of survival and growth of small business within the region. By hiring freelancers, companies save on overhead costs such as visas, insurance and gratuities (Khaleej Times, 2018). In addition, as a result of corporate cost cutting (due to changes to the local economic environment such as the introduction of value added taxes and increases to the overall costs of doing business), a new gig economy comprising an estimated 100,000 freelancers has developed (Duncan, 2018). This skills base allows local start-ups and small businesses to access resources and knowledge that would have been out of their reach in the past.

> “I personally think knowledge and its application is at the core of all professions. We may all not call this new type of economy a knowledge economy but the emphasis is still there. Our business culture in UAE puts great value on knowledge and experience. It is a bit different from Western economies in the sense that you do not find the same formality in institutions or in between institutions if that makes sense. I have experienced this contrast between how business is done and knowledge is developed and shared here in Dubai compared to the rest of the world. Over time we have become quite accepting of Western business practices, a lot of the recent development has been around changing the perception

of people when it comes to the vision of Dubai's knowledge economy as you call it. I still feel that work needs to be done to promote the development of small businesses, as there is plenty of talent around". (DCR interviewee 4, 23/06/2013)

Some interviewees had reservations over the accessibility and scope of the existing local business base. Even though the region has been able to attract well established international organizations, there has been negligible growth in the size and scope of existing relatively under resourced local companies. The unique orientation of the local business landscape dominated by international brands whose location decision is heavily subsidized by the local government has hindered the development of pathways for start-ups and small businesses to scale up. This has negatively impacted the opportunity and potential for indigenous growth which has suffered as a result of subsidising inward investment. The competitive local market forces have also resulted in creating in an environment where information and knowledge exchange between professionals working in small businesses and those employed by large multinational firms is restricted.

"At the local level, we have some highly complex knowledge intensive activity going on that lacks expansive intent. These activities have been passed on to experts [a large proportion of who are expatriates]. There is a vacuum between these highly qualified professionals and young graduates coming through the ranks who have no formal channels or networks to connect with each other. A significant amount of value [from a knowledge perspective] is lost as organizations importing skills that are high in demand fiercely protect them from other local competitors. The local business culture is insular and lacks the collaborative elements key to knowledge cluster development. Most of the interaction between professionals is informal and restricted". (DCR interviewee 4, 23/06/2013)

It is important to highlight the difficulties faced by start-ups in such an environment. Small businesses and start-ups have traditionally struggled with a lack of focus and attention from local institutions which has stunted their growth and ambitions. The costs for starting up remain high, paperwork is cumbersome, finance is hard to come by, exit options for investors are limited, and the cost of failure is high (The National, 2018). In addition, lack of economically viable office space as well as limits imposed on the number of visas these businesses are allowed to offer pose a serious challenge to SME survival and growth (Arabian Business, 2016). There is also an urgent need for more robust linkages between local institutions to facilitate development of policies to support entrepreneurs. This would entail developing accessible networks between ministries (like Labor, Economy, and Education), local government departments (like Economy and Community Development), and various private sector stakeholders (like banks and venture capitalists) (The National, 2018).

There is increasing awareness and interest from the private sector in harnessing local innovation with examples such as a local web based holding company securing $1.5 million in seed funding through investment from the private sector including Saudi's iNet, Silicon Valley's 500 Startups, UAE-based Shorooq Investments along with other angel investors from the Gulf, Europe and the US (Hariharan, 2018). There are other success stories which include Dubai-based ride-hailing service Careem and e-commerce retailer Souq, once called the Amazon of the Middle East which coincidentally Amazon acquired last year (Lauria, 2018). However, several elements of the local startup ecosystem need further development and despite the region's wealth, there remains a shortage of investment in new tech companies where the government will have to play a more significant role as a result of VC ecosystems not yet having taken root (Forbes, 2018). In addition, there is also a skills gap whereby inward investment, subsidized by local government squeezes out the supply of skilled labour to local indigenous businesses. This can create an imbalance in the local labour market.

> "The market in Dubai is extremely difficult for startups. In my eyes, and this is a hard one to explain, the biggest problem for startups is the fact that all major

> sectors are dominated and to a certain extent dictated by big companies who are impossible to compete with especially when you have limited finances and man power. This is a frustrating aspect of the local knowledge economy as well, early stage career opportunities are not easy to get as the demand from both the public and private usually exists at the skilled and experienced level. We need to look at this ready-made talent concept, as it is our biggest weakness at the moment. So this may not be competition, as you know it or competition in the traditional sense." (DCR Interviewee 4, 23/06/13)

From an ideal type perspective, limited pathways for graduates and newly qualified individuals' present a major challenge for the region to connect with the global knowledge economy. It also limits the growth of indigenous innovation as a function of local academic activity with limited demand for early stage ideas. This is another area where the lack of institutional thickness has historically had a negative impact on the development of a business environment conducive for SMEs and startups. There is a fundamental issue of not fully embracing SMEs and startups as a vital function of developed knowledge economies given the nature of challenges they face. A study by the Dubai Chamber of Commerce and Industry (Dubai Chamber) and the UAE Ministry of Economy found that nearly two thirds of the entrepreneurs surveyed cited opening a bank account for their startups as a major stumbling block followed by access to finance and lack of affordable office space as other major challenges (MySalaam, 2018). Even startups that are able to push through and scale up in the face of these major obstacles find it hard to sustain sufficient momentum to keep growing. One of Dubai's most successful startups Fetchr having successfully raised $11 million in seed funding has found it challenging to deal with issues such as visa restrictions, license fees and red tape impacting business growth and development (Arabian Business, 2016). SMEs have found it increasingly hard in recent years to access finance due to liquidity issues within the local banking system caused by a weak oil price and slowing economic growth (Arabian Business, 2016).

It is important to note that the main focus of the city region has been on infrastructure investment. This was explained by one interviewee as follows:

> “Demands for energy, demands for infrastructure, (by infrastructure, as you call it, I mean the buildings, the airports, the roads, the transportation systems) we need to catch up with this. Because if you lack in these infrastructures, you lack ability to integrate technology with infrastructures, including all immigrations, and government e-commerce, you know, chamber and commerce regulations, and the business regulations. So, things are going so fast for Dubai, and the whole UAE, really going so fast, and to reach that point, these countries have a history of four hundred years or more of development and building their infrastructure, and then they reach that point. So we have to catch up with that. (DCR Interviewee 6, 26/06/2013).

As explained earlier, Dubai City Region has experienced a steep rate of economic and labour market growth in a relatively short period of time. However, due to limited indigenous growth and a disproportionate focus on inward investment, issues such as overcapacity have been created. More hotels and residential properties than demand were built to keep up with the planned growth rate. Since 2006, the value of cancelled projects in the Gulf has been worth almost twice the value of completed projects; in other words, a project only has a 35 per cent chance of completion after plans are announced (Gulf News, 2016). The rapid speed of economic development has also stretched natural resources throughout the region including water and electricity with significant infrastructure investment (AED 1.3 trillion) expected in the energy, utilities and transportation sectors over the next 20 years (Khaleej Times, 2018).

> “Once we have caught with technology and its fast development, then we can have a time to breathe and to close on that gap. It is not easy. Also, there are other political pressures here, which really do not help. Because, investing in research and development is not like, let me think, investing in oil and gas facilities, or a big island. No, this is something very risky. It has a big contribution in the big picture. You could finance it, no problem, but it carries a

> big risk. If it fails it is like taking a big loan and you cannot pay it. So this is why you need the infrastructure, in case something like this happens, the infrastructure will be able to cope with that. And one way to cope with that, as I've said, is buying five to ten percent shares in those companies or countries that have this development hub. Then, in benefiting from that dividend you not only benefit from the shares, you also benefit from the technology. If you are a shareholder you can easily import, and duplicate systems, and work around it. But, we do need time for that as our country is only about forty-five years old, and most of the work has really been done in the last five to ten years. In the first twenty years we had to establish the ground." (DCR Interviewee 6, 26/06/2013).

The rapid transformation of Dubai City Region's physical infrastructure can be seen in the images included in Figure 1. Having achieved these goals of developing physical infrastructure with airports, logistics centres including ports and state of the art maritime facilities, the attention of local agencies has turned to developing the strategic and governance institutional infrastructure that plays a key role in enabling connection with the global knowledge economy. In addition, once again the importance of sophistication within local infrastructure, policies and regulation was cited as an important factor to facilitate global connection.

> "With Dubai's strategy, I see big emphasis in infrastructure. They want to build infrastructure for everything. Some of the infrastructure is not the buildings we see; it's the rules and regulations, the policies. I mean, you have strategy of achieving and delivering a number of projects in a short amount of time, but later on there are policies, there are regulations. If these policies and regulations do not take into account the needs of investors then you will be alone. You may build the biggest tower, but if your policies, and your visa regulations, and your airports cannot cope with tourists, and tourists cannot come, what is the use building the highest tower? Dubai did not build the highest tower until they built the biggest airports, and the malls, and hundreds of hotels meeting need, and the policies and regulations to make it easy, so

now the people will come. We chose forty key economic partners and exempted them; they can come in and out for a hundred days or forty days free of charge. I mean, I go to Belize for three weeks and I have to pay, I have to pay $100 to enter this country; they are not free. If you go to Canada or the USA, you pay $300 for a visa, and you only go for three weeks. We are not on their list of favourable countries." (DCR Interviewee 6, 26/06/2013)

As discussed in earlier sections, the government has a large ownership stake in most of the infrastructure projects that have both been completed and are a work in progress at the moment. The long term aim of the government is not just to promote private investment in economic diversification but also attract more inward investment by high levels of investment on social infrastructure to service the growing population and improve regional attractiveness.

"The reason that the government is heavily involved here, is because the government is the owner of above the ground and below the ground. Above the ground, I mean for example tourism; the sites and everything are developed by the government, underground is where we have wealth; where there is oil and gas. The government is the owner of that. In the west this is not the case. They pass all of the ownership to the private sector, in return for royalties or for taxation. We don't have taxation here. So what do you prefer; to pay your tax, but have ownership, or let the government have it, then invest, operate, and be a partner with the government? In some places such as the States and elsewhere, they say 'okay, I will rent what is below the ground, and above the ground is yours for more rent', or they will say to the private sector 'you can have everything above the ground, but we will have everything below the ground', so then the policies and regulations are then different, for here and for there. This difference in the regulations, taxation, ownership, and the wealth, this is why it is different here. This has not been an obstacle for investors who have come and built, and it has not been for economic calculations because everything is clear. There is clarity and there is transparency. Yes, it may limit the private sector, and initially the

> international giants, the oil companies, may benefit at the cost of small companies but eventually it is about developing an environment in all major sectors where small companies have the opportunity to grow. At the moment, Dubai is trying to develop this, we are still work in progress which is why the private sector is not yet where it needs to be but work is being done on this." (DCR Interviewee 1, 25/06/2013)

Whilst traditionally the city region has been able to argue in favour of government ownership of key assets across all major sectors, its debt crisis in 2009 where it was saddled with $109bn of debt (equivalent to 130 per cent of GDP) forced state affiliated companies to restructure (Financial Times, 2019). Whilst the state still retains a large stake in key economic assets following its significant infrastructural investment into their planning and development, a changing economic climate has forced a shift in strategic planning to incorporate major changes such as reducing the size of the public sector to stop it squeezing out private sector firms; reforming the labor market, strengthening the local financial markets and being more open in the sharing of information around policymaking (Dudley, 2019). Whilst high mobility within the highly skilled professionals section of the workforce is in itself a cause of concern, the region has also felt the negative impact of the exit of better paid, senior expatriates which has chiseled away at discretionary spending in the consumer-driven economy (Financial Times, 2019). There has also been major investment in delivering Expo2020 featuring pavilions from 192 countries and expected to attract 25 million visitors over a six-month period (Dudley, 2019). The event is aimed at further enhancing the economic profile of the region and drawing attention to the opportunities presented by substantial infrastructural investments. However, there is once again a risk of overbuilding along with a knock on effect on the regions government related entities and their ability to repay the debts they owe amounting to $60bn and equal to 50 % of Dubai's GDP (Dudley, 2019).

5.3.2 – Boosting the Image of the Dubai City Region

Greater levels of consistency in legal regulations are required without inhibiting access and support packages to businesses. Some who we interviewed felt that even though free zones across Dubai had played a role in raising the knowledge intensity of the region, in order to further consolidate Dubai's position as a city-region knowledge economy further policy reform is vital. DCR 4 explained how the biggest challenge facing Dubai City Region is the lack of strategic infrastructure for knowledge intensive businesses seeking to grow from a small scale to a medium and large scale:

> "We very rarely see a company - specifically in knowledge intensive sectors like creative and digital media- transition from a start-up to a key market player. We don't have success stories like Google and Microsoft at incubation stage. *We seem to have become a host for those who have succeeded instead of developing support mechanisms that could help local start-ups to progress*".
>
> (DCR Interviewee 4, 23/06/2013)

Dubai city-region builds on this to reinforce its brand, a boosterism whether it is inherent through its marketing machinery or manufactured through the presence of global industry players. However, it has a knowledge value chain that at best is based on an intellectual infrastructure that is limited at present. As DCR 1 explained:

> "*What we struggle with is the sophistication of research and quality of academic/industry research initiatives*. This is the vital link between startups/SMEs and market leaders.
>
> (DCR Interviewee 1, 25/06/2013, emphasis added)

Adding further how:

> "A demand led from the market leaders perspective, [an] incubation environment is vital as the product/service development taking place in start-ups meets the needs of its more developed counterparts. The vacuum between the product/service offerings of your Nokia's and Siemen's and a start-up is vast and only industry led initiatives can help close the gap".
>
> (DCR Interviewee 1, 25/06/2013)

The limited research intensity within the local education environment has associated implications for the quality of the research profiles of academic researchers attracted to the UAE (Ryan and Daly, 2019). As is the case with most high skill professions in the country, local higher education institutions are largely dependent on a mostly itinerant expatriate workforce (Ryan, 2016). Whilst access to highly qualified professionals that are able to assist with the implementation of a more international curriculum has helped in the setting up of several international institutions in the region, the pace of change in relation to the quality of research output has been much slower. This is another area displaying lack of institutional thickness as a result of focusing more on raising the international profile of local institutions as opposed to stimulating the local research environment to encourage the development of a community of early career researchers supported by high quality research networks. Ryan and Daly (2019) highlight how it is possible that research focused faculty may self-select themselves out of consideration from employment in the UAE context, given there is evidence to suggest that the research environment has a significant influence on research productivity (Smeby and Try, 2005; Ryan and Hurley, 2007). Therefore, local institutions have had to utilize generous salary and benefit allowances as incentives to attract highly skilled faculty (Ryan and Daly, 2019). With senior faculty lacking sustained research focus, there is limited exposure of early career researchers to internationally significant research and the processes involved

within it. This creates a research vacuum that limits connection with the global knowledge economy as commercialization of research and innovation is not organic and the work of graduates and early career researchers lacks penetration into the local markets. The relative lack of a research culture permeates the organizations and institutions of the UAE as well (Ryan and Daly, 2019).

According to theory, new firms are meant to lead innovation in knowledge intensive economies (Penrose, 1995). There are types of new enterprise start up that are vital to business and scientific innovation as they encounter and solve problems that are relevant and topical at a particular time. This is the Schumpeterian perspective, emphasizing disruptive technologies that many city-regions are keen to examine and if possible, exploit. Blue chip companies and big businesses are cushioned by layers of bureaucracy, which prevent them from having the innovative intent of start-ups and small businesses. Therefore, any region with a disproportional balance between start-ups and small businesses compared to established businesses, will suffer in terms of knowledge development. They do not appear to have the capacity for technology-focused, innovative local start up enterprises who can disrupt the status-quo in the local economy and push the city-region into a more sophisticated, knowledge-driven era. In this sense Dubai city region will require sustained focus on this front to successfully connect with the global knowledge economy.

> “Technology has certainly played a key role in allowing Dubai connect with the world. This connection has not only resulted in generating trade and investment, it has allowed the region to access systems and processes that other developed regions have had to offer. There is consensus that the pace of change and development in Dubai has been remarkable but this has only been made possible because the region has never had any issues accessing global markets. The vision of the local leadership has played a big role to make this happen whilst other GCC economies (Gulf Cooperation Council including the states of Kuwait, Bahrain, Oman, Saudi Arabia, Qatar and United Arab Emirates) have struggled to produce the same results. One can argue that an economy built on the tourism industry has helped with this but

there is more to it. You have to be welcoming; you need to be aware of what international investors see as desirable. There are big differences across the GCC. For example, the business and social culture in Saudi Arabia compared to the business and social culture of Dubai. You will see or may have already seen a big difference. This is important. When you ask me what are decision makers in Dubai doing, the simplest answer is that they are projecting an image of acceptance; everyone is welcome to invest, work and live in Dubai. That has been a hard sell for other countries and cities in the GCC as they are seeing change as a cultural issue whereas Dubai is seeing change as vital to move with the international market and develop. There are some issues here. With matching up vision with reality, current culture and distribution of population. By distribution I mean, distribution in sectors as well as distribution in terms of the widely diverse range of nationals living in Dubai. You get the best talent, technology and ideas but you also have to then deal with different expectations, different vision. For example, if you are used to doing business in China or Europe, Dubai will surprise you. Things are different. Laws are different. You need to understand these little but important things before investing otherwise risk of failure is high. Dubai is not the best place to learn at the moment, it is the best place to make it while you have it." (DCR Interviewee 3, 25/06/13)

Adding further:

"We need to develop support networks like the west where a company moving into the new region is in constant dialogue with support agencies talking about catchment benefits, grants available or staff skill levels. Owning equity in a business is a challenge in itself if you are not a local citizen as current commercial law allows foreigners to own no more than a maximum of 49% of companies registered outside of free zones. This puts a lot of overseas investors off, the impact of this is felt by startups and small companies who are desperate for funding innovative products that need global exposure. It's not all about the money, it is the expertise and know-how of taking products to

market not just in Dubai but internationally" (DCR Interviewee 3, 25/06/2013).

From an ideal type perspective, it can be argued that the city region has shown signs of self-reflection transitioning to a business environment that is more open to change particularly in comparison to its more insular GCC counterparts. In addition, as the global economy has seen a shift away from fossil fuels, Dubai city region has been forced to make significant policy changes to both maintain its regional competitiveness as well as address issues such as low survival rate of start-ups and small businesses as well as an exodus of highly skilled professionals along with their discretionary spending. There are now plans to allow foreigners to fully own their businesses in Dubai or Abu Dhabi without a local partner along with in some cases professionals being entitled to 10-year residency permits (Ismail et al., 2018). Some interviewees felt that more needed to be done about improving the sophistication of key sectors and governance institutions by focusing on quality rather than solely marketing Dubai as a global destination. The 2008 economic crisis revealed many weaknesses in the system, especially related to governance, risk management and oversight over the financing of this growth. During the credit crisis, the Dubai government could not repay immediate debt obligations of its companies and asked the government of Abu Dhabi for a bailout ($10 billion) and a voluntary debt restructuring going forward (BBC News, 2009). The lack of transparency regarding the repayment process and government role in guaranteeing the debt repayment created significant uncertainty about Dubai's macroeconomic management capacity to avoid macroeconomic imbalances, which negatively impacted market confidence. The deal came with a promise to improve transparency and offer better protection to creditors. Similar issues of transparency and quality within the education sector have been highlighted (Ashour and Fatima, 2016). Despite the UAE having achieved a high ranking for 'quality indicators' on the global level in the World Economic Forum's Competitiveness Reports, the quality of graduates, education, and research engagement is still debatable (Ashour and Fatima, 2016).

"It can be said that Dubai has clusters that have been created to add to the region's global branding strategy. These clusters are predominately dictated

by big companies, your Nokias, Siemens and Schneiders. When you speak to local practitioners, they talk about change in the broad sense. If you are looking for a consultant to look at any aspect of business, there will be a list of individuals/companies on the website of the Knowledge Village to access but the impact and quality of support provided cannot be guaranteed. There is no real sense of urgency on part of the Accreditation Commission to establish a degree of confidence in businesses to invest in these consultancies. The same can be said about local academic institutions, as they seem to work in isolation with little interaction with local businesses that on paper are the recipients of their output" (DCR Interviewee 1, 25/06/13).

5.3.3 – International Links

This is consistent with regional trend within the Middle East where the region's 50 biggest brands are now worth a total of more than $68bn – 11.25 per cent more than in 2015, a growth rate of almost double the global average (The National Business, 2016). The key strategic focus in recent times has been to transition from a localistic focus to a globalized focus in relation to education and skills development. Key local agencies such as Dubai Investment Development Agency and Dubai FDI (part of the Department of Economic Development) have launched special programmes such as the Dubai FDI Capacity Programme which involved representation from government, semi government and private sectors (Emirates247, 2016). The key aim of such programmes is to align the skills of investment facilitators and bridge the gap between public and private sector agencies in achieving the strategic goals contained within Dubai Plan 2021. Dubai Plan 2021 is a national strategic plan looking at the long term growth potential of both natural and built assets as well as evaluating the readiness of Dubai City Region in providing a socio-economic environment that will enable effective connection with the global economy. It is important to note that the government has been identified as the custodian of city development in all aspects highlighting the strong public institutional focus within the region. This has long been an issue highlighted by the private sector where limitation on autonomy have often been challenging as highlighted by one of the interviewees:

> “In our case, being a SME we have seen little change in terms of how businesses operating in the energy-manufacturing sector are resourced. The market has become more competitive but not necessarily sophisticated. Our business relies on reputation and a history of support. This is not just a cliché as I would say it is next to impossible for an investor to walk into the market and become a key player immediately no matter how much they have to spend. Local family owned businesses including big ones like Al Futtaim, Majid al Futtaim, Al Gharoor and Al Rostamani are embedded into the very economic fabric of the country. There is little meaningful choice and that is what you need to bridge the gap between western economies and us. We have some futuristic projects like Masdar City looking at sustainable energy through development of solar plants and other alternative sources of energy but even these are resourced through Mubadala which is a government subsidiary. There is little open private sector leadership when it comes to innovation and creativity, which is always a concern. The government of Dubai owns Dubai Media Incorporated, which runs most of the local multi media channels; both regional telecom providers Etisalat and Du are majority state owned enterprises and not a lot is being done to change this” (DCR Interviewee 4, 23/06/2013).

In addition to issues with infrastructural sophistication, not till very recently have policy makers realized the importance of collecting economic and social information to inform regional policy. The National Bureau of Statistics has provided a platform to develop national statistical databases and upgrade the knowledge resources available for key sectors. However, there is still a lot of work that needs to be done to increase the sophistication and proactivity of data analysis and dissemination as investors have expressed concerns over the lack of economic statistics instead having to rely on alternative figures such as banking liquidity data and anecdotal conversations with businesses (Omar and Ismail, 2019).

> “We are looking at a change in how we do business. You can say we are not as informal as we used to be. The change is more profound and evident to us

> old timers, as I don't recall in my early days being able to click a few buttons and have access to comparative statistics for social assistances or consumer price indices. You can say it's all technological evolution but here in Dubai we have had to overcome a steeper challenge trying to align our business culture with these changes. We are finally moving on from the "all will be well" mentality as concerns over availability of natural oil reserves has pushed us out of our comfort zone" (DCR Interviewee 4, 23/06/2013).

The aspirational element of Dubai's growth strategy has at times inhibited the growth of support networks aimed at developing and delivering long-term results for key sectors. More specifically, whilst there has been a significant emphasis on the development of physical infrastructure and assets, there has been a lesser focus on creating thickness of state and quasi-state institutions aided by sophisticated economic policies that are internationally consistent. There is also a growing realization amongst local agencies about the importance of attracting international companies which is only possible if local policies and procedures are consistent with those of the international market (Financial Times, 2016). This is another aspect where self-reflection from policy makers in light of a rapidly changing economic environment has resulted in policy development and economic restructuring to make Dubai city region more outward looking and consistent with its global counterparts. However, it was evident during the interviews that this is an area requiring more attention.

> "We need to develop support networks like the west where a company moving into the new region is in constant dialogue with support agencies talking about catchment benefits, grants available or staff skill levels. Owning equity in a business is a challenge in itself if you are not a local citizen as current commercial law allows foreigners to own no more than a maximum of 49% of companies registered outside of free zones. This puts a lot of overseas investors off, the impact of this is felt by start-ups and small companies who are desperate for funding innovative products that need global exposure. It's not all about the money, it is the expertise and know-how of taking products to market not just in Dubai but internationally" (DCR Interviewee 3, 25/06/2013).

New firms are meant to lead innovation in knowledge intensive economies (Penrose, 1995). Startups are vital to business and scientific innovation as they serve as a starting point for commercializing new ideas (Yasuyuki and Karren, 2017). In an ideal type of knowledge economy, we see the local institutional infrastructure constructed in a way that enables start-ups and entrepreneurship to flourish. This also includes an understanding of the fact that the contribution of start-ups and young business to job creation involves rich dynamics. Decker et al. (2014, p. 4) highlight how *"most business startups exit within their first ten years, and most surviving young businesses do not grow but remain small. However, a small fraction of young firms exhibit very high growth and contribute substantially to job creation. These high-growth firms make up for nearly all the job losses associated with shrinking and exiting firms within their cohort. The implication is that each entering cohort of startups makes a long-lasting contribution to net job creation".* Concerns for the lack of attention paid to start-ups and SMEs operating in Dubai city region was highlighted during the interviews.

> "I do not remember working with or even hearing about a startup in the last 5 years that has managed to establish its position. There has not been a lot of research done on rate of failure for startups but it is a really hard market, especially with the economic climate being the way it is. Knowledge networks are in an embryonic state no matter which sector you work in" (DCR Interviewee 2, 22/06/2013).

The city and its leaders have long tried for Dubai to be perceived as an up and coming knowledge economy but as stressed during the interviews, a significant cultural shift needs to take place to allow Dubai to get to par with western knowledge economies. Shortcut approaches to stimulate knowledge economies have been proven unsuccessful in the past. The city has a high volume of exhibitions and events all targeting big companies but this resource needs to be diverted towards start-ups and SMEs to enable a steady transition from a labour-intensive – low technology economy to a capital intensive – high technology economy. Shortcut approaches included allowing foreign academic institutions to set up wholly owned branches with a minimum of oversight (Ashour and Fatime, 2016). A significant

negative impact of this approach has been that prestigious foreign institutions have preferred to open branch campuses in neighboring Abu Dhabi which has a stricter education policy and accreditation criteria rather than Dubai.

> "In our case, being a SME we have seen little change in terms of how businesses operating in the energy-manufacturing sector are resourced. The market has become more competitive but not necessarily sophisticated. Our business relies on reputation and a history of support. This is not just a cliché as I would say it is next to impossible for an investor to walk into the market and become a key player immediately no matter how much they have to spend. Local family owned businesses including big ones like Al Futtaim, Majid al Futtaim, Al Gharoor and Al Rostamani are embedded into the very economic fabric of the country. There is little meaningful choice and that is what you need to bridge the gap between western economies and us. We have some futuristic projects like Masdar City looking at sustainable energy through development of solar plants and other alternative sources of energy but even these are resourced through Mubadala which is a government subsidiary. There is little open private sector leadership when it comes to innovation and creativity, which is always a concern. The government of Dubai owns Dubai Media Incorporated, which runs most of the local multi media channels; both regional telecom providers Etisalat and Du are majority state owned enterprises and not a lot is being done to change this" (DCR Interviewee 5, 22/06/2013).

Dubai is a developing knowledge economy trying to book the global trend by being able to service and supplement all aspects of its knowledge value chain driven by curiosity of members seeking information to enable personal and professional growth. The new generation of both local and expat professionals has led to the development of a more diverse academic offer for the region. There are an increasing number of dedicated programs such as the Emirates Institute for Banking and Financial Studies Annual Training Plan which will conduct over 690 training and

development programs in 2019 (Augustine, 2018).

> "Dubai was always a tourist economy. Not sure how knowledge intensive it was, but it did put Dubai on the map. The shift towards aspiring to be a knowledge economy is quite recent, not sure if leaders and policy makers are trying to compete with emerging global trends or increasing the sophistication of products and services that Dubai has to offer. Career outlook these days for professionals is quite different as executive training for a range of specialisms is available locally. A lot of people I know have picked an institution at the Knowledge Village which is close to business districts like the Media City and also has institutions that have finally started working with companies to increase the relevance of taught content to the local market. Whereas in the past I had to travel abroad to access relevant training, the company is now able to resource a lot of what we need locally. We do however still need to deal with issues of accreditation as it is quite confusing how the Commission for Academic Accreditation in Dubai rates universities. Also, they have licensed 70-80 institutions which is far too much when you are trying to establish a high quality system especially in a small country like ours" (DCR Interviewee 2, 22/06/2013).

Mill (1848) explains how the aim of all intellectual training for the mass of the people should be to promote and develop common sense as well as qualify them for forming a sound practical judgment of the circumstances by which they are surrounded. Whatever in the intellectual department can be superadded to this is chiefly ornamental; while this is the indispensable groundwork on which education must rest (Mill, 1848). We were keen to understand how professionals communicate with each other within the region, either formally or informally. It appears that even though knowledge networks do exist, professional are vary of the backlash caused by interactions across these networks. In addition, business culture and senior management mind-set seems to also have a significant influence on how professionals view and utilise these networks.

> “Information access and sharing is not so much about technological development within the region, it is more about mind-set of managers and business leaders. It is important to understand that there is a lot of commercial activity going on within close proximity and like in most competitive markets; you experience high levels of insecurity from managers who are very guarded about trade secrets. Professionals do meet and hang out at events and exhibitions but there is always the pressure of playing it safe, as you don’t know who hears comments made on these occasions. So in a way, our behaviour as professionals is evidence that knowledge networks do exist, at senior management level at least...it is important to understand that a majority of knowledge intensive businesses have to recruit and relocate individuals who possess the skillset needed to manage projects within the region. Therefore businesses are already filling key posts at an expense even before the employee is active within the company. To then loose these individuals locally to competitors is a big hit” (DCR Interviewee 2, 22/06/2013).

5.4 Conclusion

Those to whom we spoke with, who retained a vested interest in seeing a successful city-region knowledge economy, were part of a consensus about how important knowledge as an economic commodity is in Dubai City Region. They may also illustrate the edge of new development in the city-region. Yet we have seen a number of barriers as well. Dubai does not currently have the level of sophistication associated with the ideal type of city-region knowledge economy we set out in chapter four. Dubai also lacks dedicated sector groups, academic networks and industrial collaborations which require sustained attention particularly through a better balance between the inputs from public sector government agencies and the private sector. Much of the knowledge infrastructure has taken place on an ad-hoc basis particularly due to the regions cultural diversity hosting professionals from a multitude of nationalities. The local knowledge economy is built on a variety first

approach, where a massively diverse consumer base heavily influences the structure of academic institutions and the qualifications that they offer.

In the chapter, we have looked at the unique demographic constitution of Dubai City Region which includes large concentration of expat workers resulting in a high attrition rate in the private sector. We also look at how Dubai has rapidly transformed over a relatively short period of time fuelled by the development of physical infrastructure. However, while there is institutional support for the knowledge economy ideals in Dubai, the place remains institutionally 'thin'. It was also seen that the emphasis of local agencies was not only building on technological advancement, rather business culture and attitudes have also experienced slow but steady change but the overall infrastructure still lacks sophistication hindering the region's ability to connect to the global knowledge economy. The majority of the workforce is employed in sectors that are relatively less economically productive and of secondary strategic importance in sustainable development—such as construction and utilities, government, and other services in traditional sectors. In order to translate technological progress into productivity growth, it will be important to develop an effective labor-market that uses this skill potential. As globalization is changing the distribution of world jobs to reflect stronger emerging market economic growth and new business opportunities, raising the investment and the levels of education will create an increasing array of higher skilled employees and better-paid individuals. The long term strategic focus of the region is to achieve these goals by creating a business environment with policies and procedures consistent and compliant with internationally accepted standards.

Some interviewees felt that more needed to be done about improving the sophistication of key sectors and governance institutions by focusing on quality rather than solely marketing Dubai as a global destination. The 2008 economic crisis revealed many weaknesses in the system, especially related to governance, risk management and oversight over the financing of this growth. In Dubai, the small business population appears to remain as an unsophisticated sector that has still to

realize its potential. There is more of a sustained focus from local agencies to promote inward investment at times at the cost of small business. On the supply side, we can see more finance availability in Dubai although investment appears to be corporate focused, rather than for small innovative enterprises.

Chapter Six

Knowledge Economy of Liverpool City Region

6.0 Introduction

As is the case with Dubai, Liverpool city region also sees the prospect of developing itself as a nationally significant knowledge economy. Local agencies in the region are working towards building a profile highlighting key assets and competencies within local knowledge intensive sectors. In sharp contrast to Dubai, Liverpool city region as a maritime city has suffered a long period of decline from its glory days as an economic powerhouse fuelled by global trade. In addition to existing economic challenges including a significant gap in the GVA per capita compared to that of the UK, Liverpool city region was significantly impacted by the 2008 credit contraction in the global economy. The region saw a significant reduction in central funding with local agencies operating in the public sector facing a long period of uncertainty as a result of austerity (Guardian, 2017). This has had an adverse impact on the strategic focus of local agencies to enable connection with the global knowledge economy. It has been challenging to build upon initiatives such as the collective engagement of local agencies with the Shanghai World Expo which included the development of a £1.1 mn. pavilion which attracted around 70 million visitors during a period of six months (Hoban, 2010). This connection and the ability to substantively engage at an international level has been a major challenge for local agencies as they have faced increasing challenges at the local level due to austerity.

We show in this chapter through the contexts in which governance institutions in Liverpool City Region prepare their place for a role in the global knowledge economy. We take into account the relevance of the knowledge economy to the city region and how governance actors are keen to support supply-side initiatives around for instance, education, skills and enabling more entrepreneurial behaviour in the drive for a high skilled, high wage local economy. Similarly, we see city-region policies that provide backing to particular sectors such as digital media and life sciences as well as wider diffusion of innovation in both services and production. Results from the fieldwork indicate the knowledge footprint in Liverpool, such as

designated locations for the types of creative and innovative enterprise that should drive the knowledge economy and the integration of these with the wider city-region. We consider the role of higher education institutions and how they differ and we are able to contrast the role and responsibility of the central state vis a vis the local state. We also find that the institutional infrastructure is an important contributor that helps city-regions to connect to the knowledge economy although other factors may prove difficult to overcome.

6.1 Liverpool City Region Profile

Liverpool sits at the centre of a city-region that grew on the basis of trade between one country and the rest of the world. In this sense it is a city-region that has been connected to a wider global economy since the seventeenth century through the activities of the port and trade with key strategic locations as part of a broader imperial past. While many other cities build up their wealth through industrialization in Liverpool we see a growing intensification of global trade through the eighteenth and nineteenth century. What this means is that the wealth of the city comes through the merchants who are able to act as the gatekeepers to imports and exports via their control of the dock and maritime systems and their influence on financial institutions. The connection of Liverpool to other global ports across the Atlantic, Pacific and Indian Oceans is the basis for an increase in population, through the availability of work in the port and in the related industries that grow up around the docks (Smith, 1953). The port acts as a gateway to new opportunities in economies such as the USA, while immigration into Liverpool provides the basis for a multi-cultural city with seafarers from Asia and Africa joining the strong Celtic connection from Wales, Scotland and particularly Ireland (Belchem, 2007). And despite the wealth that was concentrated in Liverpool, this type of global connection was also associated with the poverty of the city and surrounding region.

At the beginning of the twentieth century Liverpool reaches its peak as a contemporary global city. The port and docks remain vibrant as international trade

expands while the local population continues to increase. The city economy is established around maritime, transport, commerce and financial services although employment remains precarious for many. A key moment for the city comes with the Great Depression and the actions by national governments across the world to protect their domestic economy at the expense of trade with other countries. This impacts on the port and Liverpool generally and while unemployment and poverty become entrenched, at this moment the population of the city peaks. Part of the reaction from the UK government to the Depression is through policy aimed at stimulating regional economies, including that of Merseyside. Yet as other parts of the UK slowly emerge from the weak national economy the local economy of Liverpool struggles. This period of the city's development is then significant for two reasons. First, after the Wall Street Crash in 1929 and the end of the gold standard the period of global economic activity that brought with it wealth to Liverpool and its city-region, tails off. Secondly, the problems facing Liverpool were different to the rest of the UK and the structure of its local economy could only be partially supported through the efforts of national government and Regional Selective Assistance. The significance of the maritime industry to Liverpool at this time was its dominance at a time of global crisis.

The post-war period brought reconstruction and in time, prosperity to many towns and cities in the UK. International trade was re-established, primarily facilitated through the agreement at Bretton Woods and there were ambitious plans to enhance the port of Liverpool. Although now the strengths of the Liverpool port system seen in the eighteenth and nineteenth centuries became a source of weakness, still locked into an older trading system and lacking the engagement with European countries that other ports could exploit. Chronic poverty plagued Liverpool and its population declined while the UK economy grew. Not only was it the waning of the docks that was visible in the last three decades of the twentieth century, but the city and its surrounding region overall was castigated as a problem to be managed in a period of decline. Most severely as a new era of globalization began, were the branch plant closures from companies who set up supported through government grants before and after World War II (Coleman, 1975; Merseyside Socialist Research Group, 1980). It was a perfect storm as the docks declined, investment from the private

sector collapsed and new cuts in public finance were implemented to important funds that the city felt it needed, leading to confrontation between the government and local authority. These only the backdrop to high levels of structural unemployment and riots that added to the negative perception of the city.

The current population of Liverpool City Region stands at approximately 1.52 million people with a majority of the population residing within the Liverpool local authority area (please see Table 10). Despite being home to 3 universities hosting a 50,000 strong student community complemented by a diverse set of world class knowledge assets (Merseyside Economic Review, 2009), Liverpool City Region is a developing knowledge economy. The most recent Merseyside Economic Review (2011, p. 10) states,

"Despite a strong period of growth, GVA per capita in Liverpool City Region is still well below that of the UK. The gap currently stands at some £6,600 per capita. This is principally driven by a gap in productivity, caused by lower business density, lower skill levels and a predominance of occupations in lower value-added sectors".

	2002	2009	2015
Halton	118,800	123,600	126,500
Knowsley	150,500	147,100	147,200
Liverpool	443,800	457,500	478,600
St. Helens	176,300	175,300	177,600
Sefton	280,900	274,200	273,700
Wirral	315,100	317,800	320,900
Liverpool City Region	1,485,300	1,495,400	1,524,600

(Table 10: Liverpool City Region Population Breakdown / Liverpool City Council, 2015)

Now the city looks to reconnect to a new international economy standing next to other cities in the competition for global resources. Liverpool with a Super-Port, Liverpool as a knowledge economy, Liverpool as a tourist destination and Liverpool as a place to do business and to live, each illustrating in a boosterist sense, how the comeback city can once again be a productive part of an international order of cities. Even so, there is much to address as indicators of deprivation demonstrate with poverty remaining stubborn and many of its inhabitants unable to be included in new international opportunities for work and consumption. The story of Liverpool shows how internationalization and globalization can impact on a city. This is a narrative of global connection, retreat in the face of protectionism that led to long standing structural problems for the local economy. Only now are there signs of this being overcome and while Liverpool may be a unique case, it shows that different types of globalization can impact on localities in ways that appear beyond the control of local people.

6.2 Liverpool Attempts to Connect

In Liverpool a common response to questions on how the city-region was connecting to the global knowledge economy was an emphasis on how the digital and creative sector was driving the local knowledge economy. It has been estimated that the Liverpool City Region's creative and digital sector employs over 48,000 people in more than 6800 businesses (ACME, 2014). Those interviewed in the Liverpool city-region explained that a shift in national focus had driven Liverpool to place greater emphasis on the growth of creative and digital industries. This had led to some of those involved in the interviews, who themselves were active in the city-region knowledge economy campaign, to highlight how the digital and creative industries have been earmarked to develop and grow high value economic functions. In some cases, the digital and creative sector was mentioned whilst discussing the role and development of sector-based clusters across the city-region. One such place cited in this type of discussion was focused on what is known as the Baltic Triangle, an older

industrial location consisting of warehouses and other buildings associated with the docks, which until recently had lay in a depleted state.

> “Places are important. Not only in the sense of history or the attractiveness of the high street, that helps but in the new economy that you are looking at the expectations are different. The average consumer these days is well travelled and is quick to draw comparisons. Cities and regions do that as they build their offers, they explain why this city region is better than the other, but consumers do this too. They compare for instance how the Baltic Triangle compares to a similar cluster in the Silicon Valley or Helsinki. You have the convention centre, the Liverpool One development, rejuvenated areas such as Jamica street and Rope Walks and they all play a role in shaping the consumers perception but this comparison is not always one that Liverpool wins. The new economy is technology centric and the digital media sector drives this new economy. Places are seen differently; you have to think about what skills do they offer? What is the digital infrastructure like? How proactive are the entrepreneurship networks? Competition is high and the offer for your place needs to be compelling to attract businesses and tourists. It is not easy.”
>
> (LCR 1, 13/05/2013).

The Baltic Triangle is an historic port area of Liverpool bordered by Echo Arena, BT Convention Centre, Albert Dock, Liverpool One, Chinatown and Rope Walks (see Figure 5). For some it represents a reaction to the formal development activities such as those by the old Merseyside Development Corporation and the more recent Liverpool One retail outlet, whereby local entrepreneurs from the creative and digital sectors have coalesced in a bottom up approach to growth. The Baltic Triangle has over 400,000 square feet of accommodation - 90 % of which represents property that is privately owned and managed (Liverpool City Region Multi Area Agreement, 2009). The knowledge quarter, situated about one kilometre north from the Baltic Triangle, received a further £5.2 million from the North West Development Agency

(NWDA) and the Northwest European Regional Development Fund (ERDF) to fund a dedicated business hub by upgrading 30,000 square feet of office space supporting more than 60 businesses and at full capacity, allegedly contributing £1 million to Liverpool's economy every year for the area's creative and digital sector (ERDF, 2010). For some, this is evidence of how the creative and digital sectors in the city-region have not only produced an economic impact and stimulated new enterprises, it has also added to the local institutional infrastructure necessary to support connection to the global knowledge economy.

(Figure 5: Baltic Triangle / Baltic Creative, 2015)

For some who were interviewed, they recognized that although more traditional sectors such as financial services, tourism and retail had facilitated growth in the city-region economy recently that there was now an urgent need to develop a more sophisticated business infrastructure. One interviewee pointed to initiatives such as the new Bio Medical Research Centre, the University Teaching Hospital and the proposed establishment of the Liverpool Research Alliance, cited as steps in the right direction. Local HEI's include Liverpool John Moores University, Liverpool Hope University, University of Liverpool and Liverpool School of Tropical Medicine and boast a research portfolio of almost £300 million with strengths in advanced sciences, technology and engineering including accelerator science,

telecommunications and material science along with a range of environmental sciences specialisms (Liverpool Vision, 2013).

> "There has been a lot of investment and strategic thinking that has gone into developing regional infrastructure. All stakeholders following a period of austerity realized that to compete with other cities the regional offer just had to be enhanced. The squeeze in public sector funding is forcing private sector involvement. This has been hard in the past. It is hard to motivate the private sector when there is an expectation that regional readiness is the public sectors job. It is not easy with these challenges to compete with heavily subsidized regional offers from cities in China for example".
>
> (LCR 1, 13/05/2013).

The Knowledge Quarter benefits from a high concentration of students, which provide small creative businesses with a cost effective employee base whilst at the same time helping students obtain vital work experience. This has allowed for more collaborative work with industry to take place through universities (i.e. Art & Design Academy & Liverpool Institute of Performing Arts within the Knowledge Quarter). The proposed Liverpool Research Alliance seeks to encourage more attention on human capital and would aim to commercialize knowledge assets and promote incentivizes for academics (Liverpool City Region Multi Area Agreement, 2009). Parts of the university sector have important research and academic assets in digital technologies as well as research relationships with key corporates such as IBM and Sony. As one interviewee explained:

> "Liverpool Science Park, Liverpool Innovation Park and Daresbury Science and Innovation Campus are also important partners. AIMES and its data centre development on Liverpool Innovation Park add to the mass of digital strengths. These institutions are enabling like-minded people to get together and discuss sector issues that really matter. We are not trying to

> say that we have high-speed broadband anymore as part of our sell! Instead there is genuine state of the art research being conducted in the sector that the entire Liverpool Digital cluster has benefited from"
>
> (LCR 2, 12/05/2013).

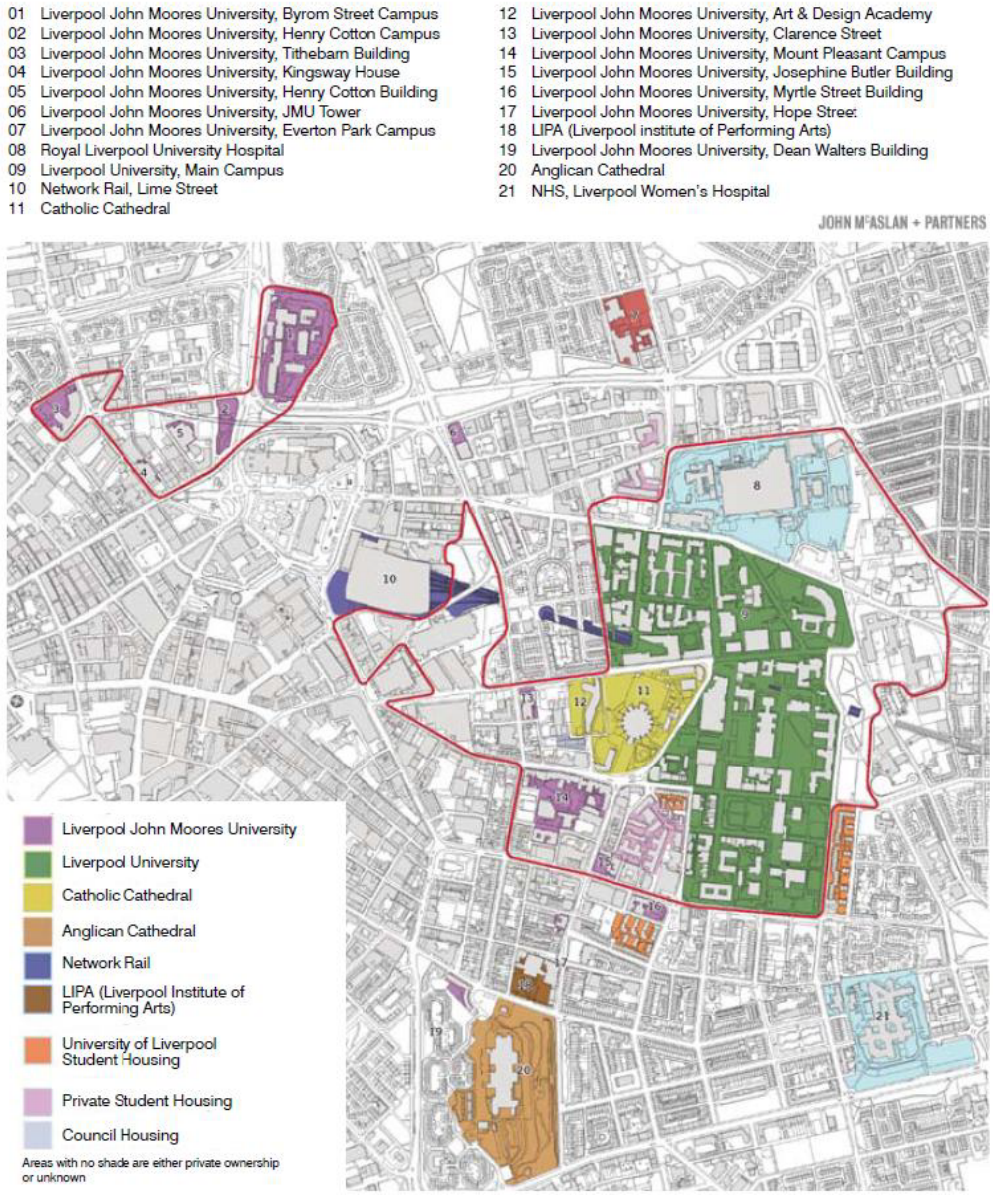
These points were expanded upon when an interviewee talked about how the Knowledge Economy Plan for the city-region was about developing innovation and creativity as cross cutting themes that would be relevant to all sectors and industries. In this respect the connection of the city-region to the field of accelerator science, instrumentation and supercomputing through the Daresbury Science and Innovation Centre based to the south of the city and on the borders between the Liverpool city-region and Manchester, in the Halton district. The Centre has 14,000 registered users of its laboratory services and has links with every research university in the UK (Liverpool City Region Multi Area Agreement, 2009).

Some of the interviewees highlighted the cluster effect produced by locating creative knowledge intensive companies around select growth zones. Here the Knowledge Quarter and Knowledge Corridor were often cited as critical sites whereby city-region could be developed by

> "blending knowledge based activities and [reviving] residential areas within the same environment to establish learning and knowledge as everyday features of life in the city, strengthening access for residents to learning and employment".
>
> (LCR 2, 12/05/2013).

Adding how knowledge assets across the city region are spread around in clusters serving as specialist hubs/commercial zones that result in the creation of areas of niche sectoral strength. Traditionally it was suggested, these creative urban zones

have been guilty of being restrictive and lacking ambition and this has also been the main reason behind limited knowledge spill over into neighboring commercial areas. The City Centre Strategic Regeneration Framework (SRF) had earlier identified the creation of concentrated areas of related activity as a major goal (Liverpool Vision, 2012). Having achieved this through the identification of specific clusters including the Commercial District, Castle Street/ Live-Work District, Cultural Quarter, Retail Core and the Hope Street Quarter, various schemes have been implemented to bridge the gap between sub-sector creative communities.



(Figure 6: Liverpool City Knowledge Quarter: Strategic Investment Framework / GVA Grimley, CAM SCI and John McAslan and Partners, 2010)

6.3 How is the Liverpool City Region Connecting to the Global Economy

The national Creative Britain Strategy (major component of the Creative Economy Program) was developed in 2008 to help move the creative industries from the margins to the main streams of the UK economy through a wide range of initiatives developing creative and digital skills at all levels (DCMS, 2008). The proposed initiatives received mixed reviews as questions were raised around how a realistic program of support can be delivered on a budget of £70.5 mn. for a highly productive sector with sophisticated development needs. This also represents the key challenge faced by economic development practitioners as developing cities with limited resources committed to specialist activities in knowledge intensive sectors struggle to keep up with the pace of economic change. The local digital media sector has witnessed significant growth of 20.3 % (please see Table 11), even as the region has tried to correct inherent macroeconomic weaknesses including economic activity within the working age population being 3.7% lower than the national average as well as the region needing 46,200 people to enter employment to match the national average (LEP, 2013). The city region also has a long standing deficit of people with higher level qualifications and above average proportion of people with no qualifications. The city region also contains 34 of the top 100 most severely income deprived LSOAs in England with 32% of all LSOAs being within the lowest 10% nationally (LEP, 2013). Therefore a significant focus of the development work within the city region to assist it connect with the global economy has been to improve regional infrastructure which has had a positive impact on knowledge intensive sectors.

Knowledge assets across the city region are spread around in clusters serving as specialist hubs/commercial zones that result in the creation of areas of niche sectoral strength. Traditionally these creative urban zones have been guilty of being restrictive and lacking ambition. This has also been the main reason behind limited knowledge spill over into neighbouring commercial areas. The City Centre Strategic Regeneration Framework (SRF) had earlier identified the creation of concentrated

areas of related activity as a major goal. Having achieved this through the identification of specific clusters [including the Commercial District, Castle Street/ Live-Work District, Cultural Quarter, Retail Core and the Hope Street Quarter (please refer to Figure 6)], various schemes have been implemented to bridge the gap between sub-sector creative communities. Policy makers have also finally realized the importance of universities as the main source of R&D providing vital enabling functions for the region's innovation supply chain. The region's universities have fine-tuned their entrepreneurial activities by establishing business development and interactive functions that make academic/conceptual research commercially viable through Business Gateway Teams and Development Centres. These bodies provide the intellectual collateral that has now started assisting regional development agencies in attracting more FDI as sectoral offers become well defined and more meaningful. There is however a fine line between these institutional assets complementing each other or limiting innovation to personal spaces. Martin & Simmie (2008) debate the importance of this institutional interaction by explaining how *"some of the most innovative local economies are marked by the complementary existence of open local, national and international networking"*. This networking – in order to be successful and result orientated – needs to focus on delivering mutually beneficial outcomes that raise the profile of all stakeholders involved.

	1998		2008		
Sector	**Jobs in LCR**	**% of all jobs**	**Jobs in LCR**	**% of all jobs**	**% change 1998-2008**
Advanced Manufacturing	49,399	9.0%	37,357	6.4%	-24.4%
Low Carbon	2,783	0.5%	6,172	1.1%	121.8%
SuperPort	23,126	4.2%	26,595	4.6%	15.0%
Financial and Professional Services	43,753	7.9%	71,167	12.2%	62.7%
Digital and Creative Industries	19,728	3.6%	23,724	4.1%	20.3%
Life Sciences	3,855	0.7%	3,607	0.6%	-6.4%

Public Sector	108,057	19.6%	117,884	20.2%	9.1%
Total	**250,701**	**45.5%**	**286,506**	**49.1%**	**14.3%**
All jobs	**550,388**	**100.0%**	**583,660**	**100.0%**	**6.0%**

(Table 11: Liverpool City Region Economy Shift Core Knowledge Sectors (1998 – 2008) / Local Enterprise Partnership, 2010)

GVA Sector Total	Liverpool City Region (£ mn.)
Creative & Digital Industries	1436.8
Advanced Manufacturing	2085.8
Low Carbon	344.6
Financial & Professional Services	4310.2
Life Sciences	201.4

(Table 12: Estimated GVA Contribution of Core Knowledge Economy Sectors in 2008 / Annual Business Inquiry, ONS Crown Copyright from NOMIS)

The regional strategy for knowledge development and growth can only be successfully implemented around a realistic structural framework. Knowledge intensive sectors now form the backbone of the region's economy (please refer to Table 11 and Table 12) and are a vital component of both its short term (dealing with the burden of recession and limited public funding) and long term [building a world class knowledge economy through targeted investment in commercial infrastructure and core knowledge assets (please refer to Figure 13)] economic development strategy.

Sector/Specialism	Knowledge Asset
Bio-medical/Life Sciences	▪ Liverpool Biomedical Research Centre ▪ Clinical Trials Research Centre (CTRC) ▪ The Centre for Medical Statistics & Health Evaluation (CMSHE) ▪ MRC NW Hub for Trial Methodology Research ▪ Wolfson Centre for Personalized Medicines ▪ MRC Centre for Drug Safety Science ▪ UK Medicines for Children Research Network ▪ Liverpool School of Tropical Medicine
Public Health: Sports Science	▪ Centre for Public Health (LJMU) hosting the North West Public Health Observatory (NWPHO) ▪ School of Sport & Exercise Sciences
Materials Science: Environmental Technologies	▪ Centre for Materials Discovery ▪ The Virtual Engineering Centre ▪ Research Centre for Built Environment & Sustainable Technologies (BEST) ▪ General Engineering Research Institute (GERI) ▪ Radio & Microwave Frequency Group (RFM) ▪ Agility & Supply Chain Management Centre
Digital & Creative/ ICT	▪ Liverpool Science & Innovation Parks ▪ International Centre for Digital Content ▪ Skillset Media Academy - Liverpool Screen School (LJMU) ▪ Semantics Web Technologies Laboratory – University of Liverpool ▪ Foundation for Art and Creative Technology (FACT) ▪ Creative Campus – Hope University ▪ School of Computing & Mathematical Sciences (CMS) - LJMU ▪ Art & Design Academy (LJMU) ▪ Advanced Internet Methods & Emergent Systems (AIMES) – University of Liverpool ▪ Education, Innovation & Enterprise Centre (Hope University) ▪ Daresbury Science & Innovation Campus ▪ Centre for Health & Social Care Informatics (CHaSCI) - LJMU ▪ The Cockcroft Institute (International Centre for Accelerator Science & Technology – AST)

(Table 13: Liverpool City Region - Major Core Knowledge Assets)

For purposes of connection, it is these key knowledge resources that would need to be repackaged so as to create a value proposition that could enable the city-region to compete in the global knowledge market. However, while the idea of the knowledge economy fits into the globalized world of free and unfettered markets, some interviewees in our older industrial city-region noted that the substantial reduction in support funding post Great-Recession was impacting on how development might take place. One interviewee suggested that Coalition austerity had "hit regional growth plans hard due to the restrictions imposed by the coalition government marginalizing the role of development and investment support agencies" (LCR 2, 12/05/2013). Adding further:

> "We were all expecting things to change after the economic downturn but the reaction and ramifications of this have been huge. Liverpool was consistently building its reputation and asset base through the European Capital of Culture phase and the economic boost supplied through ERDF funding. A lot of the business landscape and sector infrastructure has altered in the past 2 to 3 years. The Mersey Partnership was driving the Knowledge Economy plan from the outset but the recent reshuffle and upheaval has left things a bit confused. In order to make significant strategic change as well as obtaining the approval of all stakeholders, a stable environment is needed. In recent months most conversations have been about lay-offs, redundancies, austerity and the need to be careful where and when funds are being spent. I would not say that the economic climate has taken the wind out of all proposed action plans and growth strategies but it has made it more challenging to see the results that we were expecting. To obtain these will now need more time".
>
> (LCR 2, 12/05/2013).

Both digital and creative sector specialists interviewed for this research project cited the lack of resources and funding avenues to assist both sector groups and individual companies. From an ideal type perspective, we see here issues with supply of finance as key agencies such as NWDA, which historically played a key

role in the management and delivery of assistive funding schemes, have been disbanded bringing to an end several programs operating under the Northwest Operational Programme (ERDF, 2013). From an ideal type perspective, there were a number of benefits of this assistive funding delivered under the NWOP programme in the form of grants, loans or venture capital towards project costs. This included attracting new investment by subsidising operational and setup costs which allowed the local city region to compete with its more established counterparts. In addition, a key requirement of receiving funding under the NWOP programme was the need to secure match funding from other sources given that NWOP funding rarely exceeded 50% of the eligible cost (ERDF, 2013). This meant that the remainder of the funding had to be sourced from other institutions including local authorities, local investment agencies and the private sector. This promoted a more joined up approach between local agencies increasing thickness of local institutional infrastructure (Amin and Thrift, 1995; Beer and Lester, 2015) through partnership working as well as increasing the involvement of the private sector which has historically been an area where the region has struggled (Liverpool City Region Multi Area Agreement, 2009). From an ideal type perspective, this institutional infrastructure was better suited to lead to strong linkages between local agencies, academic institutions and the private sector which is a key feature of developed knowledge economies.

This in turn has had a negative impact on regional attractiveness for greenfield investment as well as incentives for start-ups and small businesses. In order for knowledge economies to develop, plans need to be translated into actions. Clusters provide economies of scale for ideas and innovation through the sheer amount of complimentary activity that takes place when the entire value chain of an industry or sector is bundled together (Acs and Mueller, 2006). However, to benefit from this, policy makers will need to ensure that local agencies have both the financial resources and decision-making autonomy to support knowledge intensive businesses and sectors. One of the interviewees highlighted how helping Liverpool City Region connect with the global knowledge economy was more than developing strategy, it was more about understanding the core competencies within high growth sectors such as life sciences:

> “I don’t think that anybody has significantly thought about precisely what comprises the knowledge economy particularly the knowledge economy of Liverpool in this case. There may be priority sectors that are the USP for the region but you can argue that these will flourish and survive with or without a knowledge economy strategy being in place. I mean there’s slight variations about, but that doesn’t really matter, does it? Your city’s relationship with key global players will be the same in key sectors if they are meeting the standards expected by the global market. I mean I suspect the principles are probably very similar, but some of the knowledge areas might be very different; it might be life sciences and chemical sciences in one place, and health care and international aid in another”.
>
> (LCR 3, 16/09/2013)

In addition, some interviewees pointed out how it was important to encompass local success stories within the Liverpool brand and work towards scaling these initiatives to be globally significant:

> “I think we need to develop Brand Liverpool which should encompass all core strengths of the city’s investment offer. Liverpool Sound City is one such initiative where we saw sector leaders tap into the business side of our creative offer. You had your traditional ticket sales for people who were attending venues to enjoy gigs but you also had a big turnout of those who attended the business conference and related events where delegates included representatives of big labels such as Universal Music and Sony BMG looking for the next breakthrough act on the line up. The concept has now seen out 6 successful years and has got people talking about Liverpool. We need to capitalize on this opportunity, as you are not just looking at increasing the scope and range of regional business activity, you are looking to change how people perceive the Liverpool brand. That is the real challenge”.

(LCR 1, 13/05/2013)

Another interviewee highlighted how it was important for the region to define its knowledge economy by highlighting what makes it unique:

> "there has been a lot of talk about the knowledge economy, but it has probably been the same groupings of people in every sitting. Those who want to know about it will do something about it, and those who are in the academic world will inadvertedly pay more attention to understanding the knowledge economy as a phenomenon and then it becomes slightly academic in how it is being talked about and discussed. At the same time, over the last few years people have started to see it as a sector, and they define it in slightly different ways and they try to put numbers on it in relation to performance through KPIs etc. So as soon as we start talking about it as a sector of its own you now have to redefine it and put real numbers on it, and have real aspirations to grow and make it happen. So Liverpool has to do something, it can't afford not to, but I'm not sure that it'll be unique. Every place will talk about their knowledge economy and that's okay, but Liverpool has to define its own knowledge economy and what it needs from it, and what helps them make it work for Liverpool. We're not necessarily the same as Leeds, or the same as Nottingham or Derby, we're very different and that doesn't matter because it's what that means to Liverpool.
>
> (LCR 3, 16/09/2013)

Whilst another interviewee stated:

> "The lack of a responsive infrastructure is a big problem when it comes to selling Liverpool's knowledge economy. I have worked for both the local regional development agency and UK Trade and Investment so you get a

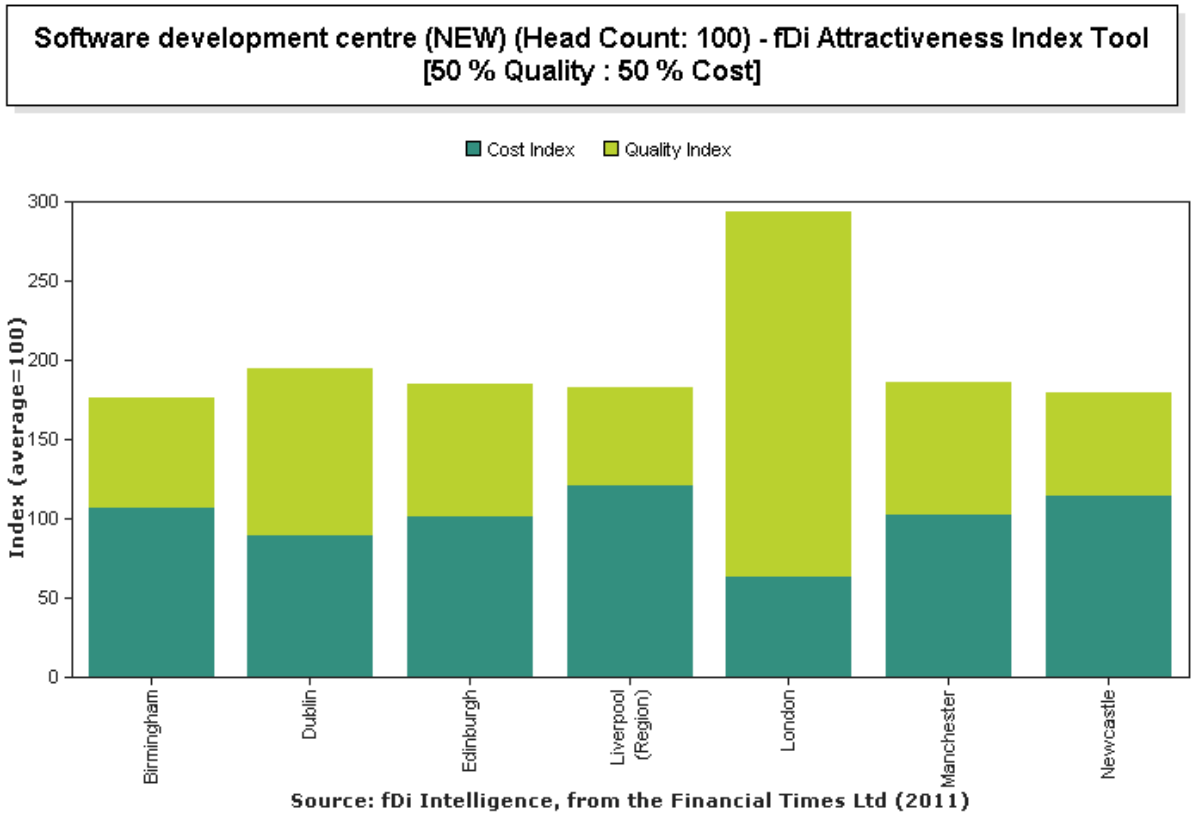
> pretty good idea of how a city offer compares to other competitors both nationally and internationally. When I was trying to sell Liverpool's knowledge sectors, particularly digital and creative media, I felt we had enough raw talent at various levels of management within the sector to get key market players to look at Liverpool as an investment location. However when I moved to UKTI, the difference in quality of proposals submitted by investment agencies in Liverpool in comparison to other national locations was significant. I was getting glossy brochures along with other information needed on time and with sufficient level of detail to have a shot at being put in front of international companies whereas Liverpool's responses always left a lot to be desired" (LCR 4, 13/05/2013)

From an ideal type perspective, a clear understanding of regional strengths within local knowledge intensive sectors is vital. The evidence base of local clusters of knowledge intensive businesses, R&D, and supplier networks is limited and lacks the sophistication possessed by its more developed counterparts. This could partly be attributed to the significant transition that the region's institutional infrastructure has gone through which includes the ownership and delivery of the Knowledge Economy Plan part of the Liverpool Multi Area Agreement (Liverpool City Region Multi Area Agreement, 2009). The interviewees highlighted the importance of establishing an effective innovation structure that helps commercialize emerging technologies through a planned system of support during each stage of the development process. Furthermore, there is also a need for creative enterprises to be driven by the private sector in order to ensure that a majority of outputs are economically significant (i.e. having a consistent regional branding element to all products/services developed in the region). The Knowledge Quarter represents synergies derived from innovative businesses with shared supply chains surrounded by a number of high quality knowledge assets. The Knowledge Quarter also benefits from a high concentration of students which provide small creative businesses with a cost effective employee base whilst at the same time helping students obtain vital work experience. This has allowed for more collaborative work with industry to take place through universities (i.e. Art & Design Academy & Liverpool Institute of Performing Arts within the

Knowledge Quarter). The three main universities also serve as interface between industry and creative talent (i.e. the Innovation Academy at University of Liverpool Management School). North West Development Agency's Innovation Vouchers scheme enabled businesses (particularly SMEs) to access the region's knowledge base for knowledge support up to £7000. The scheme has now ceased to exist along with the Grant for Research & Development. It is vital to replace these initiatives avoiding extended interim delay periods which would take away from the collaborative momentum generated in the past few years. The proposed "Liverpool Research Alliance" is aimed at placing more attention on people assets and would aim to commercialise knowledge assets and promote incentivisation of academics (Liverpool City Region Multi Area Agreement, 2009). This may assist in further developing existing knowledge networks created through a collection of minor schemes. It would also unify branding activity for the city's academic assets by providing a single platform for key stakeholders to market their research outputs. The interviewees also highlighted the divide between the public and private sector as a significant issue:

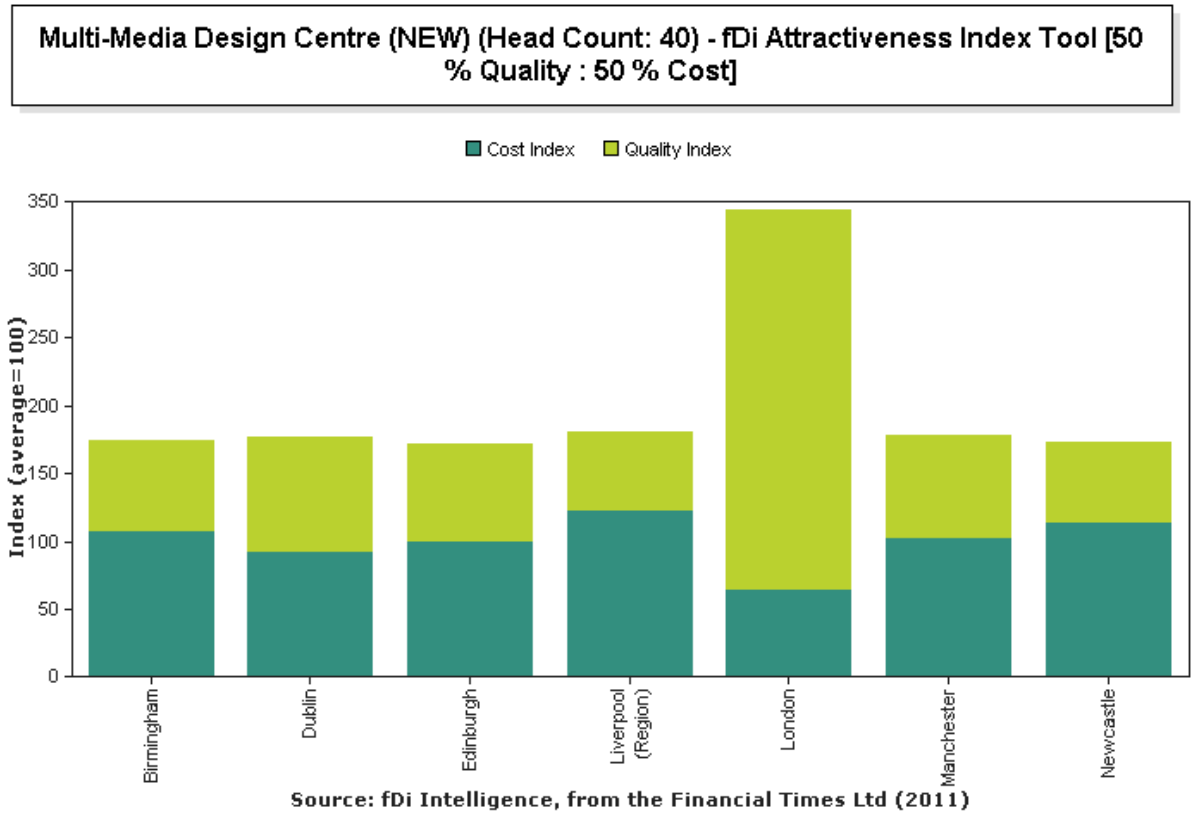
> "That's the frustration of the private sector; that there's green and blue economy and that everybody keeps talking about them, but nobody really gets to the crux of them. You know, do you think that this kind of snapshot mentality that says –' let me look at the baseline aspects of that', and then say –'what are the triggers, what are the main variables?' and then that is deemed sufficient, or is there a need, and this comes back to one of my themes; do you think that the significance of the knowledge economy, and you've alluded to this in one of your earlier answers, do you think that the significance of the knowledge economy, particularly with regards to Liverpool, has increased recently, in that people are talking about it? And if it has, do we think that there is a need now to really dig deep and try and connect this concept that it may skewed to those who are anal about it; through the private sector, through companies, through private entities?"
>
> (LCR 3, 16/09/2013)

The technolization of knowledge links, networks and systems has arguably led to the most significant addition to the balance sheet in the 21st century - tacit knowledge. The UK is an example of a nation positioning itself higher up the value chain with increased focus on employment in high value industries. This is a strategy vital to high cost economies – higher cost of manufacturing goods and services – where it is not financially feasible to compete with global competitors on the basis of price. This requires a substantial increase in the sophistication of products and services (Porter and Ketels, 2003). The interviewees also highlighted the need to understand the comparative strength of regional assets in relation to the national creative industry to build a stronger proposition for the region's creative industry. An example of this in the field of accelerator science, instrumentation and supercomputing is the Daresbury Science and Innovation Centre with 14,000 registered users of its laboratory services in addition to having links with every research university in the UK (Liverpool City Region Multi Area Agreement, 2009). The region has also been home to Sony Computer Entertainment Europe's (SCEE) European headquarters along with other major industry names including Rebellion, 3D Creation Studios, Evolution Studios, Silicon Graphics Inc (SGI), Sun Microsystems, IBM, Lime Pictures and River Media. Liverpool City Region's creative cluster has consolidated its position building upon the foundations developed during the 2008 European Capital of Culture campaign. During this period, the sector benefited from multi million pound national grants assisting in the development of knowledge networks including the Liverpool Arts Regeneration Consortium and the Small and Medium Arts Collective along with the Arts and Culture Network (Garcia et al., 2010). These initiatives have helped develop vital communication networks that have allowed businesses to take advantage of dedicated support services resulting in increased investor confidence. It is this investor confidence that has raised the region's profile allowing it to compete against its better resourced counterparts. However, the region can only become an internationally significant knowledge economy if activities in its core world class knowledge assets can be replicated at a larger scale across all local sectors. Outputs from benchmarking utilising FDI Benchmarks from Financial Times (please refer to Figure 7 and Figure 8) suggest that even though the region is highly cost-effective (with lowest operating costs for setting up both a software development centre and a multi-media design centre compared to select national locations), quality levels are still lagging behind the national average.



City	Qualitative Score	Operating Cost Index	Operating Cost Value	{ x , y }
Birmingham	69.58	89.92	3,864,974.61	{ 69 , 89 }
Dublin	105.64	106.87	4,593,837.51	{ 105 , 106 }
Edinburgh	83.32	94.69	4,070,135.68	{ 83 , 94 }
Liverpool (Region)	62.71	79.53	3,418,440.11	{ 62 , 79 }
London	230.18	151.55	6,514,352.01	{ 230 , 151 }
Manchester	83.04	93.26	4,008,890.66	{ 83 , 93 }
Newcastle	65.54	84.18	3,618,590.54	{ 65 , 84 }

(Figure 7: Liverpool City Region Cost/Quality Comparisons - Investment Attractiveness Analysis - Software Development Centre / FDI Intelligence, from the Financial Times 2011)



City	Qualitative Score	Operating Cost Index	Operating Cost Value	{ x , y }
Birmingham	66.63	89.65	1,918,203.73	{ 66 , 89 }
Dublin	85.9	104.99	2,246,400.21	{ 85 , 104 }
Edinburgh	71.96	96.26	2,059,685.60	{ 71 , 96 }
Liverpool (Region)	58.39	78.96	1,689,611.22	{ 58 , 78 }
London	280.94	151.43	3,240,072.18	{ 280 , 151 }
Manchester	76.74	94.33	2,018,373.26	{ 76 , 94 }
Newcastle	59.44	84.39	1,805,621	{ 59 , 84 }

(Figure 8: Liverpool City Region Cost/Quality Comparisons - Investment Attractiveness Analysis - Multi-Media Design Centre / FDI Intelligence, from the Financial Times 2011)

However, regional readiness to connect with the global knowledge economy also depends on the ability of local businesses to embrace new technologies and enhance the sophistication of their products and services as explained by one of the interviewees:

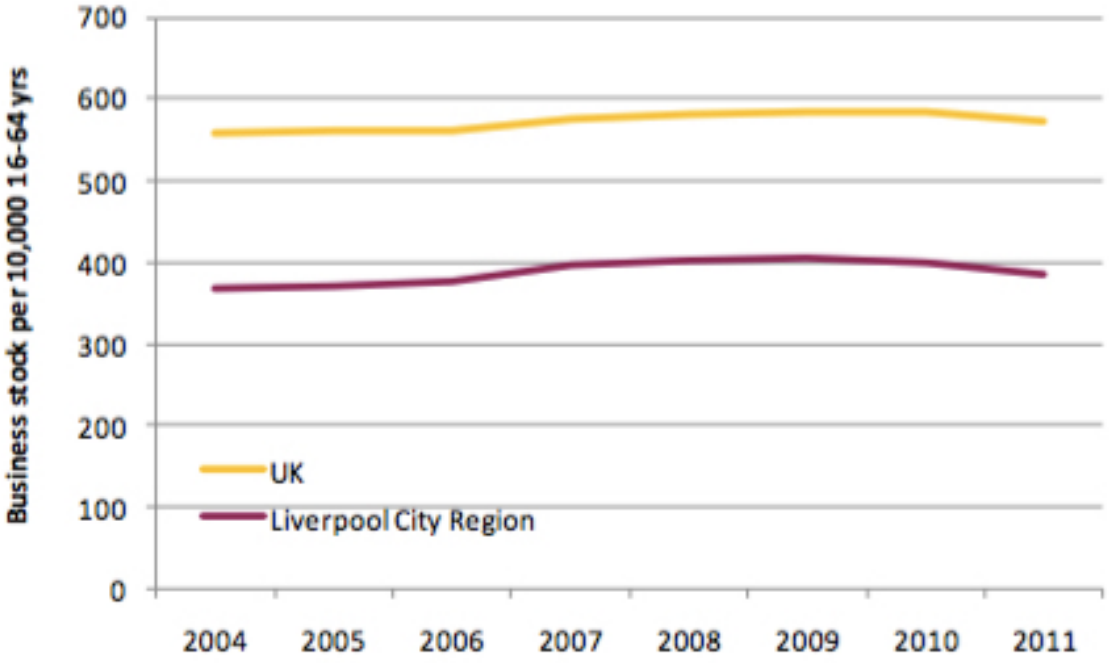
> "You know, it's not too difficult to draw up a list of new or about to be new technologies, and then make some sort of assessment of where say the Liverpool city region lies within them both in terms of attracting investment and employment, and the reverse as a threat to that. What's often overlooked is that a number of these technologies do require quite radical changes in business organization. So it's not just talking about some Gee-Whizz technology. I mean let's have a look at where in Liverpool it could be taken up by a company in order to boost jobs and growth. Actually it's the company itself, which is part of the issue. First of all, do they actually understand what the technology is all about? Do they understand the ways in which they may have to adapt their own business practices, and company organization is also crucially exploited and so on and so forth. So advanced manufacturing is a classic example of that, and companies that will take advantage of the opportunities proposed by advanced manufacturing, and that's not going to be a question of simply taking up technology into the factory on a business as usual basis. So you have to look at it the other way around. You have to look at it by putting the two together; where does the capacity lie within the business base on Merseyside and the Liverpool city region to pick this up? And how adaptable are those businesses to it, whether you're talking about the SME sector or the big corporates".
>
> (LCR 8, 13/09/2013)

It is also important to better understand the impact competition in companies and in sectors may have on the transfer and development of knowledge that is created locally.

> “competitors can sometimes inhibit new technologies. Although I think that, certainly the big corporates understand that, there is pre-competitive collaboration. Which doesn’t mean to say that you’re not competing with other companies in the same sector. So, you know, you might see that Unilever will happily collaborate with Proctor & Gamble over some basic science or development of some new technologies such as, I don’t know, new chemical formulations let’s say, even though they’re at each other’s throats once you start turning that into a product. But that’s one perspective on that. The other one actually is that there is a difference between technologies and sectors. Companies do indeed tend to think in terms of sectors, but one of the disruptive aspects of modern technological innovation is that it doesn’t respect sectorial boundaries. So it’s not the case, and I go back to advanced manufacturing again, it’s not the case of producing a better widget, and one car company wondering how it can get to market with this widget before a competitor does. Actually what’s involved in advanced manufacturing is a process, or set of processes and innovation, which transcend any one particular sectorial application. So I mean a stupid, silly example would be, you know, information technology”.
>
> (LCR 8, 13/09/2013)

However, Liverpool City Region has a significantly lower business stock rate than recorded nationally. Business demography figures support the strategic imperative of growing the business base through start-ups; a considerable gap exists between local start-up rates and the national average (Liverpool City Region Multi Area Agreement, 2009). Figures on business stocks per 10,000 16-64 year olds provide an indication of business density in an area, as well as the competitive pressures in an economy. Differences in competitive pressures can be a factor in determining variations in economic growth performance between regions (please refer to Figure 9). From an ideal type perspective, this is a critical juxtaposition as where on one hand the region has managed to successfully develop a niche knowledge intensive digital media cluster, it still faces serious challenges in relation to low employment rates and output per person in terms of gross value added (Liverpool City Region

Multi Area Agreement, 2009). On closer inspection, we see how the evolution of the digital media sector has not simply been the result of concerted policy development by local stakeholders rather other economic factors have played a key role. Liverpool's history of video game making can be traced back to the studios owned by Sony, Bizarre Creations and Evolution. Studio Liverpool shut down in 2012 leaving about 100 game experts looking for jobs or companies to found (Hellier, 2016). These individuals were able to help create a nationally relevant cluster of games companies that has provided a blueprint for other local knowledge intensive sectors to be able to connect with the global knowledge economy. However, from an ideal type perspective, there is an expectation that a city region is able to create and sustain a high density and supply of finance to support innovation and knowledge creation. In addition, the city region also requires a constant supply of in-demand graduates as well as skilled tertiary labour. The reality is that Liverpool city region has one of the highest proportions nationally of residents with no formal qualifications along with low rates of GCSE attainment (Hellier, 2016). It is therefore vital to increase the skill levels within the region to help stimulate a culture of entrepreneurship within the region. The region requires a robust institutional infrastructure along the lines of that detailed within the ideal type chapter in order to replicate the results of the digital media cluster within other local clusters.



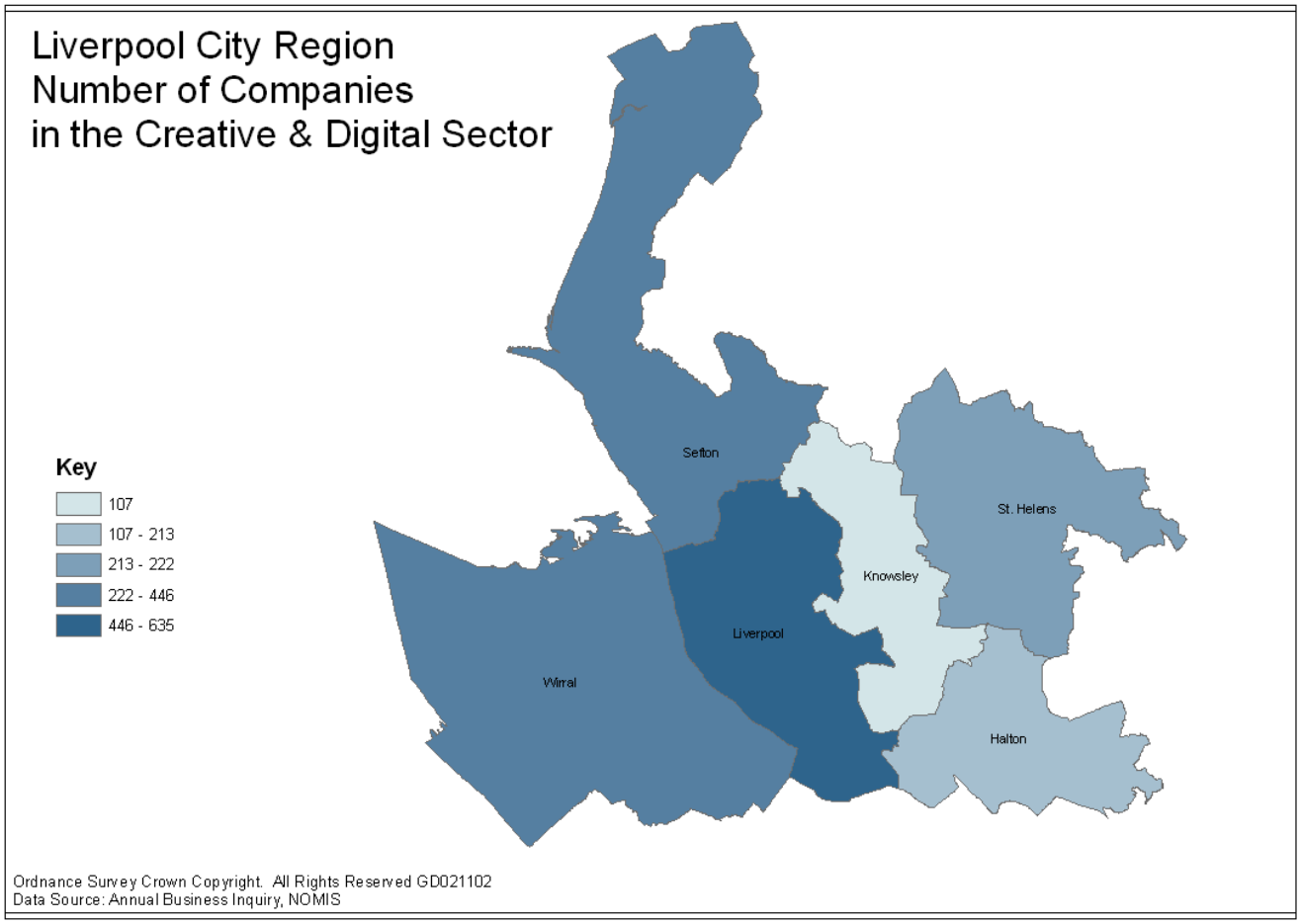
Source: Office for National Statistics, Business Demography & Populations Estimates

(Figure 9: Business Stock Rates Liverpool City Region / ONS, 2012)

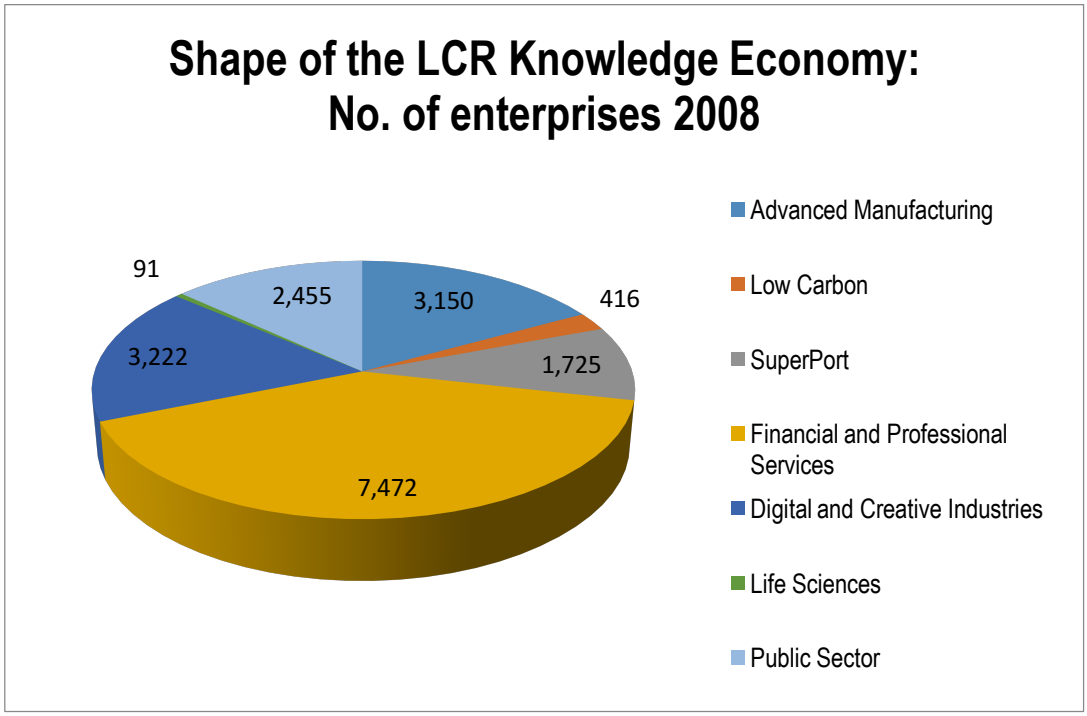
One of the interviewees explained how there is a need for sustained focus on promoting entrepreneurship to help boost the city region as a knowledge economy:

> "We keep talking about FDI, big businesses and how it impacts our brand. We forget that we have start-ups and small businesses, young graduates coming out of universities having a lot of potential in them and their ideas but needing a lot of help. This would be easy in Oxford and Cambridge but not in Liverpool. We need to look at this. We need to stop trying to compete on cost, stop saying that it is cheaper to set up in Liverpool. We need to promote and develop high quality local skills, local graduates and young professionals, as surely this is a double win. I mean this is attractive to big business as they want this infrastructure, this business environment, but you are also developing the place, not just filling the place!".
>
> (LCR 6, 22/05/2013)

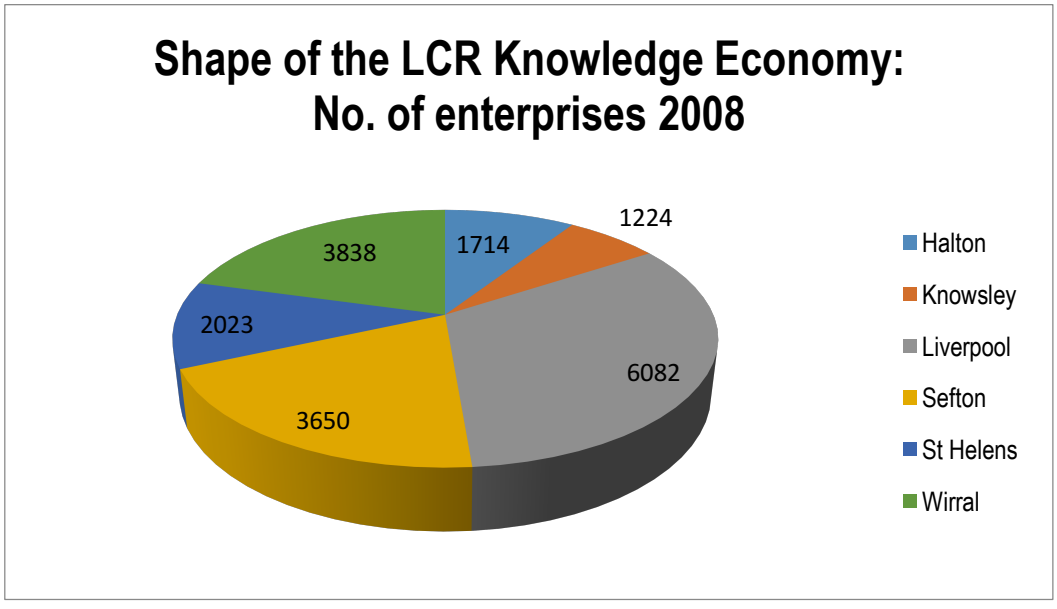
A significant majority of creative and digital businesses in the city region are small and medium sized. On closer inspection it is also evident that the core cluster originates from Liverpool (please refer to Figure 10) spreading through to other Local Authorities through specific knowledge assets. The remaining local authorities' benefit from close socioeconomic linkages (Wolfe & Gertler, 2004) with Liverpool, providing creative businesses with greater scope as each local authority provides a different proposition developed around their key knowledge assets. However, economic development practitioners agree on the role of Liverpool (also being the city region's leading foreign direct investment destination) as the central hub (please refer to Figure 12) with the knowledge quarter serving as the enabling source for other clusters across the city region.



(Figure 10: Creative and Digital Industry Enterprise Intensity across Liverpool City Region / Annual Business Inquiry, ONS Crown Copyright from NOMIS)



(Figure 11: Sectoral Breakdown of Knowledge Intensive Enterprises Liverpool City Region / The Mersey Partnership 2010)



(Figure 12: Knowledge Intensive Enterprises at Local Authority Level / The Mersey Partnership 2010)

Knowledge intensive products and services lead to greater demand for high value professional occupations which drive the pace of economic growth. Successful knowledge economies require sector leaders who have the ability to identify growth opportunities and react accordingly. In order to attract this level of talent, regions' need to incentivise their inward investment and recruitment structures with greater opportunities for career growth. Liverpool City Region has been able to successfully attract investors in high growth knowledge intensive sectors which has raised the quality of management skill base in the area, providing leadership options for key development initiatives. However, the city still suffers from leadership issues in the creative sector along with the drain of local talent to Manchester and London (Liverpool City Region Multi Area Agreement, 2009). There is also further pressure exerted on the sector to recruit top industry talent as the city struggles with a negative cycle of worklessness (over 240,000 people in the region are economically inactive), benefits, poor educational attainment resulting in around "24.5 % of super output areas in the region appear in the top 5 percent of the 2007 Index of Multiple Deprivation's most deprived area" (Liverpool City Region Multi Area Agreement, 2009). The European Capital of Culture campaign in 2008 addressed these issues by targeting deprived areas as development spots. Furthermore, economic development in the case of Liverpool City Region has taken place simultaneously with urban regeneration which in itself is a major challenge. The £12 mn. Ropewalks project to transform the Baltic Triangle area into a thriving creative cluster is a prime example of how Liverpool City Region's creative industries have in modern times been synonymous with economic development. There is now a need to build upon these strengths by extending successful development strategies to other clusters across the city region with high growth potential but low levels of development support. Interviewees within local agencies reaffirmed the commitment to achieving this ambition:

> "the sector development plans that we have developed and are now in delivery mode will, and are impacting on inward investment. High level projects that are now committed through planning permissions and institutional investment eg Superport, Mersey Gateway and the Knowledge Economy new build for the hospital and the bio-campus are proving the case

for inward investing companies and home grown companies. It is much aligned to groups of business and public sector personnel gather to influence and shape the sector within the immediate location. The NorthWest Automotive Alliance group is an example of working together to grow and manage the sector in the immediate area, it's not just about Jaguar, it's about the supply chain and making sure it is sustainable. On the back of such a group we find that the supply chain companies are encouraged to located and invest into the region, there is automatic support and track record for companies in this sector to establish and benefit from the local culture in their sector. Similar examples can be quoted for Life Science, Maritime and Visitor Economy".

(LCR 2, 12/05/2013).

Another interviewee stressed the importance of developing local infrastructure and knowledge retention within local supply chains to boost the city regions knowledge economy:

"It's complex; there's some correlation between the knowledge economy as a sector, and the elements that it does, in some ways (although the knowledge economy has been related to the business sector at some point). It's not superior knowledge, it's knowledge applied to something, and the more it can be applied to the great parts and the aspirational parts of Liverpool's economy; fantastic. It's a double win as you get the knowledge economy as a subsidy of some parts of the business sector… without which these other economies might not even move. You might get the car industry moving somewhere else, but the knowledge economy isn't. The automotive industry is now going to be based in Birmingham, so it ends up being connected through supply chain, or through innovation, but defining where the knowledge economy is, and what it means to the economy not just in its own right, but as the economy of a place. I mean at one end you've got economy and research,

right the way through to supply chain and other widgets, and all points in between potentially".

(LCR 3, 16/09/2013)

It can be argued that geographically concentrated industry activity creates pools of skilled labour and specialized suppliers, and increases opportunities for knowledge spill overs (Alcacer and Chung, 2010). However, these spill overs are not always localized and with the rapid evolution in information and communication technology, these spill overs are taking place across borders.

"I think the World Expo in Shanghai and Liverpool's presence there has opened several doors. I don't think it had any real impact on FDI yet but we did start seeing how important it was to push buttons with investors not just by existing or selling the same sector offers the same way. We needed to connect the best bits about Liverpool as an investment location and then go fit those best bits with the needs of others in an environment where we are up against international cities trying to achieve the same thing"

(LCR 4, 13/05/2013)

However, businesses within the hi-tech sectors such as digital media provide a contrasting view as explained by one of the interviewees:

"I don't know if proximity makes much of a difference to be honest. A lot of the work and contracts we have got have been a result of engaging with the right people at the right time. A lot of my recent contracts have come from the States, which have been the result of successful working relationships in the past or through link ups at global industry events where people with problems meet people with solutions. The great thing about our sector is we don't have

> the confines of traditional sectors in terms of being realistic about our target market. Creative products or software designed in the UK is just as relevant and marketable in any other country or market, we just need to be fulfilling a need for the greatest number of people possible"
>
> (LCR 6, 22/05/2013)

Therefore, there needs to be a sustained focus in developing an institutional infrastructure that is self-sustaining and can be replenished through local knowledge intensive actors including entrepreneurs and businesses. As in order to understand the role of institutions within an economy driven by knowledge, it is important to understand the interplay between its core constituents. It is also important to develop an understanding of the economy as something more than a collection of atomised firms and markets driven by rational preferences and a standard set of rules (Amin, 1998). Instead the economy emerges as a composition of networks and collective influences which shape individual action; a highly diversified set of activities owing to the salient influence of culture and context; and subject to path dependent change due to the contribution of inherited socio-institutional influences. In other words, if knowledge is the new main factor of production then like its older counterparts, there should be a continuous focus on how to sustain and replenish it, as well as become more efficient in managing its core constituents. Whilst there is evidence of embryonic startups in the Liverpool city-region, there is less support to show that these transform into larger, growth-oriented businesses.

6.4 Conclusion

In this chapter we look at our final empirical case of Liverpool city region analysing the contexts in which local agencies are preparing their place to connect with the global knowledge economy. We see how the city region has for a considerable period of time been struggling with economic challenges including a gap in productivity, low business density and a predominance of occupations in lower value

added sectors. In addition, local agencies have had to face a long period of uncertainty following the 2008 credit contraction in the global economy which led to a significant reduction in central funding for the city region. Whilst it has been challenging for local agencies to maintain their focus on developmental strategies within key priority sectors, we see that the local digital and creative sector has been able to sustain its role as a high tech knowledge intensive sector that has been earmarked to develop high value functions.

Whilst the digital and creative and life sciences sectors provide an opportunity for long term growth in high value jobs and skills, the region will need to improve the quality of its critical local infrastructure to deal with pressing issues such as high levels of worklessness and low education attainment in low output areas. We also see how the strategic focus of the city region is shifting from traditional sectors such as maritime, tourism, financial services and retail to knowledge intensive sectors such as life sciences, digital media and low carbon energy (Liverpool City Region Multi Area Agreement, 2009). The city region has also benefited from significant investment within its local logistical infrastructure during the European Capital of Culture Campaign which resulted in substantial increase in visitor numbers as well as raising the global profile of Liverpool (Garcia et al., 2008). Key strategic priorities for the future include development of local enterprise, business infrastructure, skilled workforce and sustainable communities (Liverpool City Region Multi Area Agreement, 2009). In order for Liverpool city region to realise these strategic ambitions, local agencies will require both the financial resources and decision-making autonomy to support knowledge intensive businesses and sectors and raise the economic profile of the region. This in turn will facilitate the connection with the global knowledge economy.

Chapter Seven

Synthesis Chapter – Comparing the Empirical Cases to an Ideal Type

7.0 Introduction

We looked earlier at what makes up a city region knowledge economy. We also considered the theoretical aspects of knowledge as an economic commodity and intellectual capital, role of local institutions within knowledge economies and the connection of a city region to the global knowledge economy. We also looked at an ideal type of knowledge economy and the key characteristics that are vital to it. It is important to note that in this chapter, we are not trying to compare Dubai City Region to Liverpool City Region. Instead, we are looking to compare both cases to an ideal type of city region knowledge economy as discussed in earlier chapters. We have looked at a city-region in a newly emerging economy, Dubai and a city-region in an older industrial nation in the north of England, Liverpool. Where on one hand Liverpool is an old maritime city region suffering a long period of decline from a position of global importance in the 19th Century, Dubai is a relatively new economy that has experienced a rapid transition from an economy driven by a modest fishing and pearling industry to becoming a global destination supported by tourism and an affluent UAE federal government. Where Liverpool may think of itself as a national contender given its aspirations and long term strategic initiatives, we find that there is significant ground that needs to be covered in relation to further developing certain key traits highlighted within our ideal type construct. On the other hand, Dubai presents as a global destination backed by a ready supply of finance to stimulate multinational inward investment activity supported by substantive investment by the local government in its technological infrastructure. This being said, it has been challenging for Dubai to stimulate indigenous growth and there has been negligible progress in the size and scope of existing relatively under resourced local startups and small businesses.

In addition, we also look at the key research objectives identified in the context of both cases in comparison to an ideal type of city region knowledge economy. We find that there are barriers to an ideal type connection to the global knowledge economy. We evaluate these weaknesses and short comings in relation to both Liverpool and Dubai City Region, using the ideal type construct as detailed in the table below which characterizes the important aspects of an ideal city region knowledge economy.

Characteristic	Emphasized detail
High tech economy	Evidence of embryonic start ups that transform into larger businesses
Institutional backing	The 'thickness' of state and quasi-state institutions that through their connections, provide the environment for knowledge intensive business growth
Knowledge intensity	Evidence of clusters of knowledge intensive businesses, R&D, and supplier networks
Quality of R&D	Evidence of this in sectors identified as globally important, such as biotech, life sciences and software
Supply of finance	Includes the density and sustainability (of supply) of finance to support innovation and knowledge creation, such as Venture Capital finance
Supply of skilled labour	In particular, a supply of in-demand graduates but also skilled tertiary labour provision
Proximity to growth cities	Such as London to allow access not only to markets, but state provision such as transport systems; also note debilitating effects on 'quality of life' issues when growth overheats
Ability to self-reflect	As part of the institutional thickness the institutions and actors involved become part of the 'learning' city-region through reflecting on what works

7.1 Dubai and Liverpool City Region: Comparison to the Ideal Type

It can be argued that knowledge has not suddenly become economically significant but that rather it is the new ways in which knowledge has become important economically that matters (Hudson, 2004). A number of interviewees highlighted how whilst there is a renewed emphasis on knowledge as a source of economic advantage in city regions, a lot of the time it is just as important to understand the individual perspectives and the context in which this knowledge is evaluated. This is also influenced by the growth trajectory and maturity of a region's knowledge economy. Where on one hand in an ideal type of city region knowledge economy such as Cambridge there is a clearer understanding of what makes a knowledge economy (key characteristics and depth of availability for each), in developing knowledge economies such as Dubai and Liverpool City Region the emphasis is on achieving economic growth rather than specifically enhancing the quality and depth of each component of their respective knowledge economies. As the local economy of each region has different strengths and core competencies, we witness a different type of connection with the global knowledge economy.

> "So for one example you want a definition and there you mentioned the knowledge economy, but I think people define that in a multiplicity of ways. And actually to many, say if I was to talk about markets to my mum; she wouldn't have a clue as to what the knowledge economy is. Right? And I think that we use that term 'knowledge economy' to mean more things to other people in some ways, and then classifying it as knowledge economy, which works partly, but doesn't define what it is and what it means, and what are its substantive, tangible, physical elements. So it's a bit about, as you said, the clustering of engaged knowledge particularly around a market segment or sector; it's fantastic. As soon as it becomes tangible, in which case you can now evidence something and grow it, as in some ways the knowledge economy is growing your intelligence especially at a university basis. I mean

> how many A Level students, BAs, BScs, PhDs do you get? And that might be an element of it, but I don't think that that's it". (LCR 3, 16/09/2013)

This view was shared by interviewees in Dubai City Region.

> "I don't think we all share the same definition. We agree we are in a globalized economy and there is a shift from manufacturing to services. This is driven by competitive forces and the pace of technological change. Dubai is trying hard to be a leading global destination by investing heavily in infrastructure and skills. But are we all saying we are busy creating a knowledge economy? I don't think so. We are looking at new ideas, new innovation, new technology but are we doing it because we want to be a knowledge economy or are we doing it because it was the gradual next step in our economic development. This is a hard question to answer". (DCR Interviewee 3, 25/06/2013).

DCR 1 stated:

> "I have never thought about knowledge as an economic commodity but I agree that knowledge has value. Because everything comes from knowledge. I mean there is conscious thinking and planning from innovation, designing new products and services, creating collaborative networks, everything. So I see this as business activities having economic functions, outputs. So I guess it is how you think about it, or the context in which you think about it". (DCR Interviewee 1, 25/06/13).

These views provide useful context to understand how both Liverpool and Dubai have similar aspirations for their respective knowledge economies but due to local socio economic factors have different trajectories of growth to fulfil this ambition.

Efforts by city regions trying to connect with the global knowledge economy may vary from superficial attempts at branding a city region as a viable knowledge economy to that detailed in the ideal type chapter. We find examples highlighting a lack of cohesion between aspirational strategies set by local policy makers in both regions and the needs and requirements of businesses operating within them. We also find examples of niche clusters such as digital media in Liverpool city region that have managed to raise their competitiveness to a significant level making them internationally relevant enabling connection with the global knowledge economy. Small businesses and start-ups can be seen facing similar challenges in both regions with local stakeholders trying to increase the visibility of their respective regions with lesser emphasis on increasing critical depth and cohesion within the local institutional infrastructure. There has been a significant emphasis by policy makers and stakeholders in Dubai city region to develop physical and institutional infrastructure which is considered as the platform to achieve future economic growth. However, there was a feeling amongst interviewees that this has been achieved by significant investment from the federal government as opposed to having developed organically which is why at present the institutional infrastructure specifically lacks depth. In the case of Liverpool city region, the local institutional infrastructure has gone through a significant transition following austerity measures leading to a degree of stagnation in the delivery of significant policy initiatives including those detailed in the local Multi Area Agreement. The lack of cohesion and thickness within the local institutional infrastructure is a major area of weakness having an adverse impact on the connection of each region with the global knowledge economy. This weakness has also been the major reason why there are very few examples in both regions of start-ups that have transformed into larger businesses over the years.

A significant challenge in evaluating knowledge as an economic commodity is the varied nature of the different indicators utilized in analysing the impact of knowledge on economic growth (Porat, 1977; Noyelle, 1990; Garicano and Rossi-Hansberg, 2005). Whilst the dominant approach remains to focus on the rise of new science-based industries (Machlup, 1962; Porat, 1977), there is the need to understand the motivations and drivers of local agencies which play a key role in relation to the regional targets set for the local knowledge economy. To increase local

competitiveness as a knowledge economy, the emphasis of local agencies needs to shift from branding to one that has the scope to be internationally relevant. This would include identifying key features of case studies such as Cambridge and what makes them an ideal type of knowledge economy, in turn evaluating how their region stacks up in comparison.

> "I think our cities again have defined it in slightly different ways so that when we see the number the hard thing is going back into a number and saying – 'well what's your number made up of and how do you make it work?'. And until we get that I wouldn't give any of the comparisons the time of day because we're all on different facts and figures. But I think it's important for cities to define it themselves, to make it right for themselves, and say –'We are world class in…'. In Liverpool's case it's maritime, but actually I don't think we are that. I think we're substantial in maritime, and we have been world-class, and I think we have an aspiration to be world-class again. And if that thinking really goes forward that will turn us into a world-class super port, and we'd be one of only two super ports in the whole of the UK. And with that then suddenly in the UK it becomes hugely important. But for the moment I think we want to be at that stage, but we're not quite at that now. So I think that Liverpool has to get real about some of the things that they are really good at and make it work". (LCR 3, 16/09/2013)

There were similar reservations from interviewees in Dubai,

> "I think we need to set some parameters. I am not saying that this has not already been done by cities in some fashion but I am talking about setting a standard. What makes a knowledge economy? What parameters do you need to achieve and what targets are set? How many jobs? In what sector? In what time? Is there enough FDI? If the same parameter is used globally, then we have an effective comparison." (DCR Interviewee 3, 25/06/2013).

DCR 2 stated:

> “I am not sure we are always looking at the same thing. I will go as far as saying that the knowledge economy may be one thing for the public sector and another for the private sector. I mean the public sector focuses on the optics, what is a good headline, how do other investors think of us. I am not saying this is a bad thing but it is different from the motivations of the private sector. They are looking at profitability first”. (DCR Interviewee 2, 22/06/2013).

This also highlights how the importance of a region being able to critically self-reflect streamlining priorities with initiatives that have proven to work for the region. Key strategic plans for both regions, Dubai Plan 2021 and the Liverpool City Region Multi Area Agreement, have both been in place for a significant period of time. However, as the global economic environment has shifted, both regions have struggled to keep up with the changing climate as well as the demands of their aspirational programs. Where on one hand strategic priorities within Dubai Plan 2021 included programmes to bridge the gap between the public and private sector, this has proven to be extremely challenging as between the third quarter of 2015 and the first three months of 2016, 237 small business owners left the UAE as increasingly late invoices forced firms to miss their debt repayments (Financial Times, 2016). On the other hand, a major aim of the Liverpool City Region Multi Area Agreement was to focus on combining the joint concentration of knowledge economy assets within local institutions to improve the competitiveness of the regional offer (Liverpool City Multi Area Agreement, 2009). This has been significantly hampered by a long period of austerity leading to changes in the local institutional infrastructure which has had an overall negative impact on delivering key objectives within regional plans.

This research has utilized a working definition of the knowledge economy as a global economic system driven by demand for economically significant information, ideas

and theories that are easily transferrable through the efficient use of technology. From this can result a creation of replicable mechanisms and processes directly influencing competitive advantage and value added activities within defined spatial boundaries. The term economically significant here refers to all knowledge, utilisation of which results in GDP growth helping sustain long term economic independence for nations, regions and cities (*cf*. Machlup, 1962; Cowan et al., 2000). Economic independence in the case of knowledge economies would refer to a nation's ability to service and supplement all aspects of its knowledge value chain. In the case of the city region we would expect to see something relatively similar. The city region knowledge economy would comprise of knowledge hubs such as academic institutions, businesses and clusters, transferring knowledge through the actions of knowledge workers, knowledge workers applying acquired knowledge to fulfil their professional responsibilities and industries and businesses absorbing this manipulation of knowledge into their work streams. Surplus profit extracted as knowledge is increasingly commodified in this process.

> "I agree that knowledge has become an economic commodity. There is an increased emphasis on new thinking, new ideas. I think this was different when we were younger and Dubai was younger too. In the sense that the infrastructure was not what it is today and there was a heavy focus on traditional sectors and building the infrastructure we see today. Now we have leadership that wants to compete with developed Western economies and they want to replicate Western business models. These are not necessarily based on tangible products and services but innovation. Low initial investment but potential of high returns through patent protection or being first to market. This was unheard of in the past and is something that is increasingly becoming important within sectors". (DCR Interviewee 2, 22/06/2013).

The presence of economically significant knowledge within a city-region, of such amount and substance to be acknowledged, would ideally also have a competitive component that distinguishes it from other types of knowledge. This accepts the view

that knowledge requires structures and networks that would add value to the knowledge transfer exercise and would enable in some way, efficient commercialization of existing knowledge and the production of new knowledge. Here is the basis for a competitive component that must surely be influenced by the levels of sophisticated skills available in any given city-region knowledge economy. Whilst the UAE employment market has an oversupply of jobseekers, many companies are still struggling to fill certain positions (Gulf News, 2016). In the construction sector alone, there is a shortage of highly skilled professionals with local experience in the Gulf Cooperation Council (GCC) region. In particular, those with a degree in architecture, civil engineering and a post-graduate degree in finance, international business and real estate are difficult to locate (Gulf News, 2016). Shortages in health, engineering, mechanical and high-tech skills are a result of the mismatch between new graduates and the skills needed (The National, 2014). The mind-set of the local Emirati population when it comes to vocational education also presents a problem due to a stigma affecting vocational training. This negatively impacts the local supply of skills with only 3 per cent of students in the UAE undertaking vocational training (The National, 2014).

> "We need to look at how our labor market is structured. It is good to see that we have a new supply of graduates now coming from local universities but that is only part of the equation. We need a lot more. We need talented people in senior and middle management positions that will stay long term. The expats that cover these gaps are very mobile and retention is a big problem." (DCR Interviewee 2, 22/06/2013).

This is in sharp contrast to Cambridge where strong clusters within knowledge intensive sectors have been at the core of positioning the region as a world leading knowledge economy. The region's life sciences cluster has grown rapidly to house almost 430 companies ranging from start-ups to global leaders in the pharmaceutical sector generating about £2.9 bn per year for the British economy (Partington, 2018). Over the years Liverpool's health and life sciences sector has also made significant

progress and the region continues to further enhance the scope of its life sciences sector through the development of the Liverpool Life Sciences Accelerator with a specific focus on research into antibiotic resistance. The Accelerator co-locates key researchers from the Liverpool School of Tropical Medicine and the Royal Liverpool and Broadgreen University Hospital NHS Trust (RLBUHT) along with a range of health-related SMEs and industrial partners (LSTM, 2018). This also provides the much needed laboratory space for highly knowledge intensive businesses in the life sciences sector which have historically struggled with limited growth space. In addition, significant funding boost for Sensor City, a local research community that supports and funds the development of sensor technology, will allow research into how 5G Wi-Fi can be applied to patient monitoring and support, improve communication between healthcare services and help older people live more independently (Digital Health, 2018). From an ideal type perspective, this increased focus on a globally significant sector such as life sciences coupled with a renewed emphasis on becoming a high tech economy, by further consolidating critical competencies within established niche clusters such as digital media, will assist the region in connecting with the global knowledge economy.

On the other hand, Dubai city region has positioned itself as the seat of global companies and local ones who want to become global. Whilst the region has been able to provide an environment where large companies can easily and efficiently operate out of, this race for attracting global brands has limited the opportunity for homegrown innovation with start-ups and SMEs still finding it hard and expensive to establish themselves (World Economic Forum, 2014). This challenge is compounded by cumbersome regulations impacting both recruitment of skilled staff as well as day to day operational matters such as licensing, contractual arrangements, relationships with suppliers and distributors as well as navigating through complicated ownership legislation with significant variation within free zones. The wide gap between policy development, formulation and implementation in the public and private sector is another area of concern along with limited interest in working in the private sector by the local Emirati workforce. For Dubai city region to connect with the global knowledge economy, the role of the local government and its subsidiary agencies is

vital particularly given their level of autonomy in the creation of all industrial policies and procedures along with accompanying legislation that is enforced unilaterally across both the public and private sector. There is a need for local agencies to understand how constructive interactions between the public and private sector are vital to develop innovative approaches that meet the requirements of the local labor market and create productive workplaces (Martin, 2000), as well as enable the region to connect with the global knowledge economy.

There is also a need for local institutions to focus their attention on the needs of start-ups and SMEs which are struggling under the strain of issues such as limited availability of finance, cumbersome regulatory procedures and high operational costs. This is an important area for Dubai City Region and whilst there have been some efforts in recent times to promote development through private sector involvement providing seed funding for start-ups and SMEs, there is still a considerable amount of work that needs to be done to mirror the effectiveness of the institutional infrastructure of an ideal type city region knowledge economy such as Cambridge. When we look at Cambridge as an ideal type exemplar, there has been a consistent increase in collaborative projects between local institutions. One such example is the development of one of the earliest pan-local authority asset mapping and management approaches, which includes assets from different public sector agencies put into a public sector property company which then packaged up sites and took them to market (McGough and Bessis, 2015). The program comprised of stakeholders including the county council, five district councils, the fire and police services, voluntary sector and health sector. As a consequence of this program, not only has there been increased efficiency in the use of public buildings, public service delivery in the region has also improved significantly through co-located services that were better delivered in close proximity producing associated savings in revenue expenditure from improving social outcomes and reducing the demand for public support (McGough and Bessis, 2015). There is a need for more private sector involvement in policy making as well as feeding back to governance institutions what does and does not work. Policy makers within Dubai city region are eager to replicate similar programs to raise the competitive profile of the region. Recently the

Dubai Sports Council has partnered up with Finland-based biotechnology firm Evogenom Oy as a major step into the genomics and genetic testing sectors (Gulf News, 2018). There is also an increased emphasis on serious changes in the private sector to increase the subscribership of local Emiratis within it (The National, 2018). There are significant changes expected to be made to the local labor law taking into account long standing views within the private sector which include the need for responsibility for Emiratisation to be split in a more balanced fashion between the federal government and the private sector as well as to encourage businesses to adopt Emiratisation and encourage citizens to enter and continue to work in the targeted sectors and jobs (Salama, 2018).

Despite being home to 3 universities hosting a 50,000 strong student community complemented by a diverse set of world class knowledge assets (Merseyside Economic Review, 2009), GVA per capita in Liverpool City Region is still well below that of the UK. The gap currently stands at some £6,600 per capita. This is principally driven by a gap in productivity, caused by lower business density, lower skill levels and a predominance of occupations in lower value-added sectors (Merseyside Economic Review, 2011). Therefore, there is a degree of disconnect between the supply of skills into the local economy and the uptake of these skills within the local labor market. Around a fifth of Liverpool City Region employers responding to the UK Commission for Employment and Skills Employer Skills Survey 2013 identified an existing skills gap amongst their workforce. Employers state that skills gaps are most likely to be within service roles as opposed to managerial or elementary positions which shows that planning and organization, problem solving and other ‘softer’ skills are most likely to be lacking (Skills for Growth Annual Report, 2014). These issues are further compounded by the challenges presented by austerity and the resulting reduction in core funding to the city region. Around 1 in 4 employers reported a vacancy within their business and categorised a quarter of their vacancies as ‘hard to fill’; the majority due to a skills shortage and ‘quality of applicants’ (Skills for Growth Report, 2014). This equates to 1 in 20 local businesses with an unfilled vacancy due to the City Region’s skills gap. More than 9 out of 10 Liverpool City Region respondents identify that these vacancies have an impact on

their business with resulting implications including increased workload for other staff, difficulties meeting customer needs, delay in business development and increased operating costs (Skills for Growth Report, 2014).

> "We can't do that with the economy. We can't just figure it out as we go along. We've got to have some map that says –'right, in order to get from here to there we need a combination of different skills; we need to grow grass roots skills, we need to have this amount of capital, we need to have this amount of interaction. If we can determine what those things are what we need to do we have a starting point of action. What we don't do is some ridiculous re-organization of people". (LCR 3, 16/09/2013)

Dubai faces similar challenges with the interviewees reporting several areas that required further attention such as the role of the academic system and the commercial focus of institutions within it. This is the result of an increased commercial focus within the private education sector with the Ministry of Education struggling to manage education standards in private schools.

> "It is a case of realistic expectations as the academic industry is highly commercial in Dubai. Academic institutions, many believe, are here to make money so quality is not high up the list of requirements. At least not at the moment" (DCR Interviewee 5, 22/06/2013).

Members of the National Science, Technology and Innovation Committee and their teams have developed the UAE's Higher Policy for Science, Technology and Innovation. The policy includes the establishment of funds for science, research and innovation in the UAE in addition to refocusing investment legislation to encourage technology transfer, support innovation and establish global contractual industrial partnerships. This includes targets to increase investment on research and

development (R&D) in the UAE by threefold and increase the percentage of knowledge workers in the country to 40 per cent by 2021 (Dubai Government Media Office, 2015).

> "There is a clear focus that we need state of the art infrastructure. This is an absolute must. This includes logistics, technology, accreditation and quality monitoring systems. We need to develop this environment to increase R&D activity as well as compete at a global level. This then needs to be supplemented by high quality talent. But the infrastructure is necessary to attract this talent". (DCR Interviewee 1, 25/06/2013)

In the case of Dubai City Region, there is also the need to rebalance the disproportionately large volume of low skill workers within the region as a result of entrepreneurs that favour low cost labour intensive industries as opposed to high value-added skill driven ones (Dubai Economic Council, 2011). In addition, from a skills perspective, it is considerably harder to retain expatriate highly skilled workers as compared to local highly skilled workers. However, it is important for Dubai to transition to a point where it is able to locally meet the skills requirement for major sectors particularly given the disproportionately high number of multinational companies within the region. Local start-ups and small businesses find it very challenging to compete with these multinational firms given their limited resources. Also due to the unique structure of the labour market, there is more demand for higher qualified professionals to fill gaps for roles such as data scientists and analysts, project managers, digital and cyber security experts (Gulf News, 2018). This has meant limited opportunities for entry level positions and graduate placements as there is a growing trend of local businesses driving efficiencies and not fully replacing headcount in functions such as administration and clerical support (Gulf News, 2018).

> "The market in Dubai is extremely difficult for start-ups. In my eyes, and this is a hard one to explain, the biggest problem for start-ups is the fact that all

> major sectors are dominated and to a certain extent dictated by big companies who are impossible to compete with especially when you have limited finances and man power. This is a frustrating aspect of the local knowledge economy as well, early stage career opportunities are not easy to get as the demand from both the public and private usually exists at the skilled and experienced level. We need to look at this ready-made talent concept, as it is our biggest weakness at the moment. So this may not be competition, as you know it or competition in the traditional sense." (DCR Interviewee 4, 23/06/13)

In addition, there are significant issues faced by the local education system in designing a curriculum that is able to keep up with the pace of change. This is an area receiving particular attention from the region's Knowledge and Human Development Authority that aims to revamp the education system by moving it from the traditional way of teaching to one that focuses on vocational aspects of education (Khaleej Times, 2018). Also due to a lack of awareness from potential employers, initiatives designed to promote this vocational engagement have struggled to gain traction. This includes recent changes to employment laws where university students can now take up part time jobs in several free zone clusters, but there is the need for more visibility and awareness to be brought to the new guidelines and rules (Gulf News, 2018). By limiting these placements to free zones only, it has limited the uptake and inclusion of employers outside of these areas which is vital in the development of productive networks between the private sector, policy makers and education institutions. This once again emphasizes the government's role as the custodian of city development in all aspects highlighting the strong public institutional focus within the region. This is another area where policymakers need to look at the holistic picture as by limiting interactions between graduates and the private sector, it stems the growth of critical competencies such as industry awareness as well as awareness of pathways for commercialising ideas and innovation. As government institutions try to increase the attractiveness and readiness of their region to be able to connect with the global knowledge economy, there is an increased focus on adopting good governance initiatives through policies covering proper contracting practices, bidding, fair competition and total quality management practices (The

National, 2016). However, whilst the region has a number of institutions operating under the umbrella of the federal government covering these key areas, it has been challenging for local startups and SMEs to keep up with the pace of change and varying levels of implementation (Gulf News, 2018). It has been highlighted that local institutions need to enhance their ability to develop policies and procedures that are consistent and can be implemented fairly across public and private sector agencies (The National, 2016). This is another reason why government institutions in Dubai city region need to look at not just adopting good governance policies but also fully understand their implications on an organisation and its stakeholders along with increasing government support for governance practices (The National, 2016).

> "The understanding of the need to include the private sector in planning for the future is improving but a majority of the policy development is still heavily relying on the government. This has always been the case. The influence of the private sector is low as well the way the job market is structured, it is hard to create a better balance between the public and private sector. This will take time as it has taken time for other advanced countries. It is good to want quick progress but it needs to be sustainable as well. (DCR Interviewee 1, 25/06/2013)

Contrastingly, Liverpool City Region has seen rising higher level skills in recent times but weak performance at low and intermediate levels (Skills for Growth Report, 2014). There is a significant amount of evidence to demonstrate that better qualifications reduce the incidence of unemployment, result in higher earnings and contribute to productivity and labour market efficiency. While this assumes that the division of labour can be uncritically categorised in such a way, there may be value in exploring how combinations of existing units of knowledge can be utilised to meet existing consumer demand. Romer (2007) for example talks of economic growth being an outcome of resources being rearranged in new ways that are more valuable and suggests that history teaches us *"that economic growth springs from better recipes, not just from more cooking"* (Romer, 2007, p. 34) implying that the key to knowledge development and growth lies in understanding ways in which to optimize

the application of knowledge. Constant interaction between various elements of the knowledge value chain to resolve recurring issues on a regular basis assists in the creation of knowledge networks that are both responsive and flexible in nature. One explanation would suggest how a knowledge value chain comprises of two main activities, knowledge acquisition and knowledge application (Powell, 2001). Knowledge acquisition in its simplest form refers to receiving information that has the potential to create new knowledge (Machlup, 1983). At this stage, the information flowing through existing knowledge networks may or may not be economically significant. It is only when the knowledge receiver utilizes the acquired information in a practical setting (Nonaka, 1994) that the acquired knowledge economically significant. This emphasis on the receipt of information to add value goes beyond economic determinism and shows how concepts of a knowledge-led society must incorporate some cultural analysis, not least in the mediation between production and consumption (see for example Lash and Lurry, 2007).

> "Well I think you need that, because, you know, inspiration without aspiration is a really tough gig. So how do you inspire somebody if there are no aspirations? So I think Liverpool, quite rightly, needs to aspire to be world class at being a knowledge economy, backed by world class infrastructure or whatever those things are. And then you work back by saying –'okay, that's where we want to be, let's define it and put some metrics in there', because you define where you are today with your metrics. Which then inspires that change, as there is an aspiration for others, from one to the other. The journey then becomes like the destination, and it all becomes a map to get there. And actually sometimes genuinely without a destination or without a map is fine, you know… proving that the world didn't stop at the horizon. Having an aspiration was an improvement, because they had no maps; you've just got to figure it out as you go along". (LCR 3, 16/09/2013)

7.2 Understanding the Role of Institutions who aim to Maximize the Knowledge Affect" on City Region Economies

In a broad sense institutions can be defined as any form of constraint that human beings devise to shape human interaction that can be separated into informal constraints and formal rules and of their enforcement characteristics (North, 1990). Where on one hand, formal rules in the shape of laws, economic policies and business codes of conduct can be measured and to an extent quantified, informal institutions and constraints are considerably harder to codify as a result of being based on implicit understandings, being in most part socially derived and therefore not accessible through written documents or necessarily sanctioned through formal position (Zenger et al., 2001). The interaction between local businesses and institutions is vital in connecting the related knowledge intensive products and services to the global market. In an ideal type of knowledge economy, which the author looks at greater detail in the following chapter, the institutional infrastructure naturally translates local business ideas, products and services into global market propositions. From old institutional economics comes the idea that the economy is shaped by enduring collective forces which include formal institutions as well as informal or tacit institutions such as habits, routines and norms, all of which provide stability in a context of uncertainty, as well as templates for, or constraints upon, future development (Amin, 1998; Hodgson et al., 1993; Mulberg, 1995).

It is important for city-region institutional infrastructure to be of a density that will enable connection. This is the means by which planners, policy makers, politicians and entrepreneurs (to categorize but a few) operationalise the concept of a city-region knowledge economy. In much the same way as Castells and Hall (1994) explained the need to develop the then innovative notion of a technopole, those actors in important institutions see the knowledge economy as a strategic initiative based on a combination of innovation, technological know-how and entrepreneurship. And while much of this is exclusive, as the knowledge economy by-pass peripheral low-income communities in the city-region, there are parts that local actors seek to engineer just as they were encouraged to do with the

technopole, through technologically innovative industrial related production often to be situated on 'state-of-the-art' science, technology and business parks. Thus the local institutional infrastructure has to be ‘thick’ enough (Amin and Thrift, 1995) to stimulate and capture level of innovative entrepreneurship that enable the city-region to connect to the global knowledge economy. This is the explicit strategic nature of connection. For city-regions like Liverpool shaping the local economy in this way is a political and economic strategic decision as they are faced with the need to restructure and shed the image of a Fordist past and the old logics of the spatial division of labour. For places such as Dubai it is equally as strategic. The local institutional thickness needs to enable connectivity to the knowledge economy to leap ahead of those older industrial regions in a globally competitive economy. As we see in both cases, there is a conscious effort to reimagine the city-region with knowledge, innovation and entrepreneurship crucial elements of the new vision.

> “I think the knowledge economy concept has always been valued. We may have called it something different in the past but people have always put value on creativity and innovativeness. You can say our sector is more knowledge intensive than traditional sectors in the sense that we can create a product with limited resources and financial investment that can be sold for millions if it connects with the right market. But you need help as businesses in the digital media and gaming sector house creative mavericks rather than entrepreneurs. Developing a video game or an app is one thing, running a business is another. If you are a young graduate in a city like Liverpool looking for a career in this sector, it is an uphill struggle to succeed. You need support and guidance to develop an idea into a product and then more support and guidance to take that product to market”. (LCR 6, 22/05/2013)

Acemoglu et al. (2005) defined institutions as a combination of three interrelated concepts including economic institutions, political power and political institutions. The interactions between these key variables govern institutions growth and development. Acemoglu et al. (2005) argue that political institutions and the distribution of political power in society are determined by the distribution of

resources. They govern the design of economic institutions, which in turn determine the level of development and the dynamics of the distribution of resources. The priorities and strategic vision of political institutions must align with those of economic institutions through good governance and proactive planning. Generally, good governance indicators have six dimensions including voice & accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption (Kaufmann et al., 1999). The stability and strength of these indicators is of great significance to international businesses and plays a key role in making the location decision as markets performing well on these indicators are synonymous with low levels of risk and active implementation of law. Hence, a robust institutional infrastructure would help in improving investor confidence and increase the likelihood of crossover success for local products and services allowing the region to connect with the global knowledge economy. Economic institutions matter for economic growth because they shape the incentives of key economic actors in society, in particular, they influence investments in physical and human capital and technology, and the organization of production (Acemoglu et al., 2005). During 2009, Asian markets took a hit after Dubai shocked investors by announcing it was requesting a debt freeze for at least six months for one of its biggest holding companies, Dubai World and its real estate arm, Nakheel (CNN, 2009). Dubai World at the time was said to account for some $59 billion of Dubai's $80 billion in liabilities (Independent, 2009). International investors were outraged over the timing, especially in the U.S. where the Thanksgiving holiday limited their ability to respond to the statement by adjusting their holdings (CNN, 2009).

> “It is still a challenge for international investors to have complete confidence in their investment portfolio within Dubai. Look at what happened in 2009 with Dubai World. The entire episode from the actual issue of significant unpaid debts to a full disclosure of up to date information highlighted the importance of establishing good governance and increasing oversight. Investors and traders need to have confidence in the market and the institutions within it. This is where a lot of attention is needed if you want to effectively compete globally”. (DCR Interviewee 2, 22/06/2013).

In order to develop the crucial elements of knowledge, innovation and entrepreneurship within the city region, local institutions have had to increase the level of technological exploitation. Small businesses and startups are able to gain more ground by capitalizing on technological advancements that assist in, to some extent, fill the gap created by reduction in grant funding and the overall negative impact of austerity. On the other hand, it can be argued that the global exploitation of technology is the consequence rather than the cause of the increase in international trade (Archibugi and Michie, 1995). This would mean that people are already connected across borders and due to this connection, a more conducive environment for collaborative work is created. The ease of communication, information sharing and trouble-shooting in an environment that is both dynamic and responsive to change has played a key role in shifting the economic focus of city regions to knowledge intensive sectors. In the case of Liverpool City Region, strategic plans such as the Multi Area Agreement, Knowledge Economy Plan and Strategic Investment Framework have focused on combining the joint concentration of knowledge economy assets within local institutions to improve the competitiveness of the regional offer. For instance, the Liverpool Knowledge Quarter concept was developed as an area of higher education, science and medical expertise comprising of local institutions including University of Liverpool, Liverpool John Moores University, Royal Liverpool University Teaching Hospital, Liverpool School of Tropical Medicine, Liverpool Science Park, Merseybio, Liverpool Hope University, Liverpool Community College, Liverpool Institute for Performing Arts and Liverpool Women's NHS Foundation Trust. There have also been concentrated efforts to improve the quality of local institutional infrastructure which has included reprovision of the Royal Liverpool University Teaching Hospital at a cost of £451m, development of commercial laboratory space through delivery of the Biocampus, expansion of existing facilities of the Liverpool School of Tropical Medicine and the expansion of Liverpool Science Park through the provision of a third innovation centre (Strategic Investment Framework, 2012).

"Liverpool does not have the same financial reach when compared to some of

> the advanced economies that you will be looking at. There is very limited access to grant funding and venture capital. Startups and small businesses are not progressing at a rapid rate with some exceptions in limited sectors such as digital media. Local stakeholders have had to band together to make things happen. This has not been easy. There have been logistical challenges, for instance who takes a lead with key initiatives? Where will the funding come from? It is hard when there is so much change. And this change has brought uncertainty and insecurity". (LCR 1, 13/05/2013)

In such a challenging environment, it has not been easy to stimulate sectoral growth. This is a common challenge for developing economies during periods of austerity. This has meant that recent collaboration across institutional sectors has been greatly assisted by fundamental changes in the technologies of knowledge and information production (Snellman, 2004). There is a higher likelihood of technology intensive products to be traded internationally (Guerrieri and Milana, 1995) with a significant amount of empirical evidence suggesting that technological capability is a necessary condition for successful export performance (Fagerberg, 1988; Amendola et al, 1993). Whilst there is little respite for low tech businesses, small businesses within high value technology intensive sectors have been able to continue to connect globally. In the case of Liverpool City Region, we see a significant number of individuals employed within the IT services subsector within the local digital and creative media industry (please refer to Table 14). The Liverpool City Region's share of the North West cluster amounts to some 4,500 businesses and 30,000 jobs (Liverpool Vision, 2010). The city of Liverpool accounts for a third of the businesses and half of the jobs. The profile of the sector in the city region is that it is very bottom-heavy with just over 1% of businesses being nationally significant or large (with 100 + employees). The mainstay of the sector comprises 4,000 + sole traders, micro and medium sized firms (Liverpool Vision, 2010). Liverpool City Centre is the nucleus of the digital and creative media sector within the city region.

"We cannot pretend that the recent economic climate has not impacted us. It has but not to the extent it has on for example manufacturing or someone running a bakery. We are still able to connect with stakeholders globally due to contacts we have working in industry for a long time. In our sector, we can do a lot of work for little expense particularly where we already have an existing connection. Our main value is in the people, the interface and software may be the same, but genuine creativity and innovation is still coming from people, not everyone understands that this is the case". (LCR 6, 22/05/2013)

DCMS subsector	**Total**
Artistic and literary creation and interpretation	13
Manufacture of computers and other information processing equipment	3
Other entertainment activities not elsewhere classified	2
Radio and television activities	1
Advertising	256
Architectural and engineering activities and related technical consultancy	4
Artistic and literary creation and interpretation	13
Bookbinding	4
Business and management consultancy activities	17
Data processing	1
Hardware consultancy	34
IT Hardware	1
IT Services	2681
IT Software	4
Manufacture of computers and other information processing equipment	4
Manufacture of paper stationery	1
Market Research	50
Market research and public opinion polling	1
Media	60

Motion picture and video distribution	1
Motion picture and video production	65
Motion picture projection	5
News agency activities	1
Other activities related to printing	27
Other computer related activities	2
Other entertainment activities not elsewhere classified	200
Other publishing	44
Other software consultancy and supply	59
Other sporting activities	1
Photographic activities	97
Physical well-being activities	1
Pre-press activities	13
Printing not elsewhere classified	169
Publishing	1
Publishing books	32
Publishing of journals and periodicals	19
Publishing of newspapers	4
Publishing of sound recordings	5
Radio and television activities	13
Reproduction of sound recording	3
Reproduction of video recording	2
Retail sale of books, newspapers and stationery	2
Software publishing	8
Technical testing and analysis	2
Telecommunications	183
Grand Total	**4109**

(Table 14: Profile of Creative and Digital Micro and Small to Medium Size Businesses in the City Region / Ernst and Young for Liverpool Vision, 2010)

7.3 How an Old and New City Region seeks to Overcome the Barriers to the Global Knowledge Economy

The question of why places need to connect to a global knowledge economy is more than rhetorical. Those actors in the institutions that seek to enable this pursue this line because they believe this offers the best future for their place and this is how they will remain competitive in the dynamics of the competition between places. These ideas culminate in strategies to connect city-regions resting upon an institutional infrastructure that will uniquely shape that connection process. For instance, as Scott (2006) noted and more recently Mazzucato (2013) has shown innovation requires public support, through the provision of agglomeration opportunities and specific infrastructures that might include research laboratories, sector strategy boards, specialized training and education provision, that can involve many forms of public and quasi-public agencies. However, this is challenging for developing knowledge economies as identified by interviewees in both Liverpool and Dubai City Region.

> "We need more formality in our local networks and government bodies that are looking to expand the offer for Dubai. A big problem is that at the top level we have a lot of marketing based activity which I am not saying is bad, as you need that, you need the brand to be out there and for people to know that Dubai is developing its economy. But I have seen little evidence of local innovation, that is a problem. Government agencies need to be more local and connect with the private sector at all levels, not just at the top level. As that will not need to sophistication. Local businesses, small businesses becoming more innovative and scaling globally is what Dubai needs". (DCR Interviewee 4, 23/06/2013).

Another interviewee pointed out the need for more private sector involvement and more opportunities for them to inform and contribute to regional strategic plans.

> "The top down approach is problematic. As a lot of the infrastructure funding comes from the federal government, private companies have little say or involvement in the development of strategies and networks. But the private sector is a big part of the future and in this new economy that you are looking at you will see that areas where the private sector is supporting small business and startups helping them to reach local and foreign markets, that is where the innovation is, that is where the future is. We aspire to be for example like Silicon Valley but Silicon Valley is not driven by the federal government or government agencies. It is driven by the private sector with people within it understanding innovation and R&D, they live that life, we need to be the same". (DCR Interviewee 2, 22/06/2013).

Contrastingly in Liverpool, it was the impact austerity has had in limiting the impact of the work being done by public and quasi-public agencies.

> "I think we need to self-evaluate as a region. We have experienced a lot of change in recent years and it has been hard to implement the strategies and plans before this period of austerity as there has been a lot of change in the stakeholders and also leadership has been a problem. During this transition period, it is the small business that has suffered. As grant and support funding has been limited, and sector specialists that were working on developing a compelling proposition for Liverpool are now housed in different agencies with limited funding and resources to support small business. This has had an overall negative impact on delivering key objectives within regional plans such as the Multi Area Agreement and the Knowledge Economy Plan. It is a different world now and everybody is trying to adapt". (LCR 4, 13/05/2013)

This impacts not on the human capital of locals in a city-region but helps to form important social capital that have wider consequences on the competitiveness of the city-region through its cultural impact (Scott, 2006). The impact on the types and levels of new enterprise start up, on entrepreneurship and innovation is suggested as an important outcome. Thus, much in the way that Harvey (1989) anticipated, city-regions seek to connect to the global knowledge economy and by doing so raise their own levels of entrepreneurial behaviour. In essence, for some of the older traditional industrial city-regions there are few games left in town, but connection in this way is one still left.

> "Whilst we have the physical infrastructure, we need to raise the quality. That is harder. You need quality in research, quality in innovation, quality and recognition that the skills, services, academic infrastructure are all world class. It is not for Dubai to say or for a marketing campaign to sell. It needs to be something that is consistent internationally and for Dubai to demonstrate that it can compete because its economy has these features". DCR Interviewee 1, 25/06/2013

For Dubai, it is also about reshaping its economic focus and developing the significant components of its local economy. Contrary to the international perception of Dubai's economy, mining and quarrying which includes the oil sector contributed only 2.2% to Dubai's economy in 2016 (The National, 2016). The biggest sector is wholesale and retail (29%) followed by property/real estate (15%) (The National, 2016). Recent research has identified several factors hindering local organizations from realizing the potential of their innovation activity which include fear of high potential risky innovations, lack of focus and a clear innovation strategy, failure to develop and commercialize their best ideas at pace, difficulty in measuring return on investment and reluctance to invest (Emirates 247, 2015).

> "It is not that Dubai cannot sustain staying in the energy game. Dubai has not been in the energy game for a long time, and when it has it has not been at

> the same level such as Abu Dhabi. Dubai needs this new focus where it builds on its status as a truly global destination. People know the significance of Dubai as tourism destination particularly in the GCC context, but that will bring people here but how do you bring business and how do you take your local business to other regions. This needs a lot more attention. Tourism and retail will not make Dubai a knowledge economy, you need research, innovation, opportunities and support for local businesses. All of this needs sophistication, it cannot just be superficial and brand based, you need to have substance. That is the only way Dubai can compete internationally". (DCR Interviewee 2, 22/06/2013).

Given regional policy for a long period of time had been standardized, incentive based and state driven (Amin, 1999), the impact of austerity following the credit crisis has been significant. The role of local institutions as delivery agents has diminished in Liverpool as a result of 58% reduction in central funding which has pushed local councils to breaking point (Guardian, 2017). Since 2010, £650m has been slashed from grants to the city region's six authorities. By 2017, the FT calculates, it will have hit £910m, surpassing the £900m the government has offered over the following 30 years for agreeing to adopt an elected mayoral model (Financial Times, 2016). This has made it challenging for local agencies to invest in developmental plans and strategies to enhance the proposition for the city region. Where some economic commentators view the role of the state, as well as the institutional infrastructure that it encompasses, to be the prime collective organisation with societal reach and legal power that provides the necessary resources for local business to thrive (Hausner, 1995; Amin, 1998), others highlight the influence of Keynesian legacy on regional policy in the 1960s comparing it to more recent pro-market neo liberal experiments (Amin, 1999). Where on one hand Keynesian economics promotes the use of welfare policies as well as the offer of state initiatives to stimulate demand in less favourable regions, economic neo-liberalism advocates reduction in public expenditure for social services, deregulation and privatization. The relevance of these theories has been revitalised by the recent credit contraction in the global economy and the resulting economic pressures of austerity. Local institutions particularly those within the public sector have had to rethink their investment

support strategies due to funding limitations and a greater emphasis on high-growth sectors.

> "We are spread very thin at the moment. To be asked to deliver more for a lot less without any consideration for how harsh the economic environment has been is very frustrating. Local agencies have had to lose vital operational staff to try and manage within the new funding reality, but as a result we have lost the ability to be proactive, to plan for the future. We are stuck in a reactionary mode and it is all about damage control". (LCR 2, 12/05/2013).

7.4 Conclusion

In this chapter, we have looked at the two empirical cases comparing them to an ideal type of city region knowledge economy with a particular focus on the key characteristics that we consider as vital to facilitate connection with the global knowledge economy. We find that policy makers within local agencies in both regions consider the knowledge economy as vital to their economic future. We see how Dubai city region faces significant challenges in improving the sophistication and quality of its institutional infrastructure as it tries to connect with the global knowledge economy. Whilst Dubai city region has had significant investment in its logistical infrastructure, there is still work that needs to be done in other areas including higher education as well as improving the imbalance caused by a disproportionate focus of local entrepreneurs in low cost labour intensive industries. On the other hand, Liverpool city region also struggles with low skill levels and low business density which has had a negative impact on regional economic growth. Employers within Liverpool city region find it hard to fill high level knowledge intensive vacancies (Skills for Growth Annual Report, 2014) which negatively impact regional readiness to attract more investment to facilitate connection with the global knowledge economy. Contrastingly, whilst Dubai city region is able to attract and fill positions requiring complex skills and specialist knowledge, it is challenging to retain

this skillset for long periods of time due to the high number of temporary work residents and high level of expatriates within the local population.

We also see how Dubai city region has struggled to develop a conducive environment and support strategies for startups and small businesses. This is the result of a disproportionate focus from local government on multinational corporations to add to the global destination status of Dubai city region. Whilst Liverpool city region faces similar challenges in stimulating small business growth, we find that small businesses in the high tech digital and creative sector have been able to successfully connect to the global knowledge economy. This has mainly been due to the highly technical orientation of the sector which makes connection easier and cheaper. We also look at how governance institutions within Dubai and Liverpool City Region prepare their place for a role in the global knowledge economy. We take into account the relevance of the knowledge economy to the city-region and how governance actors are keen to support supply-side initiatives around for instance, education, skills and enabling more entrepreneurial behaviour in the drive for a high skilled, high wage local economy.

Chapter Eight

8.0 The Knowledge Economies of Dubai and Liverpool City Region – Looking Towards the Future with a Critical Eye on the Present

This research has looked at the increased focus of local agencies to develop a competitive knowledge economy in both Dubai and Liverpool City Region to facilitate connection with the global knowledge economy. By looking at these two contrasting city regions, we have been able to develop two empirical cases, one of an older industrial city region and one of a new emerging economy city region, to show how city regions seek to connect to the global knowledge economy. Local agencies in both Dubai and Liverpool City Region have streamlined their strategic economic ambitions with a sharper focus on knowledge intensive sectors. This research has also looked at the contexts in which governance institutions prepare their place for a role in the global knowledge economy. This is achieved by focusing on supply-side initiatives around for instance, education, skills and enabling more entrepreneurial behaviour in the drive for a high skilled, high wage local economy. We have looked at the key themes identified at the outset of this research in the context of the two empirical cases as well the existing social and economic literature around the subject matter. In addition to analysing the role of knowledge as an economic commodity, we have tried to understand the role of institutions who aim to maximize the knowledge affect on city region economies. We have looked at two contrasting cases, one of a relatively young city region with aspirations to become a global city compared to a city region seeking to overcome negative perceptions within its host nation while competing with other similar places for the same inward investment. We also look at how all places that believe they are of the right size and importance, are seeking to what we would term as ‘connect’ to the global knowledge economy. To elaborate this point, our contrast is between an older industrial city-region and a city-region newly emerging in a developing hotspot. The former is Liverpool city-region, a maritime city that suffered a long period of decline in the twentieth century and Dubai city-region, a new centre for tourism, oil exporting and global investment. Our enquiry has been to ask why city-regions from such different backgrounds appear to be pursuing similar strategies for connecting to the global knowledge economy and to examine how they doing it.

At the outset of this research project, a number of key research objectives were developed to help streamline the focus of the research which included:

a) Role and function of knowledge as an economic commodity.

b) Understanding the role of institutions who aim to maximize the “knowledge affect" on city region economies.

c) How an old and new city region seeks to overcome the barriers to the global knowledge economy.

Whilst we have looked at the role and function of knowledge as an economic commodity theoretically in detail in the literature review chapter, it was evident during the interviews with policy makers and practitioners in both regions that there was a lack of clarity in relation to terminology, definitions and perceptions around the knowledge economy concept. We found that whilst the pursuit of a knowledge driven economy was a priority for local stakeholders in both Dubai and Liverpool city region, there was greater emphasis on becoming a knowledge economy by default rather than focusing on knowledge as an economic commodity. In some ways stakeholders in both regions saw the pursuit of a knowledge based economy as a by-product of an increasingly globalized economy, driven by significant technological and infrastructural development, which has experienced a major shift from manufacturing to services. Therefore, this would imply that the steps developing regions need to take to remain competitive are those that also make them knowledge intensive.

This research has brought out a number of interesting and important aspects of how and why a city-region might seek to connect to the global knowledge economy. Following the fieldwork exercise it was clear about how important connecting with the global knowledge economy was to both Liverpool and Dubai City Region. They may also illustrate the edge of new development in both city-regions. Yet we have seen a number of barriers in each place. Dubai does not currently have the level of sophistication associated with the ideal type of city-region knowledge economy we set out above; Dubai lacks dedicated sector groups, academic networks and industrial collaborations. Much of the knowledge infrastructure has taken place on an ad-hoc basis particularly due to the regions cultural diversity hosting professionals

from a multitude of nationalities. The local knowledge economy is built on a variety first approach, where a massively diverse consumer base heavily influences the structure of academic institutions and the qualifications that they offer. As a result, you have Australian, Indian, British, American and other international universities all trying to capitalize on the demand created by second-generation migrants who were born and raised in Dubai. As a result, the local institutional infrastructure is seen to lack the sophistication and critical depth to compete with more developed knowledge economies mirroring the ideal type exemplar utilised in this research. In addition, local institutions in Dubai city region have struggled to balance growing demands of local start-ups and small businesses against existing cumbersome legislation which mandates restricted ownership thresholds for foreign business owners as well as issues with visa regulations and retention of skilled workforce. Whilst the strategic and policy focus for Dubai city region has been increasingly outward forcing, nuances of local business culture such as the Emiratisation programme as well as an imbalance between demand and supply of public sector jobs for local nationals has presented a challenge. On the other hand, Liverpool city region has been significantly impacted by austerity measures resulting in lack of ownership of existing strategic plans such as the Liverpool City Region Multi Area Agreement.

There is still more to do to understand the attempts to connect to the global knowledge economy by an emerging city-region and one from an old industrial order. In looking at how an old and new city region seeks to overcome the barriers to the global knowledge economy, we look at how both Dubai and Liverpool have been deeply shaped by their respective maritime industries. This is important to the way in which they seek to connect to the knowledge economy. Also, given both regions display a different economic and institutional infrastructure as well as different trajectories of economic growth, it provides useful context to understand the growing influence of the knowledge economy concept on regional economies. More specifically, we have an old industrial economy (Liverpool city region) and a new economy (Dubai city region) that are both structuring their economic priorities around a knowledge economy offer. Amongst the major motivations behind this research was to interrogate the reasons around why if the contexts from which the local knowledge economy offer for each region was derived from were so different, why

was connecting with the global knowledge economy such an important priority for both city regions.

Against the backdrop of knowledge economy transformation, secured through the idealized type of attributes as detailed in this research, then both places still fall short. There is evidence of embryonic start-ups in the Liverpool city-region, although less support to show that these transform into larger, growth-oriented businesses. Within Liverpool, there is also an increased focus on developing the region's offer in creative and digital industries. We see that there is also a need to develop a more sophisticated business infrastructure as the city region looks to develop on its existing capabilities within traditional sectors such as maritime, financial services, tourism and retail. It has also been a challenging economic environment within Liverpool City Region as the local public sector, in keeping with the national trend post the most recent credit contraction in the global economy in 2008, has experienced significant squeeze in funding which has had a significant impact on both the composition as well as logistical and financial reach of local agencies. The interviewees in Liverpool City Region highlighted the importance of establishing an effective innovation structure that helps commercialize emerging technologies through a planned system of support during each stage of the development process.

In Dubai, the small business population appears to remain as an unsophisticated sector that has still to realize its potential. We can see too that there is some degree of geographic concentration, with some innovative clusters and new start-ups or attractive sites for inward investment. However, there seems to be too little of this to gain traction in such a competitive global arena. On the supply side, we can see more finance availability in Dubai although investment appears to be corporate focused, rather than for small innovative enterprises. In Liverpool it seems there are questions about both supply and demand for such finance. While the respective higher education sectors are impactful although again there may be a question of both supply and demand. Overall, it seems that there are gaps in provision of a skilled workforce across the needs of industry in both places. And while Dubai has the proximity of a growth region, in Liverpool this is more potential than certainty with

the contemporary rhetoric of the northern powerhouse. A lack of sophistication and depth in the local institutional infrastructure was identified by interviewees as a major challenge for Dubai city region to successfully connect with the global knowledge economy. The region has over the years struggled to raise the quality and educational standards within government backed universities, which are generally well funded, with the problem permeating through to the increasing number of private universities being established in the region (Goby and Nickerson, 2014; O'Sullivan, 2015). A significant divide between the public and private sector in the region has created an income inequality gap between expatriate workers and the local Emirati workforce. Where on one hand, expatriate workers have more experience and qualifications along with a willingness to work longer hours for lower salaries (Isa and Hala, 2001; Lynton, 2001; Stephen, 2001), the local Emirati workforce particularly graduates entering local industry lack technical and essential skills like analytical capabilities, communications, core technology skills, critical thinking, collaboration and working in teams as well as the English language (The National, 2018).

In Dubai city region, we see the local government play a key role in developing the physical and institutional infrastructure. Given this, it exercises a high degree of control over the strategic direction and ownership of key resources in the region. Private sector participation in policy development is limited which at times has impeded successful implementation of initiatives such as recent changes to employment laws where university students can now take up part time jobs in several free zone clusters, however employers are hesitant in employing students due to a lack of clarity around relevant policies and procedures accompanying this change. On the other hand, Liverpool city region has seen significant investment in infrastructure projects as a consequence of its run as the European Capital of Culture 2008 backed by funding from the European Regional Development Fund (ERDF). This included specific grant funding to assist SMEs to create knowledge intensive jobs and help more individuals to get into employment. Key long term strategic plans such as the local multi area agreement have identified the importance of including the private sector in policy development as well as increasing the local skills base by helping it transition from a predominance of occupations in lower value added sectors (Merseyside Economic Review, 2011). Another key challenge faced

by the region is that entrepreneurial activity is demonstrably lower with a self-employment rate of 6.8 % compared to the UK average of 9.4 % (Liverpool City Multi Area Agreement, 2009). Furthermore, 20 % of working age people in Merseyside have no NVQ qualifications compared to the national average which stands at 13.6 % (Merseyside Economic Review, 2009). On the other hand, in the case of Dubai city region, a focus on attracting blue chip multinational companies has meant lesser support for small businesses and start-ups given that costs for starting up remain high, paperwork is cumbersome, finance is hard to come by, exit options for investors are limited, and the cost of failure is high (The National, 2018). This has also resulted in the creation of a skills gap whereby inward investment, subsidized by local government squeezes out the supply of skilled labour to local indigenous businesses creating an imbalance in the local labour market. Contrastingly, from a connection to the global knowledge economy standpoint, we see that Cambridge as an ideal type exemplar displays an above national average performance on all these indicators including level of economic activity, one of the lowest rates of unemployment in the country as well as 49.6% of the population in Cambridge holding an NVQ Level 4 qualification or above, which is 13.6% higher than the national average (NOMIS, 2014). We also see strong evidence of an established institutional infrastructure with businesses in local clusters readily supported by Cambridge university in matters such as registering patents and protection of intellectual property (Evans and Garnsey, 2008), with a large volume of intellectual property licensing, consultancy and equity contracts under management by Cambridge Enterprise, which is the University of Cambridge commercialization group (Cambridge Enterprise Online, 2015).

We see a lot of strategic intent with limited substantive objective development. The policy makers are not fully in control of their respective knowledge economies. For example, in Liverpool city region we see an altered institutional environment with lack of ownership of economic development policy and initiatives. In the case of Dubai city region, there is a need to develop critical depth and sophistication of institutional infrastructure to enable better connection with the global knowledge economy. Finally, we might say that overall, while there is institutional support for the knowledge economy ideals in both Dubai and Liverpool, the two places remain

institutionally ‘thin’. Furthermore, we can confirm that key findings of this research project indicate:

a) There exists variety in the way a city region will connect to the global knowledge economy.
b) The role of local institutions (or national institutions that operate locally) are critical.
c) The city-region institutional infrastructure helps to facilitate connection providing a means by which planners, policy makers, politicians and entrepreneurs operationalize the concept of a city-region knowledge economy.

From a theoretical point of view, we highlight how the existing literature around the knowledge economy lacks a specific focus on both old industrial regions and new regions. There is also a lack of qualitative research on city regions pursuant of knowledge economy strategies that are not part of the exclusive group of sophisticated knowledge economies such as Oxford, Cambridge and London. In addition, few studies have used the Weberian ideal type approach as a methodology to understand the concept of connection with the global knowledge economy. We also highlight the importance of taking into consideration the history of any city region, particularly its local economy, as an important factor that enables connection with the global economy. We use the ideal type exemplar as well as the key characteristics highlighted in Table 6 to assess the trajectories of the knowledge economies of both Dubai and Liverpool city region. In addition, we evaluate the role of local agencies in recognizing the importance of key measures vital for connecting with the global knowledge economy such as increasing investment in education and training in order to improve the efficiency of the local human capital (Becker, 1964). We provide practical examples, utilising Cambridge as an ideal type exemplar, of how local institutions within a region have successfully prepared their place for connection with the global knowledge economy by harmonising efficiencies between both the physical and institutional infrastructure resulting in an environment conducive for knowledge development and growth. We also look at the role of

clusters which can be seen as a market based approach to economic policy that develops new roles for government and companies as well as other regional stakeholders including universities, research institutions and trade associations (Kettels, 2008). We analyse how clusters can develop not only organically but also because of targeted efforts by policy makers and practitioners. These efforts from policy makers within local institutions enhance the competitiveness of their region and facilitate connection with the global knowledge economy.

Toulmin (1990) highlights how every niche or habitat is one of its kind requiring a careful eye to its particular, local and timely circumstances. We focus our analysis in this research around the key themes identified at the outset, utilising a mixed methods approach to evaluate the context in which the knowledge economies of both regions seek to connect with the global knowledge economy. Amongst other unique socio economic factors identified for both regions, we found examples of niche specialisms within Liverpool city region's digital media and life sciences clusters. On the other hand, we found a significant focus on the development of physical infrastructure in Dubai city region heavily subsidized by the federal government which has also meant retention of significant ownership control. Policy makers in local agencies are now turning their attention to developing the strategic and governance institutional infrastructure that plays a key role in enabling connection with the global knowledge economy. The importance of sophistication within local infrastructure, policies and regulation was cited as an important factor to facilitate global connection. An alternative approach could have involved speaking with owner managers focusing on the perception of knowledge economies amongst different sectors. There is also a lot more to interrogate in relation to the impact of long term policy initiatives on priority sectors along with reviewing the existing infrastructure supporting these sectors to help the region connect with the global knowledge economy. There is also scope for delving deeper into the impact of economic shifts within each region in relation to the utilisation and capacity of natural resources. In the case of Dubai this would include examining the impact of diversification strategies given challenges with access to finance due to liquidity issues within the local banking system caused by a weak oil price and slowing economic growth (Arabian Business, 2016). In the case of Liverpool city region, this

could involve assessing the viability of plans to become a low carbon economy (Liverpool City Region Multi Area Agreement, 2009). Furthermore, another case study could have been included to compare against the ideal type exemplar.

In conclusion, we can confirm that this research adds to the body of knowledge by looking to develop the concept of knowledge economy connection as city regions seek to engage with the global knowledge economy. This research also makes a methodological contribution by drawing on the work of Max Weber to develop the idealized type of knowledge economy as an exemplar to understand the two cases under consideration. Finally, we provide two empirical cases, one of an older industrial city region and one of a new emerging economy city region, to show how city regions seek to connect to the global knowledge economy.

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Appendix A: Interview Protocol

Name _____Title_____Date_____

Company/ Department _____

Phone_____ Email_____

Interviewed by_____

Further to our telephone conversation, I hope you have been able to read through the materials forwarded detailing key interview themes and interview structure.

The main aim of the research project is to provide a comprehensive assessment of the impact and functions of knowledge as an economic commodity that is vital to sustain a modern global economic system driven by the demand for economically significant information, ideas and theories that are easily transferrable through the efficient use of technology resulting in the creation of replicable mechanisms and processes directly influencing competitive advantage and value added activities, comparing its influence on the economies of Dubai and Liverpool City Region.

To facilitate note-taking, I would like to audio tape our conversations today. For your information, all information will be held confidential with the researcher alone being privy to the recordings which will be destroyed after they are transcribed. The Researchers main aim is to locate, illuminate and understand distinctive values, management practices, and skills which enable your organization to operate as part of the regional knowledge economy that it sits within.

The information you provide in this interview will be used to build an analytical assessment around the impact of the central themes on your region of operation. The Researcher's main aim from this exercise is to learn from your experience. The collected comments, experience and suggestions from all of the participants interviewed will be summarized and reviewed as part of the Results chapter of the proposed research project.

The interview takes about one hour. The interview will tend to focus on the following topic areas:

a) Role and function of knowledge as an economic commodity.

b) Understanding the role of institutions who aim to maximize the "knowledge affect" on city region economies.

c) How an old and new city region seeks to overcome the barriers to the global knowledge economy.

Appendix B: Dubai City Region: Overview of Economic Profile

Dubai City Region
Regional Knowledge Economy Characterized by Independent International Institutions clustered together to produce sector synergies: a) Dubai Knowledge Village (core to the Dubai Government Excellence Program laying emphasis on the development of a regional knowledge economy driven by excellence in innovation and technology). Hosts campuses for more than 20 international universities including Middlesex University, Stafford University, University of Bradford, University of Connecticut and the University of Wollongong. b) Highly Marketable Media Clusters including the Dubai Media City (hosting globally significant brands including CNN, CNBC, Reuters, Nokia and Siemens). c) Dubai Internet City (providing the ICT infrastructure and core communication provision to connect regional knowledge entities). The technology start-up incubator IN5 provides the innovation development support function based alongside global ICT companies including Microsoft, Google, Yahoo, HP, Dell, Intel and Cisco.
Central Government Backed Schemes to Promote Development of Knowledge Villages & Cities a) Key incentives include 100% foreign ownership in free zones, tax-free operations and complete repatriation of profits supported by relatively simple visa and license issuance procedures. b) Business across the region have created professional development routes for their staff to exploit the proximity of these international academic institutions and knowledge zones. c) A higher proportion of the young expatriate community residing in the region is being retained as a result of viable higher education opportunities designed to meet the needs of those in industry. d) Central Government provides high levels of infrastructural development and support to these knowledge clusters with each knowledge entity benefiting from growth funding administered through the local council and cluster hubs.
Knowledge Villages & Cities are detached entities with little un-planned interaction with small and medium sized businesses across the region: a)Knowledge intensive clusters such as the Knowledge Village, Dubai Media and Internet Cities are too distant from small and medium sized knowledge intensive businesses across the region b)Businesses across the region access these specialist knowledge clusters to train and upskill staff rather than look to create mutually beneficial knowledge transfer channels and network
Creative Communities (Big Players Initiate Cluster): a) A significant proportion of knowledge intensive activity in the region caters to a global audience with all innovation, product and service development requiring an international premise. b) Dubai's International Media Production Zone aims to create a cluster environment for media production companies forming a unique free zone that incorporates industrial, commercial, residential and community service projects spread over a 43 million square feet urban complex. c) The Gulf Information Technology Exhibition connects over 3500 domestic and international ICT vendors with more than 136,000 ICT professionals. d) Small businesses across the region have traditionally found it extremely challenging to meet the demands and scale of orders resulting from the interaction at a global stage.
Regulatory Environment: a) The region urgently requires consistency in legal regulation without inhibiting access and support packages to businesses. b) Key areas lacking effective regulation in the region include difficulty to compete with government owned companies, difficulty to compete with free zone companies operating in the local market and regulating the issuance of business permits and licenses. c)The recent improvement in the implementation of intellectual property protection legislation can be attributed to the establishment of the Gulf Cooperation Council (GCC) Patent Office in Riyadh, Saudi Arabia.

Appendix C: Liverpool City Region: Overview of Economic Profile

Liverpool City Region
Regional Knowledge Economy characterized by large institutions producing knowledge on a large footprint: a) University of Liverpool, Liverpool John Moores University and Liverpool Hope University host a 50,000 strong student community clustered around a diverse set of knowledge assets. b) These institutions hold knowledge assets of regional and national significance including the International Centre for Digital Content, Liverpool Screen School, Semantics Web Technologies Laboratory, Art & Design Academy, AIMES, Liverpool School of Tropical Medicine, Radio & Microwave Frequency Group, Clinical Trials Research Centre, Liverpool Bio-medical Research Centre and The Cockcroft Institute. c) The Knowledge Economy component of the Multi Area Agreement along with the collaborative strategy developed through the Knowledge Economy Group provide a more cohesive direction for the region's knowledge economy.
Assistive Funding to support development of Knowledge Clusters a) Liverpool City Region was awarded a grant of £2.5 mn. from the European Regional Development Fund (ERDF) to support SMEs to create knowledge intensive jobs in the region helping assist almost 3000 individuals into employment. b) Merseyside Special Investment Fund (MSIF) has encouraged businesses within key knowledge intensive and high growth sectors to apply for funding from its Merseyside Small Loans for Business Fund. c) The Baltic Triangle (which lies between Chavasse Park/Liverpool One, the Albert Dock and the Liverpool Anglican Cathedral) has benefited from both ERDF and regeneration funding including infrastructure upheaval support for the European Capital of Culture Campaign in 2008. d) Liverpool City Region's year as European Capital of Culture boosted the local economy to the tune of £800 mn. in addition to achieving £200 mn. worth of global media value. The preparation also benefited from a wider city regeneration and re-imaging programme “which emerged out of public and private partnerships and was funded mainly by private capital to a value of £4 bn. over eight years”.
Stronger Correlation Between Commercial Development in Knowledge Communities that are City Center Centric: a) The City Centre Strategic Regeneration Framework (SRF) aims to assist in the creation and growth of concentrated of related activity as a major goal. The presence of small and medium sized creative business across the city centre benefiting from the interaction and proximity with universities b) Liverpool City Region's Knowledge Quarter Institutions generate £1 bn. (15% of its total GVA) supporting 14,000 full time jobs - significant proportion of which are highly knowledge intensive
Creative Community Dynamics (Small Players Initiate Cluster): a) Liverpool City Region's Digital & Creative Sector employs over 28,000 people in more than 4,500 enterprises with the video games development sector alone generating £300 mn. annually. b) The region is home to small but well known global players including Rebellion, 3D Creation Studios, Evolution Studios, Silicon Graphics Inc (SGI), Lime Pictures and River Media. c) During the Capital of Culture development period, the creative sector benefited from multi million pound national grants assisting in the development of knowledge networks including the Liverpool Arts Regeneration Consortium and the Small and Medium Arts Collective along with the Arts and Culture Network (bringing relatively small individual creative businesses closer together).
Regulatory Environment: a) Comparatively much more consistent regulatory environment nationally allowing for businesses to access similar incentives and support packages. b) The Creative Britain Strategy forms a significant component of the knowledge economy remit for the United Kingdom. c) The UK is at the forefront of regulatory reform in the OECD building upon an existing business culture of market openness and global competition. This is vital to knowledge intensive growth which requires strict protection of intellectual properties and assets to protect against the loss of innovation through competitor manipulation.

Appendix D: Selected Milestones in the evolution of the Cambridge Technopole

(Adapted from Gill and Minshall, 2013)

1209: Scholars leave Oxford to seek refuge in Cambridge – leads to formation of University of Cambridge.

1534: Cambridge University Press established.

1881: Horace Darwin establishes 'Cambridge Instruments' (now part of Leica).

1960: Cambridge Consultants formed "to put the brains of Cambridge University at the disposal of the problems of British industry".

1969: Mott Report published with recommendation for an expansion of 'science-based industry' in Cambridge.

1970: Inspired by Mott Report, Trinity College establishes Cambridge Science Park. University sets up Wolfson Cambridge Industrial Liaison Unit to support technology transfer.

1970s: Acorn Computers and Sinclair established in Cambridge.

1978: Barclays Bank begins actively supporting new technology ventures.

1985: 'Cambridge Phenomenon' report published by SQW which highlights growth of high-technology business activities in Cambridge.

1987: St. John's Innovation Centre established. University publishes its first IP policy for research council funded research.

1990: University of Cambridge Judge Institute of Management Studies established.

1997: Ionica plc becomes first Cambridge company to have a valuation of over US$1bn. Eastern Region Biotechnology Initiative. 1st Cambridge Enterprise Conference held.

1998: University of Cambridge Institute for Manufacturing established. Cambridge Network formed to provide a voice for the high-technology business community. Greater Cambridge Partnership established.

1999: University of Cambridge Entrepreneurship Centre, University Challenge Fund and Cambridge University Entrepreneurs established; University Technology Transfer Office activities enhanced. East of England Development Agency established. Public Cambridge companies, including ARM, Autonomy and Virata, reached multiple billion US$ valuations.

2000: Bursting of dot com bubble leads to slow-down in Cambridge economy. Cambridge MIT Institute established in Cambridge with £65m of Government funds to promote entrepreneurship, productivity and competitiveness. Cambridge recognised by European Commission as excellent for support of innovative start-ups. Life science sector continues to grow.

2001: University revises its IP policy for externally funded research. 'Cambridge Angels' group formed.

2004 - 2005: IPOs of CSR, CDT, Bango and Amino Communications boosts investor confidence. M&A activity grows. East of England Science and Industry Council (SIC) established. Library House

reports Technopole companies secured more than 25 per cent of the UK's venture capital investments and more than 8 per cent of the European total by value.

2005: Comprehensive new IP policy adopted by University. East of England Innovation Relay Centre ranked #1 in Europe.

2006: GCP establishes International Relations Manager to support international links. Library House reports Technopole growth has 'stalled'. Cambridge Enterprise Limited formed as a wholly owned subsidiary of the University of Cambridge to commercialize technology arising from the University's departments

2007: Plastic Logic receives largest single venture capital investment into a European technology-based start-up. 8th Cambridge Enterprise Conference held. St John's Innovation Centre celebrates 20th anniversary.

2010: Cambridge Consultants Ltd reaches its 50th anniversary; Cambridge Science Park reaches its 40th. Opening of Hauser Forum on West Cambridge site.

2011: Autonomy plc sold to Hewlett Packard for over UK£7bn. Plastic Logic receives new investment totalling US$700m.

2012: Twelve Technopole companies have reached billion-dollar capitalisation since the mid-1990s, including one US$10bn (Autonomy) and one US$20bn (ARM). The combined market capitalisation of the Technopole companies reaches US£50bn.

2013: AstraZeneca announce their decision to relocate their global R&D headquarters to the Cambridge Biomedical Campus, investing £330m to provide facilities for 2,000 staff.