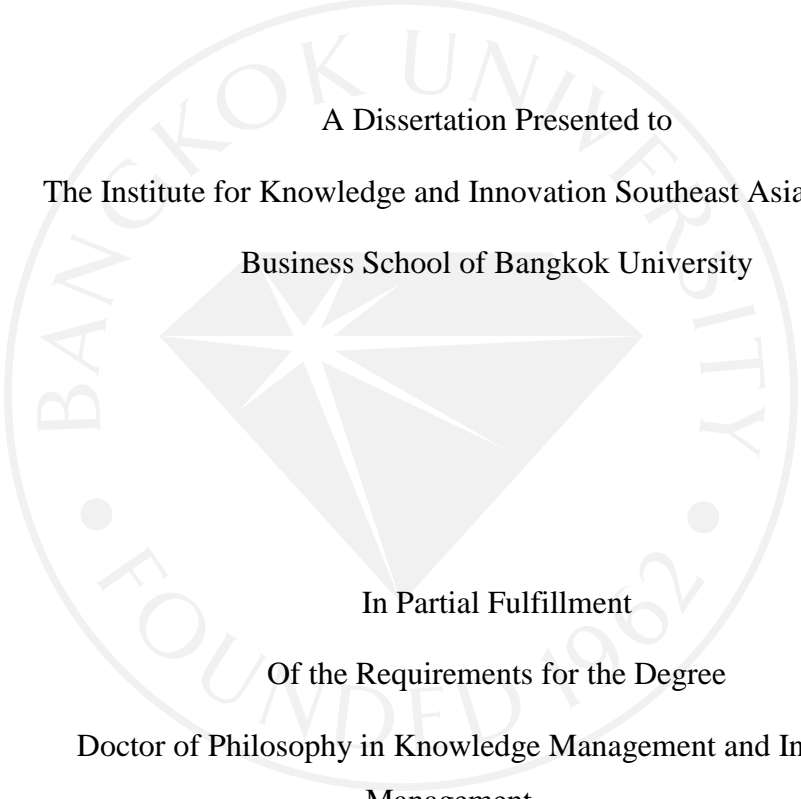A KNOWLEDGE-BASED DEVELOPMENT MODEL FOR PRIMATE CITIES OF THE

DEVELOPING WORLD

A KNOWLEDGE-BASED DEVELOPMENT MODEL FOR PRIMATE CITIES OF

THE DEVELOPING WORLD

A Dissertation Presented to

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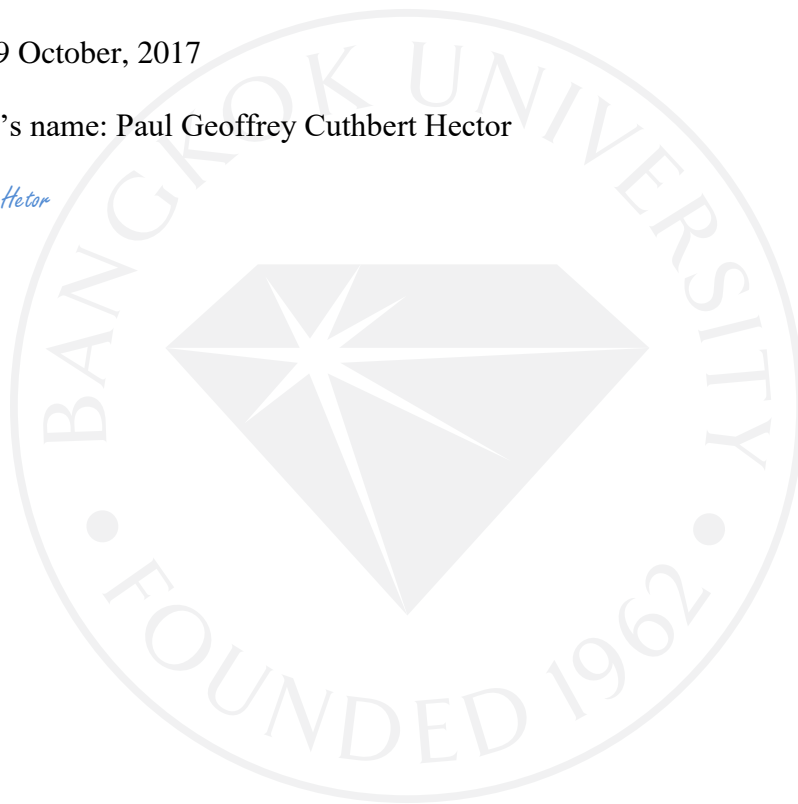(Prof.Dr.Alex Bennet –Bangkok University)

DECLARATION

In accordance with the Bangkok University Honor code, I certify that my submitted work herein is my own work, and that I have appropriately acknowledge all external sources that were used in this work.

Date: 19 October, 2017

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The Institute for Knowledge and Innovation Southeast Asia (IKI-SEA), Business

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A Knowledge-based Development Model for Primate Cities of the Developing World

(599 pp.)

Advisors of Dissertation: Prof. Dr Jean-Louis Ermine, Assoc. Prof. Dr Vincent Ribiere,

Dr Alex Bennet.

ABSTRACT

This mixed methods research study seeks to develop, validate and assess the

policy-relevance of a Knowledge-based Development Model. The model is based on

UNESCO's Knowledge Societies Conceptual Framework, developed from the

literature, validated through expert panels and field tested through application in

selected primate cities of two developing countries in Africa and Asia. The study uses

the model to gain insights into how knowledge assets in these cities can be leveraged

to address the United Nations post-2015 sustainable development goals (SDGs).

Hevner's (2004) Design Science Research provides an overarching

epistemological, ontological and axiological frame for structuring this investigation.

Scoping, design and evaluation of the model was guided by Mettler's (2009) and

Wendler's (2012) parameters for model development. Drawing on the extant

literature, indicators for the nine constructs in the UNESCO framework – human

rights, pluralism, inclusion, equity, openness, freedom of expression, universal access

to information, cultural and linguistic diversity and education – were developed and the model populated. Consultations with subject experts and a purposefully selected Delphi panel of some 66 global experts enabled the model to be validated. Pilot studies in Addis Ababa and Bangkok enabled an empirical exploration of the model, an assessment of the city's knowledge maturity and provided insights into the model's policy relevance. These findings contributed to the model's refinement.

This research is the first attempt known to the author to develop and apply a knowledge-based development model based on the UNESCO Framework. The study supports the Organization's mission of creating policy tools and resources for developing countries and provides a concrete response to Recommendation 10 of the UNESCO World Report: Towards Knowledge Societies (UNESCO, 2005). The potential for knowledge and knowledge processes in overcoming strategic societal challenges, such as the SDGs, is recognized, but there is still limited understanding around how to effectively identify and leverage knowledge at the societal level and to extend knowledge management from the realm of the organization to the society (Bresnahan & Gambardella, 2004; Ergazakis & Metaxiotis, 2011; Ritter, 2006; Yigitcanlar et al., 2012; Yigitcanlar & Lönnqvist, 2013). This field is still in a pre-paradigmatic phase with methodologies, frameworks and approaches still evolving (Ergazakis & Metaxiotis, 2011), so the dissertation and the model it advances contribute to theory-building in the area of societal-level knowledge management, and supporting policy-makers in their response to the SDGs. This research also builds

transdisciplinary linkages across disparate fields of endeavor such as knowledge

management, intellectual capital, human rights and human development.

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Finally, to the Source…. from which all possibilities flow and return and from which nothing can be hidden, I am so grateful to be on this journey, this path of greater personal discovery and self-realization…..

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LIST OF ABBREVIATIONS

BMA	Bangkok Metropolitan Administration
CPJ	Committee to Protect Journalists
KBUD	Knowledge-based urban development
LGTBQS	Lesbian, Gay, Transgendered, Bisexual, Queer and Searching
JICA	Japanese International Cooperation Agency
ICT	Information and communication technologies
ICT	Information and communication technologies for development
ITU	International Telecommunication Union
MDGs	Millennium Development Goals
MWA	Metropolitan Water Authority (Bangkok)
NWTTI	National Waterworks Technology Training Institute
ODA	Official development assistance
OECD	Organization for Economic Cooperation and Development
SDGs	Sustainable Development Goals
TISTR	Thailand Institute of Scientific and Technological Research
UN	United Nations
UNDESA	United Nations department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific & Cultural Organization
UNGA	United Nations General Assembly
UN-HABITAT	United Nations Human Settlements Programme
UNISDR	United Nations Office for Disaster Risk Reduction

UNOHCHR	United Nations Office of the High Commissioner for Human Rights
UNRISD	United Nations Research Institute for Social Development
WHO	World Health Organization
WSIS	World Summit on the Information Society

CHAPTER 1

INTRODUCTION & BACKGROUND

This portion of the study provides an overview of the phenomena, perspectives and context that this research study will investigate. It therefore serves to situate, prepare and orient the reader.

1.1   Urbanization and its Impacts as an Agent of Change

Urbanization is an important global demographic trend. Since 2007, for the first time in history more than 50% of the world's population live in cities (Carrillo, 2005; UN-HABITAT, 2014; UNDESA, 2012). By the year 2050, this proportion is expected to increase to around 70% (UN-HABITAT, 2014; UNDESA, 2012).

Previously the largest urban areas were located in the developed regions, but these are now being concentrated in the developing countries. According to UN-HABITAT, around 90% of the urbanization is occurring in the developing[1] world, mainly Asia and Africa, where each day urban areas gain about 200,000 new inhabitants (UN-HABITAT, 2013). The fastest growing urban areas in these two regions are medium-sized cities with less than 1 million inhabitants (UNDESA, 2014; UN-HABITAT, 2014).

Various studies have shown that compared to their populations, cities contribute disproportionately more to their national and regional economies. This in

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[1] The World Bank classifies countries based on their annual Gross National Income (GNI) per capita. For 2012 these groups are: low income, $1,035 or less; lower middle income, $1,036 - $4,085; upper middle income, $4,086 - $12,615; and high income,$12,616 or more. Low and middle income countries are collectively referred to as the developing countries. High income countries are often referred to as OECD countries. http://data.worldbank.org/about/country-and-lending-groups

turn enables them to attract more talent and investment (Mckinsey Global Institute, 2011; Moore et al., 2003; OECD, 2013; UN-HABITAT, 2012). Since they concentrate wealth, people and a range of tangible and intangible resources, when things go wrong in cities - such as social unrest, natural or man-made disasters - the impacts of these problems can have significant national repercussions. Furthermore, in today's globalized economies, supply chains readily transfer the adverse impacts of local events around the world impacting financial and other markets in often complex ways.

While opportunities for economic, social, political and other forms of participation are plentiful in cities, inhabitants may not have equal access to, or even receive these benefits. The inability to overcome these deep-seated inequalities may lead to a break-down in social cohesion, unrest and various forms of insecurity (Borja & Castells, 1997; Sassen, 2012) that are detrimental to harmonious economic, social and political life in the city.

Cities both in developed and developing countries must address the opportunities and challenges that impact their long-term sustainability. However, it must be noted that the countries with the most rapid rates of urbanization are also amongst the ones least prepared – due to their weak institutional and human capacities – either to capitalize on the advantages of urbanization, or to take actions that could mitigate their adverse impacts.

Against this backdrop of opportunity and risk it is relevant to reflect on what can be done to help the rapidly urbanizing countries in Africa and Asia successfully manage the challenges they face.

1.2   Knowledge as a Strategic Resource

Increasingly, intangible "cerebral work", information and knowledge mediated processes rather than physical production, commodities or labour intensive activities appear to be providing the main sources of growth and value-additions in the socio-economic sector (Chen & Dahlman, 2005; OECD, 1996). The pervasiveness and widespread impacts of these interactions and the changes they have brought about have led to debates as to whether these new forms of activities, processes and organization in the cultural, economic and political life of today's societies constitute a new paradigm (Webster, 2002; Castell, 2010). These major shifts have led various scholars to theorize that humanity is now in a post-industrial world where the creation, preservation, dissemination and application of information and knowledge have become the most important determinants for competitive advantage, differentiation and human development (Castell, 2010**;** Drucker, 2008).

These transformations are seen by many as part of humanity's evolving development and social organization from hunter-gather, to agrarian, to industrial and now post-industrial society (Lenski & Nolan, 2006). These changes are regarded as opportunities for new competitive advantages and for resolving current societal problems, but also as a source of new risks and challenges (Boutang, 2011; David & Foray, 2006; Castell, 2010; Foray, 2006; Goede, 2011; Mansell, 2010; Mercer, 2005; Pintér, 2008; UNESCO, 2005).

Consequently, questions are emerging that are at the forefront of public policy-making, civil society and business concerns. These include: What steps are needed to prepare citizens and institutions to effectively manage these knowledge-

based opportunities and risks? What should be the societies' strategic priorities?
Where should we focus benchmarking and forecasting efforts?

1.3   The Intersection of Knowledge and Cities

Knowledge is increasingly seen as a critical factor by international actors, such as UNESCO, the World Bank, the OECD and the United Nations, for addressing strategic challenges in the field of human development across a range of sectors such as agriculture, health and environmental resource management amongst others (Ergazakis & Metaxiotis, 2011; Ritter, 2006; World Bank, 1998; UNESCO, 2005). This interest has led to the emergence of the field of knowledge-based development whose theoretical foundations span the fields of economics and knowledge management (Carrillo, 2004).

The recognition of cities as an important frontier for addressing human development challenges and their key roles as macro-economic engines has stimulated interest amongst practitioners and theoreticians in the role of knowledge-based development in the urban environment (Borja and Castells, 1997; Bounfour and Edvinsson 2005; Carrillo, 2004, 2015; Ergazakis & Metaxiotis, 2011; Florida, 2004; Sharma et al., 2008, 2009; Yigitcanlar & Velibeyoglu, 2008). This in turn has given rise to an area of specialization known as knowledge-based urban development or knowledge cities, which is a new hybrid of knowledge-based development and urban studies and which seeks to provide strategic responses for addressing the complex multidisciplinary challenges that cities face (Carrillo, 2004, 2015; Yigitcanlar& Velibeyoglu, 2008; Ergazakis & Metaxiotis, 2011).

Knowledge-based development approaches also emphasize a more holistic approach. They seek to give attention not only to the economic aspects of development but also to take account of social and environmental factors as well as the implications for sustainable development, including such dimensions as tolerance and social cohesion (Borja & Castells, 1997; Ergazakis & Metaxiotis, 2011; Yigitcanlar & Velibeyoglu, 2008).

Perhaps due to its novelty, the complexity of this subject of study, as well as the important role that cities play, this field of research is attracting the interest of practitioners and researchers from a variety of disciplines. Consequently, the field is still in a pre-paradigmatic phase with methodologies, frameworks and approaches that are still evolving (Carrillo, 2004, 2014; Ergazakis & Metaxiotis, 2011; Ritter, 2006).

Although cities in developing countries represent the spaces with the greatest potential – positive and negative - for human growth over the coming years of this century, the bulk of the academic research in this field appears to be addressed towards the developed country context (Atiqul Haq, 2012; Jenkins, 2013; Roy, 2005). Much of this inquiry has focused on leading global cities in the developed world with attention given to the role of technology, specialization, reputation and knowledge workers and their impact on the attractiveness and competitiveness of these cities (Carrillo, 2004; Dickman, 2012; Ergazakis et al., 2006; Florida, 2004; Luethge & Byosiere, 2006; Sharma et al., 2008, 2009; Yigitcanlar et al., 2007). This situation therefore raises ethical questions about the intent, purpose responsibility and action of researchers.

1.4 Key International Development Challenges

What development challenges should countries and cities address when leveraging knowledge? Figure 1 presents the global challenges identified by the United Nations System[2] (UN, 2012).

The identification of societal threats and goals is a strategic task that defines the purposes to which societies' direct resources, i.e., their intellectual capital. At the national, regional and global level and within the context of their membership in various regional and international bodies, nations agree on and identify their strategic objectives. To ensure the broadest relevance of this study, the international development goals adopted by the Member States of the United Nations – and which therefore cover every territory and country – are used in this study to represent the set of development challenges to be addressed. Each country, depending on its specific context and resources interprets, adapts and implements responses based on its priorities to find solutions to these international challenges in its various administrative units *inter alia* cities, provinces, states.

The United Nations in its report, "Realizing the future we want for all" (UN, 2012) identifies four overarching strategic areas for the Post-2015 Sustainable Development Agenda: inclusive social development, environmental sustainability, inclusive economic development, and peace and security. These goals will complement and advance the work of the earlier international Agenda of the

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[2] On 21 October, 2015 the UN General Assembly released Resolution A/70/L.1 which adopted the outcome document of the United Nations summit for adoption of the post-2015 development agenda "Transforming our world: The 2030 Agenda for Sustainable Development". Building on the earlier framework depicted in Figure 1 the document identifies 17 sustainable development goals and 169 targets.

Millennium Development Goals (MDGs) adopted in 2000 (UN, 2000). These four areas of interest represent and reflect the increasing recognition and acceptance across all sectors that economic targets alone are insufficient.
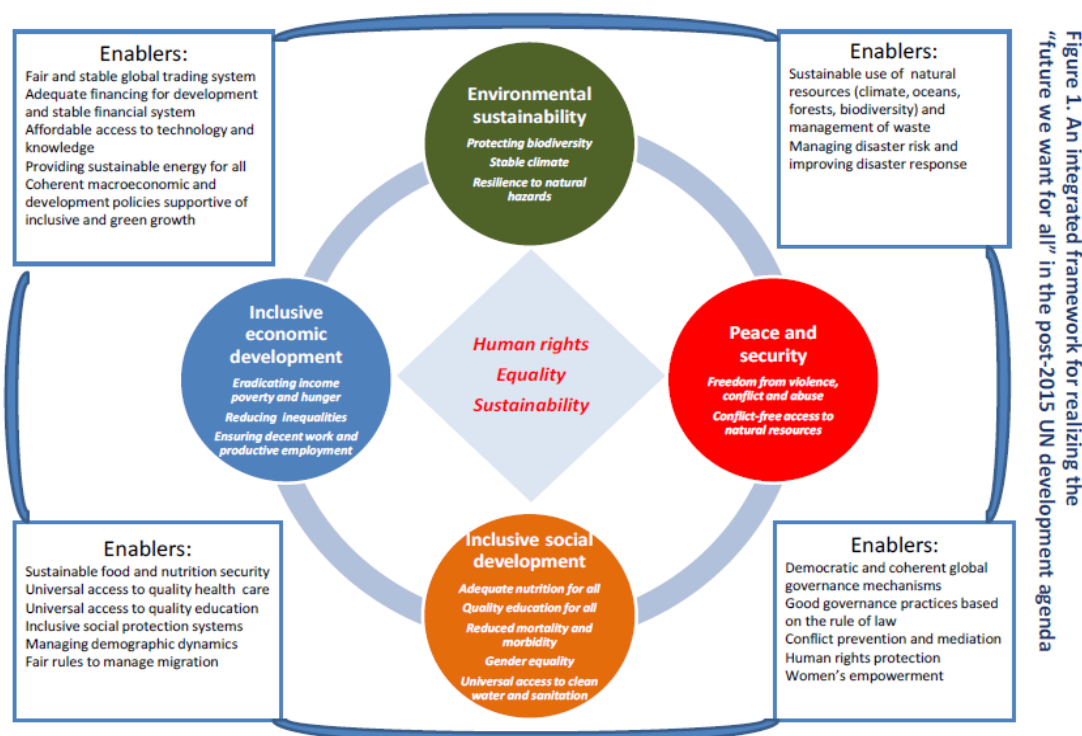
Figure 1:   The Four Overarching Areas for Development Interventions Adopted for the United Nation's Post-2015 Development Agenda (UN, 2012: 24)

1.5   UNESCO, an International Advocate of Knowledge-based Development

The Constitution for the establishment of the United Nations Educational, Scientific and Cultural Organization (UNESCO) was signed on 16 November 1945 and became effective on 4 November 1946 following ratification by 20 nations[3].

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[3] UNESCO Constitution available at:
http://portal.unesco.org/en/ev.php-URL_ID=15244&URL_DO=DO_TOPIC&URL_SECTION=201.html

UNESCO therefore came into being as a Specialized Agency of the United Nations System with a mandate to "promote the free flow of ideas by word and image" and to "maintain, increase and diffuse knowledge".

UNESCO works at the international level to fulfill its mandate with much of its efforts focused on enabling developing countries to "catch up". This effort has been undertaken through the Organization's five main modalities or functions (UNESCO, 2014b):

a) As a laboratory of ideas, UNESCO seeks to identify the most important problems in its fields of competence and develop appropriate solutions;

b) As a clearing house, it supports international research, the collection, quality assurance, piloting and prototyping and dissemination of knowledge and best practices;

c) As a standard-setter, UNESCO supports the creation and revision of both legally binding and non-binding international instruments that serve as normative and ethical benchmarks for the actions of Member States in its fields of competence;

d) As a capacity-builder, UNESCO supports technical training to enable its Member States, particularly developing countries to build their human as well as institutional capacities in all its fields of competence, through programmes of technical cooperation; and

e) As a catalyst for international multi-stakeholder cooperation, the Organization seeks to promote collaboration in its fields of competence through North-South (between developed and developing) and South-South (between developing countries) cooperation.

Through its concept of knowledge societies, UNESCO has advocated for the development of societies founded on human rights principles which aspire to enable each citizen to achieve their full potential and to contribute to solving societal challenges and building peace in their communities through the equitable use of knowledge (UNESCO, 2005, UNESCO/ITU, 2014). These ideas are analogous to those of knowledge-based development and UNESCO has proposed a conceptual framework for achieving this (See Figure 2).
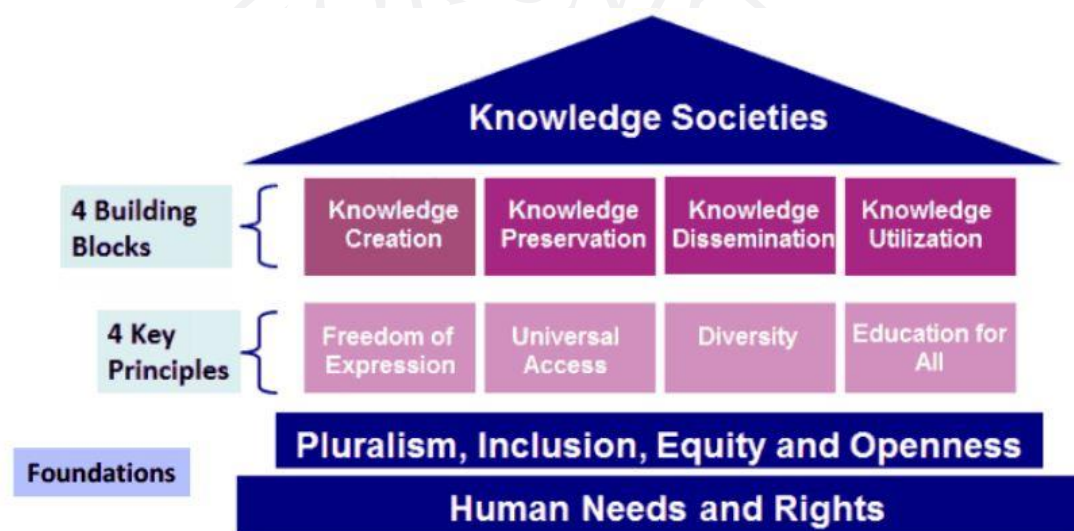
Figure 2:   UNESCO's Knowledge Societies Conceptual Framework (Souter, 2010; UNESCO, 2005)

1.5.1   UNESCO's Knowledge Societies Conceptual Framework

Through international expert meetings and consultations, World Reports and other fora going back to at least as early as 1997, UNESCO has been refining, advocating and gaining support for its vision of Knowledge Societies. UNESCO's views have been endorsed by its Member States and informed by noted academics such as Daniel Bell, Manuel Castells, Dominique Foray, Bruno Latour, Robin

Mansell, Saskia Sassen, Nico Stehr and Alain Tourraine, amongst others who contributed to the preparation of the World Report on Knowledge Societies (UNESCO, 2005).

Despite the important academic work undertaken and widespread recognition of the value implicit in UNESCO's conceptual framework, the Organization has not advanced in implementing recommendation 10 of its 2005 World Report (2005, p194). This recommendation calls for the development of knowledge society indicators and in particular:

> *..It is therefore advisable to forge, as far as possible… tools that can be used to measure knowledge by gathering data that involve not only economic variables…in particular in developing countries for which data remain by and large sketchy, this measuring effort should focus on the other constituent dimensions of knowledge societies, such as education, culture and communication.* (UNESCO, 2005, p. 194)

UNESCO has not given institutional attention to operationalizing this conceptual framework by addressing such crucial aspects as developing methodologies that would support activities such as the creation of indicators, that could support processes such as benchmarking, policy diagnosis and assessing a society's progress towards becoming knowledge societies. In its current form, the Knowledge Societies' framework, does not provide insights into how knowledge could be addressed to specific development challenges.

Other international organizations working in this space, notably the International Telecommunication Union (ITU), who in contrast to UNESCO's human-centric perspective advocates a techno-centric view, have developed a variety

of indicators which serve as a measurable basis against which Member States can measure their progress (ITU, 2014). Their annual publication of rankings; such as ITU's measures of Internet penetration and mobile phones per capita; provide incentives for countries to measure up against others and consequently to implement policies in an effort to improve or maintain their rankings.

Without tools to assess and incite progress, UNESCO's vision of knowledge societies are likely to remain lofty ideals that countries will endorse and aspire to, but not act on.

1.6   Problem Statement

Compared to the size of their populations, cities disproportionality impact - positively and negatively - the well-being of their host nations across a range of social, cultural, environmental and economic measures (McKinsey Global Institute, 2011; Moore et al., 2003; OECD, 2013; UN-HABITAT, 2012). The percentage of the world's population living in urban centers is expected to increase from 50% in 2013 to around 70% over the next 30 years (UN-HABITAT, 2014; UNDESA, 2013). This important demographic trend of urbanization is expected to heighten the importance and impact of cities on the achievement of international development goals at both the national and global level. Knowledge-based urban development (KBUD) can contribute to managing the challenges and opportunities created in cities. However, systematic and holistic approaches to shaping policies that foster conditions that favor the use of each society's knowledge at the scale and complexity of cities are needed.

KBUD is an emerging paradigm and field of practice, but there is still a limited grasp on the conditions that lead to successful development outcomes as well

as agreed methods and approaches for applying KBUD. Efforts to replicate successful city experiences have often failed as they have focused on limited measures – often economic ones - and aspects of success (Bresnahan & Gambardella, 2004; Yigitcanlar et al., 2012; Yigitcanlar & Lönnqvist, 2013). Although the most rapid population growth and urbanization is taking place in developing countries (Roy, 2005; UN-HABITAT, 2013), the majority of the research on knowledge-based development is focused on the developed world which may have limited relevance to these contexts (Jenkins, 2013; Hector et al., 2013; Rose, 1989; Roy, 2005). Furthermore, many of the dominant theories originate from frames of reference which prioritize economic values and do not give adequate attention to human rights and diversity.

UNESCO's Knowledge Societies Conceptual Framework provides a theoretical basis for addressing the above challenges which has been validated and promoted, but not empirically tested, even though the recommendations of its 2005 World Report (2005, p194) have called for this. This dissertation seeks to use this framework to develop and evaluate a maturity model in the context of cities in the developing world to assess their ability to use knowledge to identify and address the strategic challenges and opportunities that face the city. Hevner's (2004) Design Science Research methodology will guide the development of the model, its validation through expert panels and field surveys and the evaluation of the findings from its application in selected cities.

The study population will consist of up to three rapidly urbanizing, primate cities each with populations under 10 million inhabitants and located in developing countries in Africa and Asia – Addis Ababa, Ethiopia; Bangkok, Thailand and Kampala, Uganda. These countries have had periods of significant national unrest but

are recognized as regional leaders across a number of socio-economic measures. These countries and cities are also amongst the ones that according to UNDESA (2014) are the most rapidly growing and urbanizing.

1.7   Research Objectives

The primary goal of this mixed methods research study was to theoretically develop, validate and evaluate a Knowledge-based Development Maturity Model, based on UNESCO's Knowledge Societies Conceptual Framework, in selected primate cities of developing countries located in Africa and Asia. The research supports the recommendations of UNESCO's 2005 World Report and provided a response to the urban challenges facing cities of the developing world in Asia and Africa. Hevner's (2004) Design Science Research methodology provided an overarching frame for structuring this investigation.

The process of scoping, designing and evaluating the maturity model was guided by Mettler's (2009) parameters for maturity model development. Drawing on the literature, indicators for the nine constructs in the UNESCO framework – human rights, pluralism, inclusion, equity, openness, freedom of expression, universal access to information, cultural and linguistic diversity and education – were developed and the maturity model populated.

Consultations with experts as well as a pilot study conducted in two of the study cities – Addis Ababa and Bangkok – , a Delphi study with a purposefully selected panel of global experts in the knowledge-based urban development field and a policy dialogue with experts living and working in the developing world – provided the means for validating the Knowledge-based Development Maturity Model.

The validated Knowledge-based Development Maturity Model served as an instrument for conducting semi-structured interviews in each of the named cities with respondents whose profiles corresponded to established selection criteria. These surveys facilitated an exploration of the nine constructs and the city's knowledge maturity.

An analysis of the qualitative and quantitative findings obtained from the survey and selected secondary data provided the basis for a mixed method case study which enabled recommendations based on the model to be developed. A simulated policy-dialogue with policy-makers and experts knowledgeable about developing cities in Asia and Africa enabled the methodology to be applied and to generate recommendations for action plans.

1.8   Research Questions

RQ1: How can UNESCO's Knowledge societies' concept be operationalized to address the strategic challenges that cities face?

RQ2: What insights does a Knowledge-based approach reveal when applied to cities?

RQ3: What contribution does the Knowledge-based approach provide to bench-learning and the possible orientation of action plans for policy-makers in the cities?

1.9   Personal Motivation

In 2000 I joined UNESCO through its competitive Young Professionals Programme and since that time have been involved in contributing at progressively

higher levels to supporting, designing and leading various international cooperative
initiatives that focus on ICT4D.

I currently work in the Knowledge Societies Division of the Communication
and Information Sector as a Programme Specialist. In this role I manage the day to
day operations of UNESCO's intergovernmental Information for All Programme
(IFAP) and coordinate UNESCO's contribution to the WSIS C10 Action Line, The
Ethical dimensions of the Information Society. IFAP evolved from the entities that
were established by UNESCO in the 1960's to support the development of networks
for international cooperation. Addressing the needs of developing countries in general
and sub-Saharan Africa in particular is one of UNESCO's over-arching priorities. In
my current role, I support development activities, policy and other interventions that
support the use and application of information and knowledge to enhance conditions
in UNESCO's Member States.

During my 15 years as a UNESCO staff member I have had the opportunity to
live and work for seven years in two developing regions, Africa and the South Pacific.
I have been involved in capacity building and knowledge transfer projects in a variety
of contexts including countries in post-conflict and post-disaster transitions. I have
also participated in policy development processes, including the organization of
forums and expert panels during both phases of WSIS and their follow-up processes.
This has familiarized me with the strengths, challenges and different motivations that
impact the alignment of policy and implementation aspects of the international
development puzzle.

From my vantage point as a member of the Knowledge Societies Division, an
actor in the international development sphere and as a student of knowledge and

innovation management, I understand the relevance and need at an operational, policy and conceptual level of a knowledge assessment tool.

On a personal level, having access to quality education while growing up on a small, virtually unknown, developing island provided me with the opportunity to develop competencies, skills and capacities that have enabled me to make contributions at the international level. My experience in working with groups to implement projects under difficult conditions in post-conflict regions has shown me what is possible when people are empowered. Having lived in Ethiopia and through regular visits back to Ethiopia I have seen the positive transformations, but also the challenges and trauma of urbanization. Though urbanization may be inevitable, its challenges are not insurmountable. I would like to contribute to helping cities, like Addis Ababa, leverage knowledge processes to realize a more sustainable future.

1.10   Significance of the Research

Rapid population growth and urbanization is occurring in developing countries which are not well prepared to cope with this challenge and for the first time more people are living in cities (Carrillo, 2005; UN-HABITAT, 2014; UNDESA, 2012). Globalization is leading to an increase in the heterogeneity of cities as well as an ease of mobility, together they pose new challenges for social cohesion. Previously, the large cities were located in the developed world but in the future they will be in developing countries (UNDESA, 2014). At present, the research on challenges facing cities is primarily focused on cities of the developed world. The conditions and context of cities in the developed countries are materially different from those of the developing world. Accordingly, this limits the generalizability of existing research to this emerging area.

This research therefore seeks to contribute to the academic literature on the application of knowledge management in the cities of developing countries.

While there is growing recognition of the importance of non-economic factors on growth, such as social cohesion, the underlying motivations for supporting these intangible aspects is still the prospect of economic windfalls. However, this research addresses the question of social well-being based on a human rights framework and provides a new and distinct frame of reference as its starting point.

Finally, this research contributes to advancing the development and operationalizing of the UNESCO Knowledge Societies Conceptual and the Organization's mission to develop policy tools and resources for developing countries. This research will provide a first empirical investigation into the relationships proposed in the model and provide insights that could support its refinement and relevance to policy makers in cities of the developing world.

The combination of a problem domain – rapidly growing cities of the developing world – that is not well understood (Carrillo, 2005; UN-HABITAT, 2014; UNDESA, 2012), coupled with limited understanding of how to effectively apply knowledge at the societal level to address strategic development challenges (Bresnahan & Gambardella, 2004; Yigitcanlar et al., 2012; Yigitcanlar & Lönnqvist, 2013) suggest that we are in a context characterized by both low application domain maturity and low solution maturity (See Figure 3). This dissertation is therefore addressed to a problem area pregnant with potential for generating significant research and knowledge contributions.
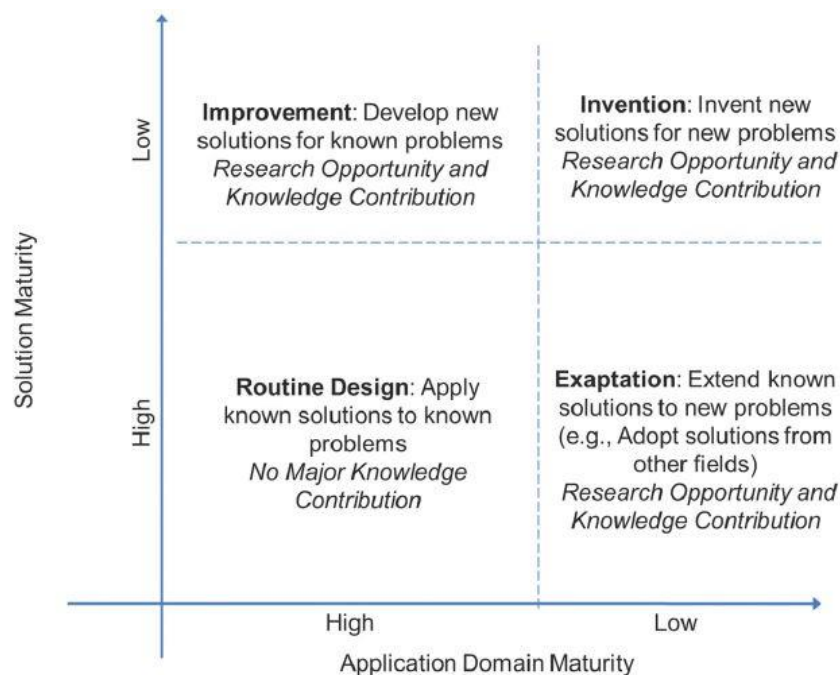
Figure 3:   Design Science Research Framework May Provide Insights for

Addressing City Challenges (Gregor & Hevner, 2013: 345)

1.11   Organization of the Dissertation

This dissertation is organized as follows: The first chapter provides the

introduction and background by providing an overview of the contextual factors and

setting the stage regarding the issues to be explored. Against this backdrop the chapter

presents the Problem Statement, Research Objectives, Research Questions,

Significance of the Research, Personal Motivation. The second chapter consists of the

literature review, which focuses on exploring key conceptual issues related to

knowledge-based development, analytical models used in this area as well as two

analytical/methodological tools used for gaining insights into problem situations, the

maturity model and Delphi panel. Attention is also given to understanding the nature

of the societal developmental problems which this research project seeks to address

by leveraging knowledge and knowledge process. Chapter three presents the research

methodology adopted in this study including the epistemological and ontological

frameworks, research limitations and issues around validity and reliability. Chapter

four presents in detail the process of building and populating the model used in the

study. Chapter five presents the model validation process, the field testing of the

model, the policy forum and discusses their findings. Chapter six presents the

theoretical and practical contributions of this research, discusses its limitation and

provides recommendations for future work.
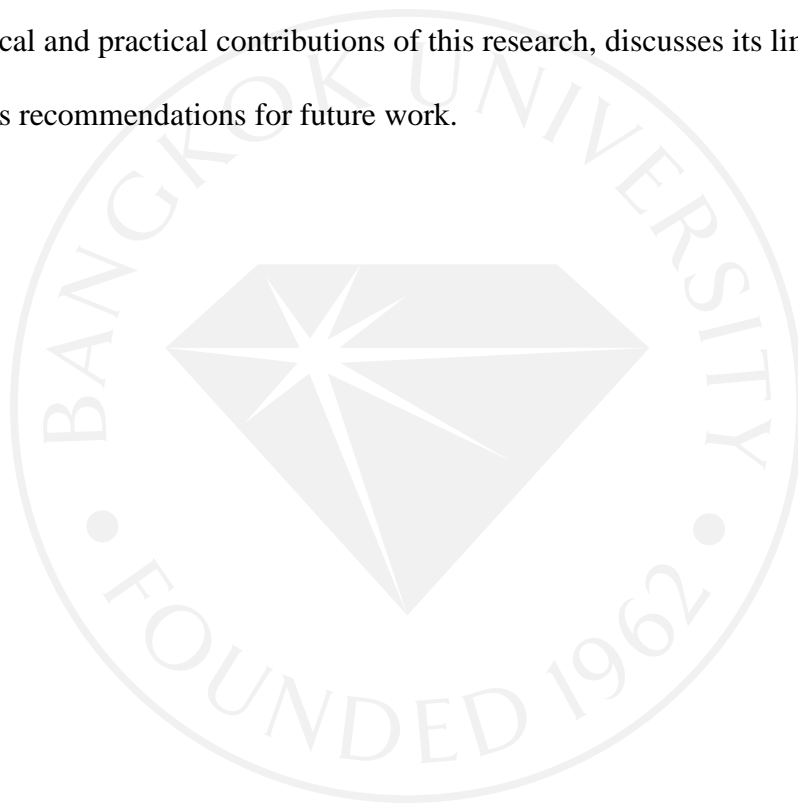
CHAPTER 2

LITERATURE REVIEW

Amongst other purposes, a literature review enables the researcher to become familiar with the state of the art in a given field; to understand if similar or related research has been undertaken; to assist in positioning the contemplated research within the particular field; and to understand whether and how the contemplated research is useful in light of past work (Cresswell, 2009; Easterby-Smith et al., 2008; Saunders et al., 2012).

This literature review therefore provided a means to inform the Researcher's efforts to answer the selected research questions and to position and identify an expected contribution. Consequently, this literature review explored: the concept of the post-industrial society and the accompanying role of knowledge and intangibles as strategic resources for development; UNESCO's role as an international actor in the knowledge-based development space; cities as critical centers of complex socio-technical activity and their typologies; knowledge-based development models created by researchers; Design Science Research as a problem-solving philosophy and method; the Delphi technique as a systematic process for gaining expert insight into decision-making and theory-building in complex situations; the role of maturity models as tools for gaining insight into complex situations to support assessment and corrective action; and finally, wicked problems and their implication and relationship to the international strategic development goals.

2.1   Heightened Role of Knowledge and Intangibles as Societal Strategic Resources

The recognition of knowledge and intangible resources as a source of value, and as an engine for value creation, with a range of unique characteristics, has given rise to interest by a variety of actors – inter alia political, academic, economic – to better comprehend and leverage this new class of assets. The multiplicity of disciplinary perspectives, motivations and world views coupled with the novelty of this field makes it a rich and in many ways a pre-paradigmatic field of study.

2.1.1   Knowledge as a Strategic Resource

The advent of the Internet and other digital technologies coupled with the phenomena of globalization has seen new forms of global, digitally mediated interactions become an integral part of contemporary life in developed and developing countries. The Internet resulted from publicly-funded research undertaken during the 1960's and 1970's in the United States of America (Castells, 2010; UNESCO, 2011). Early Internet users were from the military and academic community in the USA but by 2011 estimated Internet penetration was 32.7% with over 2.3 billion Internet users worldwide (ITU, 2011; UNESCO, 2011; UNESCO, 2012).

Rapid growth in the use of information and communication technologies (ICT), coupled with effects such as Moore's Law – the ability to purchase double the computer processing power every 18 month for the same price – triggered an exponential fall in prices and the growth of global networks such as the Internet (Castells, 2010; Roberts, 2000). International telecommunication networks have facilitated global economic interactions and contributed to a marked rise in the

knowledge intensity of economic, social, political, cultural and other aspects of our lives (Foray, 2006; Houghton & Sheehan, 2000). The advent of lower cost, powerful mobile devices, multilingual platforms, as well as the reduction of other access barriers, is increasing global Internet penetration, thereby further accelerating these technological and societal trends.

Increasingly, intangible "cerebral work", that is to say, information and knowledge mediated processes rather than physical production, commodities or labour intensive activities, appear to be providing the main sources of growth and value-additions in the socio-economic sector (Chen & Dahlman, 2005; OECD, 1996). The pervasiveness and the widespread impacts of these interactions and the changes they have brought about have led to debates as to whether these new forms of activities, processes and organization in the cultural, economic and political life of today's societies constitute a new paradigm (Webster, 2002; Castell, 2010). These major shifts have led various scholars to theorize that humanity is now in a post-industrial world where the creation, preservation, dissemination and application of information and knowledge have become the most important determinants for competitive advantage, differentiation and human development (Castell, 2010**;** Drucker, 2008).

These transformations are seen by many as part of humanity's evolving development and social organization from hunter-gatherer, to agrarian, to industrial and now post-industrial society (Lenski & Nolan, 2006). These changes are regarded as opportunities for new competitive advantages and for resolving current societal problems and also as a source of new risks and challenges (Boutang, 2011; David & Foray, 2006; Castell, 2010; Foray, 2006; Goede, 2011; Mansell, 2010; Mercer, 2005;

Pintér, 2008; UNESCO, 2005). Consequently, there are critical questions at the fore-front of public policy-making, civil society and business concerns. These questions include: What steps are needed to prepare citizens and institutions to manage these opportunities and risks? What should be the strategic priorities? Where should we focus benchmarking and forecasting efforts?

While recognizing increased knowledge and information, scholars such as Webster (2002, p26), argue that humanity has always depended on knowledge and conclude that, "If there is just more information, then it is hard to understand why anyone should suggest that we have before us something radically new".

2.1.2 Knowledge's Unique Properties

However, in many ways knowledge is intrinsically different from other factors of production, such as land and buildings, which traditionally shaped and defined societies and economies. Economists describe knowledge as a public good due to its properties of non-rivalrous consumption and non-excludability (Menell, 1999) and its cumulativeness (Foray, 2006). Together, these three properties make knowledge an infinitely renewable, intangible resource which increases its value when shared provides a basis for future knowledge growth, and which is very difficult to prevent others from consuming.

Furthermore, knowledge is portable and can substitute for other factors of production. These properties of knowledge, an intangible asset, are in stark contrast to those of tangible assets. Our economies and societies have largely dealt with tangible assets whose values increased with scarcity; in turn, this perspective has been instrumental in shaping such ideas as the concepts of property, competition and social

accountability (Castell, 2010; Drucker, 2008; Lessig, 2001). Thus, the increased role

of knowledge and its distinctive properties calls into question the values and efficacy

of the current systems and values. The shift to knowledge economies and societies

signals a rupture with past forms of social organization. Table 1 provides an overview

of knowledge-based productions and these properties and their implications are

further explored in this Chapter.

Table 1:   Attributes of Knowledge-Based Production (Carrillo, 2015)

Attribute	Characteristics
Non-rivalry	Possession and use of a good by an agent does not consume it and therefore does not prevent possession and use of the same good by another agent
Non-excludability	Access to a good by an agent does not prevent access by another agent
Non-scarcity	A good can be replicated indefinitely at no extra cost
Non-decrementality	The rent value of successive product units x_i, x_{i+1},….x_n does not diminish as a function of iterations of the production cycle.
Capital – labour convertibility	Labour may simultaneously operate as capital and become the most critical factor (e.g. talent-intensive companies)
Ubiquity	A good may be simultaneously available to anyone, anywhere
Time & context dependency	A good may decrease in value as a function of time and sometimes may become obsoletes soon after it has been released
Connectivity	The sum value of a network increases as the square of the number of members
Intangibility	The market value of a firm can (largely) surpass that of its book value
Externalities	Unintended consequences, both positive and negative can (largely) surpass the value of producing a good

At the national, regional and international levels, policy-makers, academics,

the private sector and citizens appear to accept the paradigms of a knowledge-based

post-industrial society as evidenced by extensive commitments of financial, personnel

and strategic resources being deployed to harness the potential of knowledge in

addressing economic and social challenges. These commitments include the Lisbon

Strategy adopted in Europe in 2000; with the aim of making Europe the leading

competitor in the knowledge-based economy with sustainable economic growth and

greater social cohesion (EU, 2000; COE, 2011); and the World Summit on the

Information Society (WSIS) organized in two phases in Geneva and Tunis in 2003

and 2005, respectively. At WSIS, nations committed to promoting access to ICT and

networks and ensuring all of the planet's peoples share in the benefits that arise from

the growing social, cultural, economic and other forms of value that are generated

from information and knowledge (ITU, 2012).

2.2   Knowledge Management

The growing recognition of knowledge as a source of competitive advantage

and value over the past several decades resulted in increased interest by practitioners

and academics to better understand how this strategic resource could be effectively

created, preserved, disseminated, utilized and protected so as to achieve strategic

goals (Dalkir, 2011). As the understanding of knowledge within the context of the

post-industrial era has been evolving, so too is the young field of knowledge

management which focuses on the creation of systematic approaches to creating,

sharing, preserving and applying relevant knowledge to support organizational

success (Dalkir, 2011). Knowledge management is continually informed and nurtured

by various conceptualizations, models and approaches from a range of disciplinary

perspectives. These trans-disciplinary influences include anthropology and sociology,

organizational science, information and library science, cognitive sciences, education,

journalism, design, amongst others (Dalkir, 2011). They offer a rich and eclectic

mixture of ontologies and epistemologies which cut across and challenge the neat silos of structures, methodologies and traditions that have institutionalized the pursuit of knowledge. These multi-disciplinary influences reveal that knowledge is complex, subjective and contextual, so if we wish to manage it then we need to adapt to it[4].

2.2.1   Knowledge Representations in the Literature

To enhance the understanding of knowledge it has been metaphorically represented in many ways, for instance as a flow, a stock, a capital, an object, a process, a capacity, something which can be made explicit or embodied, as light, as theoretically based, as a public good, as learning, as sense-making (Bennet & Bennet, 2004, 2008, 2015; Brooking, 1996; Carrillo, 2004; Cross & Prusak, 2002; Deeds & Decarolis, 1999; Edvinsson & Maloney, 1997; Menell, 1999; Snowden, 1999; UNESCO, 2005; World Bank, 1999; Yamao et al. 2009). These conceptualizations and metaphors for portraying knowledge have played an important role in the way that valuing, creating property rights, developing, accessing, sharing and other management issues around knowledge have been handled. Similarly, these metaphors directly influence or emphasize various roles or aspects of knowledge – profit maximization from knowledge, administration of knowledge through information technology, supporting knowledge exchange through social interactions amongst others as presented by Kebede (2010), Malhotra (2000) and Zuckerman and Buell (1998) as cited in Malhotra (2000).

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[4] **Spoon boy:** 'Do not try and bend the spoon. That's impossible. Instead... only try to realize the truth.' **Neo:** 'What truth?' **Spoon boy:** 'There is no spoon.' **Neo:** 'There is no spoon?' **Spoon boy:** 'Then you'll see, that it is not the spoon that bends, it is only yourself.' Quotes from the Matrix - http://www.voidspace.org.uk/cyberpunk/matrix_quotes.shtml

For example, this can be seen in work by Earl (2001) which classified knowledge management approaches and research in firms into 3 analogous categories – behavioral, economic and technocratic – depending on their primary orientation or motivation. Behavioral approaches focus on understanding and supporting the knowledge interactions between people, for example through the development of communities of practice; economic approaches concentrate on extracting value from knowledge for instance through the licensing of intellectual property; and finally technocratic approaches which emphasize the development of systems such as knowledge bases and directories to harvest and organize knowledge to support organizational capabilities.

The Resource-based view (Barney, 1991, Conner, 1991) is an important framework in the strategic management literature that emphasizes the competitive advantage that firms enjoy as a result of resources that are heterogeneous, valuable, rare, not easily imitated or substitutable. Knowledge, knowledge-based resources and capabilities such as innovation and absorptive capacity are thought to be a special class of resources as they combine the context dependent nature of knowledge with its social complexity (Bennet & Bennet, 2007). These features make knowledge difficult to imitate and could provide a sustained competitive and survival advantage. These insights have led to the knowledge-based view of the firm and provided an important theoretical basis for advancing efforts in knowledge management and related support systems (Alavi & Leidner 2001).

2.2.2   Some Evolutions in the Field of Knowledge Management

Initially, knowledge management was the dedicated role and responsibility of an individual specialist such as a Chief Knowledge Officer and a dedicated team. Considerable attention was given initially to the codification of knowledge through documents and databases (Alavi & Leidner, 2001). The insights provided by Nonaka and Takeuchi (1995) through their SECI model highlighted the importance and value of tacit knowledge, the type of knowledge which Edvinsson and Maloney (1997) described as the knowledge that leaves the firm after 5 pm. The recognition that knowledge is central to success, and human-based, coupled with evolutions in the nature of work has seen knowledge management, though often centrally managed, become an activity that involves the entire organization (Davenport & Grover, 2001). This evolution is also reminiscent of Wiig's (1993) perspective of knowledge functioning and bringing value at the organizational or business level at the managerial level and at the employee level which could also be seen through the lens of strategic, operational and tactical actions. Increasingly firms are working across continents, languages and cultures seeking to do business with diverse internal teams as well as external partners. Here the encounter of diverging content, context and socio-cultural aspects create dynamic environments – with great potential for creativity and insight but also for roadblocks and conflict - where multiple approaches that foster group learning and collaboration, communities of practice and sense-making are required (Bennet & Bennet, 2007; Snowden, 2001). The advent of social media and practices such as open innovation and working with lead users to develop new products and practices such as co-opetition are also radically redefining the

borders of firms and the knowledge resources they are able to draw on. As Leif Edvinsson explains,

> *"We are now in the age of the boundary-less organization where the greatest resource that organizations have lie not with their staff but is actually embodied in people outside the organization. There are many people with varying motivations…..who are willing to work for your business for free. The challenge is, how to tap into this resource?"* (Personal communication, June 5, 2014)

So while knowledge management initially was concerned with operating within the firms, its scope and capabilities have now enabled it to develop a track record, a growing body of tools as well as ambitions to realistically address knowledge management at the societal level, such as in cities.

While acknowledging Knowledge Management's potential, Carrillo (2004) and Ergazakis & Metaxiotis (2011), cite the lack of agreed references, indicators, appropriate development and assessment frameworks and methodologies, as barriers to the application of KM processes in societies. Through research projects - conferences such as the annual World Conference on Intellectual Capital for Communities[5] organized by the New Club of Paris, the annual conferences on Knowledge Management in Society and Organizations convened by the Association for Knowledge Management in Society and Organizations as well the Knowledge Cities World Summit organized by the World Capital Institute[6] - the challenge of

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[5]Programme of the 10th edition of this conference http://www.educore.nl/media/ic10-presentation-draf-agenda-2105141.pdf

[6]World Capital institute http://www.worldcapitalinstitute.org/

expanding knowledge management beyond the firm is progressing. This research seeks to contribute to this endeavor.

2.3   Intellectual Capital

The recognition of information and knowledge mediated processes as the main sources of value addition has led organizations to focus on intangible attributes such as the skills and competencies of their employees, customer loyalty, corporate culture, management skills, intellectual property (IP), innovation, brand reputation and business process systems amongst others (Davenport & Grover, 2001; Edvinsson & Malone, 1997; Marr, 2005; Stewart, 1991). Intangibles attributes like the foregoing ones, which organizations are increasingly seeking to explicitly identify, capture, develop and leverage for their current as well as future growth and success, are collectively referred to as intellectual capital (Dalkir, 2011; Stewart, 1991).

2.3.1   Varying Disciplinary Perspectives on Intellectual Capital

Economics, management, research, law, finance and accounting are some of the disciplines that are involved in helping organizations to achieve their strategic goals. These disciplines often use different epistemological and ontological frames of reference to conceptualize the context, challenges and opportunities in which organizations operate. Accordingly, a range of perspectives on intellectual capital grounded in the goals and practices of these various discipline have emerged. A number of terms, definitions, approaches and assessment methodologies for intellectual capital exist which may be equivalent or sharply contrasting (Marr, 2005). For example, within the legal profession intellectual capital prioritizes those aspects which can be legally protected under intellectual property (IP) regimes (Cloutier &

Gold, 2005). On the other hand, economists may seek to emphasize those aspects of intellectual capital that relate to expenditures on research and development, corporate infrastructure and staff training, since from the perspective of economists these represent investments in future growth (Augier & Teece, 2005). However, accountants would perceive these investments on research and development quite differently, often as inputs or costs (Lev et al., 2005).

In the management literature, intellectual capital is the expression of choice (Marr, 2005) and is synonymous with terms such as intangible assets (Hall, 1992), intangible capital (World Bank, 2006), intellectual assets (Dalkir, 2011), invisible assets (Itami & Roehl, 1991), knowledge assets, and brainpower (Edvinsson and Malone, 1997) which appear in other disciplines. Intellectual capital is also considered to present a way to measure knowledge (Koulopoulos and Frappaolo, 1999).

2.3.2   Classifying and Leveraging Intellectual Capital

Intellectual capital has a strong future orientation; consequently, there is a lag between investments and the benefits that it generates (Bontis, 2004; Käpylä et al. 2012; Lin & Edvinsson, 2011; Malhotra, 2003; Stam & Andriessen, 2009). The spillovers and externalities associated with knowledge processes and their non-linear behavior may give rise to emergent properties. These effect make the outcomes of investments and activities uncertain and complex; they may also account for the limited understanding and recognition of these concepts and the importance of intangibles outside academic circles (López Ruiz et al., 2014; Salonius & Lönnqvist, 2012).

A range of schema for classifying and identifying the components of intellectual capital exist, but the most widely used – and shown in Figure 4 - identifies three broad sub-categories of capitals, namely human, structural and relational capital (Dalkir, 2011). Human capital refers to the value, potential and actual, that results from the collective competencies, skills and capacities of employees such as their creative capacity, entrepreneurial and problem-solving ability. Edvinsson and Maloney (1997) refer to this as the knowledge that leaves the company after 5 p.m. In contrast, structural capital consists of assets in the forms of procedural manuals and methods of work, patents and databases which are largely under the organization's control. Relational capital focuses on such aspects as loyalty, trust, brand awareness, distribution channels and links between the organization and its clients, suppliers, regulatory bodies and other external entities. The manner in which these components interact plays a decisive role in determining both how and what forms of value are generated. The choices made by firms to influence these processes can become a source of competitive value.

By mastering their Intellectual Capital (see Figure 5), organizations may expect to gain greater success in the operational, tactical and strategic aspects of their activities. However, the intangible nature and the degrees of tacitness of the type of knowledge involved, coupled with differences in the level of predictability over the different planning time horizons pose important challenges to the process of mastery. Furthermore, the development of measures for assessing performance in these areas must address the needs of the audience and the intended uses of these measures.
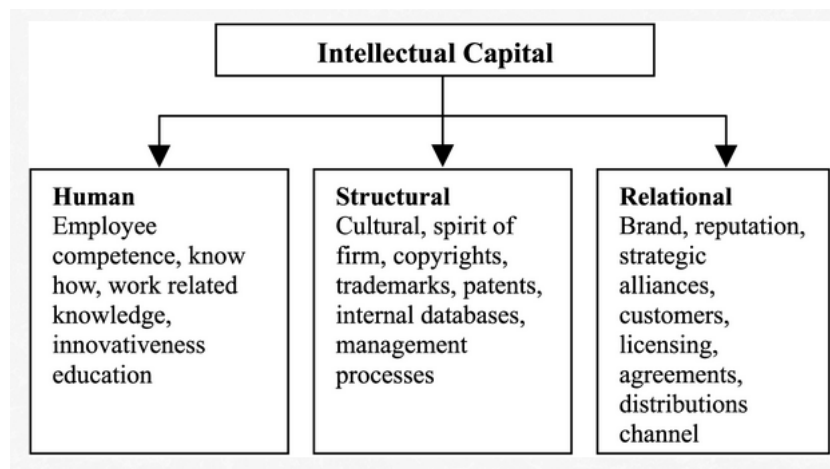
Figure 4:   Three Components of Intellectual Capital. It is Essential for the

Components to Interact and Work in sync to Achieve Optimal

Performance. [Image provided by Strategybuilders.eu]

Common approaches to assessing intellectual capital in organizations include:

Direct intellectual capital methods (DIC), which seek to estimate the value of

intangible assets based on value of the identified components; Market capitalization

methods (MCM), which view intellectual capital as the difference between a firm's

market value and its book value; Return on Assets (ROA), which involve estimating

the contribution of IC to the firm's annual earnings by comparing the average return

made on tangible assets with industry standards in that region; and Scorecard methods

(SC), which involve selecting intangible assets of interest and generating appropriate

indicators or proxies that allow performance of the intangible assets to be monitored

over time.

2.3.2.1 Intellectual Capital and Knowledge-Based Development

While much of the early work on intellectual capital focused on organizations, researchers, practitioners, governments and international development actors have been giving increased attention to the role of intellectual capital in supporting the prosperity of nations, regions and cities. To date several models for knowledge-based development that utilize the concept of intellectual capital have been developed and tested in concert with researchers (Bounfour & Edvinsson, 2005; Lin & Edvinsson, 2011; López Ruiz, 2011; Marti, 2005; World Bank, 2006).
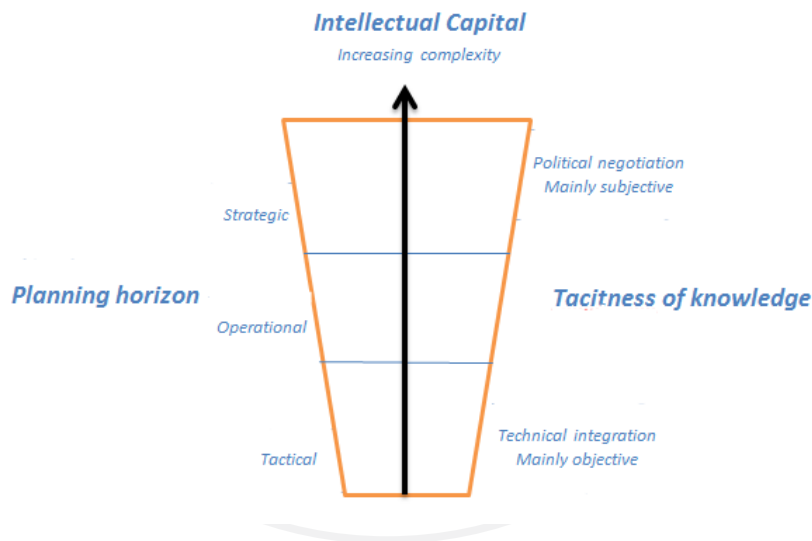
Figure 5:   The Management of Intellectual Capital Becomes More Challenging as the Tacitness of the Knowledge Involved and the Planning Horizon Increases [adapted from Dalkir, 2011: 21]

Lin and Edvinsson, (2011) building on earlier work by others including Edvinsson and Malone (1997), conducted a comparative study of the national intellectual capital in 40 countries. Taking the view that intellectual capital is future earning capabilities (Lin and Edvinsson, 2011: 3), a measurement model was

developed based on five intellectual capital components, namely, human, market, process, renewal and financial. Inspired by Edvinsson and Malone (1997) and Bontis (2002), Marti (2005) developed a model for assessing cities using an intellectual capital model with components of financial, process, human market and renewal & development. This model has been applied to at least two European cities. The model for estimating the intellectual capital of cities (MEICC) and the Knowledge City Index (KCI) developed by Navarro et al. (2012) and ending with Lopez-Ruiz et al. (2014) are based on earlier work by Nevado & Lopez (2006). Navarro adapts a model initially created to support the assessment and management of intellectual capital in businesses to municipalities. The model assesses human, structural and process capitals and also introduces novel capitals, namely, commercial, communication, environmental as well as research and development capital. The method has been applied to 158 cities in 24 European countries.

Various researchers regard the human capital dimension as the most influential (Lin & Edvinsson, 2011; Navarro et al. 2012) given its key role in the organization, direction of processes and the generation of knowledge. The growing interest and recognition of the role played by groups of skilled individuals in supporting knowledge intensive activities in regions and cities, such as Florida's (2004) 'creative class', has also given rise to academic interest in the application and modelling of the Intellectual Capital of individuals (Arenas et al., 2013).

Ongoing research and inter-disciplinary collaboration coupled with a growing body of global experiences of practitioners is likely to support the enhancement of existing conceptual frameworks and greater recognition for the utility of intellectual capital in supporting knowledge-based development.

2.4   Economic Theories of Knowledge

Within the field of economics two main streams of investigations are macro-economics and micro-economics (Bounfour & Edvinsson, 2005)). Macro-economics is concerned with the structure, behaviour, decision-making and operation of economies at the city, regional, national or global level. On the other hand micro-economic is concerned with operations within markets and the allocation of resources at the individual and firm level. The rise of knowledge as a key resource has impacts and influence both at the macro and micro-economic levels. According to Foray (2000), knowledge generation impacts the economy through investments in research and education, through learning and the development of new capabilities which together drive overall growth. Facilitated by globalization and telecommunications, firms and individuals through various processes, for instance disruptive innovation, can create impacts at the micro and macro levels. More generally however, at the level of the city or other large societal agglomerations it is the macro-perspective which may be expected to dominate.

Bounfour and Edvinsson (2005) highlight six macro-economic theories related to knowledge that impact macro-economic processes, namely, Human Capital theory, Technical Change and Innovation theory, Intellectual investment, New Growth theories, Evolutionary theories and the Analytical Approach. The following overview of these theories is based on Bounfour and Edvinsson (2005):

i.   Human Capital theory – This perspective considers human capital to play critical roles in enhancing productivity and supporting innovation through the spreading of applied knowledge. Human capital is enhanced through education. Individuals, who this theory views as being rational investors who

will seek to secure to their long-term well-being, are therefore believed to be motivated to increase the quantity and quality of their human capital by enhancing their educational qualifications and capabilities. Proponents of this view include Becker (1975), Kendrick (1976) and Bartell, (1991, 1992).

ii. Technical Change and Innovation theory – This view sees incremental innovation through the application of knowledge that leads to process improvements as the main source of productivity. Proponents of this theory include Pasinetti (1981) Arrow (1962) and Bernstein (1989).

iii. Intellectual Investment theory – Views the efficiency of firms in using their resources as the key driver of economic productivity. So in the post-industrial era knowledge/intangible resources are the most important ones firms need to create conditions that foster innovation. Proponents of this school of thought include Caspar and Afriat (1988), Buigues et al. (2000) and Machlup (1962).

iv. New Growth theories – Perceive the continual growth and application of knowledge both separately and in sync with traditional factors of production as key to economic growth. Therefore investments are needed to support the development of human capital, organizational capital and, traditional assets and to support innovation to create technical improvements. Proponents of this theory include Romer (1986, 1990) Lucas (1988) and Barro and Sala-i-martin (1995).

v. Evolutionary theories – Emphasize the role of routines in driving economic productivity. The challenge is to develop, learn and progressively implement better routines. Learning therefore becomes key to the generating of new

processes as well as their implementation. Nelson & Winter (1982), Dosi (1988) and Carlson and Eliasson (1990).

vi. The Analytical Approach theory – Views knowledge assets as the key drivers of tangible and intangible economic growth and as the major output of the economic production. Enhanced measurement of intangible assets and inputs such as education and research are therefore key to assessing economic production. This view is promoted by Nakamura (2000) and in the work of institutional actors such as OECD (1992) and INSEE (1992).

These theories mainly differ in the importance that they ascribe to the contribution made by physical assets to economic productivity and the specific specialized use or priorities for knowledge creation and application. Despite emphasizing the role of human capital and social interactions as the source of innovation, the approaches adopted by these economic theories to aspects such as education are largely instrumental and sterile in their outlook, giving little attention to the human condition and humanistic values.

2.5   Knowledge as an Agent of Societal Transformation

With the exception of a minority of dissenting voices such as the scholar Webster (2002), there is general agreement as evidenced by the actions of policy-makers – e.g. Europe's Lisbon Strategy (EU, 2000; COE, 2011) - and academics – a variety of conferences, journals and research programmes - that we are in a post-industrial era characterized by the role of knowledge as the pre-eminent sources of value generation and addition. However, there are a considerable range of terms being used, sometimes interchangeably to describe the post-industrial period as well as

prominent dimensions within it leading to a lack of consensus and fuzziness about key terms, definitions and purpose (Bajracharya et al., 2009; Ergazakis & Metaxiotis, 2011). This portion of the literature review therefore seeks to examine the scholarly perspectives around the concepts of information society, knowledge economy, and knowledge society with a view to developing clarity around these terms so as to provide a clear conceptual basis for the investigation being conducted.

2.5.1   The Information Society

Karvalics (2008) credits the origin of the term information society to three books published in Japan in the late 1960's. According to Pintér (2008), the central role played by the organized production, storage, retrieval and use of information has created a new form of existence for humanity, which he terms the information society. Information therefore becomes an important organizing factor which in turn leads to changes at the societal level that impact such facets as politics, economics and culture. In a similar way other societal units such as institutions, families and individuals are impacted and transformed. Drawing on the work of Buckland (1991, p. 6) based in the discipline of information systems, Pintér regards knowledge as an intangible specific form of information, that is to say "information as knowledge". Consequently, from the perspective of authors such as Pintér the information society and knowledge society represent equivalent concepts.

Moore (1997) characterizes the information society by its dependence and use of information as an economic resource, increased use of information by society in all spheres of their lives and the emergence of an information sector. A similar view is held by the International Telecommunications Union (2003), which uses the term

Information Society to characterize the new social and economic interactions resulting from the creation of platforms - based on the use of ICT - for the free flow of information, ideas and knowledge across the world.

According to Moore (1997), the information sector is composed of three types of "information industries", namely, information content industries, information delivery industries and information processing industries. Due to their ease of applicability to a variety of fields, these industries trigger other technological developments such as cheaper and more wide-spread use of information and communication technologies. Moore (1997) and ITU (2003) attribute the emergence of the information society to technological changes and long-term economic developments. The information revolution and increased application of ICT in a variety of areas induce changes in society, economy and other aspects of life.

2.5.2 The Knowledge Economy

A knowledge economy... is determined not only by the economic principles that apply to the production and distribution of goods and services. It is also determined by the rather odd and little understood properties of ideas and emotions insofar as components of production. (Carrillo & Batra, 2012, p. 2)

Sheehan and Tegart (1998) use the term Knowledge Economy to describe the overall economic structure that emerges as a consequence of increased knowledge intensity and the globalization of economic activities. Houghton and Sheehan (2000) attribute this increase in knowledge intensity to the ICT revolution which facilitated the low-cost codification, creation, storage, manipulation, transmission and application of knowledge to goods and services. On the other hand, globalization is

being accelerated by the reduction of access barriers to trade and financial markets, removal of barriers to technology transfer and international capital flows as well as the deregulation and disappearance of national market monopolies, particularly in areas such as telecommunications and transport (Houghton & Sheehan, 2000; Sheehan & Tegart, 1998). Houghton and Sheehan (2000) characterize knowledge economies by the key role of knowledge as a factor of production.

In their literature review covering the period 1960 to the early 2000's, Powell & Snellman (2004) identify three major approaches used by researchers to define or characterize the Knowledge Economy. The first, and earliest characterizations are typified by the work of researchers such as Machlup (1962) and Bell (1973) whose explorations focus on social and economic changes resulting from the introduction and development of science/technology-focused industries and which, through the application of scientific knowledge, spur economic and social changes. The second research stream focuses on work by researchers like Gordon (2000) and Hitt (1999) who investigated the emergence of knowledge-intensive industries and their impact on productivity, economic growth and the creation of new forms of work.

The third and most recent strand of work described by Powell and Snellman (2004) reflects work by researchers such as Cowan (2000), Drucker (1993) and Nonaka (1995) who characterize the Knowledge Economy by the emergence of learning organizations, the mainstreaming of practices around knowledge generation, knowledge use and the reliance of firms on skills, learning, innovation and networks for growth and competitive advantage. Peters (2010) updates this work characterizing the Knowledge Economy by its focus on learning, creativity and openness as key factors for competitiveness.

As underscored by Carrillo and Batra (2012), knowledge economies are very much a social phenomenon and as such are influenced perhaps to an even greater extent by perceptions, world views, cultural values and goals of individuals and societies. The cognitive limitations of human beings; such as their inability to comprehend emergent and non-linear dynamics; points to the need for tools and processes that can support the management of complex circumstances (Carrillo, 2014; Linstone & Turoff, 2002).

2.5.3 The Knowledge Society

Three Knowledge Society archetypes can be seen in the literature. The first, envisages a society built on the Knowledge Economy and focused on maximizing and obtaining competitive strategic advantages from knowledge assets. In this type of Knowledge Society, knowledge and knowledge-based activities are the organizing principle for the society's cultural, economic and political activities and in the private life of citizens. Priority is given to cultivating human capital through education and learning with a view towards enhancing and sustaining the society's ability to leverage knowledge. This view of the Knowledge Society can be seen in Britz et al. (2007), Organization of American States (2006), Rohrbach (2007) and the United Nations Development Programme (2003).

A second conception of the Knowledge Society focuses on the widespread deployment of ICT infrastructure with a view to facilitating the uptake of knowledge and learning strategies aimed at enhancing citizens' ability to create, use and disseminate knowledge and to access public and private services. This technology-

centric view of the KS can be seen in the works of Forfas (2003) and of Lytras and Sicilia (2005).

In contrast to earlier perspectives which prioritize ICT infrastructure and knowledge-based economic activity as central organizing and defining facets, the third view focuses on leveraging knowledge to foster human development and well-being. In this version of the KS, human capital is cultivated; this is not motivated by the prospects for return on investments but rather by ethical values which view education and empowerment of the individual to fully participate in social and cultural life as fundamental to their dignity. Economic and other social benefits emerge as properties of this human-centered approach. This type of Knowledge Society can be seen in Al-Hawamdeh & Hart (2001) and UNESCO (2005) and is referred to by the World Bank (2005) as Knowledge-based development.

Based on the foregoing, we conclude that the ICT revolution provides the basis for the information sector which leads to the emergence of the Information Society. While knowledge processes are intrinsically human, the presence of a planet-wide scalable ICT infrastructure and globalization contributes to knowledge-intensification and the emergence of the Knowledge Society and economy. Various experts (World Bank, 2005; UNESCO, 2005) indicate that the Knowledge Society and Knowledge Economy, though facilitated by ICT, does not automatically imply or require their use, as shown by agriculture-based examples.

2.5.4 Knowledge Management and the Knowledge Society

Knowledge Management supports the establishment of systems and processes for the creation, collection, dissemination and use of knowledge, learning and

innovation that enable an organization to achieve its strategic goals within the frame of its social context shaped by the tacit beliefs, values and assumptions (Dalkir, 2011). Knowledge Management is essential for assisting societies to successfully leverage knowledge. Societies are larger agglomerations than organizations; therefore, Knowledge Management processes must be scaled up and/or transformed to enable societies to effectively leverage knowledge to achieve their desired goals. While acknowledging Knowledge Management's potential, Carrillo (2004) and Ergazakis and Metaxiotis (2011), cite the lack of agreed references, indicators, appropriate development and assessment frameworks, methodologies, etc. as barriers to the application of Knowledge Management processes in societies. This dissertation seeks to contribute to this ongoing effort.

One of the challenges for Knowledge Management relates to the nature and representation of knowledge. This is particularly important for understanding how to access, model and exploit knowledge for optimal societal benefit. A variety of portrayals of knowledge: as a justified belief, as an object, as a process, as a flux, as data or information to which value has been added, or as a societal construct, amongst others, can be found in the academic literature (Bennet & Bennet, 2007; Cook & Brown, 1999; Edvinsson & Malone's, 1997; Engeström's, 2001; Mennell, 1999; Nonaka & Takeuchi's, 1995). This paper views these contrasting perspectives as non-exclusionary and complementary, their greatest utility lies in their ability to facilitate the conceptualization, modeling, leveraging and application of knowledge. Like the ancient fable of the blind man and the elephant, together these collective insights provide a more complete and nuanced understanding of reality.

Knowledge is often seen as spanning a continuum from tacit to explicit forms. Tacit knowledge is embedded, inseparable and even "unknown" to the individual. In order for other persons and the society at large to benefit from the individual's tacit knowledge, it must be converted to an explicit or expressible form so that it may be appropriated. Nonaka and Takeuchi's SECI model (1995) provides insights into how these knowledge conversions and the renewal and leveraging of knowledge may be facilitated. Cook and Brown (1999) and Engeström's (2001) work around activity-learning highlights the challenges and contestations involved in integrating an individual's knowledge into an organization-wide shared meaning and subsequent purposeful action. In today's democratic-minded, multicultural, multi-faith, inclusive and increasingly mobile societies, where all persons are encouraged to be empowered and express themselves, Engeström's work takes on added significance. Edvinsson and Malone's (1997) concept of intellectual capital represents knowledge as stocks embedded in individuals (human capital), social relationships (social capital) and in governance processes and structures (structural capital) that serve to moderate interactions between individuals and which can serve to direct the distribution and uptake of knowledge. The intellectual capital perspective is particularly useful in supporting benchmarking, explicitly representing knowledge poles and competencies and thereby supporting strategic governance actions that enable improvements directed towards achieving desired societal goals to be realized.

Bennet and Bennet (2007) describes knowledge as the capacity to take effective action. At the societal level this raises questions such as effective for whom/where/when at what cost? Considerations of purpose, taken in light of the society's tacit or explicit values, goals, the collective benefit gained and shared, and

the governance and decision-making processes around how knowledge is created, transmitted, applied and used are thus crucial.

As indicated by Menell (1999), knowledge while difficult and expensive to create once codified can be readily disseminated. Knowledge's properties of non-excludability and non-rivalry may limit incentives to create and disseminate knowledge and constrain a society's ability to optimally benefit from knowledge. Information and knowledge asymmetries can create structural barriers that may cause persistent social advantages and disadvantages for various groups. Incentives, systems of governance, norms or processes that promote society's overall benefits from knowledge are therefore required.

The foregoing views on knowledge provide complementary insights on important roles and functions of knowledge in societies and point to some ways in which they could be harnessed.

This paper adopts the Universal Declaration of Human Rights and the UN's International human rights conventions administered by the United Nations System as the basis for the value considerations and norms that should shape societies' beliefs, assumptions and strategic goals. Accordingly, the strategic objectives for societies are international peace and the common welfare of humankind (UNESCO, 1945) and articulated in the United Nations development agenda documents. We therefore define knowledge societies as: *Societies committed to utilizing knowledge and knowledge processes to realize international peace, ensure the common welfare and inclusion of all, respect the interdependent web of existence which connects living and non-living things and avail to each citizen avenues for pursuing the attainment of their full potential.*

2.6   Conclusion on Knowledge and Intangibles as Societal Strategic Resources

The academic literature and activities in the private sector as well as the development of some governmental strategies and frameworks suggest that we are in the early stages of a growing recognition and transition to societies where knowledge and intangible assets become the key levers and shapers of societal transformation. The characteristics of this emerging class of assets contrast with and potentially threaten the current system of social structures and values with a new wave of creative destruction. Consequently, there is a great need for awareness and understanding of tools, processes and concepts such as intellectual capital and knowledge management that engender broader social awareness and action if we are to better manage these transitions. As the knowledge economy and society are largely social phenomenon (Carrillo & Batra, 2012), this overwhelmingly points to the need to overcome the current focus on economic and technological dimensions and to give greater emphasis to the humanistic dimensions. Growing recognition and understanding of the implication of knowledge as an infinitely renewable resource may enable a shift in mindset to non-zero-sum thinking. In such a climate goals such as human rights, equity and peace may well be more easily conceived and attained. Figure 6 below captures key concepts discussed in this section.

Figure 6:   Word Cloud of Concepts Discussed in this Section

2.7   Cities in the Post-Industrial Era

Cities concentrate human, social and structural capital, therefore the extent of a given city's influence at the national, regional or international level can provide indications of its ability to effectively leverage these assets. This ability will also influence the city's viability and determine whether it will be able to attract or lose its citizens in the face of the increased mobility of capital, labor, information and knowledge that globalization has triggered.

2.7.1   Cities as Critical Centers of Human Activity

Urbanization is an important global demographic trend. Since 2007, for the first time in history more than 50% of the world's population live in cities (Carrillo, 2005; UN-HABITAT, 2014; UNDESA, 2012). By the year 2050, this proportion is expected to increase to around 70% (UN-HABITAT, 2014; UNDESA, 2012).

Although an important subject of research, there is no universally agreed definition for an urban area, and while the concepts of rural and urban are often portrayed as binary they rather represent a spectrum for describing spaces (Rashed &

Jürgens, 2010; UNDESA, 2014). For the purposes of this research we adopt the definition proposed by Rashed and Jürgens (2010, p 34) "urban is a place-based characteristic that incorporates elements of population density, social and economic organization, and the transformation of the natural environment into a built environment".

Previously the largest urban areas were located in the developed regions, but these are now being concentrated in the developing countries. According to UN-HABITAT, around 90% of the urbanization is occurring in the developing[7] world mainly Asia and Africa where each day urban areas gain about 200,000 new inhabitants (UN-HABITAT, 2013). The fastest growing urban areas in these two regions are medium-sized cities with less than one million inhabitants (UNDESA, 2014; UN-HABITAT, 2014).

These increases can be directly related to a) the economic attractiveness of cities which in turn drives rural to urban migration and b) the high population growth rates in the developing regions. According to UNDESA (2012), Africa's population numbered around 1 billion in 2010, but is expected to increase to two billion by 2050 and to exceed 3 billion by 2070. In Asia, UNDESA's forecast sees the current population of 4.3 billion exceeding 5 billion by 2050.

Various studies have shown that compared to their populations, cities contribute disproportionately more to their national and regional economies than other forms of human settlements. This in turn enables them to attract more talent and

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[7] The World Bank classifies countries based on their annual Gross National Income (GNI) per capita. For 2012 these groups are: low income, $1,035 or less; lower middle income, $1,036 - $4,085; upper middle income, $4,086 - $12,615; and high income,$12,616 or more. Low and middle income countries are collectively referred to as the developing countries. High income countries are often referred to as OECD countries.

investment (Mckinsey Global Institute, 2011; Moore et al., 2003; OECD, 2013; UN-HABITAT, 2012). The combination of demand and density along with high levels of human capital can in turn lay the basis in cities for economies that leverage scale, scope and knowledge. The virtuous cycles created make cities magnets for migration and important nodes for creativity, innovation, knowledge generation, cultural and economic activity (Scott, 2008; OECD, 2013). The dense networks of infrastructure around cities, such as transportation links, make cities important national hubs and key global connection points. Consequently, cities are playing increasingly important roles in a wide range of fields - trade, culture, sports, research, manufacturing, and entrepreneurship, amongst others - at the national, regional and international level.

Since they concentrate wealth, people and a range of tangible and intangible resources, when things such as social unrest, natural or man-made disasters occur in cities - the impacts of these problems can have significant national repercussions. Furthermore, in today's globalized economies, supply chains readily transfer the adverse impacts of local events around the world impacting financial and other markets in often complex ways (Komori et al., 2012; Ye & Abe, 2012).

The record flooding of the Chao Praya River in 2011 inundated industrial estates in the Bangkok metropolitan area, inflicting heavy damage and losses. The floods prevented the movement of goods and services, thereby disrupting global supply chains for a variety of end products and components including hard drives (Komori et al. 2012; Ye & Abe, 2012). Effects of this event included temporary shortages and price fluctuations for some goods and services, firms deciding to relocate and/or reduce the scale of their operations and workforce in Thailand, as well as economic losses in countries such as Japan, Malaysia and even Canada (Ye & Abe,

2012). The floods demonstrated the far-reaching consequences of a city's inadequate infrastructure and urban planning (Komori et al., 2012).

While opportunities for economic, social, political and other forms of participation are plentiful in cities, inhabitants may not have equal access to, or even receive these benefits. UN-HABITAT (2014) reports that about one third of urban inhabitants in developing countries live in slums where they face inadequate infrastructure to address sanitation and waste disposal and are thus at a higher risk for a range of adverse health impacts. Along with other deprivations, for example, lower levels and quality of education, the opportunities available to slum dwellers to develop their full potential are significantly reduced. The inability to overcome these deep-seated inequalities may lead to a break-down in social cohesion, unrest and various forms of insecurity (Borja & Castells, 1997) that are detrimental to harmonious economic, social and political life in the city.

Cities both in developed and developing countries must address a number of challenges that impact their longer term sustainability. While the impacts of inadequate infrastructure on health and the environment have already been indicated, inadequate urban planning and transportation networks can also make the movement of people, goods and services extremely difficult and significantly curtail a range of socio-economic activities leading to stagnation (UN-HABITAT, 2014). Cities also make a disproportionate contribution to global warming; according to UN-HABITAT (2011) they account for around 70% of harmful Greenhouse gas emissions. Cities are therefore at an increased risk for climate change induced risks (OECD, 2013; UN-HABITAT, 2014).

Global reductions in fertility rates - coupled with improved health care - suggests that in the future populations will be living longer and the number of older people will increase significantly both in developed and developing countries (UNDESA, 2012). This in turn creates the need for new services and requirements in the built environment to support what the World Health Organization (2007) refers to as "age-friendly cities". The success of cities in attracting people and industries coupled with rapid growth also means that cities must address challenges of man-made and natural hazards. It is also expected that more and more conflicts will be occurring in urban areas (Sassen, 2012). If not adequately addressed, these challenges will prevent cities and nations from reaching their full potential.

The growing influence of cities gives them new political and economic power to exert global change which may give lead to rivalries between city and national governments (Borja and Castells, 1997; Sassen, 2012). In some cases, national governments may delay reforms or authorizations that city governments require, in order to exert political influence or gain political mileage. Green (2012), Goodfellow and Titeca (2012) as well as Goodfellow (2012) cite examples from Kampala in Uganda and Kigali in Rwanda that demonstrate the impacts of support or opposition from central governments on the city. Despite evidence to the contrary, African governments supported by international agencies have focused on improving rural areas to reduce migration to the city rather than seizing the city's potential as an engine of development (UN-HABITAT, 2014). So against the backdrop of the role and the anticipated contribution and evolution of cities, current assumptions and practices must be reassessed.

Finally, it must be noted that the countries where the most rapid urbanization is taking place are also amongst the ones least prepared either to capitalize on the advantages of urbanization or to take actions that could mitigate their adverse effects due to their weak institutional and human capacities. Ethiopia is a least developed country (LDC) in Eastern Africa with a population of around 94 million. As a result of sustained, high economic growth over the past decade the World Bank expects the country to graduate from low income to low-middle income status by 2025 (United Nations, 2013). Uganda, which is also located in East Africa with a population of 38 million is currently a low-middle income country with good prospects for attaining high-middle income status. Both Ethiopia and Uganda are among the eight nations[8] that demographers at the United Nations project will exhibit a 50% increase in global population over the coming years (UNDESA, 2013). These two countries are also expected to at least double their urbanization rates, with the majority of this likely to occur in their capital cities of Addis Ababa and Kampala respectively (UNDESA, 2013).

In Asia, Thailand is widely regarded as a development success story having significantly transformed itself over the past 30 years from a low income to high-middle income country and is now poised to join the ranks of the OECD countries (World Bank, 2015). In 2011, Bangkok, with around 12% of Thailand's national population generated about 30% of the country's national gross regional product (NESDB, 2013; UNDATA, 2014). During years of rapid urbanization Bangkok

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[8] Half of all population growth during the period 2013 – 2100 will be concentrated in a small number of countries. Eight countries are expected to account for over half of the world's projected population increase: Nigeria, India, the United Republic of Tanzania, the Democratic Republic of Congo, Niger, Uganda, Ethiopia and the United States of America, listed in order of the descending size of their contribution. Uganda's population is expected to increase by five times during this period. http://esa.un.org/wpp/documentation/pdf/WPP2012_%20KEY%20FINDINGS.pdf

demonstrated success in addressing a number of urban challenges such as slums, waste management and water supply (UN-HABITAT, 2014). Bangkok, with a population estimated by UNDESA (2014) of 9.1 million persons, is expected to become by 2030 one of 41 global mega-cities with populations in excess of 10 million.

Against this backdrop of opportunities and challenges it is relevant to reflect on what can be done to help the rapidly urbanizing countries in Africa and Asia successfully manage the challenges they face. More specifically what lessons, insights and practice can cities such as Addis Ababa gain from Bangkok as they seeks to advance socioeconomically in the context of population growth and urban expansion?

2.7.2 Informational Cities: Castells' Theory of the Post-Industrial City

Castells introduces the concept of informational cities in his book *The Informational City* (1989), which he defines as a city whose spatial arrangement is shaped, defined and continuously transformed by flows of power, finance and information. These flows are facilitated by global telecommunications which connect both local and global processes across space and time.

According to Castells, these flows manifest their influence in three main ways: namely, by spatially distributing labor, creating milieus of innovation and facilitating decentralization. Information networks enable a high degree of separation of the functions and process stages within operational activities to be achieved. Consequently, various forms and aspects of productive operations can be relocated and concentrated in the spaces most suitable for them. Any specialized labor that is required for these tasks must therefore relocate to the areas in which the production

activities occur. As workers require a variety of services to support their lifestyles, this in turn drives the development of ancillary services and features such as residential patterns. The value of the work performed determines the workers' level of wages, their position in the social hierarchy and the level and quality of the services and amenities that they require. This specialization of the labour force along with its spatial distribution leads to the creation of clusters of worker separated spatially, socially and in terms of their areas of specialization. According to Castells, this makes mobility in terms of place, social hierarchy and across areas of specialization increasingly difficult.

In areas where knowledge intensive and specialized activities are predominantly tacit knowledge transfer necessarily depends on face-to-face interpersonal contacts. Processes such as socialization, imitation and the use of metaphors to support externalization are required (Nonaka & Takeuchi, 1995). In order to participate in the critical communications occurring in these fertile innovation spaces, it becomes necessary to locate to these communities.

Castells points out that along with the opportunities there are also risks. These include notably the banalization of spaces whereby individual locations could lose their significance and meaning, becoming merely another node in a production network and being influenced and controlled by decisions and effects that are invisible and unknown to them. This is a consequence of the availability of ICT infrastructure through which the decentralization of operations to a variety of places becomes possible. This situation, Castells points out, leads to asymmetries of information and power. The challenges of social inequality and a restriction on opportunities for social mobility have been previously mentioned. It can also be

inferred that the establishment of centers of knowledge or control can become centres of gravity for talent precluding the ability of other areas to compete for skilled human capital.

In their seminal publication, *Local & Global: Management of cities in the information age*, (1997), Jordi Borja and Manuel Castells seek to provide some solutions to the foregoing challenges. Here they envisage cities where empowered societies interact in global and local processes to mediate economic, technological and cultural relationships based on systems that support efficiency and fairness. Jordi and Castells (1997) therefore envisage for cities key roles as: a) local command centers for managing economic productivity and competitiveness, b) as centers for fostering socio-cultural integration and c) as active agents for ensuring the political representation and decision-making of their citizens. In their view, cities possess attributes that provide them with key levers for exerting global influence far beyond their territories in these three areas. To develop this potential, cities must focus on improvements in several key areas that are explained below:

Economic productivity and competitiveness: To realize stable and consistent gains, cities must simultaneously enhance their technological infrastructure base, the conditions for social well-being of their citizens – for example by providing adequate health care, urban services, environmentally friendly and socially cohesive spaces, – and build the human capital necessary through education and other programmes. In addition, local stakeholders need to collaborate with local government in mobilizing and orienting the foregoing resources to capitalize on opportunities at the global level.

Fostering socio-cultural integration: Globalization, the ease of communication and travel has resulted in cities becoming increasingly diverse. Without a shared sense of identity, norms and codes of communication which respect the diversity within the city, there will be little social cohesion. Societal fragmentation is likely to occur, impeding the ability of citizens to act in unison. The greater the diversity in the city, the more challenging creating harmony can become. However, if successfully managed, the manifestations and expressions of this diversity – such as cuisine, traditions, festivals - coupled with features that arise from the locale – landscape, history, agricultural practices, architecture, climate, fauna, etc. – can give rise to unique and distinctive place identities that provide sources of competitiveness.

Political representation and decision-making: City administrations can be more effective in managing, celebrating, giving expression to and integrating the socio-cultural differences amongst citizens living in an area than a national government. Through their participation in the political structures at the city levels these voices can then be integrated into the overall national political scene. City governments therefore have a greater political legitimacy than national governments – in some cases the national goals may not be aligned with those of groups living in some area - and in a world where nations are at the mercy of global trends and flows, city governments can more readily develop and implement adaptive strategies than national governments.

2.7.3 Global and Primate Cities

Saskia Sassen (1991) coined the term "global city", to designate cities such as London, New York and Tokyo whose influence at the political, economic, socio-

cultural and technological level enable them to strongly influence and even dictate trends and global decisions through their extensive networks. These cities therefore act as super nodes, points of global connectivity and reference; they serve as centers of gravity attracting new investments, new migrants, international events, visitors and corporate headquarters (Stock, 2001). Global cities are thought to be able to exert this influence as a result of the combination of several characteristics they embody (Sassen, 1991; Stock, 2011), specifically, infrastructure, labor markets, location, corporate presence and political support which are explained below:

Infrastructure – The presence of a highly developed physical infrastructure, that is to say water, electricity, transport (including international travel) etc. as well as an advanced telecommunications network that support global and local – *glocal* - information flows and exchanges is vital. This physical infrastructure is vital for supporting the timely and efficient flows of people, goods, services and information as well as the power and financial value they embody;

Labor markets – Highly developed and readily available human capital available locally, as well as the ability to attract, absorb and retain from regional and international sources a workforce aligned with the city's needs is essential;

Location – A variety of place specific factors and amenities that exist or are developed are needed to provide an enhanced and attractive living environment that appeal to the leisure, health, social and other needs of the knowledge workers;

Corporate presence - The presence of capital intensive international service companies in areas such as banking and insurance; knowledge intensive high-tech industries such as biotechnologies and pharmaceuticals; service and industrial companies in the area of software development, computer manufacturing; and

creative enterprises in fields such as architecture and consulting provide a stimulus for attracting other investments in physical infrastructure and human capital which serve to further enhance the cities influence and power.

Political support – A combination of political support and political transitions that are stable, as well as policy interventions that are favorable to the development and strengthening of the foregoing factors, enable these cities to consolidate and build on past hard-earned achievement rather than squandering these gains in conflict.

Various researchers hypothesize that the benefits that result from the impact of knowledge intensification in global cities is not equitably shared, rather it leads to the polarization of jobs and incomes and considerable social inequality (Castells, 1989, 1991; Borja & Castells, 1997; Sassen, 1999). As these divisions are based on the ability to perform in a knowledge intensive environment and on the ability to access specialized educations these inequalities can become deeply entrenched (Stock, 2011). Empirical studies conducted in Toronto during the period 1970 to 2005 (Hulchanski, 2007) and in London following the development of the Canary Wharf project (Stock, 2011) appear to support these hypotheses**.**

2.7.4   Primate Cities

There are also cities, often national capitals, which exert similar forms of influence at the national level as global cities do on the international stage. The term "primate city", first coined by Mark Jefferson (1939), is used to describe a city whose population is much greater than any other in a given nation and which act as a center of national political, economic and socio-cultural influence (Argenbright, 2013). Primate cities exhibit similar characteristics to global cities though on a smaller scale.

In the current world-wide demographic phenomenon of urbanization, particularly in African countries where rural populations still dominate, primate cities can be expected to receive a significant portion of the rural to urban flows in the current and foreseeable future. Developing cities will therefore need to cope with the increased demands on their infrastructure as well as on social cohesion. Unlike the global cities the cities in the developed countries are by and large not equipped to address these challenges.

2.7.5   Other Typologies and Classifications for Post-Industrial Cities

As discussed earlier, a range of terms are used, sometimes interchangeably and with very different meanings and philosophical orientations, to interpret and describe the societal period that has followed the industrial era. In a similar way, a range of terms are used to describe cities, their roles and functions. Terminologies encountered in the literature include: age-friendly cities (WHO, 2007), child friendly cities (Nour, 2013; Osborne et al., 2013), creative cities (Florida, 2002; Hospers & van Dalm, 2005; Landry, 2000; Suet Leng & Badarulzaman, 2014; UNESCO, 2013), digital cities (Cocchia, 2014; Komninos, 2008; Stock, 2011; Yovanof & Hazapis, 2009), green cities (OECD, 2006), informational cities (Borja & Castells, 1997; Castells, 1989, 1991) intelligent cities (Cocchia, 2014; Komninos, 2006, 2008), knowledge cities (Carrillo, 2006; Ergazakis et al., 2006; Ergazakis & Metaxiotis, 2011; Yigitcanlar et al., 2014), learning cities (Biao et al., 2013; OECD, 1999; Osborne et al., 2013; Preisinger-Kleine, 2013), resilient cities (UNISDR, 2014), smart cities (Batagan, 2011; Cagliu, Del Bo & Nijkamp, 2011; Cocchia, 2014; Dameri,

2013; Hall, 2000; IBM, 2010; Setis-Eu, 2012; Su et al., 2011), sustainable cities (UN-HABITAT, 2010) and wired cities (Holland, 2008).

The foregoing terms are used in a wide range of contexts by academics, practitioners, governments and international organizations. To obtain a better sense of these terms a classification schema based on four aspects – a) technological/infrastructure focus, b) economic production focus, c) cognitive focus and d) values/issues based focus – is used to categorize cities. An overview of these categorizations as well as the allocation of the different city terminologies to these categories follows:

Technological/infrastructure focus – This category emphasizes the role played by the installation of technological devices, sensors and information networks to facilitate access to knowledge and information networks to enhance the efficiency of transportation, production, health and other systems. Terms used in this category include digital cities (Komninos, 2006, 2008; Stock, 2011; Yovanof & Hazapis, 2009), smart cities (Batagan, 2011; Hall, 2000; IBM, 2010; Su et al., 2011) and wired cities (Holland, 2008).

Economic production focus – In this context the emphasis is on wealth maximization through the commoditization and commercialization of knowledge and knowledge products as well as the application of sensors to reduce costs and response time and to enhance the efficiency and delivery of goods and services. Terms used in this category include creative city (Hospers & van Dalm, 2005; Suet Leng & Badarulzaman, 2014, UNESCO & UNDP, 2013), green city (OECD, 2006), knowledge city (Carrillo, 2006; Ergazakis et al., 2006; Yigitcanlar et al., 2014) and smart city (Hall, 2000).

Socio-Cognitive focus – The accent here is on the role of knowledge to support processes with a distinct emphasis on a human-centered, holistic approach that seeks to emphasize principles that advocate for the inclusion and widespread sharing of value to all citizens, social cohesiveness, environmental and economic sustainability. Terms used to describe cities with such orientation include child friendly cities (Nour, 2013; Osborne et al., 2013), creative city (Scott, 2006; Suet Leng & Badarulzaman, 2014, UNESCO & UNDP, 2013), intelligent city (Komninos, 2006), knowledge city (Carrillo, 2006; Ergazakis et al., 2006; Yigitcanlar et al., 2014), learning city (Biao et al., 2013; OECD, 1999), and smart city (Cagliu, Del Bo & Nijkamp, 2011; Dameri, 2013; Setis-Eu, 2012).

Value/issues focused – Here there is a strong emphasis on a specific vision or problematic aspect of the city, for example addressing the adverse impacts of climate change. The identified issue serves as a principal organizing or rallying factor for prioritizing the cities' actions. Addressing the identified problem or goal then depends on the judicious application of specific knowledge, policies and efforts. Terms used to describe cities in this category include age-friendly cities (WHO, 2007), creative/culture city (Scott, 2006; Suet Leng & Badarulzaman, 2014, UNESCO & UNDP, 2013), green city (OECD, 2006), knowledge city (Carrillo, 2006; Ergazakis et al., 2006; Yigitcanlar et al., 2014), learning cities (Biao et al., 2013), resilient cities (UNISDR, 2012) and sustainable cities (UN-HABITAT, 2010).

These four categories are not mutually exclusive. Suet Leng and Badarulzaman (2014) and UNESCO (2013) in their discussion of creative cities emphasize the socio-cognitive aspects and the role of cultural elements such as art handicraft, cultural diversity play in providing a distinctive sense of place and

identity. Often specific activities - which may be cuisine-related, touristic, health, spiritual, craft or other aspects - are linked to unique experiences within these places and provide a means for sustaining knowledge and practices that would otherwise disappear. The same term creative city is also used to describe places whose main form of economic activity is derived from cultural activities (Hospers & van Dalm, 2005) and yet still others use the term creative cities to refer to those which attract Florida's creative class of worker (Florida, 2002; Hospers & van Dalm, 2005).

The study of the post-industrial city and the role played by knowledge and information in supporting and shaping its development continues to be enriched by numerous authors working across a range of fields. Many claims and counterclaims to the generalizability of the models and their applicability as optimal approaches for city planning continue to be made. The informational city as a theoretical construct proposed and elaborated by Manuel Castells and recognized by other authors is regarded as an important and enduring contribution to this area (Stock, 2011).

As illustrated in Figure 7, the conceptual developments advanced by Castells (1989) and Borja & Castells (1997), the notion of an informational city emerges as an overarching super category under which the various city categorizations may be organized. Global and primate cities may be considered to be existing or potential informational cities; also as they host distinct advantages which are difficult to overcome, we may consider them to exhibit a strong sense of place. The financial dimensions of Castells' information society are most strongly developed in those city typologies which seek to enhance their economic positions, consequently we map these cities to the money factor. Power has strong social and conceptual dimensions so the city typologies that focus on socio-cognitive aspects are mapped to this class.

Information is the explicit form of knowledge which is readily transmitted by ICT, we therefore map the technological/infrastructure centric typologies to this aspect of the informational city. The values/issues typologies are as a whole cross-cutting, consequently, a mass mapping is not feasible.

2.7.6 Leveraging Knowledge to Address Strategic Development Challenges

Increasingly, knowledge is seen as a critical factor by international actors such as the World Bank, OECD and the United Nations for addressing strategic challenges in the field of human development across a range of sectors such as agriculture, health and environmental resource management amongst others (Ergazakis & Metaxiotis, 2011; Ritter, 2006; World Bank, 1998; UNESCO, 2005). This interest has led to the emergence of the field of knowledge-based development whose theoretical foundations span the fields of economics and knowledge management (Carrillo, 2004). The field of knowledge management and its evolution is presented in a later portion of the Literature. However, by way of introduction, knowledge management is broadly concerned with the creation, preservation, sharing, and identification of knowledge and knowledge needs with a view to applying this knowledge or meeting knowledge needs in order to create, preserve or leverage value (Dalkir, 2011).

2.7.7 Knowledge-based Development and the City

The recognition of cities as an important frontier for addressing human development challenges and their key roles as macro-economic engines has stimulated interest amongst practitioners and theoreticians in the role of knowledge-based development in the urban environment (Borja & Castells, 1997; Bounfour and

Informational City

Super category

Space

Power

Money

Information

Castell's Flows

Global Ciity

Primate City

Socio-Cognitive

Economic

Technological / Infrastructure

Proposed City Categories

Age-friendly
Child-friendly
creative, green
intelligent ,
knowledge
learning, resilient
sustainable, smart

Creative
Green
Knowledge
Smart

Digital   Smart
Wired

City typologies in literature

Figure 7:   Classification of the Typologies of "Post-industrial" Cities in the Extant Literature based on Castells'

Informational City Concept of Flows

Edvinsson 2005; Carrillo, 2004; Ergazakis & Metaxiotis, 2011; Florida, 2004; Sharma et al., 2008, 2009; Yigitcanlar and Velibeyoglu, 2008). This in turn has given rise to an area of specialization known as knowledge-based urban development or knowledge cities, which is a new hybrid of knowledge-based development and urban studies and which seeks to provide strategic responses for addressing the complex multidisciplinary challenges that cities face (Carrillo, 2004; Yigitcanlar, 2014; Ergazakis & Metaxiotis, 2011).

Knowledge-based development approaches also emphasize a more holistic approach which seeks to give attention not only to the economic aspects of development, but to also take account of social and environmental factors as well as the implications for sustainable development including such dimensions as tolerance and social cohesion (Borja & Castells, 1997; Ergazakis & Metaxiotis, 2011; Yigitcanlar & Velibeyoglu,2008).

Perhaps due to its novelty, the complexity of this subject of study as well as the important role that cities play, this field of research is attracting the interest of practitioners and researchers from a variety of disciplines. Consequently, the field is still in a pre-paradigmatic phase with methodologies, frameworks and approaches still evolving (Ritter, 2006; Ergazakis & Metaxiotis, 2011). Although cities in developing countries represent the spaces with the greatest potential – positive and negative - for human growth over the coming years of this century, the bulk of the academic research in this field appears to be addressed towards the developed country context (Atiqul Haq, 2012; Jenkins,2013; Roy, 2005). Much of this inquiry has focused on leading global

cities in the developed world with attention given to the role of technology, specialization, reputation, knowledge workers and their impact on the attractiveness and competitiveness of these cities (Carrillo, 2004; Dickman, 2012; Ergazakis et al., 2006; Florida, 2004; Luethge & Byosiere, 2006; Sharma et al., 2008, 2009; Yigitcanlar et al., 2007). This situation therefore raises ethical questions about the intent, purpose, responsibility and action of researchers.

Cities of the developed world have often been portrayed as the models for cities in the developing world but it is important to question whether these lessons and paths to success are directly transferable (Jenkins, 2013; Roy, 2005; Schluter, 2012). As Roy eloquently points out, "The study of cities today is marked by a paradox: much of the urban growth of the 21st century is taking place in the developing world but…theories of how cities function remain rooted in the developed world" (2005, p. 147). For example, when developed and developing countries are compared great differences in the socio-economic situations, the nature and dynamics of the power relationships between the state and citizens, as well as the capacity and capabilities of the state can be observed. Based on research conducted in Mozambique, Jenkins highlights a significantly greater contribution and role by citizen actors in the shaping of the city-scape in developing countries than in those of the developed world.

This can be seen in cities like Addis Ababa where, according to UN-HABITAT (2007), up to 80% of the city's dwellings are slums. While the desirability of slums remains contested, they nevertheless represent a response to very real and urgent housing needs that is unmet by state, civil society or private sector actors (Roy, 2005; Schluter,

2012). The social networks that exist within these slums provide important support services for their inhabitants, often referred to as the informal sector, that represent important sources of financial as well as relational and structural capital. However, without opportunities for meaningful engagement by the majority of their citizens, such as slum dwellers, in the decisions that impact them, it is unlikely that cities of the developing world will be able to tap into much of the human, relational and structural capital they contain or ensure that all citizens have a "right to the city"[9]. Against the backdrop of such experiences, Roy therefore signals the need to "to locate the production of theory and policy in the cities of the developing world" (2005, p. 147).

Various researchers (Carrillo, 2006; Ergazakis et al. 2006; Yigitcanlar, 2009) identify the creation of a shared city vision and collective action as necessary conditions for the successful leveraging of knowledge in cities. Borja and Castells (1997) also underline the roles of participation, social cohesion, equity, tolerance and multiculturalism as key success factors. Until this is achieved, the creation of sustainable responses to economic, social and environmental challenges – the goal of knowledge-based development in cities – will likely be elusive for cities both in the developed and developing world (Borja & Castells, 1997; Ergazakis & Metaxiotis, 2011; Yigitcanlar and Velibeyoglu, 2008). Consequently, people-centred perspectives on knowledge-based development should be seen as crucial for the success of the emerging cities of the developing world.

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[9] This concept introduced by Henri Lefebvre, in his book *Le Droit a la ville,* advocates for a collective right of citizens to democratic access and control over the use and shaping of the urban environment to meet their socio-economic, political and cultural needs.

2.7.8   Conclusions about Cities in the Post-Industrial Era

The opportunities, but also the challenges that nations and cities face and must respond to so as to ensure the well-being of their citizens, have perhaps never been as great. The multi-faceted nature of the opportunities and challenges, the rapid speed of change and the need to address them simultaneously is indicative of the inherent complexity and also points to the need for broad-based, concerted, coordinated multi-stakeholder interventions. The development of a shared city vision around which its diverse stakeholder groups can coalesce therefore takes on a critical role. The various city typologies point to examples of some of the overarching approaches that cities may select.

Cities must therefore endeavor to develop the conditions for joint action. Central to this success is the need for cities to develop the human capital of their citizens. The increasing heterogeneity of societies and the importance of social cohesion, coupled with the glocal nature of interactions, points to the need to develop both soft and hard skills. Investments to ensure that the full spectrum of human needs and rights are met – civil, cultural, political economic and social – as well as attention to environmental aspects, infrastructure and governance systems ensures the creation of favorable conditions for an engaged and empowered citizenry. Such a foundation will provide the basis for conscientiously managing Castells' flows of information, power and finance and economic.

Cities of the developing world need to recognize that urban solutions from the developed world may not be suitable for them. Efforts such as enhanced regional

cooperation between academic institutions, governments agencies and other actors within this context is essential to share experiences and support capabilities necessary to respond to the urban challenges of the developing world.

2.8   UNESCO as an International Actor for Knowledge-based Development

The Constitution for the establishment of the United Nations Educational, Scientific and Cultural Organization (UNESCO) was signed on 16 November 1945 and became effective on 4 November 1946 following ratification by 20 nations[10].

The Governments of the States Parties to this Constitution on behalf of their peoples declare:

That since wars begin in the minds of men, it is in the minds of men that the defenses of peace must be constructed;

That ignorance of each other's ways and lives has been a common cause, throughout the history of mankind, of that suspicion and mistrust between the peoples of the world through which their differences have all too often broken into war;

That the great and terrible war which has now ended was a war made possible by the denial of the democratic principles of the dignity, equality and mutual respect of men, and by the propagation, in their place, through ignorance and prejudice, of the doctrine of the inequality of men and races;

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[10] UNESCO Constitution http://portal.unesco.org/en/ev.php-URL_ID=15244&URL_DO=DO_TOPIC& URL_SECTION=201.html

That the wide diffusion of culture, and the education of humanity for justice and liberty and peace are indispensable to the dignity of man and constitute a sacred duty which all the nations must fulfil in a spirit of mutual assistance and concern; That a peace based exclusively upon the political and economic arrangements of governments would not be a peace which could secure the unanimous, lasting and sincere support of the peoples of the world, and that the peace must therefore be founded, if it is not to fail, upon the intellectual and moral solidarity of mankind. For these reasons, the States Parties to this Constitution, believing in full and equal opportunities for education for all, in the unrestricted pursuit of objective truth, and in the free exchange of ideas and knowledge, are agreed and determined to develop and to increase the means of communication between their peoples and to employ these means for the purposes of mutual understanding and a truer and more perfect knowledge of each other's lives;

In consequence whereof they do hereby create the United Nations Educational, Scientific and Cultural Organization for the purpose of advancing, through the educational and scientific and cultural relations of the peoples of the world, the objectives of international peace and of the common welfare of mankind for which the United Nations Organization was established and which its Charter proclaims. (Preamble, UNESCO Constitution, 1945)

UNESCO therefore came into being as a Specialized Agency of the United Nations System. As part of the actions to be undertaken to fulfill this mission the

Organization's Constitution mandated it to "promote the free flow of ideas by word and image" and to maintain, increase and diffuse knowledge".

2.8.1 UNESCO as a Pioneer in Building the Capability of Developing Countries to Leverage Information Management Systems

In 1946, UNESCO, in line with its mandate, commenced a feasibility assessment for the establishment of an international institute in the field of digital computing. This study led to the adoption in 1951 of a UNESCO convention for the creation of an International Computing Center (ICC) that would conduct research in this area (Pohle, 2012; UNESCO Archives[11]). This center was intended to support developing countries by building capacity and providing them with the means to access computing resources. However, a limited appreciation and understanding amongst developing countries in particular and also, more broadly, the inability of persons outside the computing communities to recognize the potential that these technologies held, meant that it was not until almost the mid-1960's that the Convention was finally ratified by 10 Member States and the ICC established.

Continuing to support its forward-looking mission, UNESCO in concert with the International Council of Science Unions (ICSU), undertook in 1967 an ambitious project which aimed to develop a World Science Information System (UNISIST) (Rose, 1989). This global project sought to establish networks for fostering cooperation and exchange in the natural sciences and engineering fields. It was UNESCO's view that socio-

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[11] Reference code, FR PUNES AG 15-IBI; Title: Archives of the Intergovernmental Bureau of Informatics (IBI) Date(s) 1961 - 1988 (Creation) Level of description Fonds Extent and medium432 boxes.

economic development could be stimulated through the building of human capacity and the transfer of information and knowledge. Over time UNISIST expanded to address the development of software and information systems and their deployment in developing regions. These efforts sought to bridge the already visible gaps between countries with access to digital information technologies and those without access.

UNESCO's experiences in the developing, non-Western countries provided the Organization with first-hand insights into a range of cultural and linguistic barriers as well as psychological and cognitive challenges – including information overload and the need for change management – that often adversely affect the use and deployment of information systems. Furthermore, they also served to highlight the crucial influence of human diversity around aspects such as meaning, values, mental models and the acceptance of technology and therefore the need to adapt technologies and related processes to the socio-cultural contexts in which they were deployed (Rose, 1989). Local knowledge often proved more relevant and effective in addressing development challenges than external knowledge, therefore underlining the importance of facilitating local capacity to access, use and develop local information and knowledge systems and practices (Mansell, 2010, 2012; Rose, 1989).

2.8.2 The Ideological Battles of the People-Centric and Techno-Centric Worldviews

The late 1970's through to the 1990's coincided with a growing global recognition and understanding of the economic, social and political influences of digital technologies (Castells, 2000; UNESCO, 1997). A number of concepts such as

"leapfrogging" promoted information and communication technologies (ICT) as a silver bullet for remedying the challenges of developing countries. The metaphor of knowledge as light, promoted by the World Bank, emphasized the speed and ease with which knowledge from developed countries could enlighten and remove the darkness of ignorance in developing countries (World Bank, 1999, p. 1). However, these narratives did not appear to be informed by the experiences of development actors such as UNESCO. These viewpoints therefore saw knowledge as a largely one-way flow and placed little value on local and indigenous knowledge. In this context the role of technology and other infrastructure took on elevated importance. Consequently, it was theorized that by providing ICT for development (ICT4D) the digital divide could be closed, and by doing so ensure that developing countries could emerge from their positions of backwardness (Mansell, 2010, 2012; Pohle, 2012).

Drawing on its experiences in the developing countries, UNESCO sought to counter such arguments, emphasizing rather the need to focus on building the capacity of people, underlining the importance of being context relevant and to see technology and external knowledge as an enabler, rather than as the driver or determinant of progress (Mansell, 2012; UNESCO, 2005). UNESCO, with far more modest resources than the World Bank, was unable to counter these dominant views, especially in light of the growing commercial attractiveness and allure of these technologies and the many ICT4D success stories.

UNESCO therefore promoted ICT as part of a broad set of solutions for enabling countries to access information and knowledge relevant to addressing their development

goals. UNESCO also warned of the potential challenges that ICT posed for creating new forms of risk, exacerbating existing inequalities and contributing to societal transformations whose impacts were not well understood (UNESCO, 2012). To further stimulate debate and encourage research that could provide insights and recommendations to assist its Member States in better understanding and developing policy responses to these prospects and challenges, UNESCO organized three international Info-Ethics Congresses between 1997 and 2000 on the societal, legal and ethical implications of new technologies[12],[13],[14]. Issues such as the impacts of data exchange on privacy and human dignity, the use of technologies in state surveillance and the role of exemptions to intellectual property rights to facilitate development were amongst the topics examined.

2.8.3 Emergence of UNESCO's Knowledge Societies Conceptual Framework

The Info-Ethics congresses, various international expert meetings, regional and international debates - and research involving universities, civil society organizations, various international bodies and leading experts such as Manuel Castells - , supported UNESCO's efforts to develop the theoretical basis for its concept of Knowledge Societies and the subsequent publication of a peer reviewed *UNESCO World Report: Towards*

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[12]First UNESCO Info-ethics Congress on the Social, Legal and Ethical Challenges of Cyberspace organized in the Principality of Monaco, 10-12 March 1997 October http://www.unesco.org/bpi/eng/unescopress/97-27e.htm
[13] Second UNESCO Info-Ethics Congress organized in the Principality of Monaco, 1-3 October 1998, available at http://www.unesco.org/webworld/infoethics_2/
[14] Info-Ethics 2000 organized at UNESCO's Paris Headquarters in France, 13 – 15 November 2000 http://webworld.unesco.org/infoethics2000/

Knowledge Societies[15] - that presented these concepts[16]. These international forums

attended by a range of stakeholders during 1997 to 2003 served as an important platform

for positioning UNESCO as an important player in the global debate on ICT and their

role in advancing human development.

UNESCO's concept of Knowledge Societies, presented in Figure 8, advocates for

the development of a society founded on human rights principles which aspire to enable

each citizen to achieve their full potential and to contribute to the solution of societal

challenges and peace in their communities through the equitable use of knowledge. These

ideas mirror the Organization's founding principle which are reflected in its constitution

(UNESCO, 1945). On this basis, UNESCO proposed a set of "foundations", "principles"

and "building blocks" for creating knowledge societies. The foundations - respect for

human needs and rights, pluralism, inclusion, equity and openness - represent values

aimed at fostering cohesiveness and peace and informing societal choice-making and

strategy. The principles - freedom of expression, universal access, and diversity and

quality education for all - serve to create a population with the attitudes, process skills

and competencies needed to operationalize the ethical values. Finally, we see as building

blocks the familiar Knowledge Management processes - knowledge creation, knowledge

preservation, knowledge dissemination and knowledge utilization- which would be

employed to address the strategic objectives of the society. This framework, though

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[15] UNESCO. (2005). UNESCO World Report: Towards Knowledge Societies, UNESCO Publishing, Paris. Available at http://unesdoc.unesco.org/images/0014/001418/141843e.pdf

[16] See Summary records Item 8.1 – Construire des societies du savoir (Building Knowledge Societies) Pages 29 to 94 http://unesdoc.unesco.org/images/0012/001270/127084m.pdf

normative with respect to human rights and values, did not seek to prescribe a uniform set of behaviors, hence the use of the plural "societies". Each society was therefore expected to use knowledge and innovate using approaches and processes relevant to its context to find appropriate solutions (UNESCO, 2005).
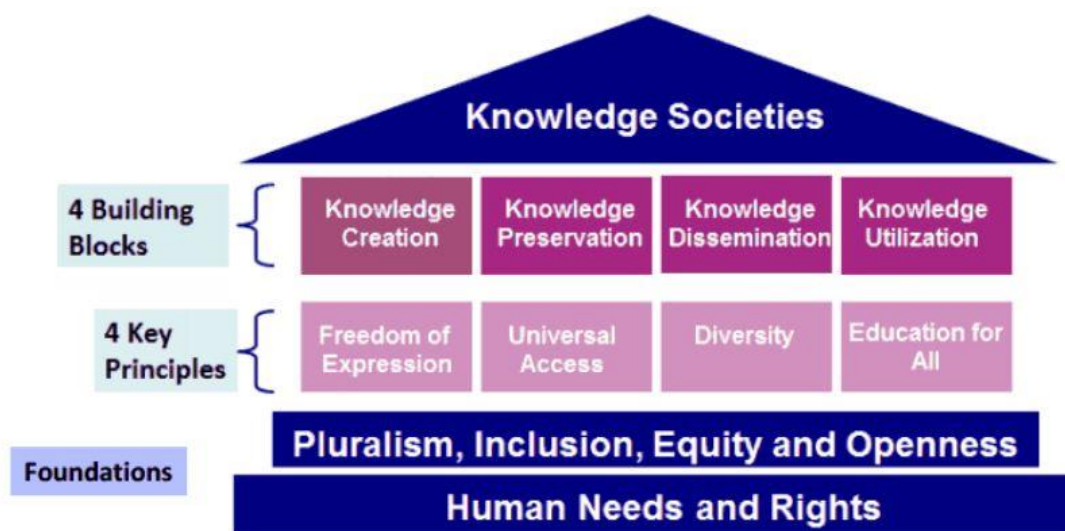
Figure 8:   UNESCO's Knowledge Societies Conceptual Framework (Souter, 2010)

2.8.4   UNESCO's Knowledge Societies Concept at WSIS

The significant interest around ICT and their global impacts, as well as the growing importance of the Internet and concerns over its regulation and governance, led to the United Nations General Assembly adopting a resolution in 2001 for the convening of an international summit of states known as the World Summit on the Information Society (WSIS). WSIS was the first ever Summit of States convened by the United Nations to discuss the development of the information society, that is to say, the role of global information flows and networks and their socio-economic political and

environmental implications[17]. WSIS was also given a mandate to contribute to the achievement of the Millennium Development Goals (MDGs) a set of 8 international targets that nations of the world adopted in 2000 to be achieved by 2015 in order to alleviate poverty[18].

The Summit took place in two phases in Geneva and Tunisia in 2003 and 2005 respectively, and was organized under the leadership of the International Telecommunication Union (ITU) with the support of other interested organizations of the United Nations system including UNESCO and the hosting countries. The first phase focused on developing political consensus for concrete actions that reflected the interests of the varied stakeholders – governments, inter-governmental organizations, private sector, civil society and the Internet technical community. On the other hand, the second phase focused on implementing the Geneva Plan of Action as well as seeking to obtain agreements on the establishment of financing mechanisms for overcoming the digital divide and administering Internet governance. The first phase of the Summit was attended by over 11,000 participants including representatives of 175 countries, with over 19,000 participants and 174 countries represented at the second phase[19].

UNESCO effectively campaigned for the inclusion of civil society representatives and perspectives of developing countries in the Summit. It also stressed and highlighted

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[17] The UN General Assembly Resolution 56/183 (21 December 2001) endorsed the holding of the **World Summit on the Information Society (WSIS)** in two phases. The first phase took place in Geneva from 10 to 12 December 2003 and the second phase took place in Tunis, from 16 to 18 November 2005.

[18] The Millennium Development Goals represent 8 target which nations of the World have committed to attain by 2015 to alleviate poverty. http://www.un.org/millenniumgoals/

[19] See Basic information about WSIS available at: http://www.itu.int/wsis/basic/about.html

its human-centered approach to information and knowledge a position which contrasted

with the more technology-centric agenda of the ITU. Following the Summit, UNESCO

was awarded responsibility for undertaking global coordination of six Action Lines

adopted under the Summit's Action Plan. The Summit did not achieve agreement on the

establishment of a digital solidary fund or resolve the issue of Internet Governance. A

multi-stakeholder mechanism, the Internet Governance Forum (IGF), was established to

continue discussions in the area of Internet Governance while a WSIS Forum served as a

mechanism to review and pursue progress made under the Action Lines.

2.8.5   UNESCO's Knowledge Societies Concept Gains Ground

In February 2013, UNESCO organized at its Headquarters in Paris, in concert

with ITU, the United Nations Development Programme (UNDP) and the United Nations

Conference on Trade and Development (UNCTAD), the First WSIS+10 Review Event

under the theme, "Towards Knowledge Societies for Peace and Sustainable

Development". In July 2014, the second step of this process in the form of the WSIS + 10

High Level Forum was organized at ITU Headquarters in Geneva by ITU, UNESCO,

UNDP and UNCTAD. This event endorsed the statement that resulted from the 2013

UNESCO event. Ths multi-stage process culminated in December 2015 with the adoption

by the United Nations General Assembly in New York of a new plan of action for the

Post-2015 phase of WSIS.

UNESCO has continued to advocate its Knowledge Societies concept which has

continued to demonstrate its relevance and attract interest from Member States as a

conceptual framework that Member States could draw inspiration from in developing

their national knowledge and information society policies. Much of UNESCO's work has consisted of conducting programmes that enable states to build their capacities in various aspects such as supporting the capture, validation and dissemination of local knowledge, preparation of policy materials, organizing expert meetings and developing recommendations for policy-makers. However, no attention has been given to operationalizing this conceptual framework by addressing such crucial aspects as developing methodologies that would support activities such as the creation of indicators that could support processes such as benchmarking, policy diagnosis and assessing a society's progress towards becoming a knowledge society. Furthermore, the Knowledge Societies' framework, in its current form does not provide insights into how knowledge could be used to address specific development challenges.

Other international Organizations working in this space, notably ITU who advocates a technology-centric view, have developed a variety of indicators which serve as a measurable basis against which Member States can measure their progress (ITU, 2012). Their annual publication of rankings on measures such as Internet penetration and mobile phones per capita provide incentives for countries to measure up against others. UNESCO's concept of knowledge societies does not lend itself to ranking of countries as it assumes that each country must find its own path based on its own context. However, offering tools that enable countries to establish baselines could provide goal posts against which progress can be assessed. However, without such tools to assess and incite progress, UNESCO's vision of knowledge societies is likely to remain a lofty ideal that countries will endorse and applaud but not necessarily act on.

2.8.6 Conclusions on UNESCO's Role as a Proponent of Knowledge Societies

As a Specialized Agency of the United Nations System with a mandate for promoting peace, education and the diffusion of knowledge and information, coupled with its experience on the ground, research and legitimacy points to a key leadership role for UNESCO in assisting all nations to manage their transition to knowledge societies. The Organization has been responding to this task but there is a clear need for UNESCO to equip its Member States with the policy tools and resources to promote its distinctive human-centered brand of knowledge societies. Unless the Organization is able to address this gap it may face such challenges as a loss of relevance to Member States and may need to cede responsibility for aspects of its mandate to other UN Agencies.

2.9 Models of Knowledge-based Development in the Academic Literature

Over 30 knowledge-based development models with varying purposes and levels of coverage have been created to conduct assessments at the national, regional, city and village levels (Batra, 2013; Garcia, 2008; Bounfour & Edvinsson, 2005; Käpylä et al., 2012; Sharma et al., 2008, 2009;UN-HABITAT, 2002,2004,2013;Yigitcanlar et al. 2014, 2014). Ergazakis and Metaxiotis (2011) point to factors such as variations in the conceptualizations of knowledge and disciplinary traditions as influences on the range of approaches to modeling, assessing and evaluating the use and role of knowledge to support development in the urban space. However, this review was limited to those critiqued in the academic literature and for which information on their theoretical basis, methodology for the development and derivation of indicators is available. These models

have also been applied in at least one city, region or nation, primarily in developed country contexts. While the model developers claim to be holistic in their approach in most models the economic dimension is prioritized. In addition, while most modelers claim to focus on identifying the specific attributes of a specific place which could provide distinct strategic knowledge advantages, factors such as the availability of comparable secondary data and an interest in benchmarking lead to the selection and use of indicators that promote uniformity. Several exemplary models featured in the academic literature are analyzed.

2.9.1 The Most Admired Knowledge City MAKCI Framework

The Most Admired Knowledge City (MAKCI) Framework was developed by the World Capital Institute (WCI), an international think tank specializing in the application of knowledge-based development to urban problems. The WCI is headquartered in Monterrey, Mexico and collaborates with Teleos, the developers of the Most Admired Knowledge Enterprise (MAKE) Award. The MAKCI Framework involves the application of a methodology developed by Teleos. This approach consists of a series of expert consultations and analyses conducted within an on-line Delphi panel that uses the Generic Urban Capitals System as its assessment framework.

The Generic Urban Capitals System is a taxonomy / theoretical framework developed by WCI (Carrillo, 2002, 2004) which seeks to capture through eight dimensions the entire productive value base of tangible and intangible assets, referred to as collective capital, which a city is able to harness and recombine for its future and ongoing development. These eight capitals are Identity, Intelligence, Financial,

Relational, Human Individual, Human Collective, Instrumental Material and Instrumental

Knowledge. These are briefly described below and depicted in Figure 9.

      Identity capital - These are the distinctive elements that draw on factors such as

the city's history, location, specialization, etc. that serve to shape the city's reputation and

identity and which differentiate it from other cities.

      Intelligence capital - This provides an indication of the city's ability to plan and

implement actions in response to long-term or short-term events that impact the city's

welfare, (e.g., the city's ability to respond to disasters or to designs and implement

projects and programmes that mitigate their potential impacts, developing and

implementing effectively medium-term strategies.

      Financial capital - The ability of the city to generate financial and economic

value as measured by the size of the city product, which is analogous to GDP, as well as

its ability to attract investment, create employment, and also to collect the revenue it

generates;

      Relational capital – This serves as a measure of the city's ability to support social

cohesion and integration as evidenced by its ability to generate and maintain diversity

across ethnic and cultural lines, support linguistic diversity etc.

      Human individual capital – This is concerned with the quality of the people in

the city with regards to their physical health, sense of well-being and empowerment, and

educational levels.

Human collective capital - This encompasses a range of attributes such as the demographic profile of the population (aging/youthful), the society's readiness to be open to other cultures, and to be open to risk-taking and innovation.

Instrumental material capital - These are city attributes whether natural, such as the location, climate and natural resources the city is endowed with, or built infrastructure, such as transportation networks, sports infrastructure, historic sites and central business districts through which other capitals can generate value.

Instrumental knowledge capital – These are the knowledge production systems to enhance their value through, for example data repositories, whether digital or paper-based, that can serve to generate value.
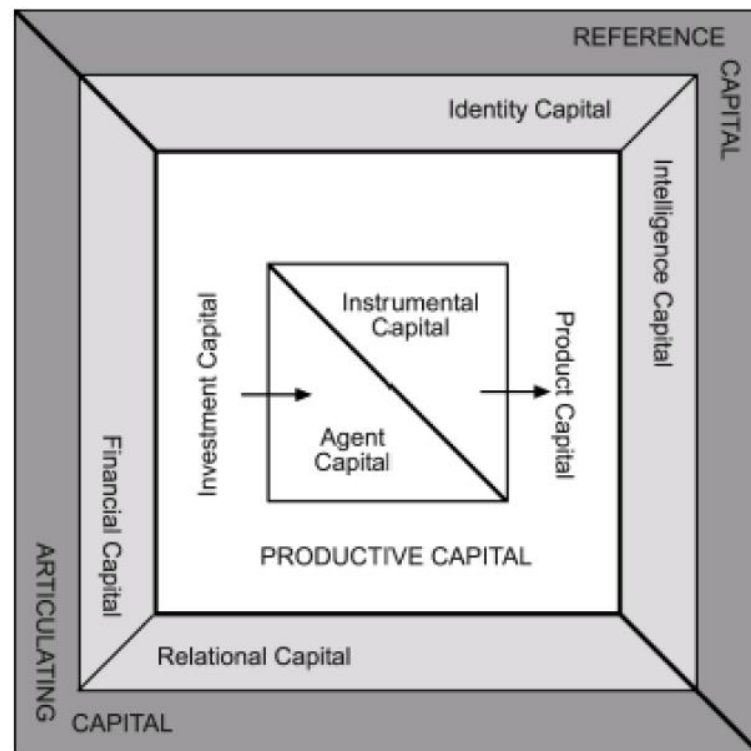
Figure 9:   Taxonomy of the Generic Urban Capitals System (Carrillo, 2002: 391)

In recognition of the determining role that scale effects can play in a city's ability to leverage knowledge, the MAKCI Framework adopts two broad categories for classifying cities, namely:

Knowledge metropolis –Typically have over 3.5 million inhabitants and are major centers of international economic, political and cultural activity; and,

Knowledge City-Regions – Typically have 500,000 to under 3.5 million inhabitants and are regional centers of economic, political and cultural activity.

A set of 17 open ended questions that relate to each of the capitals identified in the Generic Urban Capitals System is used to qualitatively assess cities. A panel of international experts working in the fields of intellectual capital, knowledge management, knowledge-based development and knowledge-based urban development are invited to nominate cities, which in their view, are exemplary knowledge cities. These invited experts are encouraged to participate as members of a social knowledge network hosted by WCI with a view to connecting these geographically and disciplinary distant expert communities. According to Yigitcanlar et al.(2014, p. 108), "Dialogues have started to build knowledge in this nascent group of knowledge city experts [participants selected to the MAKCI Delphi Panel] within the wider KBD network of professionals". Each expert who nominates a city qualifies their selection by gathering and providing information on the city's performance across each of the eight generic urban capitals on the basis of an established questionnaire. The responses are reviewed and validated, then submitted to the panel of experts who through three rounds of consultation identify winners in each of the two main categories, knowledge metropolis and knowledge city-regions.

The MAKCI Framework has been applied since 2007 to at least 57 cities. The methodology has proven useful in gathering data on a number of cities against an established framework, facilitating longitudinal observations and supporting benchmarking. The methodology has enabled a variety of other city typologies to be identified based on their knowledge generating characteristics. These groupings include UniverCities, which are characterized by strong partnerships between universities and various city actors; InnovaCities where there is an especially tight coupling between the generation of knowledge and CatalystCities which while not the origin of ideas, provide capital or other resources which enable ideas and knowledge to be transformed into market-viable solutions.

2.9.1.1 Critique of the MAKCI framework

The MAKCI Framework has strong a methodological and theoretical basis being grounded in the Delphi technique and intellectual capital which are both well regarded with established methodologies and theoretical concepts. The Framework is also appreciated by academics and practitioners as well as municipal authorities (Batra, 2008; Garcia & Leal, 2010).

Within the Delphi methodology ensuring the anonymity of participants has been identified as an important element to avoid self-censorship, group-think and domination by experts and to allow participants to revise/review their opinions. However, given the objective of building up expertise around this methodology, its role as a "social knowledge network" and its dependence on an annual consultation of an international

database of experts, it appears that this aspect could serve to undermine the aspects on which a Delphi process depends for its validity (Garcia, 2008, Yigitcanlar et al., 2014).

While scale effects are important, the omission of cities with population levels below 500,000 can be objected to as they account for about half of the world's urban population (UNDESA, 2011). There are also a number of notable and exemplary cities with populations well below this cut-off mark who out-perform much larger cities; these experiences could add valuable insight. Examples include Guimaraes in Portugal, voted as a European city of culture and sports with a population of 150,000 and Issy-Le-Moulineux, in France with a population of just over 60,000 which is ranked by the European Commission as one of the top 15 smart cities in Europe alongside notable and far larger cities such as Amsterdam and Barcelona[20]. Furthermore, the fastest growing cities have populations with fewer than 1,000,000 inhabitants are located in Africa and Asia (UNDESA, 2011), and existing data points to the shift of urban centers from developed to developing countries. These factors point to a significant blind-spot and an area of both current and potential future research, policy and practical prominence which the MAKCI Observatory can contribute.

2.9.2 Batra's Knowledge Village Capital Framework (KVCF)

Batra's (2013) Knowledge Village Capital Framework (KVCF), seeks to adapt the MAKCI Framework's system of Generic Urban Capitals to the context of the rural village. While urbanization is an undoubtable global trend, Batra, citing World Bank

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[20] http://www.issy.com/en/node/10451 Official website of the city of Issy-Le-Moulineux

Rural Indicators data (2013), points to existing significant rural populations in excess of 107 million persons in each of the countries of India, China, Indonesia, Pakistan and Bangladesh. In the case of India and China, rural dwellers account for 853 million and 665 million persons, respectively. Furthermore, citing the same source Batra indicates that between 2008 and 2011, although the number of rural dwellers decreased in 72 countries, increases in rural populations were observed in 118 countries.

In addition to the absolute scale of the rural population and the importance of using knowledge to overcome the existing divides that exist between rural and urban areas, the academic rationale proposed by Batra (2013) for the development of this framework include: a) contributing to enhancing understanding of how knowledge-based development operates at a range of scales extending from the global through inter-organizational level; b) improving modeling at the community level of knowledge processes and c) transferring understanding of knowledge-based development processes at the community level to support additional insights and improved understanding at larger scales of agglomeration.

In contrast to the MAKCI Framework the KVCF proposes 7 instead of 8 generic capitals for the village. These are:

Identity capital -The ability of the village to create and shape over time distinctive attributes that enhances its inhabitants' well-being;

Intelligence capital – The ability to adequately identify/predict and respond adequately to threats and opportunities;

Relational capital – The presence of inclusive social relations and to develop quality interactions;

Human capital – The presence of initiatives aimed at building both collective and individual capacity of villagers to leverage and benefit from knowledge-based development;

Financial capital – The ability of the village to create and maintain an adequate financial basis;

Material capital – The physical production means and attributes that enable value generation; and

Innovation capital – The ability to develop knowledge into grass-roots level innovations that support the village.

While the MAKCI framework uses a set of 17 open ended questions based around the capitals and a Delphi panel the KVCF uses a different approach. In conducting their pilot tests in India, a set of 27 prescribed indicators are associated to the identified capitals. For each indicator a 5-level Likert scale is used to assess performance on the indicator.

Although recognizing the variations in needs, context and circumstance that villages within and across countries face, Batra identifies three key areas of focus which knowledge-based development should address in all villages, namely, a) supporting the production of good and services that support economic growth; b) promoting development of the village that is both environmentally and socially sustainable; and c)

advancing the well-being of the inhabitants. The KVCF model has been applied to villages in India.

2.9.2.1 *Critique of Batra's KVCF*

Batra's KVCF responds to an important aspect of knowledge-based development whose significance and importance, like that of the rapidly growing cities of the developing world, has escaped the attention of the majority of knowledge-based development practitioners. The framework therefore provides novel contributions to the literature and the discipline of knowledge-based development and points to new areas where research is needed.

On the other hand, several aspects related to the application of this approach are unclear. For example, it is not at all clear which stakeholder groups are consulted and on what basis respondents are selected. Information on this framework, such as the development and identification of the seven capitals in this model, is quite limited. Batra (2013) also points to the results of a principal factors analysis which indicate that a set of six capitals, which include two new capitals of accessibility capital and social capitals that provide better results, but no information on the basis of these new capitals and their definitions is provided. Seeking to transpose to the village a framework developed for the city also presents conceptual difficulties.

However, since the framework is still new and research papers on its development are still being reviewed by journals, it is likely that some of these areas will be clarified in forthcoming publications.

2.9.3 UN-HABITAT's City Development, Urban Government & City Prosperity Indices

The United Nations Human Settlements Programme[21] was established in 1978 to serve as the lead agency within the UN system for coordinating activities related to the development of human settlements. Since 2002 this agency has become known as UN-HABITAT. Its activities include providing technical assistance to countries and cities in the areas of urban governance, housing, environmental management, disaster mitigation, post-conflict rehabilitation, urban safety, water management and poverty reduction. It is the only UN Agency headquartered in a developing country, perhaps reflecting the demographic trends amongst cities. In line with its mandate, UN-HABITAT has been developing a range of tools and models aimed at supporting city leaders and national governments in assessing conditions in their cities to create appropriate policy responses.

Since its inception, UN-HABITAT has developed three modelling tools to assess the situation of cities, namely, the City Development Index (CDI) introduced in 1996, the Urban Governance Index (UGI) in 1999, and, most recently in 2012, the City Prosperity Index (CPI). The CPI has replaced the two earlier models.

In 1988, UN-HABITAT established the Urban Indicators Programme to assist cities in the design, collection and application of policy-oriented indicators. This data collection process had the dual goal of improving global understanding of urban issues and supporting evidence-based policy-making (UN-HABITAT, 2004). The project initially focused on indicators related to housing, but in light of the United Nations

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[21] Additional information on UN-HABITAT and its activities can be found at http://unhabitat.org/about-us/

Global Summit on Sustainable Development in 1996, it was decided to expand the indicator programme to reflect other urban-related aspects of sustainable development. A Global Urban Observatory (GUO) was established to monitor progress in the implementation of the refocused global policy orientation and continues to operate. Responding to this expanded mandate required a broader data collection envelope that now includes Shelter, Social Development, Environmental Management, Economic Development and Governance dimensions. In 2001, following the adoption by the United Nations system of the Millennium Development Goals (MDGs), in order to take into account the new roles and responsibilities allocated to UN Agencies, the data collection process was again revised (UN-HABITAT, 2004).

2.9.3.1   The City Development Index

The CDI (UN-HABITAT, 2002) developed in 1996 used five measures, namely, city product, infrastructure, waste, health and education, which were considered by UN-HABITAT to be crucial for assessing the city's development. Each measure was assessed on the basis of sub-indicators as follows: a) the infrastructure components assessed the availability of water supply connections, the city, sewerage, electricity and telephone services; b) the waste aspect considered the proportion of wastewater generated in the city that was treated and its solid waste disposal capacity; c) the health component measured literacy and school enrolment; while d) the city product represented the city-level contribution to the national GDP. This selection therefore provided insights into tangible financial measures (city product), as well as dimensions of human (health and

education) and structural (infrastructure and waste) capitals. This measure did not, however, take into account social capital aspects. Using the CDI's extensive framework, assessments were conducted in cities across 167 countries which were classified on the basis of two broad categorizations on the basis of regional groupings (Africa, Asia-Pacific, Latin America and the Caribbean) and economic status (High Income countries and Transitional countries).

2.9.3.2   *The Urban Governance Development Index*

Recognition of the complementary roles played by various stakeholders - institutions in the public and private sphere, civil society, individuals, etc. - in planning and managing the common affairs of the city led to UN-HABITAT undertaking efforts to gain insights into the role of these diverse actors and their actions in shaping development outcomes in cities (UN-HABITAT, 2004). This research was conducted under the umbrella term of urban governance. Urban governance was viewed as a means to accommodate and resolve diverse conflicting interests through formal as well as informal mechanisms that allowed social capital to be leveraged. To assess the empirical conditions, an Urban Governance Index was created to investigate the factors that affected this process and to develop indicators that facilitated regional, national and local comparisons as well as the analysis and development of policy responses. Initially, five broad areas of investigation, namely, accountability, participation, effectiveness, equity and security were explored but weak results in the principal components analysis of security led to this aspect being eliminated.

The final index is based on 21 indicators as illustrated in Figure 10. In developing the UGI value the indicator values are normalized and equal weightings applied. The index has been used to assess over 200 cities around the world.
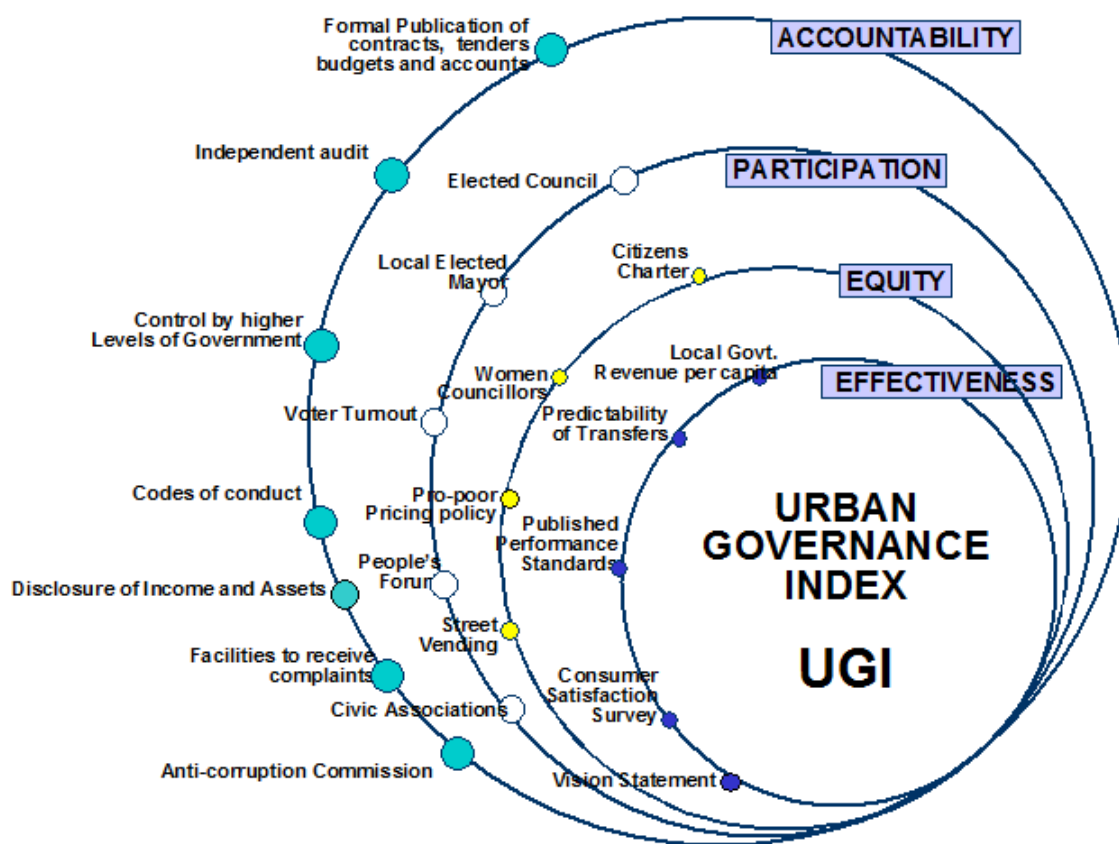
Figure 10: UN-HABITAT's Urban Governance Index, its Components Groups and Indicators (UN-HABITAT, 2004a: 1)

2.9.3.3   The Prosperous City Index

The Prosperous City Index (PCI) is the most recent contribution by UN-HABITAT (2014) to knowledge-based development modeling. The PCI seeks to provide

a balanced approach to supporting holistic knowledge-based development approaches in the city. The index adopts a multi-dimensional perspective of prosperity, which considers productivity, infrastructure development, quality of life, equity and social inclusion as well as environmental sustainability, as illustrated in Table 2. These dimensions are thought to interact with each other and to be moderated by interventions in the form of policies, law and programmes implemented by governmental institutions. The relationship between these components is schematically depicted in Figure 11.

Table 2:   Definitions of the Concepts in the UN-HABITAT Prosperity Index (UN-HABITAT, 2013:14)

Defining a prosperous city	
A prosperous city is one that provides	
Productivity	Contributes to economic growth and development, generates income, provides decent jobs and equal opportunities for all by implementing effective economic policies and reforms
Infrastructure development	Provides adequate infrastructure – water, sanitation, roads, information and communication technology in order to improve urban living and enhance productivity, mobility and connectivity
Quality of life	Enhances the use of public spaces in order to increase community cohesion, civic identity, and guarantees the safety and security of lives and property
Equity and social inclusion	Ensures the equitable distribution and redistribution of the benefits of a prosperous city, reduces poverty and the incidence of slums, protects the rights of minority and vulnerable groups, enhances gender equality, and ensures civic participation in the social, political and cultural spheres
Environmental sustainability	Values the protection of the urban environment and natural assets while ensuring growth, and seeking ways to use energy more efficiently, minimize pressure on surrounding land and natural resources, minimize environmental losses by generating creative solutions to enhance the quality of the environment

UN-HABITAT highlights the importance of intangible assets across the full set of intellectual capital assets when it points out that:

The role of Prosperity is a more complex notion, one that cannot be captured

through straightforward indices that measure how much money people earn or

how many cars they own. A 'prosperous' life includes other non-material, non-

tangible dimensions, like having a voice in shaping the future of one's city, having

meaningful relationships, belonging to supportive communities, and having the

resources and capabilities to transform your dreams into concrete realities. (UN-

HABITAT, 2013, p. 16)

Indicators for the CPI are developed in each of the model's dimensions.

Productivity is calculated on the basis of the city product; quality of life takes into

account measures of education, health and public space; infrastructure development

addresses two dimensions, one related to housing and the other examines the adequacy of

other forms of the built infrastructure; environmental sustainability is based on measures

of air quality, carbon dioxide emissions and indoor pollution levels; and the equity and

social inclusion utilize statistical measures of inequality of income and consumption as

well as inequality in the access to services and public infrastructure. This is depicted in

Figure 11.
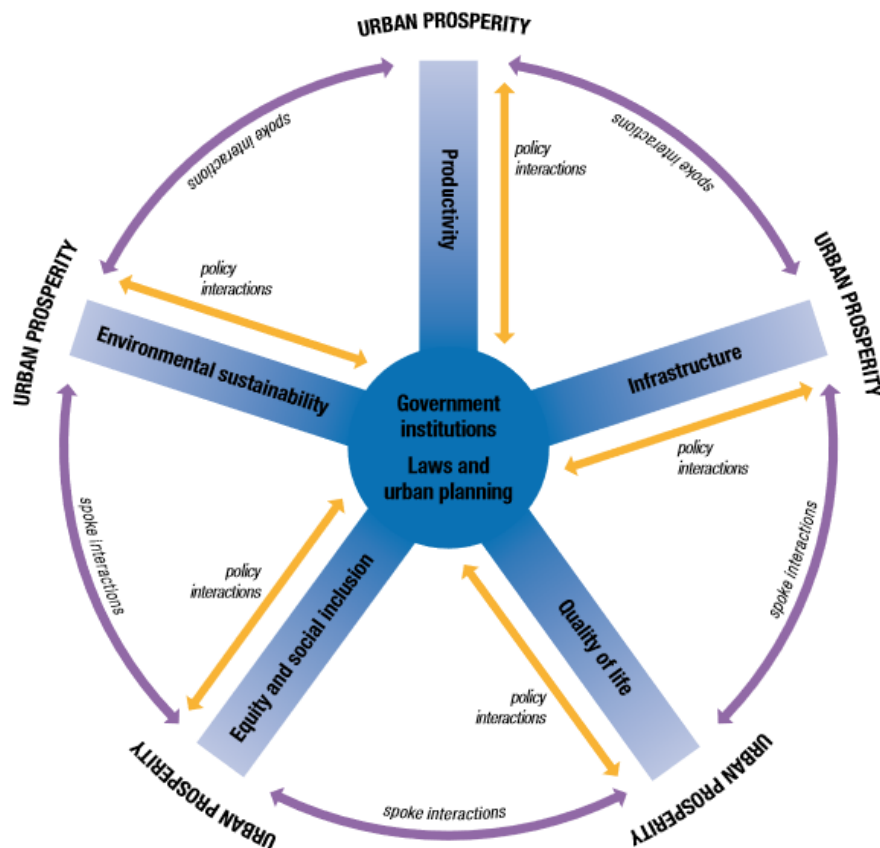
Figure 11:   Schematic View of Components and their Relationships in UN-HABIT's City Prosperity Index (UN-HABITAT, 2013:15)

The CPI has been applied to at least 70 cities in developed and developing regions and this has allowed for the classification of cities into five bands ranging from 0 to 1 as: very solid prosperity factors, solid prosperity factors, moderate prosperity factors, weak prosperity factors and very weak prosperity factors.

2.9.3.4   *Critique of the UN-HABITAT Indices (CDI, UGI and CPI)*

The measures developed by UN-HABITAT in the three indices it developed have continued to evolve over time, reflecting the experiences gained from their work in a

range of global cities and the context of evolving needs and challenges these cities face.

UN-HABITAT's work is also exemplary considering the high level of attention it gives

to the cities of the developing world. The evolution of the three indicators also reflects

the influence of international political decision-making processes and the allocation of

responsibilities across the United Nations Agencies. The evolution of the CDI to the UGI

was influenced by the Millennium Development Goals (MDGs). Consequently, while

improvements could be seen in the UGI over the CDI, as evidenced by the incorporation

of elements which now strongly addressed the relational/social capital dimensions of the

city, as part of the focus on governance and social inclusion of city actors in decision-

making processes we also observe the removal of education from the indicator. This shift

likely reflects efforts within the UN System conducted under the OneUN Programme to

more clearly define the responsibilities of individual Agencies with a view to curtailing

inter-Agency competition and mandate creep (UN, 2006).

Within the international development agenda the aspect of good governance has

also taken on a more important role at the local, national and international levels. Under

the CDI it appears somewhat puzzling that aspect such as wastewater treatment and solid

waste disposal were considered separately from other infrastructure aspects such as

water, electricity and telephone. The dominant role of waste water and sewage in the CDI

can be perhaps attributed to the responsibilities assigned to UN-HABITAT for the

implementation of MDG Goal 7[22] and related shifts in the UGIs. However, despite the

key role played by roads and transportation networks in facilitating access to and within

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[22] The UN Millennium Declaration and its Goals http://ww2.unhabitat.org/mdg/

the city - and its influential role on social, cultural and economic aspects of city life and inclusion (Biao et al., 2013; Hine & Mitchell, 2003; Lucas, 2004; Sietchiping et al., 2012) - this aspect was not included in the CDI.

With its explicit references to intangibles and a broader coverage of the main dimensions of IC, the CPI shows a shift to a more balanced approach. However, it is unclear what weightings are used for the indicators. The application of the model to some 70 cities around the world and its classification of cities into 5 bands, given the need to rely on secondary data and to impute or extrapolate where data did not exist, raises questions about comparability. While referenced in the academic literature (Carrillo et al., 2014) it is not clear on what methodological or theoretical basis these indices have been derived. Nevertheless, during its development the indices have benefitted from extensive expert consultations and subsequent field testing in cities. The model is also regarded and use as a basis for policy development by many governments.

2.9.4 The Knowledge-based Urban Development Assessment Model (KBUD/AM)

Yigitcanlar's (2014) KBUD/AM Model which is presented in Figure 12, seeks to meet the need for a holistic conceptual model that can support an improved analysis and understanding of the role of knowledge in cities. The model provides a generalizable approach to knowledge-based development of cities that is based on cited theoretical and empirical work addressing the interaction of economic, societal, spatial and institutional aspects of the city. This foundation includes the areas of economics (Lever, 2002; Romer 1990), the creation of a social environment that is attractive to knowledge workers

(Asheim, 2007; Florida, 2002) and purposeful transformation of the urban regions and spaces (Fernandez-Maldonado & Romein, 2010; Knight, 1995; 2008; Kunzmann, 2008; Perry, 2008; Wezemael, 2012).

Yigitcanlar (2014) views knowledge-based development as a planning strategy that is applied within a given spatial context with a view to supporting development that is balanced and integrated, for fostering research, generating a collective vision or goal and undertaking relevant coordinated actions to achieve them. The KBUD/AM Model is therefore envisaged as a tool to conceptualize and support these processes.
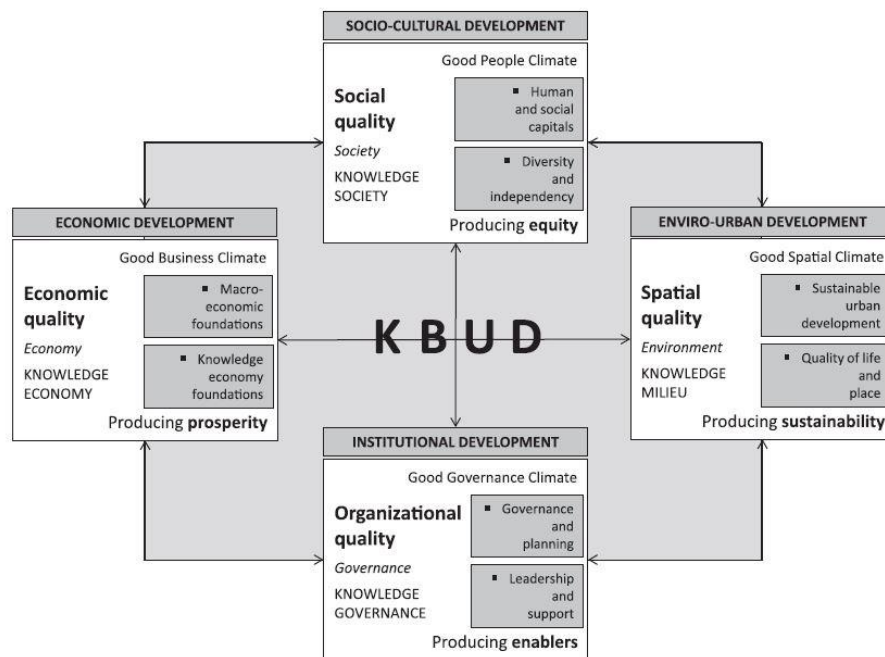
Figure 12:   Conceptual Framework for Knowledge-Based Urban Development (Yigitcanlar & Lönnqvist, 2013: 359).

The model indicates the interactions and underlying influences that affect these four formative shapers of the city's evolution. The economic aspect focuses on

leveraging local knowledge as a key resource for attracting investments, generating jobs and developing strong macroeconomic and knowledge economy foundations. The socio-cultural aspect addresses the development of human and social capital with a view to fostering qualities such as equity, diversity and social cohesion. The environ-urban development aspect serves to ensure balance between the constructed and natural environment, thereby ensuring ecologically sensitive development and the preservation of the regions unique natural landscapes. The institutional development perspective seeks to balance the competing interests of stakeholders with a view to better orchestrating the various actors towards developing shared visions for the city's future and achieving those visions by democratizing and humanizing knowledge.

The model defines eight indicator sets with two indicator sets allocated to each of the four development areas. It employs quantitative and qualitative methods to take into account the unique assets of individual cities so as to gain additional insights to support strategic planning. For example, within the socio-cultural dimension the two indicator sets are human and social capitals as well as diversity and independency in the city. Within each indicator set, four indicators are defined and specific measures of these indicators may be selected on the basis of measurability, analytical soundness, comparability, geographic coverage, data availability and relevance. This allows city-specific variances to be taken into account while ensuring compliance with the underlying model logic. Through the use of normalization and weightings, comparisons across cities can be made using the KUD/AM.

The conceptual framework for the KBUD/AM was developed from the literature as well as through extensive consultations with international experts in related fields. The model has been applied in a variety of city contexts, mainly in the developed world, on this basis, case studies, benchmarking and comparisons exercises to inform city policies have been undertaken.

In the field tests conducted, Delphi panels have been used to identify and evaluate suitable quantitative indicators for assessing the various elements in the model as well as to rank these indicators by importance and to allocate importance weightings to them. According to Yigitcanlar (2014) some 50 international experts were invited to be involved in this process, with 30 agreeing and 24 participating in all three rounds. In field applications where data is unavailable, subjective ratings (high, medium, low) have been utilized. It is important to note that in this case the intention was to develop a set of indicators which could be broadly applied across a range of cities to support benchmarking and other exploratory research. Notably, the model has been applied to two cities in advanced/emerging developing countries, namely, Istanbul, Turkey and Cyberjaya, Malaysia.

2.9.4.1 *Critique of Yigitcanlar's KBUD/AM*

Although based on literatures from several academic disciplines, Yigitcanlar's KBUD/AM provides a relatively transparent, intuitive and accessible approach to knowledge-based development and is thus likely to succeed in gaining the confidence of policy-makers. The model has demonstrated its relevance as an important tool to help provide insights into the unique conditions that can lead to successful development

outcomes in cities. The flexibility that the model provides in allowing individual cities to select relevant indicators allows for a high degree of customization to the city's context. The ability to conduct the Delphi panels and to validate the customized indicators could, however, prove a challenge for small cities and those in developing regions, where resources may be limited.

2.9.5 Sharma et al.'s Analytical Knowledge Society Framework

The Analytical Knowledge Society Framework (Sharma et al.'s, 2008, 2009), depicted in Figure 13, is a conceptual model that adopts an intellectual capital perspective based on Edvinsson's (2003) work on the intellectual capital of nations as well as the research of Nahapiet and Ghoshal (1998) that examine the influence of social capital on organizational advantage. Other formative perspectives that significantly influence the model include UNESCO's Knowledge Societies Concept (UNESCO, 2005), the writings and speeches of UNESCO's Director General Koichiro Matsura (2007) as well as those of the noted 2001 Nobel Prize winner in economics, Joseph Stiglitz (1999), on knowledge as a public good and inequality. The model therefore takes a decidedly social perspective and seeks to understand what factors beyond ICT and technologies contribute to the development of knowledge cities.

From the viewpoint of Sharma et al. (2008:151), knowledge societies are endowed with a set of specific qualities. These consist of high absorptive capacities for knowledge and information, the presence of established governance structures and systems, as well as a cultural ethos that prioritizes the easy dissemination and sharing of knowledge. The preceding features in turn provide a base that enables the society to

participate in complex knowledge gathering, transformation, dissemination and utilization processes. Furthermore, according to Sharma (2008, 2009), knowledge societies are characterized by a focus on advancing sustainability, supporting innovation and community learning. These attributes consequently result in an economy where knowledge-based activities provide the most important sources of economic growth.

The model identifies four principal intellectual capital components or pillars, namely, governance and infrastructure dimensions which together create the society's structural capital, human capital which constitutes the cognitive abilities of citizens and the society's culture which is the source of relational capital. The pillars are defined below.

Infrastructure - The presence of efficient and reliable systems - water, electricity, healthcare, communication, transport – which are essential building blocks to support the flows of knowledge, people, goods and services.

Governance – This is the effective macro-management of societal knowledge resources. Adequate processes and policies as well as built infrastructure to facilitate management processes and to involve other stakeholders are key.

Human capital or talent - Education and the ability to manage information and knowledge enriches a society's human capital and enhances the capacity for creativity, innovation and knowledge-based tasks.

Culture – This provides a unique source of competitive advantage which is, unlike the others, neither replicable nor transferable. Culture entails the attitudes, expectations and assumptions of the society. Where learning is valued and exploration

and experimentation are encouraged, knowledge creation and related processes are enhanced.

Through an examination of the literature 12 components are identified namely, geographic proximity, net knowledge inflows, ICT accessibility, rule of law favorable to international norms, IP regime, political vision and strategy, business environment that rewards innovation, higher education, R&D, human rights and freedom, shared Ba (physical and virtual) and knowledge sub-networks. The components are thought by Sharma et al., to interact and contribute to multiple pillars, consequently the contribution they bring are equally assigned across them.
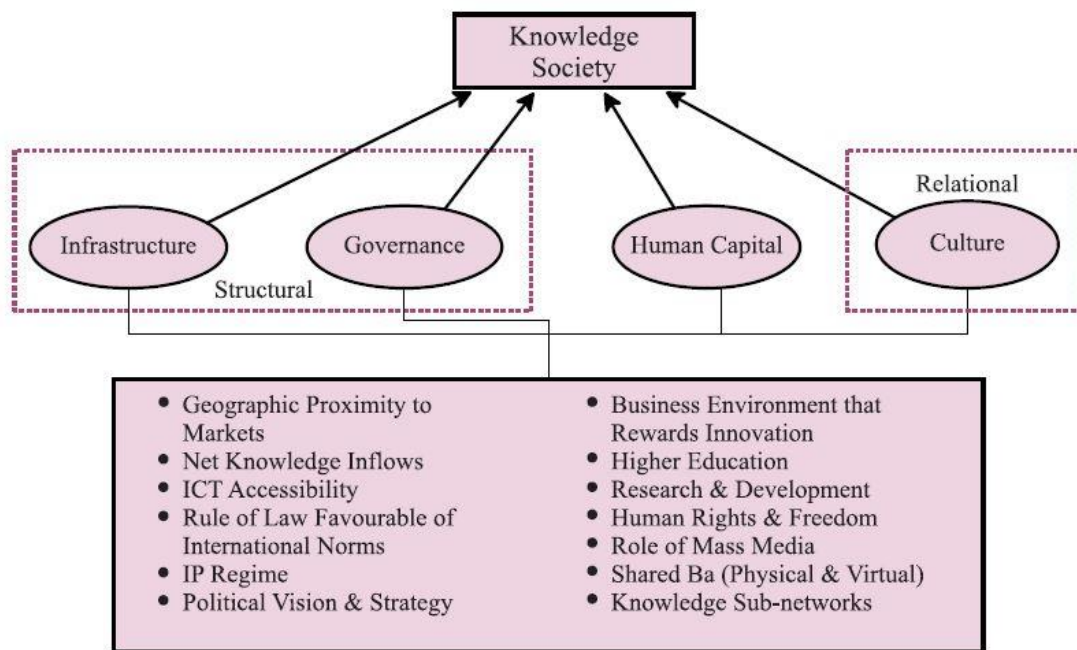
Figure 13:   Sharma et al.'s Analytical Knowledge Society Framework (Sharma et al., 2008: 154)

An e-mail based Delphi panel composed of 10 "thought leaders" was used to validate the conceptual model; this included commenting on the model, its definitions, pillars and components as well as assessing the model's adequacy for policy makers. During this process a 13th component, "the role of mass media", was identified and incorporated by consensus.

Sharma et al. (2009), examined secondary national level data, collected mainly by international development agencies such as the World Bank and United Nations, in order to select proxy indicators for the model. On this basis, proxy indicators were selected and mapped to the 13 capital components, largely using the judgement of the researchers. In some cases, a single proxy indicator was thought to be suitable for covering several of the components, while in other cases multiple proxy indicators were mapped to a single component. This is consistent with the perspective of interaction between components of Nahapiet and Ghoshal (1998) and Chou (2005) as well as the earlier premise of non-exclusiveness claimed by the researchers (Sharma et. al, 2008, 2009).

On this basis, using secondary data and the identified proxy indicators 20 countries were assessed using the model. Their findings yielded similar rankings of the countries to the rankings resulting from the use of measures such as the Human Development Index and similar international measures.

To assess the relevance of the model for policy-makers, the model was used to explore the countries of Nigeria, Singapore, the United Arab Emirates and the United States of America using the K-SWOT methodology developed by Zack (1999). This involves qualitatively assessing the internal (strengths +ve, weaknesses -ve) and external

(+ve opportunities and threats -ve) factors facing the country along each of the model dimensions on a scale of 0 to 10. The net strength and net opportunity values are then calculated by summing the strengths and weaknesses and opportunities and threats. The focus group participants were selected based on their familiarity with the countries concerned and through the use of storytelling, case studies and newspaper clippings the relative rankings are reached by consensus. The relative areas of strengths and weaknesses, the discussions which allow for the sharing of various national experiences are then used to support the identification of relevant policy interventions that may be applied to the given country.

2.9.5.1 Critique of Sharma et al.'s Analytical Knowledge Society Framework.

Although little detail and precision is provided regarding the approaches used in key aspects of the methodology such as in the development of the model and the selection of proxy indicators, the model and the process involved in its application are quite accessible to the lay reader. The authors draw confidence in the model due to the similarity in rankings it produces when compared to other international models; however, as the data used in evaluating countries are likely also based on the same sources of secondary data, this perhaps limits the conclusions that can be made on the usefulness of the model in producing new insights. The process of validation using Delphi panels as well as the interactive approaches used in developing policy recommendations, provide excellent opportunities for bringing local knowledge and qualitative dimensions of the problem into focus that are not necessarily captured in secondary data. In this

researcher's view, this confidence of the policy-maker in the model is more relevant. The specific attention given to developing countries and the findings of applicability are a further positive factor for the model. The transparency and accessibility of the model are critical as they suggest that policy-makers will have confidence in its recommendations, making it likely to be used.

While this model was developed for national analysis, the factors incorporated are relevant to the city. In addition, the general approach to model development and application – with attention to rigor in the selection of Delphi participants and proxy indicators – makes this approach suitable and amenable to use in the researcher's current study.

2.9.6   Käpylä et al.'s National Intellectual Capital Performance Approach

Käpylä et al. (2012), propose a national intellectual capital conceptual approach which seeks to go beyond what they view as the unidimensional focus on economic growth portrayed by other intellectual capital models such as those of other researchers (Bontis, 2004; Hervas-Olivier & Damlmau-Porter 2007; Lin & Edvinsson, 2011; Malhotra, 2003; Stam & Andriessen, 2009, Stahle & Bounfour, 2009 and Weziak, 2007). The National Intellectual Capital Performance approach seeks to counter what they view as a trend to models and measures that emphasize the ranking of nations through the use of a limited set of intellectual capital measures, which Käpylä et al. (2012), contends overlooks the fact that societies even within the same country vary significantly. Käpylä et al. (2012), emphasize that each society exists in a specific context, with its own assumptions, judgments and assumptions which in turn influence what is deemed

valuable. They convincingly argue that models must therefore align with rather than ignore the goals, visions and needs of national strategies. Furthermore, they propose that in societies that adopt democratic principles, the concept of what is valuable shifts over time and is clarified and updated through debates and the political process, so these changes and sources of influence need to be captured and reflected in the modeling process. Käpylä et al. (2012) emphasize that choice implies values which are essentially subjective, consequently intellectual capital models should help to surface and communicate these choices and assumptions rather than being viewed as objective and decidedly positivist. Therefore, national development strategies should be at the basis of any national intellectual measurement model which must decidedly be multidimensional and account for social, environmental and other objectives besides economic ones.

With a view to identifying the components of national intellectual capital and capturing the sources of values that influence the goal setting process, four sets of actors, are identified, namely, the public sector, private sector, civil society organizations and a so-called fourth sector comprising family, relatives and friends. These are depicted in Figure 14. Käpylä et al. argue that these four components produce emergent effects and are in turn influenced by the effects of other societies with whom they interact both nationally and internationally. This perspective makes this approach amenable to supporting analysis at the city as well as the national level.

Against this backdrop, Käpylä et al. contend that it is only by taking account of the national strategy - that is to say the set of values, objectives and assumptions - and outcomes, - in other words national performance against economic, social and

environmental measures - can a determination be made of whether the national

intellectual capital is effective in supporting knowledge-based development.

Consequently the interaction of inputs - national intellectual capital investments;

processes - national intellectual capital and strategy and outcomes and national

performance must be reflected.

Four overarching categories of capital are distinguished by Käpylä et al., namely,

natural capital which consists of the traditional physical resources, produced capital

which results from the transformation and creation of goods and services, and national

intellectual capital that is the human-related knowledge or national knowledge-base that

is central to the creation of value. National intellectual capital has four components which

are defined as:
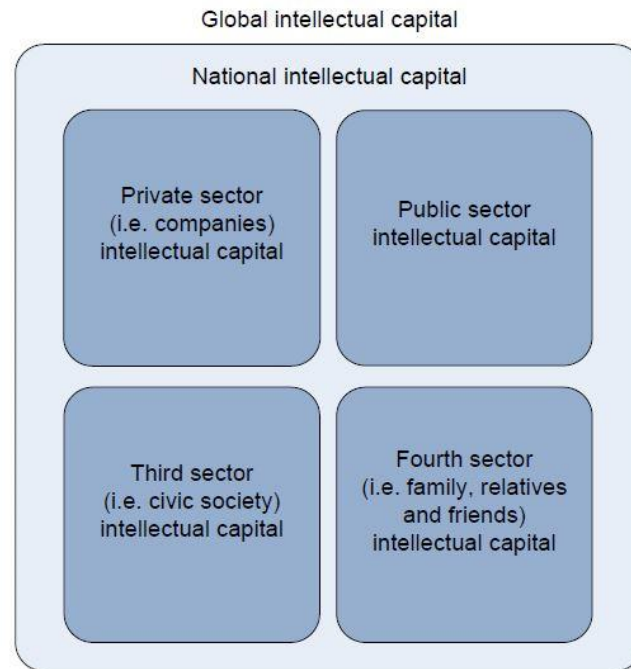
Figure 14:   Component Relationships within Global and National Intellectual Capital
(Käpylä et al.; 2012:349)

Human capital – This considers the human capabilities that enable solutions to be found but which also take into account the intent, outcomes and rightness of actions.

Social capital – Relates to aspects such as cohesiveness and strength of societal ties.

Relational capital – Focuses on the ability to contribute and appropriate value from its international networks and relations; and

Structural capital – This consists of the national processes and technological infrastructure.

The elements found in the four components are not deemed as exhaustive by Käpylä et al., but rather serve as an initial point of departure for policy discussion and

direction as well as a means for identifying indicators which can support assessment, monitoring and benchmarking against national goals.
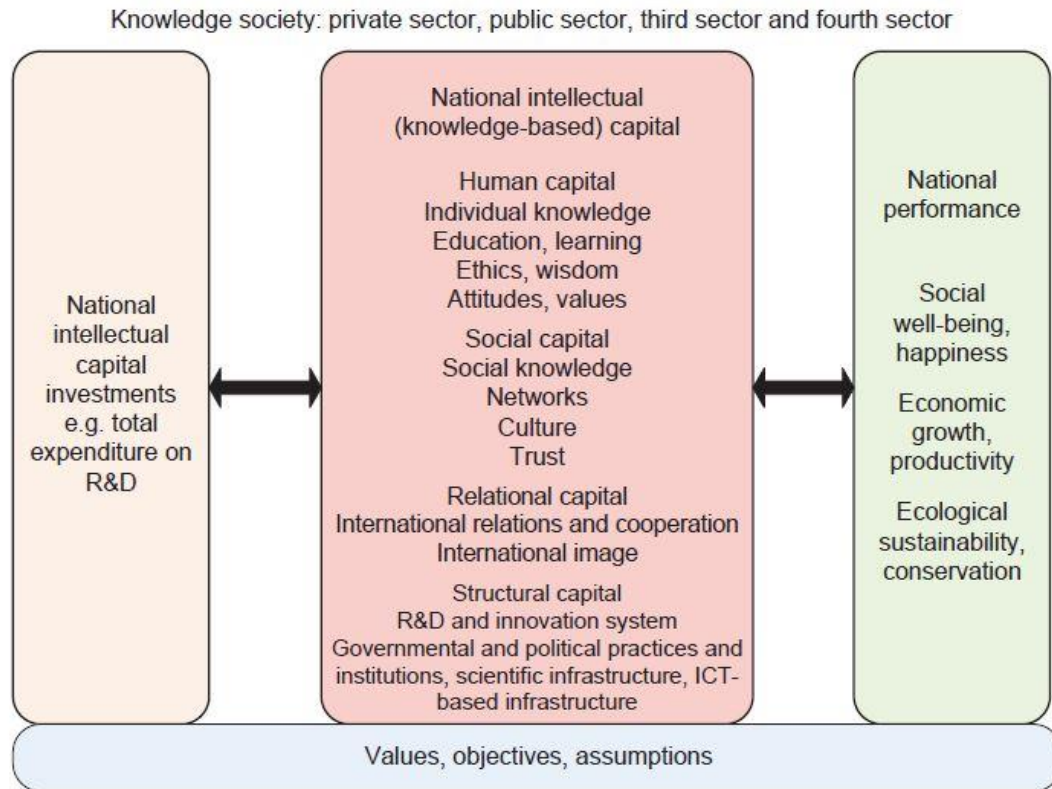
Figure 15:   National Intellectual Capital and its Link to Development Outcomes (Käpylä et al.; 2012:350)

Adopting an approach that interweaves the conceptual model, availability of secondary data, relevance to the Finnish context, literature and the subjective judgment of the authors (Käpylä et al.; 2012:352), a set of quantitative indicators were used to develop a longitudinal assessment of the national intellectual capital performance of Finland over the period 2000 – 2007. By comparing trends in values and between variables considered,

their inter-relations and underlying assumptions, for example, between investments and performance, can be explored.

2.9.6.1   *Critique of Käpylä et al.'s National Intellectual Capital Performance approach*

The model provides a useful and accessible approach that enables policy-makers to understand the role of intangible assets in supporting the attainment of national strategic goals. This is important given the still low level of awareness and understanding of intellectual capital and intangibles outside academic circles (Salonius & Lönnqvist, 2012). The model also highlights the potential contribution of various sectors to the national strategy by giving attention to human, social, relational and structural capital they possess. The emphasis the model gives to addressing national strategic needs and improvements rather than international benchmarking is also useful in developing support for better national governance in directing scarce resources.

The premise behind the adoption of a flexible approach to selecting indicators is a valid one, but is fraught with problems from both a conceptual and implementation perspective. While the intent is good, guidance on the selection of appropriate indicators is necessary to assure rigor and validity. This shortcoming is also evident in the national study conducted by the author. For example, no information is provided on the rationale behind the indicators omitted or included. Novel components such as the ethics and wisdom dimensions of the human capital elements, though discussed as important features are largely ignored in their analysis. Also, despite decrying the emphasis on

economic aspects in most intellectual capital models, measures such as R&D

expenditure, patents and exports, nevertheless appear to dominate the indicators collected

for the 2002-2007 study. Incorporating and enhancing the collection of qualitative aspects

would be useful. Nevertheless, despite these limitations, the approach's fundamentally

sound theoretical basis, input-process-output makes it a promising and readily available

candidate for modelling knowledge-based development processes in the city.

2.9.7 Marti's Cities Intellectual Capital Benchmarking System (CICBS)

Marti's (2005) approach consists of a methodology and framework that seeks to

enable cities to identify and manage their intangible assets in order to support progress

towards realizing the vision for their city's future. Marti indicates that the development of

the model was spurred by a lack of awareness on his part of existing models for

measuring and managing the intellectual capital of cities.

Marti's model is based principally on the Intellectual Capital Navigator developed

by Edvinsson and Malone (1997) at Skandia, but also draws on the work of Bontis

(2002), who adapted Edvinsson & Malone's model in his study of national intellectual

capital in selected Arab States. Bontis' adaptation involves enlarging the scope of

intellectual capital from the aspects considered at the organizational level in an attempt to

more adequately capture intellectual capital at the national level. This modification is

rather limited, entailing the modification of one type of capital. So, in Marti's model

rather than focusing on the combined customer and market capital at the organizational

level as in Edvinsson and Malone (1997) initial work, Bontis (2002) instead focused on

macro level national markets. Marti assumes that the national adaptations made by Bontis

are relevant to the city. Figure 16 indicates the intellectual capital components within the model. In line with their focus on realizing a future vision, the model embodies an assessment of the current intellectual capital resources (past and present) as well as the intellectual capital investments (renewal and development) that are needed to achieve the desired future.
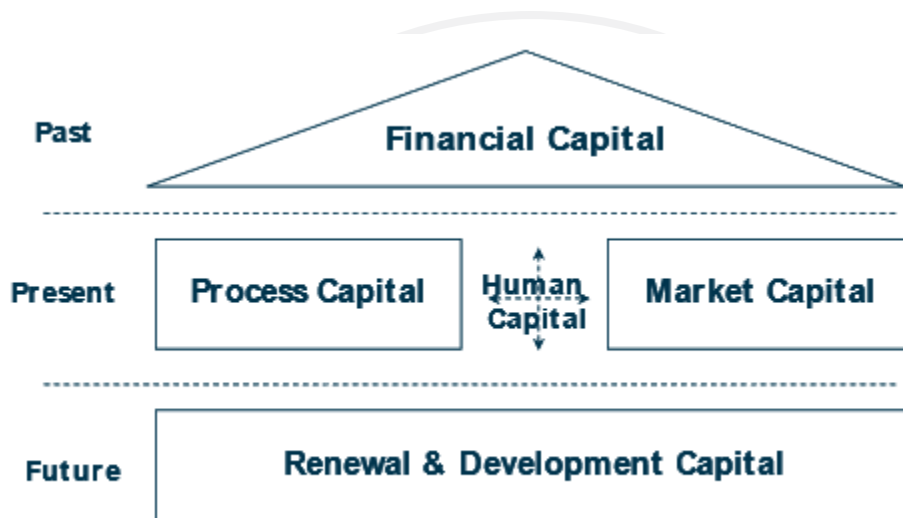
Figure 16:   Intellectual Capital Categories and their Temporal Focus in Marti's Model
               (Marti, 2005)

Marti has applied his model to Mataro, a city in Spain which is the capital of the Marese region and has a population of just over 100,000 inhabitants. Mataro is located about 30 km to the North of the city of Barcelona in Spain's autonomous region of Catalonia. For the purpose of benchmarking, Mataro was compared with the city of Treviso in Northern Italy. Treviso has a population of around 80,000 persons and is the capital of the Treviso commune. The model is applied in a two stage process which

consists of a Cities' General Intellectual Capital Model and a Cities' Specific Intellectual Capital Model.

2.9.7.1   Cities' General Intellectual Capital Model (CGICM)

The CGICM involves five stages as indicated in Figure 17. Firstly, the city vision document is examined. Where no such document exists, interviews are held with key stakeholders including young people, to understand how the city is currently perceived and to generate what represents the range of desirable futures for the city.

On the basis of the identified vision, key programmes, policies and other initiatives to achieve the vision are identified in the second stage (See Figure 18). The third stage concentrates on identifying the capabilities and competencies required to successfully undertake the activities identified in stage two. Stage four involves the identification of indicators for the core competencies of stage three and the core activities to be developed, this would enable the establishment of a baseline and ongoing progress to be assessed. The indicators selected can be used to support benchmarking against other reference cities in areas that the city may consider relevant. The final stage, stage five, involves the allocation of the indicators selected to the various categories of intellectual capital.

2.9.7.2   Cities' Specific Intellectual Capital Model (CSICM)

The CSICM adopts a conceptually similar approach to the CGICM, with attention directed to the specific key industry sectors within the city. These industry sectors are

referred to as micro-clusters and efforts are undertaken with a view to improving their competitiveness and performance.
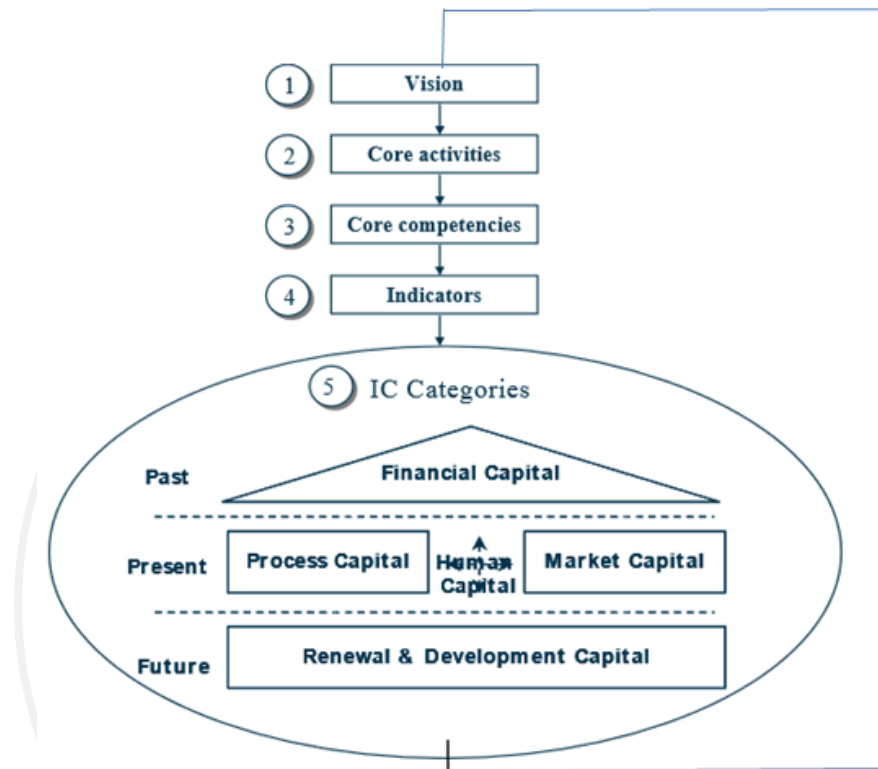
Figure 17:   Cities' General Intellectual Capital Model (Marti, 2005)

The analysis commences by seeking to gain an understanding of the needs of the customers served by the various micro-clusters; and identifying the financial and non-financial goals of businesses within each micro-cluster; analyzing the content, characteristics, knowledge intensity and other attributes of the goods and services produced. For each micro-cluster an understanding is developed of the core competencies required by that industry to provide sustainable competitive advantages; similarly, attention is given to identifying the relevant personnel competencies that support the core

competencies; and finally attention is given to the intangible infrastructure. On the basis

of the analysis, relevant indicators are identified and baselines developed. These

indicators can support benchmarking within the micro-cluster, with micro-clusters in

other cities as well as support ongoing longitudinal assessments.

2.9.7.3 *Critique of Marti's approach*

The breadth of capitals incorporated in the model allow for a range of intangible

aspects of a society's well-being, such as people's life satisfaction and social inclusion to

be assessed. However, while the potential exists, the methodology adopted and what

Marti chooses explicitly to measure indicate that the model draws on a paradigm that

privileges the economic and production dimensions rather than the humanistic, societal

and environmental attributes.

For example, while it would seem both useful and strategic, particularly where no

consolidated vision document exists, to bring together stakeholder to collectively arrive at

a shared city vision, Marti's approach does not explicitly highlight this as an important

step. This is a significant oversight as various authors (Borja & Castells, 1997; Camillus,

2008; Carrillo, 2006; Ergazakis et al. 2006; Rittel & Weber, 1973; Yigitcanlar, 2009)

point to the crucial role of a shared vision in the effective leveraging of societal

knowledge, strategic goal setting and solving collectively-owned societal problems. The

methodology for investigating industry micro-clusters could be readily applied to aspects

such as the environment; again, here the privileging of economic pursuits seems

paramount with the result that knowledge takes on a largely instrumental role in enhancing economic value.
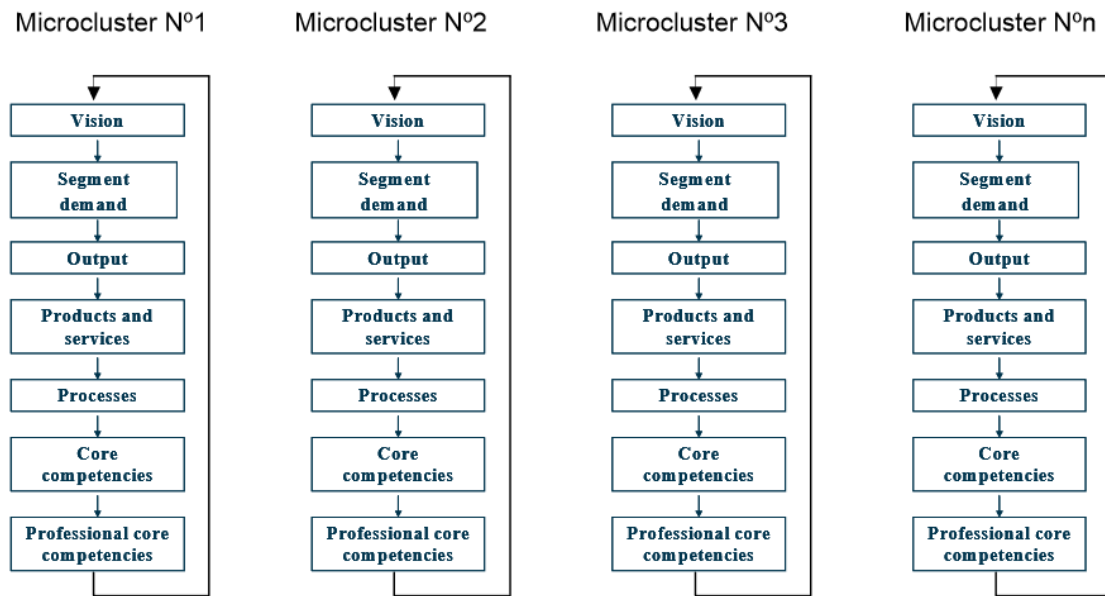
Figure 18:   Key Stages in Analyzing the Main Industry Segment or Micro-clusters in the City (Marti, 2005)

Marti does not provide guidance on how indicators should be selected; however, this oversight or inherent flexibility could inadvertently be useful in forcing cities to focus on those aspects, which are most relevant to their specific needs. Various authors (Bresnahan & Gambardella, 2004; Yigitcanlar et al., 2012; Yigitcanlar & Lönnqvist, 2013) indicate that seeking to imitate rather than to innovate and adapt has been a cause of failure in the attempts of some cities who sought to develop their knowledge-based development strategies largely on the basis of what others had done. Against this backdrop, Marti's non-prescription of indicators has clear merit.

2.9.8 Knowledge City Index (KCI) and the Model for Estimating the Intellectual Capital of Cities (MEICC)

The model for estimating the intellectual capital of cities (MEICC) and the Knowledge City Index (KCI) developed by Navarro et al. (2012) and Lopez-Ruiz et al. (2014), respectively, are outputs of an ongoing collaboration by a research team at the University of Castilla–La Mancha in Spain.

2.9.8.1 Overview of the MEICC

The MEICC adapts an earlier model by Nevado & Lopez (2006) for assessing and managing intellectual capital in businesses to the needs of cities. The updated model assesses human, structural and process capitals but also introduces novel ones such as commercial, communication, environmental as well as research and development capitals. These capitals are defined as Human, Process, Commercial, Communication, R&D&I and Environmental. These are explicated below.

Human capital is concerned with both the individual and social collective. At the individual level, aspects such as decent work, integration of immigrants and crime are considered. At the collective level the focus shifts to the viability of civil society and presence of an environment conducive to civic participation and engagement.

Process capital considers a broad set of measures including accountability and engagement of elected city officials, market access and telecommunications support for government, business and personal activities that facilitate effective resource management and participation.

Commercial capital considers the quality of goods and services and, the intensity of business activity in national and international trade, as well as the innovativeness of business offerings.

Communication capital relates to the perceptions of the city amongst national and international actors as evidenced by the city's portrayal in the media and the existence of formal partnership agreements.

R&D&I capital is concerned with the city's ability to leverage research and development as well as innovation to attract investments to the city. Use of ICT in firms and measures of investment in training by firms and individuals are emphasized.

Environmental capital takes account of the commitments to meeting environmental and social responsibilities at the governmental and corporate level.

For each capital, a set of indicators are elaborated to facilitate its assessment. These indicators take two forms: a) an absolute indicator which measures actual expenditures made by the city for the particular capital and b) an efficiency indicator which assesses the impact of this expenditure. To illustrate this approach, if we consider the area of human capital then education represents a relevant indicator. Total expenditure on education would provide an absolute measure while outcomes such as the literacy levels and percentage of the population with higher degrees could serve as efficiency measures. By aggregating the product of these absolute measures and their corresponding measures for a given capital, their total financial cost could be attained. By summing across all capitals, a total financial value of the financial costs can be calculated

on the basis of the Equation 1 below. Table 3 provides the full set of components for the Human Capital component.

$$C = \sum_{c=1}^{m} AI_c \cdot \sum_{i=1}^{k} w_{ci} EI_{ci}$$

Formula for evaluating City Capital (based on Navarro et al., 2012; Nevado & Lopez, 2006)

C = Total Capital

c = Capital component

AI_c = Expenditure made on the cth Absolute Indicator

m = number of absolute indicators

i = efficiency indicator corresponding to Absolute Indicator C

k = number of efficiency indicators

W_{ci} = weighting factor applied to the ith efficiency factor of capital component

EI_{ci} = Efficiency Indicator for the ith component of capital c

The full MEICC model identifies 7 component areas having 16 absolute indicators that represent public expenditure streams under each of the capital components and some 64 corresponding efficiency indicators. This approach therefore supports an input output analysis that enables rationale decision-making processes. The model incorporates a number of non-economic social indicators.

Table 3:   Selected Capital Components Indicators - MEICC Model (Navarro et al.

2013: 462)

TABLE 1 – MEICC Overall Scheme		
Intangibles	Indicators	
	Absolute (AI)	Efficiency (EI)
HUMAN CAPITAL		
Individual		
Wellbeing Education Capacity Skill Development	Social costs (equality, health, housing, etc.) Total salary cost of qualified employees Spending on education Spending on training	Work-related fatalities Literacy Employment figures Inequalities in income Inequalities in income because of gender Life expectancy Immigration/emigration balance Level of education among immigrants Fatalities from transport accidents Crime rates Percentage with higher qualifications Absenteeism rates Percentage of employees receiving training Unemployment rate

2.9.8.2   Overview of the KCI

The Knowledge City Index (KCI) presented in Figure 19 builds on the earlier

work undertaken in the development of the MEICC and retains the perspective that

Intellectual capital is comprised of structural and human capital. Under the component of

structural capital, the commercial capital dimension has been recast as Image capital, but

otherwise the model logic and relations between the intellectual capital components

remain essentially the same as depicted for the MEICC.

Apart from the foregoing shared conceptual roots, the development of the KCI

diverges considerably from the process adopted in the MEICC. This divergence is due

primarily to the purpose; in this case the KCI seeks to assess the city's potential for future

growth on the basis of the intellectual capital that it possesses. Substantial changes have been made to the indicator set used in order to reflect this future orientation.
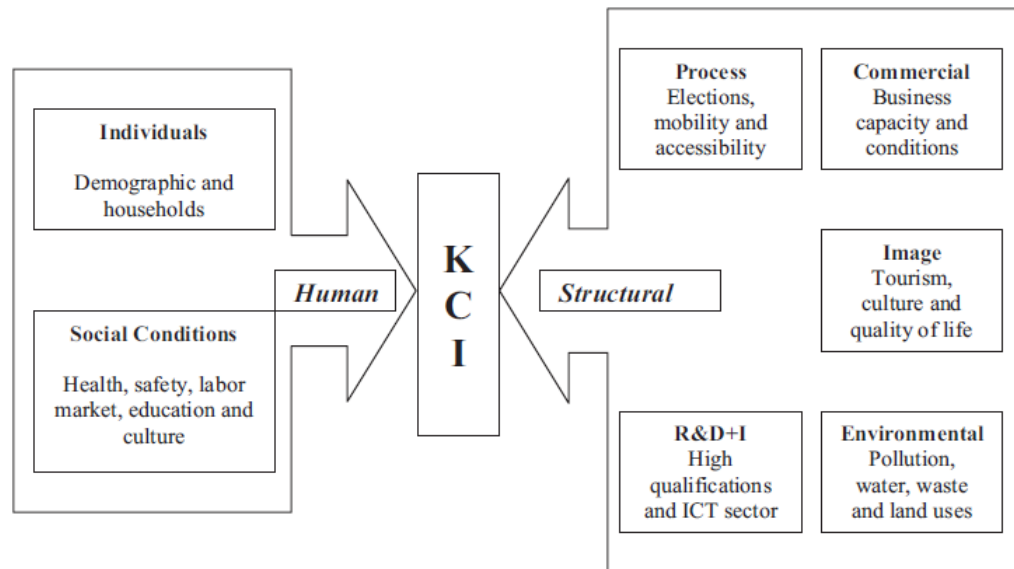
Figure 19:   Conceptual Framework for the Knowledge Cities Index (Lopez-Ruiz et al., 2014: 5561)

Consequently, the division of indicators between absolute and efficiency adopted in the MEICC is replaced. Across the 7 components of human and structural capital 19 domains of interest with a total of 90 indicators have been adopted. The indicators used in the KCI are selected from those used and reviewed by Veugelers (2001), Carrillo and Batra (2012), Grant and Chuang (2012), Lin and Edvinsson (2012), Scheel and Rivera (2013), and Yigitcanlar and Lönnqvist (2013). In addition to the academic literature other indicators developed from commercial sources such as the Economists Intelligence Unit are also incorporated. A panel of experts was subsequently used to confirm the suitability of the selection and to allocate the indicators to each of the capitals and their components.

As the indicators used to assess the various capital components are heterogeneous in nature, such as percentages, per capita values and having different directionalities, various transformations are required to normalize them.

While the MEICC used a simple summation of components following the application of the derived weightings and efficiency measures to the expenditures, it was not clear how these measures were derived. The KCI, however, develops weighting for each indicator by undertaking a principle component analysis, which Lopez-Ruiz et al. argue presents a more objective approach. The components of each capital are then combined by taking into account the variance within their respective indicators. The geometric means of the resulting capitals is then calculated; this output represents the knowledge capital index. The KCI was applied to 158 European cities for which data from EUROSTAT could be obtained and a regression model with GDP yielded an R^2 value of 0.69. Further work to investigate the contribution of components is planned.

2.9.8.3 *Critique of the KCI and MEICC*

The MEICC approach encompasses a broad range of social and environmental measures such as political participation, allocation of public space for civic activities and participation in volunteer activity. However, the emphasis on adopting a decidedly positivist economic based approach in converting these to monetary values is likely to further hide a range of externalities and emergent properties. Furthermore, the focus on a single or subset of values may also reduce the debate and exploration of the deeper, crucial underlying causes. The model is also dependent on and assumes access to and the

availability of almost 80 pieces of quantitative data, which makes it unwieldly in cities such as those of the developing world where statistical capabilities are limited. Furthermore, unless modifying factors such as measures of purchasing parity and per capita values are considered, the ability of the MEICC to serve as a basis for meaningful comparison appears limited. Measures of efficiency, while potentially more useful, could also have limited utility and could differ widely due to a range of factors such as demographic conditions, policy choices and city-specific advantages. The MEICC does not, however, indicate how the efficiency measures can be calculated or deduced. While the conceptual basis for the MEICC is well-based in the theory of intellectual capital, little information is provided about the process for the selection of indicators and how they are believed to interact.

The KCI demonstrated an impressive R^2 score of 0.69 in its explanatory power with relation to GDP, and its conceptual basis built around human and structural capital is both intuitive and linked to accepted theoretical work in intellectual capital. However, the process used in the development of the KCI is highly convoluted, drawing on highly involved statistical manipulations that are rather opaque to lay users and are thus not likely to generate understanding nor confidence amongst policy-makers.

Cities generally have higher levels of skilled persons, knowledge intensive and creative activities, denser networks of professionals, universities and better infrastructure, as well as greater political clout than non-urban areas. Cities also exhibit higher per capita incomes than non-urban areas and when compared to the proportion of the national population they host, cities make a disproportionately large contribution to the national

GDP (NESDB, 2013; UNDATA, 2014). Consequently, a high correlation between any of the underlying city measure used in the model, or the imputed KCE with the national GDP, is not surprising.

The large number of indicators used in the model also raises questions about uniformity of collection methods across the various data sets. The high data requirements are likely to limit the use of this index to countries within the Europe Union.

2.9.9   UNESCO's Knowledge Societies Conceptual Framework

What are knowledge societies? According to UNESCO:

Knowledge societies are about capabilities to identify, produce, process, transform, disseminate and use information to build and apply knowledge for human development. They require an empowering social vision that encompasses plurality, inclusion, solidarity and participation. (UNESCO, 2014:27)

Knowledge Societies "are societies in which people have the capabilities not just to acquire information but also to transform it into knowledge and understanding, which empowers them to enhance their livelihoods and contribute to the social and economic development of their communities".(UNESCO, 2014:19)

UNESCO posits that knowledge societies develop based on local cultures, experiences and capabilities; consequently there is no single universal model. Furthermore, knowledge societies are undergirded by four themes: freedom of expression, quality education for all, cultural and linguistic diversity, and universal access to information and knowledge.

UNESCO's Knowledge Societies conceptual framework emerged out of reflection by the Organization on its past work and activities, and a global research project that sought to inform UNESCO's contribution to the first and second phases of the World Summit on the Information Society (WSIS). This research and reflection process involved UNESCO staff as well as numerous external stakeholders around the world from governments, international organizations, academicians and think tanks, civil society and private sector communities. The final output of this study was the *UNESCO World Report: Towards Knowledge Society*, published in 2005.

The development of the conceptual framework was led by Dr. Abdul Waheed Khan, Assistant Director-General for Communication & Information; Mr. Hans D'Orville, Assistant Director-General in the Bureau of Strategic Planning; and Dr. Axel Plathe, Executive Officer in the Communication & Information Sector[23]. The framework was subsequently validated through research conducted in the preparation of the UNESCO World Report (2005), consultations and various expert seminars convened by UNESCO notably in 2006 and again in 2010.

2.9.9.1 *Overview of UNESCO's Knowledge Societies conceptual framework*

The UNESCO Knowledge Societies Conceptual Framework, presented in Figure 20, is a human-centered "house" model composed of three levels referred to by UNESCO as Foundations, Key Principles and Building Blocks. Specific constructs are allocated to

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[23] Personal communications with all three respondents.

each level. While not excluding the potential for contributions from other constructs, UNESCO views the components in its model as necessary and sufficient for realizing knowledge societies that are inclusive, equitable and based on principles of human rights (Personal communication Dr Khan, 2014; Personal communication Mr D'Orville, 2014; Personal communications Dr Plathe, 2014). The model therefore adopts a normative perspective. UNESCO advocates the plural form "Knowledge Societies", from its perspective that each society is unique and should therefore focus on understanding how best to leverage its specific resources to address its unique challenges. Consequently, there should be numerous visions, priorities and approaches to achieving human development and world peace that are consistent with this framework.
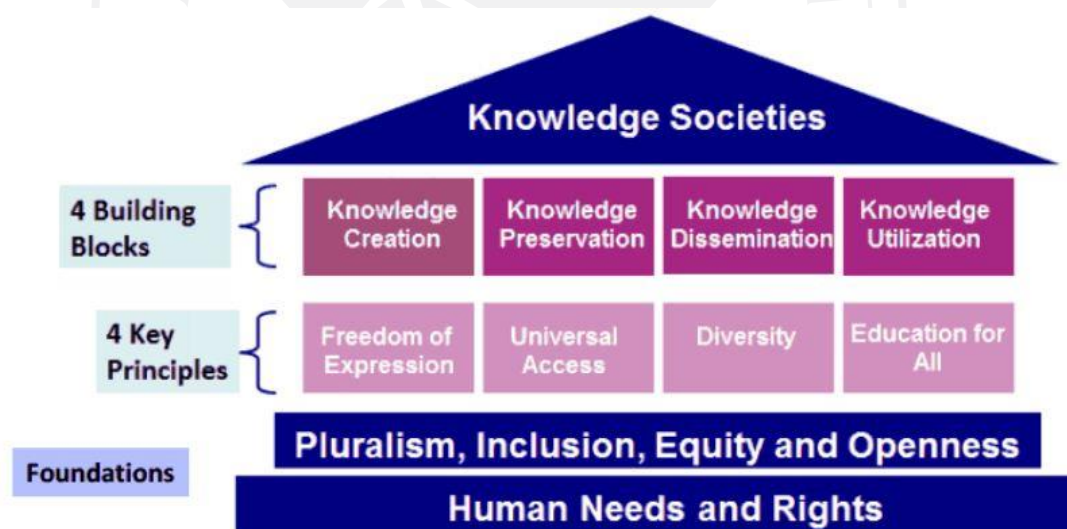
Figure 20:   UNESCO's Knowledge Societies Conceptual Framework (Souter, 2010; UNESCO, 2005)

UNESCO continues to promote the knowledge societies conceptual framework amongst policy-makers, but has not developed tools or indicators to support its use

Table 4:   The Foundations constructs in UNESCO's Knowledge Societies Conceptual

          Framework

Name of Construct	Definition	References in the Literature
Human Needs & Rights	These refer to the set of basic needs for survival and the guarantees of human dignity afforded under the international human rights law	De Beco, 2008; OHCHR, 2012; UN, 1948; UN, 2012
Pluralism	An energetic engagement with diversity and expressed through processes such as the active seeking and building of understanding across lines of difference, involving both criticism of another viewpoint & active self-criticism and reflection on one's own viewpoints.	Eck, 2006; Global Centre for Pluralism, 2012; UNESCO, 2000
Inclusion	The ability of an individual to fully exercise and claim the social, cultural, political and other rights afforded to them under the international and national laws.	De Beco, 2008; OHCHR, 2012; UNESCO, 2005
Equity	The belief that people's basic needs should be met consistently and adequately, that burdens and rewards should not be spread too unevenly across communities, and that policy should be applied impartially, fairly and justly to achieve these goals.	Beder, 2000; Clark, 2012; Dulal et al., 2009; Falk et al., 1993, UNESCO, 2005
Openness	A hybrid concept embodying three distinct aspects: transparency and participation in decisions that impact one's well-being; curiosity and willingness to venture outside one's frame of reference; and the use of open standards, collaboration and the sharing of knowledge assets	Downes, 2007; Educational Technology & Media Massive Open Online Course 2013; European commission, 2001; Gisselquist, 2012; Judge et al., 2013, Matthews et al., 2004; McCrae et al. 1992; UNESCO, 2005

amongst its membership[24]; nor has it developed an operational definition for the societies its work addresses even though this is one of the recommendations in its World Report (UNESCO, 2005, p. 194).

The Foundations are viewed by UNESCO as providing the societal norms, ethical values and principles that shape the setting of societal goals and which provide guidance for determining how decisions are made and how priorities are set and for assessing what means are acceptable for achieving desired ends. The foundations consist of human needs and rights, pluralism, inclusion, equity and openness. Definitions of the concepts from the literature are provided in Table 4 below.

The Principles - freedom of expression, universal access, diversity (linguistic and cultural) and quality education for all - serve to provide the skills, competencies, attitudes and other attributes needed to enable individuals to participate in their society and to support the processes required to discuss, define and operationalize the strategy for achieving the society's vision. Freedom of expression is seen as critical to the free exchange of ideas and the stimulation of creativity (United Nations, 1948); universal access the ability to participate in information and knowledge flows across networks: cultural and linguistic diversity refer to inter-cultural competencies that support team work and the ability to live in increasingly heterogeneous societies. Education plays a central role in developing human capital and developing abilities such as learning to learn

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[24] As of May 2014, UNESCO had 195 Members and 9 Associate Members. Sovereign states are admitted as Members while non-self-governing territories are admitted as Associate Members.

and coping with change which are crucial for living in knowledge societies. Table 5

provides definitions of these constructs.

Table 5:   "Key Principles" Construct in UNESCO's Knowledge Societies

Conceptual Framework

Construct	Definition	References in the Literature
Freedom of Expression	The right of every individual to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.	Peters, 2010; United Nations 1948; UNESCO, 2005, 2010;
Universal Access	Equitable and affordable access by all citizens to information infrastructure (notably to the Internet) and to information and knowledge essential to collective and individual human development.	UNESCO 2003
Cultural Diversity	Culture takes diverse forms across time and space. This diversity is embodied in the uniqueness and plurality of the identities of the groups and societies making up humankind. As a source of exchange, innovation and creativity, cultural diversity is as necessary for humankind as biodiversity is for nature. It is the common heritage of humanity and should be recognized and affirmed for the benefit of present and future generations.	UNESCO 2001, 2005
Education for All	The provision of quality basic education for all children, youth and adults to provide the foundation and skills to effectively navigate social changes and to equip citizens with the skill needed for learning to learn and to fully participate in their societies.	United Nations 1948, UNESCO 1990

The four UNESCO building blocks of knowledge creation, knowledge

preservation, knowledge dissemination and knowledge utilization reflect processes

readily observed in many KM process cycles at the organizational level. For example, the

Wiig KM Cycle (1993), Meyer and Zack KM Cycle (1996), McElroy Cycle (1999) and the Bukowitz and William KM Cycle (2000) (Dalkir, 2011). UNESCO seeks to apply these processes at the societal level through programmes consistent with the foundation and key principles but adapted to the specific local context. By developing or redesigning knowledge processes in line with the society's values and vision, concerted, collective and coherent action by institutional and citizen actors in their various roles can be facilitated. Definitions for these constructs are provided in Table 6.

2.9.9.2 Critique of UNESCO's Knowledge Societies conceptual framework

In contrast to other frameworks examined in this section, UNESCO limits itself to the human dimensions and adopts a decidedly human rights-based perspective. UNESCO posits that by focusing on an ethical framework that prioritizes human needs and rights, builds inclusion, participation and is contextually aware and relevant, economic, social and environmental development will appear as emergent outcomes.

While the theoretical contributions and relevance of constructs such as education, knowledge utilization, dissemination, preservation and universal access to knowledge management themes such as innovation, creativity and the knowledge economy would be readily understood by knowledge management researchers and practitioners, many of the other constructs and language of human rights-based frameworks are largely foreign concepts to the disciplines of knowledge management and intellectual capital.

Table 6:   Building Blocks in UNESCO's Knowledge Societies Conceptual

Framework

Name of Variable	Definition	References in the Literature
Knowledge Creation	A dynamic social process between individuals involving multi-directional, interactive and spiraling knowledge transformations that includes the engagement of these individuals in recognizing and resolving cognitive contradictions and conflicts.	Nonaka and Takeuchi 1995, Cook & Brown, 1999; Engeström, 2001; Dalkir 2011
Knowledge Preservation	The process of producing knowledge or intellectual artifacts that allow knowledge to be communicated independently of the holder	Dalkir, 2011
Knowledge Dissemination	Sharing knowledge occurs when people are genuinely interested in helping one another develop new capacities for action; it is about creating learning processes.	Dalkir, 2011
Knowledge Utilization	knowledge application or internalization occurs when individuals understand content and concepts, are convinced that these approaches are valid and consequently apply this knowledge to real life situations	Nonaka and Takeuchi, 1995; Cook & Brown, 1999; Engeström, 2001 Dalkir 2011

However, there is growing support in the literature on creativity, innovation and
economics which suggests that a range of positive economic and social benefits may
accrue as a result of factors in the UNESCO model. Johnstone (2002) and Skutnabb-
Kangas (2002) point to research which correlates linguistic and cultural diversity with
enhanced creativity. In the knowledge economy and society where the development of
ideas into goods, services and processes are key sources of economic advantage,

linguistically and culturally diverse countries may be more likely to do well in economic terms. Research in international firms by Lønsmann (2014) and Marschan-Piekkarie et al. (2009), identify multilingualism as an important factor in the building of social capital and accessing critical information through formal and informal channels. In the field of economics, Stiglitz (2012) has found greater social resilience and economic prosperity in societies which are equitable and inclusive.

In a similar vein, Sen (1999) has also emphasized factors that contribute to social inclusion as key determinants of individual, family and societal well-being across a range of economic and qualitative measures. Similar findings have also emerged from work by the economist Jeffrey Sachs who in the World Happiness Report (Helliwell et al., 2012) has identified an end to extreme poverty, environmental sustainability, social inclusion and good governance as the keys to sustainable global development.

From a conceptual perspective and also taking into account the validation exercises undertaken by UNESCO, the model appears plausible. Acceptance by a wide range of credible stakeholders and academics of UNESCO's conceptual work on Knowledge Societies (Sharma et al., 2008, 2009; Mansell, 2010; 2012; Pohle, 2012; Souter, 2010; UNESCO, 2005), including the WSIS+10 Review held in 2013 which adopted an Outcome Statement that advocated for UNESCO's vision of building knowledge societies, is significant. In the earlier models presented, conceptual constructs were instantiated empirically so that links between inputs and corresponding output indicators, indices or states that relate to a specific goal or improvement could be made.

However, in its current format the UNESCO Knowledge Societies Conceptual

Framework is not amenable to such a role.

Consequently, indicators for the constructs contained in the framework need to be

developed as well as the target indicators or measures of knowledge societies. Earlier

models reviewed have demonstrated theoretical or conceptual links to theories in the

knowledge-based development or intellectual capital paradigms. Accordingly, it would

seem important to explain such linkages, which, given the endorsement by noted

academics in various disciplinary field of UNESCO's work, does not seem far-fetched.

It is also not evident how or what defines the boundaries of knowledge societies

and who or how qualifications and entitlement to membership, rights and responsibilities

for participation in it arise. Given the role played by information and communication

technologies, knowledge societies could presumably be virtual. It is important to note that

UNESCO's political role and its requirement to respect and uphold the sovereignty and

territorial integrity of Member States could potentially limit the ways in which the

Organization could define knowledge societies. The current fractious debates around

governance of the Internet are thus indicative of potential challenges and complexities

around this concept and point to the need for future work by UNESCO in this area

(UNESCO, 2015).

On the basis of the foregoing, making UNESCO's Conceptual Knowledge

Societies Framework operational as the basis for a knowledge-based development model

would require, at a minimum:

i.   Establishing or demonstrating plausible conceptual links between UNESCO's conceptual framework and knowledge-based development or intellectual capital paradigms;

ii. Empirically demarcating or situating the knowledge societies that UNESCO seeks to assess so that they may be observed or measured;

iii. Identifying indicators from the literature for the constructs contained in the framework as well as the target indicators or measures of societal challenges to be addressed in knowledge societies;

iv. Developing a conceptual model which links input, outputs or processes to desired strategic goals; and

v.   Validating this model.

2.9.9.3   Summary of knowledge-based development models

This review of exemplary approaches to knowledge-based development reveals the important role being played by intellectual capital as a modelling tool. The lack of a defining model, coupled with the need to address the specific national, regional, city or village context points to the importance of flexibility in the identifying and enumerating of relevant intangible assets and indicators. The use of the literature in concert with the Delphi technique appears to be a best practice for the validation of models and indicators.

Models tend to have an input-output focus with comparability and rankings appearing to be one of the driving goals. The focus on comparability however appears likely to lead to a sub-optimal performance - as demonstrated in the models reviewed - as this is likely to preclude the ability to identify region-specific niche areas of competitive

advantage. Furthermore, the emphasis on comparisons tends to drive an emphasis on quantitative measures. Consequently, the access to and availability of existing large-scale quantitative data across nations, regions or cities plays an important role in determining what enters into the models. A notable exception to this are the MAKCI and KBUD/AM which, in addition to the quantitative research, also undertake in-depth analysis of specific regions which allow, even at a large scale, competitive niches to be identified. For regions such as developing countries where statistical capacities are more modest, questions of data availability and quality could pose significant constraints, thereby pointing to the importance of perhaps placing greater emphasis on qualitative measures. Qualitative approaches could therefore offer great potential to take into account a range of context-specific attitudinal, perceptional, social and environmental aspects. The insights emerging from this review will inform the operationalization of UNESCO's Knowledge Societies Conceptual Framework.

2.10 The Delphi Method

The Delphi method was one of the outcomes of a defense research study named "Project Delphi" conducted in the 1950's by the Rand Corporation at the request of the United States Air Force (Linstone & Turoff, 2002; Okoli & Pawlowski, 2004; Skulmoski et al., 2007; Wakefield & Watson, 2014). The study sought to address challenges that centered on developing reliable consensus amongst groups of experts that could inform the development of strategic counter-measures to military actions the Soviet Union could potentially undertake against industrial targets in the United States of America.

Since its development, the use of the Delphi method has expanded, finding

applications in areas such as forecasting and foresight studies (Linstone & Turoff, 2002;

Okoli & Pawlowski, 2004); business (Linstone & Turoff, 2002; Skulmoski et al., 2007),

education (Donohoe et al., 2012; Linstone & Turoff, 2002; Skulmoski et al., 2007),

environment (Donohoe, 2011) health care (Donohoe et al., 2012; Linstone & Turoff,

2002; Powell,2003; Skulmoski et al., 2007), information systems development (Linstone

& Turoff, 2002; Okoli & Pawlowski, 2004), engineering (Linstone & Turoff, 2002;

Skulmoski et al., 2007), transportation (Linstone & Turoff, 2002; Skulmoski et al., 2007),

and knowledge-based development (Garcia, 2008; Sharma et al., 2008; Yigitcanlar, 2014)

as well as in the development of taxonomies, theories, concepts and frameworks (Okoli

& Pawlowski, 2004; Sharma et al., 2008; Skulmoski et al., 2007; Wakefield & Watson,

2014; Yigitcanlar, 2014). In the foregoing applications, the Delphi method has been used

to address problem situations that are uncertain, speculative and complex as well as to

develop theory and support model building.

The Delphi technique has been characterized as a method for structuring a

communication process amongst a group of individuals so that a complex problem can be

dealt with (Day & Bobeva, 2005; Linstone and Turoff, 2002; Wakefield & Watson,

2014). This involves tapping into the knowledge of individuals having relevant expertise,

and then iteratively combining these perspectives so as to obtain a more complete

understanding and shared opinion for resolving the particular problem situation (Powell,

2003; Skulmoski et al. 2007; Wakefield & Watson, 2014). Typically, this involves,

soliciting the experts' opinions on a given problem situation, assessing the level of

consensus amongst the experts based on established criteria, and updating the problem situation (scope, assumptions, definitions, feasibility, causal relations, etc.) to take into account the insights provided by the experts. A revised problem situation that integrates these views is then reported to the experts along with measures of the levels of consensus and new contributions. Experts are then invited to again provide their opinions on this revised problem situation taking into account the new information that has emerged from the inputs of other experts. This process may continue until the target consensus criterion is met or a set number of rounds of consultation have been completed.

Various authors (Linstone & Turoff, 2002; Powell, 2003; Skulmoski et al., 2007; Wakefield & Watson, 2014) point to the difficulty of succinctly defining the Delphi given the range of variations of the method that exist, but identify four characteristics common to this structured communication processes. These are 'the provision of anonymity to the inputs provided by participants, the provision of feedback on these inputs, the development of statistical assessments of the group's viewpoints and variations within it, and an iterative process with opportunities for participants to update their views. The development of variations on the method has been influenced by factors such as changes in technology, adaptation of the method to the context, various disciplinary fields and the goals of the studies in which it has been applied (Donohoe et al., 2012; Linstone and Turoff, 2002; Wakefield & Watson, 2014).

Although a useful method, that has proven relevant to practitioners as well as academics, careful design of the Delphi is crucial to ensuring the scientific value of its

Table 7:   Some Advantages of the Delphi Method (Day & Bobeva, 2004; Donahoe,

2011; Donohoe et al., 2012; Linstone & Turoff, 2002; Okoli & Pawlowski,

2004; Wakefield & Watson, 2014)

Criteria	Description
Legitimacy	An established research technique with a well-documented history suitable for addressing complex social problems.
Appropriateness	Well suited to complex problems where the contributions of experts would contribute to advancing understanding and knowledge about the problem.
Model building and testing	The Delphi model supports the validation and testing of models, constructs causal relations and support theory building through insights from subject experts.
Enhanced insight	Studies indicate that for questions requiring expert judgment the average of individual responses is inferior to the average of group decisions.
Proximity	The ability to conduct the survey remotely can significantly reduce travel and other costs and constraints that a face to face event would impose.
Reflexive nature	The method requires participants to provide their views points and also consider and explore the diverging views of other participants and to think through the consolidated synthesis. This shared reflection is thought to enhance the quality and objectivity of the process and its outcomes.
Flexibility	The adaptability of the method enables comprehensive and novel ways of developing understanding about the research problem.
Repetition	The iterative process provides the means to develop a shared understanding and knowledge that can support a more informed assessment of the problem situation.
Anonymity	Can serve to reduce the influence of individual and group dynamics on the outcome.
Richness of data	Due to the multiple rounds of interactions with participants, Delphi studies can produce very rich and insightful data. Participants are usually also more open to follow-up interviews.

findings. This is particularly important as numerous variations of the method have emerged

since its development and application under a variety of epistemological frameworks.

Examples of the use of the Delphi technique in both quantitative and qualitative research abound in the literature (Day & Bobeva, 2004; Donohoe, 2011; Donohoe et al., 2012; Linstone & Turoff, 2002; Okoli & Pawlowski, 2004; Wakefield & Watson, 2014). Drawing on their extensive literature review of the use of Delphi Method by researchers, Day & Bobeva (2004) have sought to provide greater confidence in the method as a tool for both positivist and interpretivist research. Their work led to the development of a taxonomy of design choices and identified key stages in the Delphi process, as well as critical decisions which impact the method's effectiveness.

2.10.1 Taxonomy of Design Choices

The taxonomy developed by Day & Bobeva (2004) identifies seven design considerations, namely, the purpose of the study, participants, anonymity considerations, number of rounds, concurrency of rounds, mode of operation and the communication media used to conduct the study. An overview of this taxonomy and the parameters for each of its criteria follows.

2.10.1.1   Purpose of the Study

The Delphi can be used to support theory building, to explore new areas, to test hypotheses and causal relationships, and to support the evaluation of possible options (Day & Bobeva, 2004; Linstone and Turoff, 2002; Powell, 2003; Skulmoski et al., 2007; Wakefield & Watson, 2014). By developing a shared understanding, the Delphi can contribute to creating common definitions and a shared language of communication (Okoli & Pawlowski, 2004).

2.10.1.2   Participants

A variety of criteria, depending on the objective of the study, can be used to determine the degree to which participants are considered homogenous or heterogeneous. Factors such as nationality, region of origin, institutional affiliation (Rosemann & de Bruin, 2005; Day & Bobeva, 2004), qualification, seniority and experience (Day & Bobeva, 2004) are often used to assess the degree of heterogeneity.

2.10.1.3   Anonymity

While the individual inputs of experts provided are known only to the researcher, the degree of anonymity with respect to fellow-panelists can vary considerably. The value of anonymity is contested (Linstone & Turoff, 2002). While it can ensure more democratic participation and reduce the influence of dominant personalities, there are examples where democratic modeling processes using Delphi have been shown to produce sub-optimal results. Also, in some settings, full anonymity may be a disadvantage as the source of the possible inputs may be useful in establishing their credibility. The MAKCI Framework uses a Delphi methodology that encourages social networking amongst the participants selected for its Delphi panels to develop exchanges of views across disciplinary and geographic communities and to contribute to the creation of a network of trans-disciplinary knowledge city practitioners (Yigitcanlar et al., 2014).

2.10.1.4   Number of Rounds

There is a wide variation in the number of rounds reported in the literature, varying from as few as two rounds to as many as ten rounds; however, two or three

rounds appear to be typical (Day & Bobeva, 2004; Wakefield & Watson, 2014). Linstone and Turoff (2002:311) suggests that beyond the third round there tends to be a fall-off in the quality of the outputs while Donohoe et al. (2012), report that four rounds are optimal.

2.10.1.5   Concurrency of Rounds

Concurrency relates to the ability to adapt (urgency, time frame, synchronity, number of persons to be polled, geographical coverage etc.) the Delphi process to participants and the problem situation to be investigated. Early Delphi surveys were conducted by mail, thereby imposing a variety of constraints such as the speed at which inputs could be provided, analyzed and communicated to participants. The availability of other modes of communication such as e-mails, on-line forums and conferencing services coupled with analysis support enable the sequencing of Delphi to be adapted to real-time, semi-asynchronous and asynchronous modes.

2.10.1.6   Modes of Operation

The Delphi may be conducted in a fully face-to-face mode, remotely or using a combination of these two.

2.10.1.7   Communication Media

The technology can be conducted using a variety of media including paper and pens, telephone, fax and e-mail as well as the Internet.

2.10.2 Key Stages in the Delphi Method

Day & Bobeva (2004) characterize the Delphi method as comprising of three consecutive phases which they denote as exploration, distillation and utilization. Wakefield & Watson (2014) identify six stages while Linstone and Turoff (2002) identify four stages; in both cases these are accounted for in the three stages described by Day and Bobeva and outlined below.

2.10.2.1   Exploration

The exploration phase is focused on the planning and design of the study. This aspect entails identifying the problem situation (i.e. research questions) to be investigated, designing the data collection and analysis instrument, establishing criteria for selecting participants, constituting the panel of participants, developing the set of issues – which may be exploratory or confirmatory in nature – that are to be addressed during the first round of the panel.

The quality and validity of the Delphi depends on the expertise of its panelists and their engagement rather than statistical size and power to produce significant findings; consequently the selection criteria for experts is a critical choice (Donohoe, 2011; Okoli & Pawlowski, 2004). Nevertheless, there is considerable variation in the sizes of Delphi panels reported in the literature, ranging from as few as 4 experts to as many as 171 experts as reported by Skulmoski et al. (2007) while Day and Bobeva (2005) cite a Japanese Delphi study with more than 1000 panelists. More typical panel sizes are in the

range of 10 – 18 experts (Day & Bobeva 2005; Okoli & Pawlowski, 2004), with a minimum number of 7 experts in the final panel round (Day and Bobeva 2005).

Skulmoski et al. (2007) recommend that selected participants should at a minimum possess: a) knowledge and experience with the problem situation being studied; b) capacity and willingness to participate in the study; c) sufficient time to participate; and d) effective communication skills. Okoli and Pawlowski's (2004) knowledge resource nomination worksheet (KRNW) provides a structured method for identifying relevant categories of expertise and group affiliations required, finding experts with the requisite skills, ranking the experts and inviting them to participate. The use of snowballing – that is to say requesting qualified experts to nominate other experts known to them - is a common feature of the method (Skulmoski et al., 2007; Wakefield & Watson, 2014).

In the case of exploratory work, the problem situation being investigated is not well understood so through open-ended questions participants are invited to generate new ideas which provide the basis for subsequent work. In the case of a confirmatory process, the panel seeks to evaluate or extend current understanding of the problem situation which may for example take the form of a model or conceptual framework. Both forms can support theory generation and testing.

2.10.2.2   *Distillation*

During the distillation phase the problem situation is presented to the participants so that their opinions on the research question can be received. The opinions received are

coded, the problem situation questionnaire updated to take into account the responses received, and other aspects such as response rate and the degree of convergence of opinions assessed. The results are reported to the participants who may then revise their inputs. Again the responses received are coded, response and convergence rates assessed, and necessary updates to the problem situation incorporated and reported to participants. This process continues until the termination criteria are met.

2.10.2.3   Utilization

During the utilization phase a full analysis of the results obtained during the Delphi study and their implications for the research questions investigated are analyzed and assessed. Recommendations, limitations and other findings are accordingly reported and used to inform responses to the problem situation that was investigated.

2.10.3 Critical Factors in the Delphi Method

Day and Bobeva (2004) and Linstone and Turoff (2002) highlight a range of factors which may undermine the quality of research undertaken using the Delphi approach that relate to the design and implementation of the study as well as cognitive factors which affect participants and the researcher.

2.10.4 Design Factors

Given that the success of the method depends on the quality of the selected experts, the establishment of adequate selection criteria is fundamental to ensuring rigor.

The more specialized the research question being investigated the more relevant purposive selection becomes.

A selection of panelists with known biases can serve to provide insights into the broad and potentially divergent range of viewpoints that may affect the problem situation. For complex social issues such "biased" viewpoints are likely to be more useful than objective ones as they provide richer insight into the potential range of issues that could arise. On the other hand, for more technically oriented problems impartial experts may be more relevant.

Delphi panels often experience high drop-out rates, so regular monitoring of feedback by participants and follow-up communication is important. The structuring of the survey instrument to avoid overwhelming participants, providing clear instructions and using aesthetically pleasing layouts that can be readily completed, has been identified as a best practice.

In undertaking the Delphi, the researcher should follow ethical research principles such as ensuring that participants are informed of what is expected, the anticipated time commitments indicated, and the level of anonymity and confidentiality.

2.10.4.1   *Implementation factors*

Linstone and Turoff (2002) report that Delphi studies conducted by mail have taken as long as one year, during which reduction shifts in the participants' interest in the study and circumstances can change. Consequently, reducing the overall duration of the study through the use of electronic communication can enhance participation. The

proactive engagement of the researcher with participants, through the sending of reminders, providing succinct and timely feedback and enabling them to be able to see how their contribution is shaping the process can serve to keep their interest high.

As Delphi studies produce both qualitative and quantitative data, these should both be collected to provide a full and rich picture. In the case of quantitative data, statistical analysis measures appropriate to the type of quantitative date being collected - typically descriptive and parametric – should be used.

2.10.4.2   Cognitive factors

As the Delphi method seeks to explore phenomena which are complex and not well understood, its success can be affected by various cognitive limitations and individual biases. Linstone and Turoff (2002, p. 564) highlight the "strongly counter-intuitive behavior" of complex systems is in stark contrast to what they term as "the simplification urge". Consequently, important aspects of a problem situation may be overlooked.

Linstone and Turoff (2002) also point to differing abilities to use the language of the survey coupled with differing culturally influenced norms, modes of communication and personal values as well as disciplinary orientation that may serve to distort the understanding of problem situations. Such effects may be more pronounced in heterogeneous groups and can be countered by allocating panelists to multiple homogenous groups. Considerations of such factors in the design phase can serve to reduce their impact.

In novel and complex situations, hypotheses, rather than serving as a tool of inquiry, may instead come to be viewed as established scientific facts. This, coupled with observed tendencies of persons to be optimistic about near-term events and pessimistic about longer term ones, can negate the value of consensus arrived at by experts. The ability of the researcher to be critical and reflexive and to avoid dismissing minority and dissenting views to achieve consensus can serve to counter this challenge. The dissenting views can also provide insights into areas that warrant additional exploration.

2.10.4.3   Evaluation

As Delphi studies allow both quantitative and qualitative data to be collected, they provide the opportunity for the researcher to investigate interpretivist aspects such as trustworthiness criteria of confirmability, credibility, transferability and dependability as well as positivist aspects such as objectivity, reliability and validity. Such aspects as ensuring adequate audit trails, providing the theoretical basis for frameworks used in the study, providing ongoing feedback, documenting both divergent and convergent views, and ensuring that researchers serve only as facilitators and not participants can enhance confidence in the results. The comparison of qualitative and quantitative results as well as the results from different panels and rounds can serve to support the triangulation of results.

2.10.5 Conclusion Regarding the Delphi method

With a track record of successful use spanning almost 70 years, the Delphi has demonstrated its robustness and efficacy as a tool for exploration, model building and

testing and foresight across a range of disciplinary fields. The model is well suited to addressing complex issues, so is especially relevant to the current research in the pre-paradigmatic field of knowledge-based development. Critical to the techniques success is the quality of the experts selected to participate in the method. By following exemplary methodological approaches such as those of Linstone and Turoff (2002) and Day and Bobeva (2004), the research quality, that is to say validity and reliability in the outcomes, can be assured.

2.11 Maturity Models

2.11.1 Overview of Maturity Models

Maturity models typically consist a pre-determined, hierarchical set of stages that define and describe a path, from a given stage or level of competence on some attribute to a final desirable stage of "perfection" or maturity of the attribute (Becker et al., 2009; de Bruin, 2005; Maier et al., 2009; Mettler, 2009; Röglinger et al., 2012; Wendler, 2012). These stages in the hierarchy are often based on logic, past experience and theories, for example technology adoption or life cycle models (Mettler, 2009; Röglinger et al., 2012). Identifying the current maturity level that an organization has with regards to a given attribute, or capability, allows the organization to benchmark its current capabilities and to undertake improvements actions (Mettler, 2009; Rosemann and de Bruin, 2005; Wendler, 2012).

According to Wendler (2012), the history of maturity models can be traced back to work by Shewhart in the early 1930's. Pöppelbuβ and Röglinger (2011) point to work

by Maslow in the development of his hierarchy of human needs and work by Kuznet on

economic growth in the 1950's and 1960's as other notable early uses of maturity

models. Crosby (1979) whose publication "Quality is free" presented a quality

management maturity grid, appears to have been a watershed point which marked the

start of the modern period in the use and development of maturity models.

2.11.2 Application of Maturity Models

The software industry appears to be the sector which has gravitated most strongly

to the maturity model approach; consequently, the Capability Maturity Model (CMM)

developed at Carnegie-Mellon's Software Engineering Institute and subsequent

refinements of this model, such as the Capability Maturity Model Integration (CMMI),

are amongst the most widely used and known (Boughzala et al., 2014; Wendler, 2012).

As of 2012, more than 200 maturity models developed and in use by academics have

been identified by Wendler (2012) in at least 22 diverse fields including software

development, engineering, knowledge management, project management, business

process management, medical services, business intelligence, finance and sustainability.

Many of the models in use have been inspired by the CMM or other exemplary models

that have emerged from project management and business process management.

Accordingly, maturity models are an important tool used by organizations to

describe, assess and plan for improvements. Their effectiveness in supporting directed

and systematic processes, reducing errors and enhancing quality, coupled with being

relatively easy to use, account for their growing use today (de Bruin et al., 2005; Maier et

al., 2009; Wendler, 2012).

2.11.3 Mechanics of Maturity Models

Maturity models establish a set of sequential, discrete stepwise improvements towards a given desired end state as measured against one or more criteria. By using these criteria as a frame of reference, it becomes possible to assess one's position and to identify measures that enable improvements to be made against the defined criteria (Wendler, 2012). Maturity models therefore raise awareness, and enable the establishment of mileposts against which progress can be tracked.

2.11.4 Purpose of Use

Maier et al. (2009), Pöppelbuβ and Röglinger (2011) and Röglinger et al., (2012) identify three main modes in which maturity models can be used, namely, descriptive, prescriptive and comparative. In the descriptive mode the maturity model serves as a diagnostic tool enabling the current state of the organization to be assessed with respect to the target criteria or attributes. In a prescriptive mode the maturity model assists the organization in identifying desirable maturity guidelines and specifying improvement measures. Where the goal is to support comparison or benchmarking, whether within the organization or across an industry, access to relevant longitudinal comparable data is necessary. Pöppelbuβ and Röglinger (2011) and Röglinger et al., (2012) propose distinct methodological approaches to developing these three model types to ensure fitness for purpose.

2.11.5   Life-cycle and Potential Performance Perspectives

According to Wendler (2012), there are two main approaches to maturity, the life-cycle approach and the potential performance perspective. Under the life-cycle approach it is assumed that performance on any given attribute is linked to its current position in a process life-cycle. Consequently, improvements are seen as evolving naturally over time. By assessing where one is in the life-cycle, the actual level of performance on the attribute can be compared to what is expected. On the other hand, the potential performance sees higher levels as possible desirable states which may be pursued based on the overall context, resources and other competing priorities. Consequently, the organization has the flexibility to decide if and when to pursue improvements. Whichever approach is adopted the maturity model provides a frame of reference, that can serve to direct systematic improvement actions.

2.11.6   Maturity Stages and Attributes

According to Wendler (2012) and Mettler (2009) the stages in a maturity model should be ordered sequentially and hierarchically. They both underscore the importance of ensuring that descriptions of the stages are clear, significantly different from each other and do not overlap. Furthermore, the stages selected should make sense for the target audience, that is to say, they should correspond well with what may be observed in practice. While there are no recommendations on the number of stages in a maturity model, defining and ensuring clear differences between stages becomes more difficult as

the number of stages increase. In a similar way the number of attributes assessed can vary from one to multiple attributes. Any main attribute may also have sub-levels within it.

Table 8:   Levels (stages) of Maturity for the Mission attribute of a Maturity Model assessing Joint Enterprises (Boughzala & Bououd, 2011)

JOINT ENTERPRISE
Mission
What is the nature of the community' mission?

Level 1   Undefined
The community has not clearly identified mission.

Level 2   Blur
Each member within the community defines its own missions, according to his/her perception of the community objectives

Level 3   Clear
The community defines itself its missions collectively.

Level 4   Precise
The missions are in line with a predefined framework/strategy.

Score (from 1 to 4)

Models with 3 to 5 stages and up to 27 measurable attributes have been reported by Röglinger et al., (2012), while Anja et al. (2012), report models also with 3 to 5 stages and up to 132 measurable attributes. In both of these studies, most of the maturity models reviewed had fewer than 20 measurable attributes. Consequently, with respect to the number of stages there are trade-offs between granularity and distinctiveness, while the number of attributes present trade-offs between granularity and measurement costs. Table 8 provides an illustration of the concepts of maturity levels and attributes from an existing maturity model.

2.11.7   Some Limitations of Maturity Models

There are a number of criticisms and limitations identified in the literature with respect to the use of maturity models. According to Mettler (2009), even though maturity models are useful in identifying shortfalls, they do not always succeed in identifying

appropriate responses. In cases where they do suggest corrective actions, these changes may not be implemented. Also, because of their emphasis on systematizing and formalizing processes, Mettler further warns that they can instil a false sense of certainty and stifle initiative and innovation. Consequently, Mettler suggests that the people aspects should be considered in the development and application of any maturity model.

Other limitations around the validity (de Bruin & Rosemann 2005; Mier et al., 2012; Wendler, 2012), rigor (de Bruin & Rosemann 2005; Mier et al., 2012; Röglinger et al., 2012, Wendler, 2012) and theoretical basis (de Bruin & Rosemann, 2005; Mettler, 2009; Röglinger et al., 2012) have been raised in the literature. Mettler takes a pragmatic view with respect to theoretical grounds arguing that in domains where theory is well established this should be clearly incorporated but in novel areas with limited academic work these models should be viewed as exploratory and labelled as such by the developers.

2.11.8   Addressing Limitations of Maturity Models Through Rigorous Design

Some exemplary structural approaches to the design and development of maturity models include Stages of Maturity (de Bruin et al., 2005), Design Science Research Framework (Hevner et al., 2004); Design Principles for Maturity Models (Röglinger et al., 2012; Pöppelbuβ & Röglinger 2011) and Decision Parameter Model (Mettler, 2009). Particularly for models that have been developed conceptually from the literature, Wendler (2012) underscores the importance of field testing. Wendler also notes that while qualitative approaches to validation are most widely used for maturity models,

multiple methods and, in particular, a mixed method (qualitative and quantitative) could provide additional insights and quality assurance in the development of maturity models. These structured approaches to maturity model development along with accompanying tables and figures are presented below.

2.11.8.1 De Bruin & Rosemann (2005) stages of maturity approach.

With respect to ensuring rigor and validity, de Bruin & Rosemann (2005), suggests the use of structured design processes that clearly elaborate the scope and purpose (descriptive, prescriptive, comparative) of the model, identify provisions for the testing of the model in terms of validity, reliability and generalizability and ensure a well-documented design and development audit trail. Figure 21 depicts this approach.

Table 9:   Design   Principles   for   Descriptive   &   Prescriptive   Maturity   Models

(Pöppelbuβ & Röglinger, 2011)

Group	Design Principles
(1) BASIC	**1.1 Basic information** a) Application domain and prerequisites for applicability b) Purpose of use c) Target group d) Class of entities under investigation e) Differentiation from related maturity models f) Design process and extent of empirical validation
	1.2 Definition of central constructs related to maturity and maturation a) Maturity and dimensions of maturity b) Maturity levels and maturation paths c) Available levels of granularity of maturation d) Underpinning theoretical foundations with respect to evolution and change
	1.3 Definition of central constructs related to the application domain
	1.4 Target group-oriented documentation
(2) DESCRIPTIVE	**2.1 Intersubjectively verifiable criteria for each maturity level and level of granularity**
	2.2 Target group-oriented assessment methodology a) Procedure model b) Advice on the assessment of criteria c) Advice on the adaptation and configuration of criteria d) Expert knowledge from previous application
(3) PRESCRIPTIVE	**3.1 Improvement measures for each maturity level and level of granularity**
	3.2 Decision calculus for selecting improvement measures a) Explication of relevant objectives b) Explication of relevant factors of influence c) Distinction between an external reporting and an internal improvement perspective
	3.3 Target group-oriented decision methodology a) Procedure model b) Advice on the assessment of variables c) Advice on the concretization and adaption of the improvement measures d) Advice on the adaptation and configuration of the decision calculus e) Expert knowledge from previous application

Figure 21:   Stages in Maturity Model Development (de Bruin et al., 2005)

2.11.8.2   *Pöppelbuß & Röglinger (2011) design principles for maturity models*

This approach focuses on creating specific model-building methods for a descriptive, prescriptive or comparative uses. The design principles are shown in Table 9.

2.11.8.3   *Hevner et al.'s Design Science Research approach*

This is based in the Design Science Research problem solving paradigm and provides a generic set of seven steps for guiding the development process and ensuring a quality output. The process begins by identifying the type of maturity model to be developed, ensuring the relevance of the maturity model to the problem to be addressed, evaluating the resulting maturity model, identifying the research contribution made by the development of the maturity model, ensuring research rigor in both the development and evaluation of the maturity model, encouraging reiteration and finally, communicating the solution and lessons to relevant audiences. The guidelines association with this approach are presented in Table 10.

Table 10:   The Design Science Research Approach to Developing Maturity Models

(Hevner et al., 2004: 86)

Guideline	Description
Guideline 1: Design as an Artifact	Design-science research must produce a viable artifact in the form of a construct, model, a method, or an instantiation.
Guideline 2: Problem Relevance	The objective of a design-science research is to develop technology-based solutions to important and relevant business problems.
Guideline 3: Design Evaluation	The utility, quality and efficacy of design artifact must be rigorously demonstrated via well-executed evaluation methods.
Guideline 4: Research Contribution	Effective design-science research must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and/or design methodologies.
Guideline 5: Research Rigor	Design-science research relies upon the application of rigorous methods in both the construction and the evaluation of the design artifact.
Guideline 6: Design as a Search Process	The search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.
Guideline 7: Communication of Research	Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences.

2.11.8.4   Mettler's (2009) parameters for maturity model development

Mettler's advocates for development and application approaches that operate in tandem, thereby allowing these processes to inform each other. The cyclic process of design and field testing enables model validation and corrective actions by the designer. Cycling through this process provides additional quality assurance ensuring that the model is fit for purpose and the needs of the end-user. In addition, Mettler develops a detailed checklist of decision parameters that supports model building and testing. The design flow and the content of the design stages are presented in Figure 22, Table 11 and Table 12.
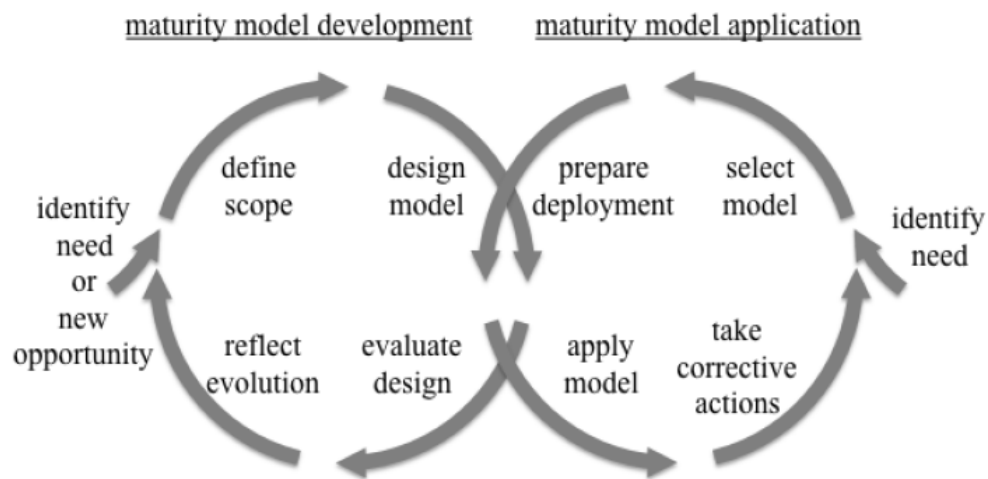
Figure 22:   Interplay Between Development and Implementation can Support

Effectiveness (Mettler, 2009: 8)

Table 11:   Part 1 - Design Schema for ensuring Rigor in building Maturity Model (Mettler, 2009 : 8)

Phase	Decision Parameter	Characteristic				
Define scope	Focus / Breadth	General Issue			Specific issue	
	Level of analys / depth	Group decision making		Organizational considerations	Inter-org consideration	Global & Societal considerations
	Novelty	Emerging		Pacing	Disruptive	Mature
	Audience	Management oriented		Technology oriented	Both	
	Dissemination	Open			Exclusive	
Design model	Maturity definition	Process focused	Object focused	People focused		Combination
	Goal function	One-dimensional			Multi-dimensional	
	Design process	Theory-driven		Practitioner - based	Combination	
	Design product	Textual description of form		Textual description of form & function	Instantiation (assessment tool)	
	Application method	Self-assessment		3rd party assisted	Certified professionals	
	Respondents	Management	Staff	Business partners	Combination	

Table 12: Part 2 - Design Schema for ensuring Rigor in building Maturity Model (Mettler, 2009: 8)

Phase	Decision Parameter	Characteristic			
Evaluate design	Subject of evaluation	Design Process	Design Product	Both	
	Time-frame	Ex-ante	Ex-post	Both	
	Evaluation method	Naturalistic		Artificial	
Reflect evolution	Subject of change	None	Form	Functioning	Form and functioning
	Frequency	Non-recurring		Continuous	
	Structure of change	External / open		Internal / exclusive	

2.11.9   Conclusions for Maturity Models

Maturity models provide a useful diagnostic tool that enables assessment and improvement processes to be undertaken. Although the method originated in the software industry, it has been utilized with success across a wide range of sectors. The method is highly customizable and flexible and may be used in quantitative, qualitative and mixed modes. To ensure validity and reliability of the insights and findings provided by this method it is recommended that one of the exemplary model development approaches be utilized.

2.12   Wicked Problems

2.12.1 Overview of Wicked Problems

In their seminal article, Rittel and Weber (1973), professors in design and city planning, respectively, state that problems in the natural sciences are definable, can be separated and have solutions that can be found analytically or otherwise. In contrast, they contend that problems in the realm of social governance and planning are necessarily always ill-defined and must instead depend on political judgment for solutions. These broad classes of problems which cannot be exhaustively analyzed, nor for which clear cut problem solutions can be developed in advance, are referred to as wicked problems (Dalsagard, 2014; Ramaley, 2014; Rittel & Weber, 1973).

As Rittel and Weber explain, the use of the term "wicked", is not related to the ethical or moral status of the problem to be addressed. Rather, it serves to contrast this class of problems to "tame" problems such as "to accomplish checkmate in five moves….

[where] the mission is clear" (Rittel & Weber, 1973, p. 160). Consequently, in tame problems it is possible to know once an intervention has been made whether or not a problem has been solved.

Ramaley (2014), points to contemporary societal challenges such as sustainable development, climate change, health issues, clean water, peace and conflict as examples of global wicked problems. The challenges of urbanization, slums, issues of social cohesion and inadequate infrastructure amongst others, that cities in developing countries face, fall within the realm of wicked problems.

The challenges of complex social problems have been observed by academics in other fields and some of these perspectives are briefly present here. Ackoff (1974) as cited in Mitchell (1993), Pidd (2003) and Ritchey (2004) classified problems into three categories on the basis of whether or not agreement could be reached on their formulation and solutions. Ackoff reserved the term "puzzles" for situations in which a problem could be well defined with a specific solution. The term "problems" he reserved for those situations in which while the problem could be well defined, there was no unique solution to satisfying it. The term "messes" Ackoff used for situations that were complex, ill-defined and unstable, where there was no agreement either on the solution or the understanding of the situation. According to Pidd (2003), a mess is a system of problem issues in which the various issues to be addressed are themselves inter-related, with these relationships being as important as the issues to be addressed. Mitchell refers to them as "complex assemblages of problems" (1993:54). Consequently, Ackoff's "messes" and

Rittel and Weber's "wicked problems" are equivalent. Ritchey's (2002) views on messes are presented in Figure 23.
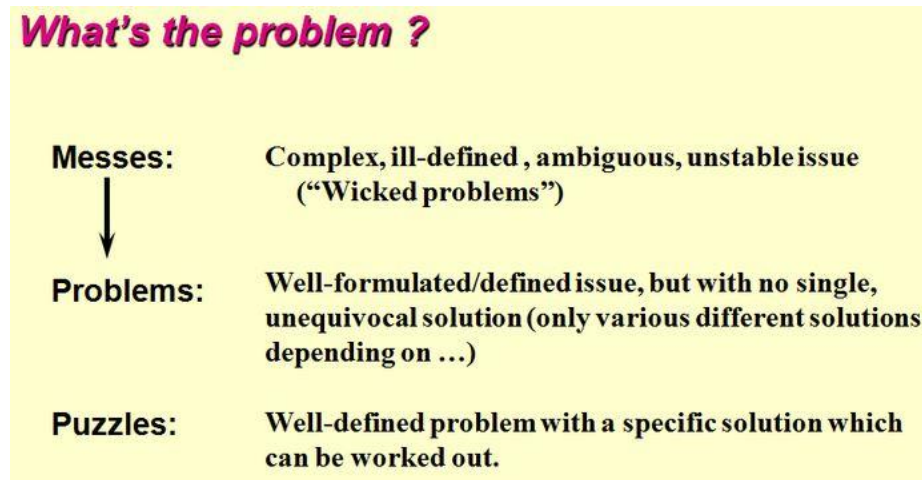
Figure 23:   Differences Between Messes, Problems and Puzzles (Ritchey, 2002 adapted

from Ackoff (1974)

2.12.2 Characteristics of Wicked Problems

Rittel & Weber (1973) offer ten defining characteristics of wicked problems:

1. There is no definitive formulation of a wicked problem - While it is possible to develop an exhaustive brief for a tame problem, the proposed solution determines the information that is required to solve a wicked problem, so an inventory of solution approaches must be generated in advance. There is thus a constant interplay between problem resolution and problem understanding. Specifying each aspect of the solution points to the need to solve another sub-problem and so formulating the problem to be solved is itself a complex and problematic task. Citing the case of poverty, Rittel and Weber show that its very conceptualization points to inter-related issues and solution

strategies that lie within the remit of policies on employment, education, health and culture amongst others.

2. Wicked problems have no stopping rules - The difficulty in bounding the problem coupled with the numerous interlinked sub-problems and causal chains results in there being no clear criteria for when the problem is solved. Consequently, in practice, solution efforts depend on external factors such as the availability of resources, dis/satisfaction with progress made or other rationale.

3. Solutions to wicked problems are not true-or-false but good-or-bad - In the same manner that it is not possible to define stopping criteria, it is not possible to objectively assess if the problem has been solved. However, a subjective assessment of the impacts of the interventions can be made, for example, in terms of the value created, losses incurred or perceived benefits.

4. There is no immediate and no ultimate test of a solution to a wicked problem - Wicked problems, given their multiple causal paths and interdependencies, are not under the influence of a defined set of actors. Furthermore, the interdependencies they contain give rise to lags and delays which may amplify, attenuate, lead or lag in complex ways. Consequently, the full set of causes and effects cannot be mapped.

5. Every solution attempt is a "one-shot operation", there is no opportunity to learn by trial-and-error - Public interventions, such as a decision to build a highway to alleviate transportation challenges or to change an educational curriculum bring irreversible effects that have long-term consequences. These consequences alter the situational landscape and in turn create other new effects.

6. There is no well-described or exhaustive set of solutions or operations - The solution set for a wicked problem is unknowable and is often limited largely by the way in which the problem is envisaged, and so depend on the resourcefulness and the imagination of the solution creators. The choice of the solution may also be influenced by factors such as the trust and support generated between proponents of a solution and concerned stakeholders.

7. Every wicked problem is essentially unique - Despite numerous similarities, over-riding and distinguishing properties exist which prevent the direct transfer of solutions from one context to another.

8. Every wicked problem can be considered to be a symptom of another problem - Resolving a problem often begins by seeking to understand why a given situation is not as would be desired. This in turn points to higher order causal factors. However, the higher up the causal ladder, the broader a problem's conceptualization becomes and the less ability there may be to focus and mount a solution. This gives rise to the challenge of assessing whether efforts are being focused on problems or symptoms.

9. The way in which a problem is described determines the way in which it will be resolved - Wicked problems provide a very large number of modes of reasoning of possible causes and effects. The richness of the problem situation and the lack of time and spatial boundaries, coupled with their essential uniqueness, means that it is not feasible to conduct rigorous experimentation. Consequently, the plausibility of explanations of success or failure become somewhat arbitrary and depend on attitudinal factors for their plausibility.

10. The planner has no right to be wrong - In the academic environment a hypothesis if found unsatisfactory is refuted or modified. However, in the case of planners their decisions impact societies and, consequently, planners are held accountable for their actions and the outcomes. This in turn has tremendous implications for the solutions adopted, perceived risks of those with a responsibility for finding solutions and the political capital invested.

2.12.3 Political Dimensions of Wicked Problems

Camillus (2008) presents some reasons which explain why political solutions become important in addressing problems of social governance and planning. First, problems on a social scale involve a large number of stakeholders motivated by differing values and priorities. Consequently, this immediately raises questions about how the problem and responses should be conceptualized and how it affects the current status quo, that is, who wins or loses and who is advantaged or disadvantaged? Second, the roots of the problem are often complex and tangled, therefore, as in the case of the mythical hydra it is not clear where the response should begin. A third challenge that Camillus points out follows closely on from the second one, is that interventions often lead to unexpected changes in the situation. In the case of the mythical hydra chopping off one head of the creature resulted in multiple heads replacing the initial one. Fourth, these problems in whole or in part are usually unprecedented. For example, while seeking to increase tourist arrivals and remove barriers to travel many countries also worry about increased human trafficking and illegal migration as well as terrorism. However, there are often few models, analogies, prescriptions or experiences that decision-makers can quickly draw on

for guidance. Finally, for social and governance planning problems there is no clear indication as to what the correct solution could be; consequently, pursuing any approach is accompanied with the prospect of unsatisfactory outcomes as well as the loss of political capital.

2.12.4 Other Conceptions of Wickedness

Schön (1987) uses the metaphor of swamps and high grounds to similar effect as Rittel and Weber's (1976) use of wickedness. According to Schön, problems where theory and research can be clearly and easily applied represent "the high ground, manageable problems lend themselves to solution through... theory and technique". In contrast the "swampy lowland, messy, confusing problems defy technical solutions Schön (1987, p. 37)".

Unlike Rittel and Weber (1973), Farrell and Hooker (2013) view the concepts of wickedness and tameness not as a dichotomy, but rather as a continuum along which problem types lay. They use three characteristics, namely, finitude, complexity and normativity to assess the extent of wickedness or tameness. Their ideas are briefly presented below.

Finitude - refers to the limit on human cognitive capacities both collectively and individually. It includes ignorance as well as resource limitations which prevent optimal outcomes.

Complexity - refers to the nested hierarchies of complex interaction. Complexity makes it impossible to disentangle the effects of co-occurring phenomena and other cause

and effect relations and accordingly leads to an inability to predict the outcomes of processes.

Normativity - refers to the influence of human values and norms which may give rise to conflicts between actors, and even between courses of action that an actor is required to take within a functional role and their personal beliefs. These conflicts require negotiation to achieve compromise and influence the course of the problem solving activity.

Of these three factors, Farrell and Hooker (2013) view finitude as the most important influence on wickedness.

2.12.5 Approaches for Resolving Wicked Problems

In Rittel and Weber's (1973) view it was not possible to tame wicked problems; all that could be undertaken were mitigation factors. From their perspective demographic changes such as increased social heterogeneity were likely to increase inter-group rivalries and make consensus and compromise increasingly difficult. Recognizing that experts and policy-makers also had biases that influenced their advice and decisions Rittel and Weber's (1973) were also not confident that central planning was ideal. They were of the view that supporting the capacity of citizens to express and attain their individual goals and engendering the recognition that societies and their dynamism were a reality was the best that could be done.

Rittel is credited by Rith and Dubberly (2006) as promoting the role of robust dialogue and even argumentation to arrive at common definitions and common goals and actions. It was Rittel's view that only by achieving such consensus that wicked problems

could be tamed. According to Rith and Dubberly, Rittel recognized the key role played

by political forces in shaping agreement, collaboration and supporting action. In Rittel's

view, political approaches also took on an important role in ensuring continued

engagement by a broad stakeholder base. Furthermore, as the number of variables that

required attention invariably exceeded the cognitive capacities of a single actor or

stakeholder group, the political dimension could ensure coordinated and sustained efforts.

Camillus (2008) also shares Rittel and Weber's (1973) view that it is not possible

to solve wicked problems; instead, the best that can be done is to develop coping

strategies. Camillus is however more forthcoming in proposing options and approaches

based on the experiences of global companies. In his view simple approaches are best and

he recommends the following actions:

Stakeholder engagement and dialogue – to create both a shared understanding of

the problem and a commitment to interventions for its resolution. Camillus emphasizes

the importance of developing sufficiently clear understanding of positions so as to

facilitate different interpretations of the problem and enable collaboration. This is

reminiscent of Eck's (2006) concept of pluralism. Camillus also advocates active

communication throughout the intervention period and the documentation of

commitments and action plans.

Nurturing a shared identity – Camillus emphasizes the importance of developing

a shared identity amongst the stakeholders built around common core values,

competencies and aspirations. In his view these factors provide an important basis for

shaping responses, ensuring coherence and maintaining commitment. Values serve to

clarify what is fundamentally important, competency serves to highlight strengths, while aspirations serve to identify and capture a shared future vision and consequently provide a unifying set of measures aligned with shared values to which collective efforts can be directed.

Focus on action – As the efficacy of any approach to a wicked problem is never known, Camillus recommends that rather than extensive and agonizing analysis, interventions should rather seek to try out several feasible actions and assess their outcomes. These attempts will change the problem context but also provide greater insight and understanding, thereby enhancing the likelihood that the coping strategies selected will be more effective.

Adopt a "feed-forward" orientation – Feedback which involves taking corrective action to reduce the gap between desired and actual performance traditionally has limited utility for wicked problems. However, it becomes necessary to ally foresight processes, such as weak signals analysis, scenario planning and similar processes to set future goals. These processes should involve the various stakeholders, so as to build recognition of the uncertainty of the future, while enabling joint action around visioning and the shaping of desirable futures.

Darlsgaard (2014) offers approaches to wicked problems from within the design paradigm. From his perspective this involves iterative phases of action and reflection which allow the designer to progressively develop and deepen understanding of the problem situation. The designer draws on existing experience, theories and feelings. This process involves emergence and interaction with the problem space, its stakeholders,

rules and other aspects; as these become understood opportunities and constraints can be identified. Since wicked problems are situated and systemic, this involves reducing the gap between "what is" and "what should be" within the particular problem context. The design process which involves acting, observing and reflection serves as an experimental process which enables the problem space to become more fully known. This interplay between theories and practice enable these existing frames of references to be rejected or extended – within the context of the problem situation, thereby helping to provide contributions to theory and knowledge.
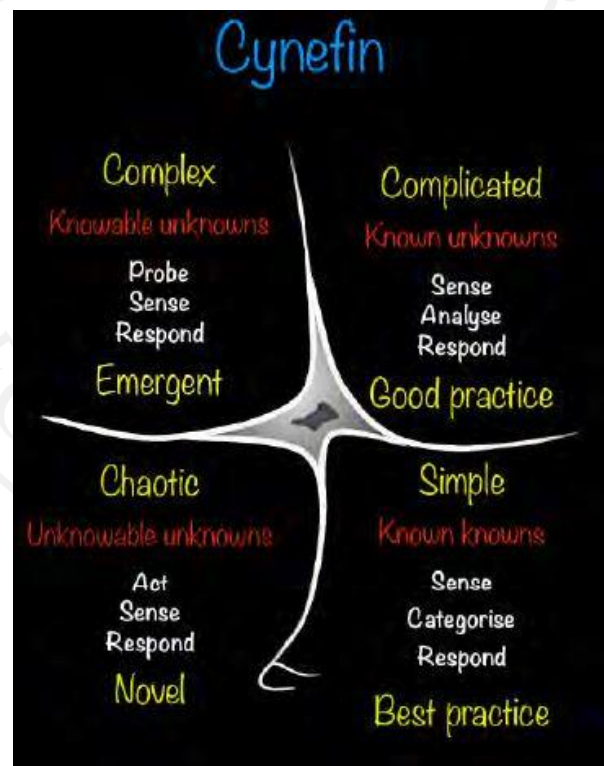
Figure 24:   Cynefin Framework (Snowden & Boone, 2007)

The Cynefin Framework (Snowden & Boone, 2007) presented in Figure 24, is a sense-making tool which supports decision-making across a range of situational types.

The framework identifies four types of situations, simple, complicated, complex and chaotic as well as a fifth type, disorder, which is located in the area between the four main typologies. By enabling the specific situation to be identified, appropriate responses can be developed. Although Snowden and Boone do not use the phrase "wicked problems", such types of problems would appear to fall into the complex, chaotic and disorder type situations. In complex situations the relationship between cause and effect are not always discernible, even in retrospect while in chaotic situations there is no relationship between cause and effect. With regards to response strategies, Snowden & Boone suggest that for complex situations an approach based on Probe - Sense - Respond should be pursued while in chaotic situations an Act - Sense – Respond approach would be preferable. Snowden and Boone suggest that these approaches would allow emergent and novel practices respectively to emerge.

2.12.6 Conclusion to Wicked Problems

The academic literature on wicked problems is very relevant to the international strategic challenges such as the Millennium Development Goals (MDGs) and the Post-2015 Sustainable Development Goals, which all cities, especially those in the developing world must address. The strategies enumerated for responding to these challenges emphasize explicitly the importance of broad-based, informed and inclusive approaches and the need for ongoing coordinated efforts. Clearly, the success of any such effort will depend on the capabilities and competencies of the individuals as well as the societal structures for organizing them and the processes which they bring to bear on the identified problems. The focus on common visions, shared goals, engagement, the

equitable sharing of benefits and risk, and harnessing relevant knowledge are all

reminiscent of the values embedded in UNESCO's Knowledge Societies Conceptual

Framework. The nature of wicked problems therefore suggests that knowledge societies

are not a destination; rather, they represent a dynamic societal state characterized by

engagement and innovation supported by collective decision-making and problem-

solving.

CHAPTER 3

METHODOLOGY/RESEARCH DESIGN

3.1   Research Design: An Overview

Creswell (2009) defines research design as a plan or proposal for conducting research that involves the intersection of three distinct aspects, namely philosophy, strategies of inquiry, and a specific method or methods. Figure 25 below presents Creswell's framework.
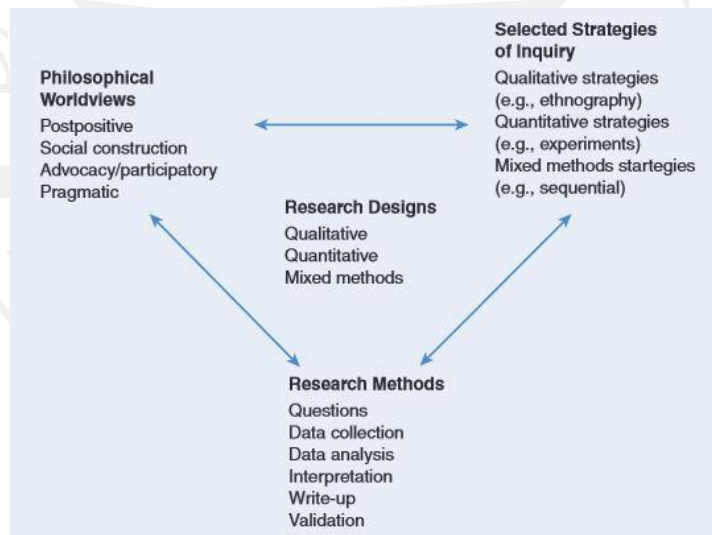
Figure 25:   Framework for Research Design in the Social and Behavioral Sciences

(Creswell, 2009: 5)

According to Creswell, the researcher first identifies and acknowledges the philosophical worldview and assumptions which they bring to the research project.

Secondly, the researcher needs to identify and select approaches for conducting their inquiry that are coherent with their philosophical orientation. Finally, a specific set of methods are selected that support the conduct of the investigation.

By developing a research design that consistently and coherently integrates these three considerations the researcher is able to arrive to a point of enhanced understanding and knowledge with respect to their topic of interest and provide a contribution to their field.

Saunders et al. (2011), presents a complementary approach to understanding the research process which is summarized in their "research onion" and depicted in Figure 26. The researcher commences with the selection of a philosophical position, selects an approach, identifies a methodological approach, selects research strategies, determines the time horizon for the study and selects procedures for the process of data collection and analysis.
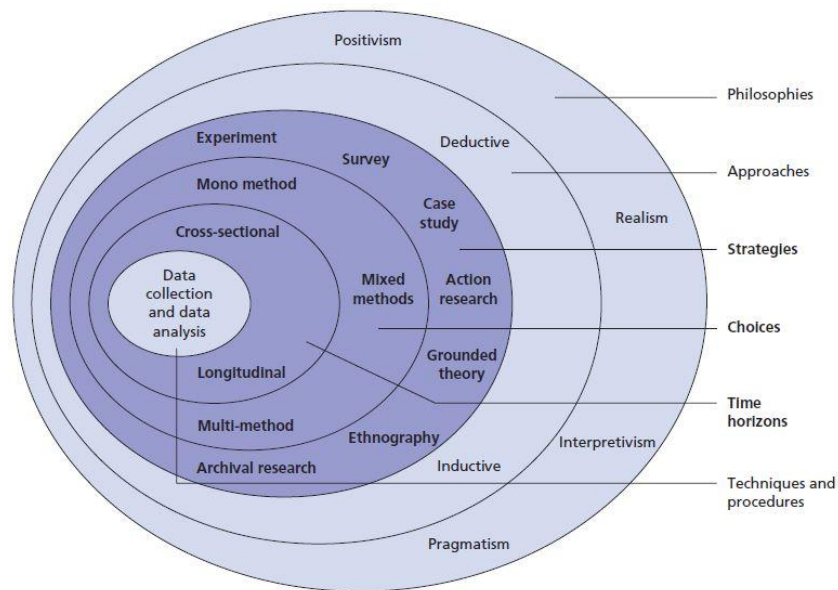
Figure 26.   "Research Onion" Design in Business and Management Research

(Saunders et al., 2011: 108)

Table 13 presents the most common philosophical perspectives in management

research and an overview of their ontological and epistemological stances, axiological

perspectives and preferred approaches to data collection (Saunders et al., 2009).

This study is focused on the development of a model, its validation, and

application to a problem context, and the subsequent evaluation of its suitability and

value to policy actors in the cities of developing countries. In many ways this process is

exploratory. The subject area of enquiry, knowledge-based development, is a newly

emerging sub-field without established research traditions (Ergazakis & Metaxiotis,

2011). The research seeks to venture into fairly "uncharted research waters", the cities of

the developing world, where findings from the developed world may not be applicable

(Jenkins, 2013; Roy, 2005; Schluter, 2012). The underlying UNESCO Knowledge

Societies Conceptual Framework, though prescriptive, nevertheless adopts a strongly

normative position that emphasizes relevance, adaptation and operationalization in

specific contexts as well as openness to multiple world views. These orientations are

consistent with a design philosophy which takes a pragmatic view directed to the creation

of tools, processes, models and methods for solving problems (Hevner, 2007; Hevner &

Chatterjee, 2010; Hevner et al., 2004; Simon, 1996).
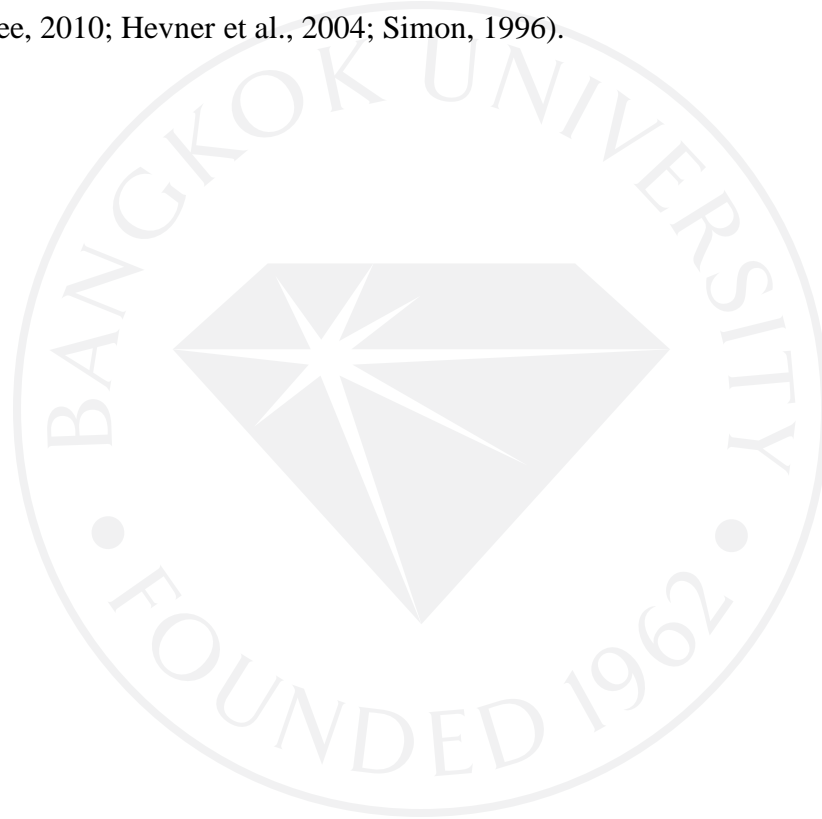
Table 13.   Major Philosophical Perspectives in Social Sciences and Management

Research (Saunders et al., 2009: 109)

	Positivism	Realism	Interpretivism	Pragmatism
Ontology: *the researcher's view of the nature of reality or being*	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology: *the researcher's view regarding what constitutes acceptable knowledge*	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: *the researcher's view of the role of values in research*	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

3.2 Research in Pre-paradigmatic Fields

The research frameworks by Creswell (2009) and Saunders et al. (2011) should be viewed as non-exhaustive, presenting the most commonly used and widely accepted approaches, at this time, within the business, management and social sciences. Other design philosophies, such as Design Science Research (Hevner et al., 2004; Hevner & Chatterjee, 2010; Peffers et al., 2007), and inquiry strategies, such as the Delphi Method (Day & Bobeva, 2005; Linstone and Turoff, 2002; Okoli & Pawlowski, 2004; Powell, 2003; Skulmoski et al., 2007; Wakefield & Watson, 2014), are widely used in other research communities but are not reflected in either Creswell's or Saunders et al.'s frameworks.

The situation just described reflects what Venables and Baskerville (2012), citing Campbell and Stanley (1963), Glaser and Strauss (1967) and Miles and Huberman (1994), refers to as "the current state of consensus following extensive debate and evolution of how research should be conducted", in the social sciences and business management research. From their perspective, this points to the inherently social nature of scientific communities and the role of social influences such as community norms and hierarchies. Furthermore, Venables and Baskerville (2012) warn that the privileged status of certain dominant perspectives, contributes to the adoption of ad hoc and non-rigorous research methodologies, as the disciplinary norms. Ethnographic research presented by Latour and Woolgar (1986), in their book "*Laboratory Life: The Construction of Scientific Facts*", points to the key and influential role played by the social status and

advocacy efforts of scientists on the biological science community's acceptance of new ideas and theories.

Transdisciplinary insights have, and continue to support, advancement and innovations in many fields. For instance, findings in physics have supported the development and application of models based on theories of gravity in other fields including economics (Subasat & Bellos, 2013) and marketing (Desarbo et al., 2002). Similarly, research in the biological sciences has supported the development of so-called genetic algorithms used widely in operations research (Shukla et al., 2013). In knowledge management, both Snowden &and Boone's (2007) Cynefin model and Bennet and Bennet's (2004) intelligent complex adaptive systems (ICAS) model reflect insights gained from ecological systems.

In well-established disciplines, questions around the applicability, utility and development of new research, methodologies seldom arise. However, in fields which are in a pre-paradigmatic phase or which seek to investigate new innovations and phenomena, the search for and development of new methodologies takes on importance and may even be necessary for the advancement of these fields (Kuechler & Vaishnavi, 2009). Therefore, for emerging disciplines such as knowledge management, the questioning of dominant views and the exploration of other fields can provide valuable contributions to the development of the discipline's theory and methods of inquiry. This perspective is of particular value in the emerging field of knowledge-based urban development, which is the subject of this research. Consequently, this researcher adopts

the view that the research needs and the nature of the problem, rather than disciplinary

traditions should guide the selection of the research design and approaches.

3.3   Trans-disciplinary Borrowings from Information Systems

In his influential publication "*The Informational City*" (1989) as well as in his

trilogy on "*The Information Age*" (2009), Manuel Castell positions the city as an

environment in which spaces are shaped by flows of power, finance and information

mediated through computers on telecommunication networks. These flows of

information, power, finance and changes in the use of space occur as a result of the socio-

technologically mediated actions of human beings acting in various organizational forms

within and across cities.

The study of information systems involves the design, management, planning,

decision-making and use as well as the study of the evolution and adaptation of hardware,

software and human interfaces (Hevner et al., 2004; Hevner & Chatterjee, 2010; Peffers

et al., 2007). Information systems researchers recognize that the information transmitted

by these systems is value-laden, often determined by social relationships, and embedded

in human activity; furthermore, these transfers of information represent the shaping of

meaning (Aakhus et al., 2014; Cecez-Kecmanovic, 2014; Scott & Orlikowski, 2014).

It has been shown in the Literature Review that the informational city, as defined

by Castells, represents an overarching category that includes knowledge cities. On the

basis of these shared characteristics we regard cities as socio-technical constructs that

have analogous properties to information systems. This provides a basis to support the

application of epistemological and ontological paradigms and their research methods from the field of information systems in the development of a model for understanding the knowledge-based development of cities.

3.4   Philosophical Perspectives Adopted in this Study

Design Science Research is a well-established approach in the field of information systems (Dalsgaard, 2014; Hevner et al., 2014; Hevner & Gregor, 2012; Hovorka, 2009; Kuechler & Vaishnavi, 2012; Otto & Österle, 2012; Vaishnavi & Kuechler, 2009).

Vaishnavi and Kuechler (2009) describes the ontology, epistemology, methodology and axiology of Design Science Research which given their pragmatic roots bears considerable similarity to the classical pragmatic paradigm. Table 13 provides a comparison of pragmatism and pragmatic Design Science Research.

The ontological perspective in pragmatic Design Science Research views reality as being of a situated and evolving nature (Dalsgaard, 2014; Dewey, 1998; Vaishnavi & Kuechler, 2009). The situation is composed of the subject and its socio-physico-technical environment. This socio-physico-technical environment includes other people, technological devices and artifacts and the physical space, as well as the socially constructed space that is defined by socio-cultural rules, norms and expectations. The elements within this situation interact between the elements in the space and the subject and these elements. As a result, both the subject and environment interact and they thus evolve and change over time. The rate of change will therefore determine for how long

the situation appears to remains stable (Dewey, 1998). Reality is therefore in a state of

flux.

Table 14.   Comparison of Pragmatism and Design Philosophical Orientation (adapted

from Dalsgaard, 2014; Saunders et al., 2011; and Vaishnavi & Kuechler

2009)

	Pragmatism	**Pragmatic Design Science Research**
Ontology: the researcher's view of the nature of reality or being	External, multiple view chosen to best enable answering of the research question	Multiple contextually situated alternative world states that are socio-technologically enabled
Epistemology: the researcher's view of what constitutes acceptable knowledge	Either or both observable phenomena and subjective meaning can provide acceptable knowledge depending on the research question. Emphasis on practical applied research integrating different perspectives to help interpret data	Knowing through making: objectively constrained construction within a context. Iterative circumscription reveals meaning.
Axiology: the researcher's view of the role of values in research	Values play a large role in interpreting results, with the researcher adopting both objective and subjective points of view	Control, creation and progress that seek to support improvement and understanding
Data collection techniques most often used	Mixed or multiple method designs, quantitative and qualitative.	Developmental process that seeks to measure the impact of the created artifact on the system

In seeking to create change in their environment to achieve a desired end, the

designer bases her action on preconceived theories that may be implicitly or explicitly

articulated (Dalsgaard, 2014; Dewey, 1998; Vaishnavi & Kuechler, 2009). The results of

these actions, combined with a reflective practice serve to either reinforce, enrich or to

reject the theories that the designer holds and also enable the designer to become more

aware about the beliefs that they hold (Schön, 1987). The knowledge gained from this interaction therefore informs future intervention. The designer is operating in a situated space which is evolving; consequently, depending on the rate of change of conditions in the given situation space, the results may vary over time. This does not invalidate knowledge but rather may serve to increase the understanding and awareness of the influence of granularity of boundary conditions. The epistemological view is therefore one in which practice and theory inform each other with learning being an ongoing and dynamic response to change.

The designer or researcher is part of the situation and by her presence is able to transform this space and also to be transformed. The focus of action is therefore to understand with a view to being able to gain insight into how actions may be directed to a given end goal. However, the attainment of the goal is not merely functional but a deeply socio-technical process. This becomes obvious when we ask: Utility for whom? Utility for what purpose and to what end? Utility when, where, how? The pragmatic Design Science Research therefore values transformation, the testing of knowledge and concepts that is aimed towards improvement (Dalsgaard, 2014; Vaishnavi & Kuechler, 2009).

In conducting Design Science Research, knowledge is generated iteratively and applied within a given context towards some desired and improved end. Reflexivity, past knowledge and disciplinary guidelines with a view to gaining greater insight into the problem situation serve to influence the choice and selection of methods. Therefore, the role of iteration and reflection is emphasized in the Design Science Research approach.

Both subjective and objective approaches based on the specific situation, its constraints and the pre-knowledge of the Design Science Research community are employed.

3.5   Data Collection Techniques

3.5.1   Selection of Data Collection Techniques

Yin (2014) provides an overview of research methods and their relevance to various research situations. Yin's classification is based on three factors: the form of the research questions, the extent to which the researcher can exercise control over the problem situation and the temporal nature of the research situation being investigated. Yin's classification system is presented in Table 15.

Table 15.   Relevant Situations for Different Research Methods (Yin, 2014: 9)

METHOD	(1) Form of Research Question	(2) Requires Control of Behavioral Events?	(3) Focuses on Contemporary Events?
Experiment	how, why?	yes	yes
Survey	who, what, where, how many, how much?	no	yes
Archival Analysis	who, what, where, how many, how much?	no	yes/no
History	how, why?	no	no
Case Study	how, why?	no	yes

Form of the research question - The research questions explored in this study are primarily of the how and what format. However, a closer reading of the what

questions, for example**,** "To what extent can the model inform the development of action plans for the city?", reveals that they fall into Yin's (2014:10) "how much" categorization. Consequently, all five methods are relevant. Furthermore, as this study represents a first application of the model support for exploration is also relevant and ensures openness to all five approaches.

Control over the problem situation - This study uses the model as a theoretical lens for observing, gaining insights and making sense of the problem situation. The researcher is also unable to introduce changes into the problem situation – the city – and observe response. While the study will seek to provide recommendations and interventions that policy-makers could implement to enhance their cities, no treatments will be applied, nor are any variables intended to be manipulated. Consequently, the experimental approach is not relevant to this study.

Temporal nature of the problem situation – Some historical aspects of UNESCO's evolution, the pre-WSIS and post-WSIS phases, are important influences on the development of the Knowledge Societies Conceptual Framework and the maturity model. In a similar way, historical factors have influenced the current context of the cities and an appreciation of these forces is relevant. However, the application of the model is focused on the current situation and context of the cities as well as seeking to understand what may be done to arrive at a preferred vision of the future. This suggests that surveys, archival analysis and case studies do have relevance for this research.

3.5.2   Use of Archival Analysis, Surveys and Case Studies in this Study

3.5.2.1   Archival analysis

While historical influences are relevant, the main focus of the study is to understand the present with a view to supporting policy interventions that may influence the future. The ontological and epistemological perspectives adopted see the city as a situated space. Consequently, there are subjects, environments, people, artifacts, physico-spatial surroundings and social constructs such as norms and rules (Dalsgaard, 2014) at work in the city shaping its context.

Furthermore, these properties of the situation interact with and modify each other. As the researcher is not immersed in the situation, many of these influences will be invisible to the researcher. It is only by engaging with the problem situation that an understanding of the problem situation and its components can be achieved (Dalsgaard, 2014; Schön, 1987). As the researcher's field visits to the sites are short and focused on interviews with respondents, archival analysis is used to support this engagement with the problem situation.

The archival analysis used in this study involves using digital information retrieval tools to capture daily news items published about the city. These newspapers will be limited to English language publications that are available on-line and retrievable through Google News Alerts. The city names (and their variations) will be used as keywords. The categories in the maturity model will be used as the coding categories to analyze the events unfolding in the city. Content analysis is undertaken using the constructs in the maturity model. Reading the various narratives enables the researcher to

engage with the problem situation and also deploy the model. Both qualitative and quantitative content analysis are used. Tests of inter-coder reliability are also undertaken.

3.5.3   Surveys

3.5.3.1   *The maturity model*

The maturity model developed in this study is in essence a survey tool that consists of a quantitative and qualitative questionnaire. The structured, quantitative section of the survey requires the respondent to select a single response within a pre-defined numerical range. The qualitative dimension of the survey is semi-structured and solicits the opinion of the respondent on a series of questions. The quantitative and qualitative components are designed to cross-reference each other, allowing the researcher to identify and investigate possible conflicts and contradictions to obtain greater insight into the city and the respondents understanding of its nature and relationships.

3.5.3.2   *The Delphi technique*

The Delphi technique is regarded as a structured group communication process to leverage expert opinion to solve problems that are complex (Day & Bobeva, 2005; Linstone and Turoff, 2002; Wakefield & Watson, 2014). This technique allows the knowledge and perspectives of experts to be iteratively combined. In essence, the Delphi is a survey technique which involves asking a group questions, systematically sharing with the group its response, and through a series of iterations, enabling the response to be improved. The Delphi Technique is used primarily in this study to validate the maturity

model. As indicated in the literature review, the Delphi technique is widely used for validating models used in knowledge-based development (Batra, 2008; Garcia & Leal, 2010; Sharma et. al, 2008, 2009; Yigitcanlar's, 2014; Yigitcanlar et al., 2014).

3.5.3.3 Knowledge Strengths Weaknesses Opportunities Threats (K-SWOT)

This group survey technique was developed by Zack (1999) and has been used by Sharma et al. (2009) in knowledge-based development work with national policy-makers. The process consists essentially of seeking to identify areas of competitive advantage as well as detractors to knowledge-based development. The approach involves a small group of experts who meet face to face to discuss the problem situation. Ideally the participants should be of comparable status and expertise about the city under discussion as well as target cities used as comparators in the benchmarking process.

3.5.3.4 Case study

The case study will provide a means for drawing together the findings uncovered in the model building, archival analysis and survey phases of this research study. The evidence collected under these areas will address four of the six sources of evidence cited by Yin (2014), namely, documentation, archival records, interviews and an artifact in the form of the maturity and knowledge-based development model. The analysis of the case study will seek to blend pattern-matching with cross-case comparisons and synthesis.

3.6   Setting of the Study

In identifying the setting for the study, consideration was given to identifying the relevance of the site to the research problem question, requirements of the methodology - case study – and the feasibility in accessing the research setting.

3.6.1   Selection of the Research Sites

The focus of this study is to develop, validate and apply a maturity model based on UNESCO's knowledge society conceptual framework to cities in the developing world. As indicated earlier, urbanization is concentrated and occurring most rapidly in Africa and Asia. These regions are thought to be amongst the least equipped to handle the adverse consequences associated with this trend. UNDESA (2014) indicates that the average levels of urbanization in Africa and Asia are currently 40% and 47.5%, respectively. This level of urbanization is low compared to other developed and developing regions where urbanization range s from 70 to 82% as indicated in Table 16.

Table 16.   Urbanization levels in 2014 by Region (Source: Population Division, Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2014 Revision)

Region	Africa	Asia	Europe	Latin America	North America	Oceania
Urbanization (%)	40	47.5	73.4	79.5	81.5	70.8

Within Africa and Asia there are 16 countries with urbanization levels below 20%. In eight of these countries - Burundi, Ethiopia, Malawi, Niger, South Sudan and

Uganda in Africa and Nepal and Sri Lanka – national populations are greater than 10

million persons and urbanization levels are expected to at least double by 2050

(UNDESA, 2014). In addition, UNDESA (2012) anticipates that half of the total global

population growth during the period 2013 – 2100 will be concentrated in a small number

of countries. Eight of these countries - Nigeria, India, the United Republic of Tanzania,

the Democratic Republic of Congo, Niger, Uganda, Ethiopia and the United States of

America – are projected to account for 50% of this population increase.

Table 17.   Population Projections for Ethiopia, Niger, Thailand and Uganda (Source:

Population Division, Department of Economic and Social Affairs of the

United Nations Secretariat, World Population Prospects: The 2012

Revision)

Country	Population 2013 (Million)	Population 2030 (Million)	Population 2050 (Million)
Ethiopia	94.1	137.7	187.6
Niger	17.8	34.5	69.4
Thailand	67.0	67.6	61.7
Uganda	38.5	63.4	104.1

Ethiopia, Niger and Uganda appear in both lists and their population projections

over the period 2013 to 2050 are indicated in Table 17. Each of these countries has a

primate city – Addis Ababa, Niamey and Kampala respectively. These cities can

therefore be expected to be significantly impacted by increased urbanization notably

through an increase in their population levels. Table 18 below provides some projections

made by UN-HABITAT (2013) for these cities' growth.

All three countries have a number of similarities. They are all landlocked, low income countries with economies that are growing at higher rates than their sub-Saharan peers as indicated in Figure 27 (World Bank, 2015). The populations of all three countries are ethnically heterogeneous and within the last two decades have experienced, or continue to experience periods of major civil unrest and challenges to their social cohesion. These countries also face natural hazard risks, which are expected to increase as a result of global warming. Though they have considerable potential for growth, their institutional systems are weak and this presents a limitation in their ability to be impacted by global trends and to grow in the face of a number of social and environmental challenges. In line with Castell's theory (1989) of the informational city, these cities may be best placed to undertake policy reforms and implement measures that can enable their nations to more successful respond to external global challenges.

Table 18. Past and Projected Population of selected Primate Cities (UN-HABITAT, 2013:State of the World's Cities 2012/2013)

City	Population 2000 (Million)	Population 2005 (Million)	Population 2010 (Million)	Population 2015 (Million)	Population 2020 (Million)	Population 2025 (Million)
Addis Ababa (Ethiopia)	2.38	2.63	2.93	3.37	3.98	4.76
Niamey (Niger)	0.68	0.85	1.05	1.30	1.64	2.11
Bangkok (Thailand)	6.33	6.61	6.98	7.40	7.90	8.47
Kampala (Uganda)	1.1	1.32	1.60	1.98	2.50	3.20

3.6.2   Thailand as a Bellwether for Ethiopia, Niger and Uganda

The World Bank (2015) cites Thailand as an example of a country that has experienced socio-economic success and which, over several decades has evolved from a country beset with socio-economic problems to one which is now a regional and global leader and on the cusp of joining the ranks of high income countries. Bangkok, its capital, is a highly urbanized, cosmopolitan, primate city that hosts around 12% of Thailand's national population (NESDB, 2013). During years of rapid urbanization Bangkok demonstrated success in addressing a number of urban challenges such as slums, waste management and water supply (UN-HABITAT, 2014). Furthermore, by 2030 Bangkok is expected to become one of 41 global mega-cities with populations in excess of 10 million UNDESA (2014).

Like the three rapidly growing and urbanizing countries of Ethiopia, Niger and Uganda, Thailand has also been and continues to be beset by civil unrests, which have resulted in governmental changes and socio-economic shocks. Though less ethnically diverse, the country has struggled with integrating sections of its populations in the North and South. It also faces the risks of natural hazards and climate change.

Against this shared historical and contextual backdrop, Bangkok presents the possibility of providing insights for policy interventions in the other three cities preliminarily identified as cases for study. These insights could arguably be both more relevant and implementable than those from developed countries.

GDP % growth, annual
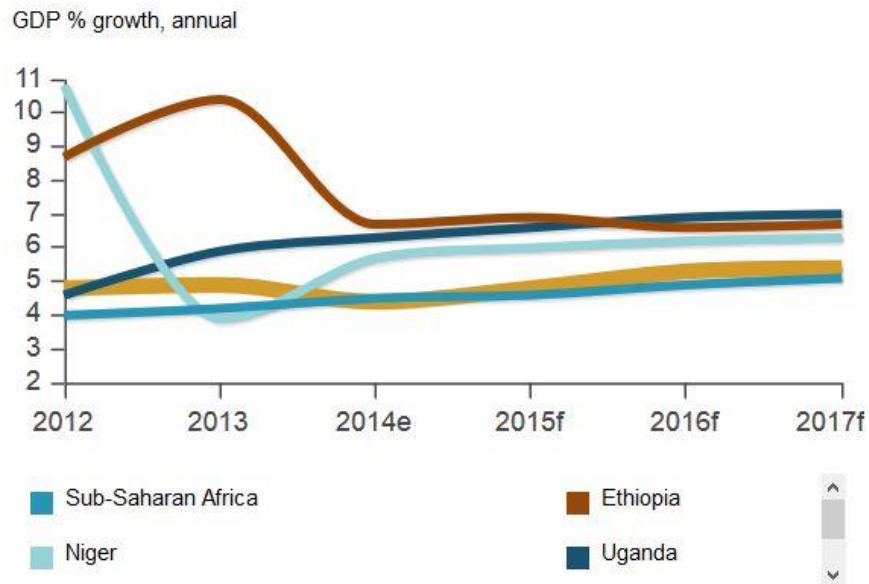
Figure 27.   Country and Region-specific Forecasts and Data 2012 - 2017 (World Bank)[25]

3.6.3   Sampling Techniques for the Research Sites

Yin proposes two sampling approaches to be used in multiple cases/settings for research studies that seek to contribute to theory, namely literal replication and theoretical replication (Yin, 2014). Literal replication refers to the selection of cases that may be predicted to produce similar results while theoretical replication is likely to yield results that provide contrast.

The cities of Addis Ababa, Kampala and Niamey are in a similar development situation and therefore can be expected to contribute to support replicability and robustness of findings and support predictability. On the other hand, as a city in a country

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[25] World Bank Country and Regional Specific Forecasts and Data http://www.worldbank.org/en/publication/global-economic-prospects/data?region=SST

that has succeeded in transitioning from a developing to developed state, the inclusion of

Bangkok can be expected to give rise to contrasting results with the former sites.

Administratively, Addis Ababa is a chartered city with the same level of

administrative authority as a Federal state and is thus able to exercise a high level of self-

autonomy. In contrast, Kampala, like many sub-Saharan cities, is subject to the whims of

the national government who exercise considerable control over the city (Green, 2012;

Goodfellow & Titeca; Goodfellow, 2012). In Kampala the actions of the national

government have delayed decision-making and prevented the implementation of an

effective urban planning and management programme. These contrasts can provide

potential insights into underlying relations and support the development of policy

recommendations.

Participants in each of the city sites selected for the research study are identified

from the indicated stakeholder groups – government, civil society, international

organizations, academia and the private sector. Criteria for respondents are established

and on this basis purposeful sampling of knowledgeable experts identified through

sources such as social media sites like Linkedin, government websites, conferences and

journal articles, consultations with national partners and supported through snowballing,

is used to contact those who appear to meet the selection criteria. These shortlisted

persons are subsequently invited to participate in the study.

3.6.4   Feasibility of Undertaking Research in the Selected Countries

Meredith (1998) points to the role of physical constraints (cost, time and access) in undertaking case study research and which need to be balanced with the requirements of academic rigor in undertaking the study.

3.6.4.1   Access

The researcher has lived and worked in Ethiopia for over 5 years and has a network of family and professional contacts in this country and its capital Addis Ababa. As part of his current programme of study, over the past two years the researcher has resided in Thailand and has begun to develop a nascent network of institutional and personal contacts. In addition, through Bangkok University various other networks can be accessed.

The researcher has never visited either Uganda or Niger, but has been involved in implementing from a distance projects in Uganda and could presumably gain access to in-country professionals from his existing network of contacts.

Security briefs prepared by the United Nations Department of Safety and Security indicate high risks associated with terrorism and armed conflict in both Niger and Uganda. As an employee of the United Nations System, the researcher is required to comply with the guidance provided by its security advisories. It is therefore not feasible to travel to either Uganda or Niger to conduct research.

Preliminary investigation into the possibility of undertaking research with potentially identified respondents in Niger and Uganda indicate Internet penetration

levels of 0.83 persons and 12.5 persons per hundred inhabitants in Niger and Uganda, respectively (ITU, 2013). In addition, the ITU (2013) data indicates that while Internet penetration is increasing rapidly in Uganda, it is stagnant in Niger. This could be due to the high cost of satellite connectivity in Niger which ITU (2013) indicates as the main means of Internet connectivity.

While English is either an official or business language in Ethiopia, Thailand and Uganda, this is not the case in Niger and presents an additional layer of difficulty in accessing respondents.

While Internet-based interviews covering Kampala could be undertaken if adequate respondents could be identified, critical contextual influences would likely not be captured. Accordingly, on te basis of the foregoing analyses, it appears to be infeasibl to undertake research in the cities of Kampala and Niamey. Consequently, the study will be restricted to Addis Ababa and Bangkok.

3.6.4.2   Costs

The current research is fully self-funded by the researcher. Visiting multiple country sites to conduct interviews therefore represents a constraint to be managed. To address this challenge data collection will be linked with visits made by the researcher to Thailand as part of his academic studies and to Ethiopia within the context of family visits. As a supplement, on-line information resources such as newspapers, official websites and similar resources will be utilized to gain insights into ongoing development in these cities. Where feasible, interviews will be conducted by telephone or through on-

line means such as Skype and e-mail. To reduce the impact of potential costs related to translation and interpretation, the researcher will limit interviews to respondents with professional competence in the use of English.

3.6.4.3   *Time*

The researcher is in full-time employment; consequently, field visits will need to be scheduled during allocated vacation periods. The doctoral programme in France provides a limitation of three years for attaining the graduation requirements. Consequently, the extent of data collection and analysis while seeking to ensure academic rigor must respect this fixed time constraint. Effective planning of the design process, including the development and adherence to design process, the maintenance of an audit trail as well as the incorporation of pilot studies prior to full data collections, will serve to ensure the respect of this constraint.

3.7   Research Participants

This study involves working with several distinct groups during various phases of the research activity. During the development of the models from the literature, expert advice will be sought from past as well as current UNESCO Programme Staff working at the Headquarters or in Field Offices. Validation of the model will include both a pilot field test and a Delphi Panel. The Delphi Panel is expected to occur on-line and will be addressed primarily to academics and practitioners working in the area of knowledge-based development. The field pilot is expected to take place in Ethiopia and will seek to involve actors from five stakeholder groups – government, civil society, private sector,

academics and international organizations. Final testing of the model in the identified cities will target the same stakeholder groups identified for the field pilot. Additional information on the reason for selecting these groups and the approaches used are given below.

3.7.1   Current and Past Programme Staff at UNESCO

These persons have expertise in the constructs that appear in the UNESCO Knowledge Societies Framework and have global experience gained through living and working in multiple regions of the world, particularly developing ones. They also have ongoing collaborations with stakeholders from governments, civil society, private sector and other international organizations and so could assist me in identifying persons in the target cities to participate in this study. As a UNESCO staff member who has worked at headquarters as well as in offices in Africa and Asia-Pacific, I could identify appropriate persons based on my personal knowledge, through the internal directory or with the assistance of colleagues. To ensure that my purposeful selection was rigorous, a set of criteria was elaborated. These criteria included academic qualifications, years of experience, experience in Africa/Asia, and knowledge of the constructs in the model. A balance was also sought between male and female informants and persons serving in field offices and at Headquarters. A form was developed through which participants could provide their feedback on the Maturity Model being developed; this is included in the Appendix.

Inputs received from this diverse group served to inform the development of scenarios, indicators and criteria in the maturity model. Semi-structured interviews were

also organized with the three persons who were central to the development of the

UNESCO Knowledge Societies Conceptual Framework.

3.7.2 Academics/Experts in Knowledge-based Development

This group participated in the validation of the maturity model which was

conducted online using an asynchronous Delphi panel. Panelists were selected from

academics and practitioners working in the field of knowledge management, knowledge-

based development and international development. A set of criteria based on a

combination of academic qualifications, publication history, developing country

knowledge and years of experience was established for panelists. Panelists were

identified through academic journals and conference proceedings, their affiliation to

universities and institutes conducting research activities in this area as well as from

relevant communities on the professional social media site Linkedin. Panelists were also

invited to nominate other experts. On this basis, a database of experts was created and

panelists invited to participate. The literature indicated that 10 to 18 participants is a

suitable size for a Delphi, so having a large pool enhances the probability that a valid

sample size of participants is achieved.

3.7.3 Influential Stakeholders at the Research Sites

For the three cities under consideration – Addis Ababa, Bangkok and Kampala –

key influencers were identified from among the public sector, private sector, civil society,

academia and the United Nations involved in either shaping or implementing policies that

impact the cities being investigated. A combination of approaches was used to identify

suitable persons including personal contacts, directories of UNESCO networks and communities, government and municipal websites and snowballing. Criteria were established to ensure that the persons selected were relevant. In light of the access, time and cost limitations a maximum of 3 persons per stakeholder group or 15 persons per city was established.

From within this group up to 5 persons will be purposefully selected to participate in the K-SWOT exercise that seeks to review the policy recommendations that the Study produces.

3.8   Researcher's Role

This study is undertaken in a range of organizational and cultural contexts with a variety of persons. Having worked within UNESCO for almost 17 years, the Researcher has a large network of contacts and was able to secure interviews with persons up to the level of Assistant Director-General[26].

Although officially included in his UNESCO professional development plan, the Researcher's activities were a private activity. However, as an international civil servant the researcher is bound by the International Standards of Conduct for International Civil Servants (UNESCO, 2014). The Researcher is therefore required to submit for review and authorization, prior to publication all research communications such as conference and journal articles as well as the final dissertation. The Researcher may also be obliged

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[26] Within the UNESCO context, Assistant Director-Generals have operational responsibility for implementing UNESCO's global programmes and report to the Director-General the head of the Organization. They have a status akin to Senior Government Ministers.

to take into account any modifications required by UNESCO. The foregoing

requirements could potentially impair the Researcher's academic independence.

3.9   Research Sequence

This section focuses primarily on the work of Hevner and Chatterjee (2007),

Briggs and Schwabe (2011) which have contributed to the methodological approaches

used in this research endeavor.

Hevner and Chatterjee's (2007) three cycle model, depicted in Figure 28, provides

an overarching framework for orienting the overall research process. Design Science

Research serves as an interface and area of action. It takes into account the Environment,

that is to say the context in which the problem to be resolved is situated, as well as

existing resources and constraints that the system imposes. To address the needs of the

Environment, the Design Science Research draws on a Knowledge Base of theoretical

and practical knowledge as well as existing models and methods for creating models. By

considering the Knowledge Base and Environment in the design cycle, new models and

processes are developed. In turn, the processes and models developed are then evaluated

against the needs of the environment. If adequate then a working solution is available, the

problem solved and the new information added to the body of knowledge.

However, even if the solution produced is evaluated to be unsatisfactory, this also

represents new knowledge that may be added to the knowledge base. This new

knowledge may point to problems in the methods, existing theories and models or even a

lack of understanding of the problem environment or the way in which a problem has

been defined. Potentially this may encourage and inform subsequent efforts that yield a more robust or fine-grained description and understanding of the Environment. This knowledge will in turn be incorporated into the knowledge base. Consequently, from a Design Science Research perspective, a failure may yet represent a significant theoretical contribution (Briggs & Schwabe, 2011; Gregor & Hevner, 2013). Design Science Research therefore stimulates an interplay between problem understanding (March & Smith, 1995; Niehaves, 2007) and problem solving (Hevner et al., 2004; Niehaves, 2007) thereby opening up space for reflection and exploration that is amenable to the use of a variety of approaches and a plurality of perspectives.
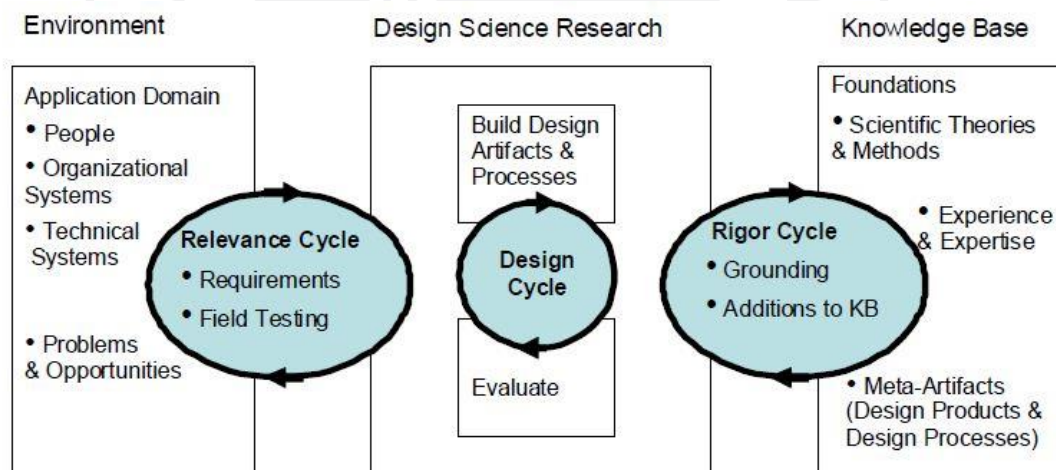
Figure 28.   Three Cycle Design Research Model (Hevner, 2007: 88)

Briggs and Schwabe (2011), builds on Hevner and Chatterjee (2007) three cycle model by drawing on Hevner et al. (2004) and Hevner and Chatterjee (2010) to show how Design Science Research can provide contributions to all four modes of science inquiry, that is to say exploration, experimentation, theory building as well as its

traditional role of applied research by considering existing models in the Knowledge

Base. Their concept is presented in Figure 29.
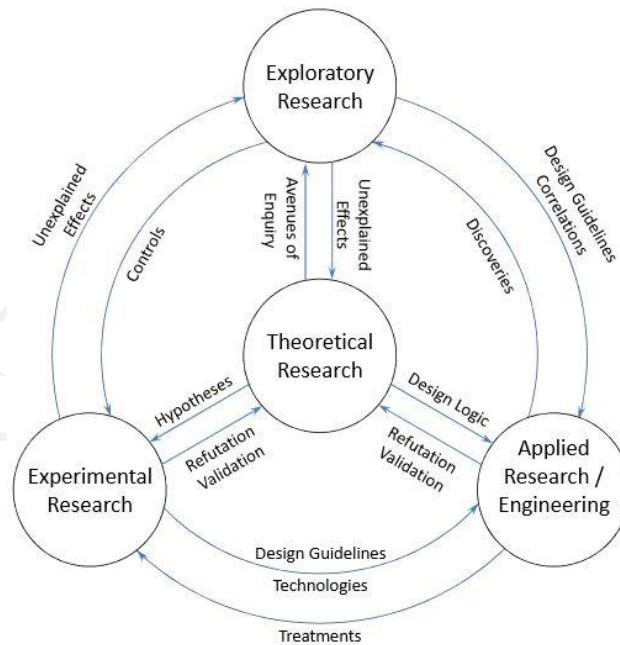
Figure 29.   Four Modes of Scientific Inquiry (Briggs & Schwabe, 2011: 95)

Briggs and Schwabe (2011) argue that this can be done by comparing the

outcome of a Design Science Research intervention with the knowledge on which this

intervention was based. If a new, unexplained result emerges during the problem solving

attempt, this would represent a contribution to exploratory research. On the other hand, if

the problem solving effort is successful, this would provide support or validation of the

underlying theories, and from this perspective a contribution to experimental research

could be claimed. Alternatively, where the problem solving effort met with failure, this

would give rise to the need to develop explanations for the failure, thereby supporting

theoretical research. Finally, if the outcome of the problem solving exercise leads to an

improved outcome over what previously existed then a claim to an applied research outcome could be made.

Table 19, which is based on work by Briggs & Schwabe (2011), presents within the context of Design Science Research, the types of products, standards of rigor, and criteria for research contributions as well as the contributions that each mode of research provides.

On the basis of their investigation of the four modes of design, Briggs and Schwabe (2011) propose an updated version of the three cycle design research model (Hevner & Chatterjee, 2007) to take it beyond its origins as an approach steeped in the engineering orientation. This model is shown in Figure 30 below.

By observing the standards of rigor associated with the four modes of design criteria, Briggs and Schwabe (2011) argue that the rigor cycle proposed by Hevner & Chatterjee (2007) become superfluous. The new model entails three main stages that consist of 1) Discovering Problems and Opportunities; 2) Designing and Building Artifacts and Processes; and 3) Validating Artifacts and Processes. Processes 1 and 2 are linked by a relevance cycle, whereby the relevance of the models and products can be evaluated against the problems to be addressed and the resources that are available. In a similar way Processes 2 and 3 are linked by the design cycle which seeks to ensure that the model is fit for the intended purpose. The new configuration allows the three Processes to be informed by and add to the Environment and the Knowledge Base. This model therefore emphasizes the contribution to the research process made by stakeholders. Figure 31 illustrates how these aspects are employed in this research study.

3.9.1 Relevance Cycle

The research process begins in the Discover Problems and Opportunities segment with the formulation of the research questions and a literature review which provides insights into the knowledge base – theories related to knowledge-based development, cities and their challenge, demographic trends, methods and tools. This aspect of the
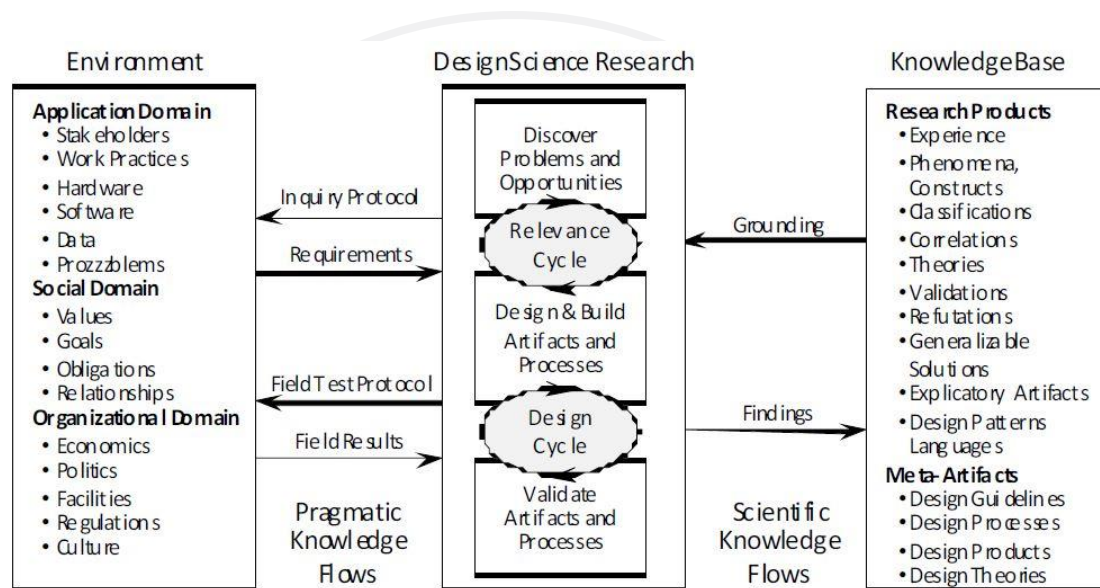
Figure 30.   Modified Design Science Research Model embodying Four Research Modes and non-exhaustive List of Activities and Relationships (Brigg & Schwabe, 2011: 103)

Design Science Research takes place in the relevance cycle. Progressively, these inputs are used to modify and develop the initial UNESCO model. Insights from the environment such as the limited statistical capacity in developing countries and challenges around data collection point to the need for qualitative modeling. Other considerations such as what types of qualitative data or indicators are meaningful and

readily collected inform the model building process. Iterating through the relevance cycle leads to a modified Knowledge Societies Framework, then to a conceptual model and the Maturity Model V1.0.

3.9.2   3.9.2   Design Cycle

During the design cycle we field test the model and reflect on requirements as we iterate between the design and building of the model and processes and their validation.

Two pilot field tests were undertaken in Ethiopia and Thailand. These field tests confirmed face validity of the model but pointed to the need to remove two indicators. The study also revealed common challenges around coordination and information sharing in both cities investigated.

Remaining phases to be undertaken will involve carrying out a Delphi study with experts to validate the model. The Delphi study is expected to involve at least 10 experts in up to three rounds. The validated model will then be used to conduct studies in each of the three selected cities. The findings from the model will be evaluated and it is expected that exploratory and theoretical finding will emerge. Recommendations will be presented to and discussed with a focus group of municipal policy-makers using a knowledge strengths weaknesses opportunities and threats (K-SWOT) approach.

Table 19.   Evaluation Criteria for Design Science Research under the Four Modes of

Scientific Inquiry (based on Briggs & Schwabe, 2011)

Research Modes	Research Products	Standards of Rigour	Criteria for a Research Contribution	Contribution to other Research Modes
Exploratory	Descriptive reports of phenomena, correlates, and contexts where they manifest	Constructs are well defined; Inductions from multiple studies; identifies relation (correlation, inverse, etc.) between constructs	a) New context or phenomena described b) link previous findings, to conceptual saturation,	Provides the basis for all other forms of research inquiry
Theoretical	Deductive nomological theory that predicts and explains variations in a phenomenon	Falsifiable expressions of causal relationships between constructs	Greater explanatory power and parsimony	Anticipates unseen effects; suggests design guidelines and new lines of exploration
Experimental	hypotheses, experimental designs and methods, analyzed data sets	Assess validity (construct, internal, external) inter-subjective concurrence	a) hypotheses comes from theoretical propositions by deductive logic; b) construct validity is well argued; c) experimental design rules out alternative explanations, threats to validity; d) Statistical support e) analyses support the hypotheses, f) novelty	May reveal new phenomena and correlation, improve or support theory, may validate and/or inform design choices & processes
Applied Research/ Engineering	Descriptions of key problem classes; generalizable design goals, constraints, & requirements; solutions useful & generalizable; reference models & prototypes; elements are design theories for solutions	Useful, original, generalizable, validated	Solves important practical problems	Informs other modes of research through discovery, theory development & validation.

3.10   Research Instruments

Four instruments are used in this study: a knowledge city maturity model, a Delphi process and questionnaire for conducting the Delphi study, a city news content analysis coding form, and a policy knowledge strength weakness opportunities and threat (K-SWOT) analysis.

3.10.1 Knowledge City Maturity Model

A knowledge city maturity model based on the UNESCO Knowledge Societies Conceptual Framework is used as a conceptual lens for answering the research question. This maturity model is developed by the researcher using methodologies proposed by Hevner et al. (2004), and Mettler (2009). The current version of this maturity model which included 37 indicators across 9 constructs, derived from UNESCO's Knowledge Societies Conceptual Framework. The maturity model also contains a set of questions that seek to assess where the greatest opportunities and threats exist across the four groups (economic, social, environmental, peace and security) of development goals. The development of this instrument is presented in Chapter 4. The validated maturity model used to conduct the field assessment study of the target cities is included in the Appendix.
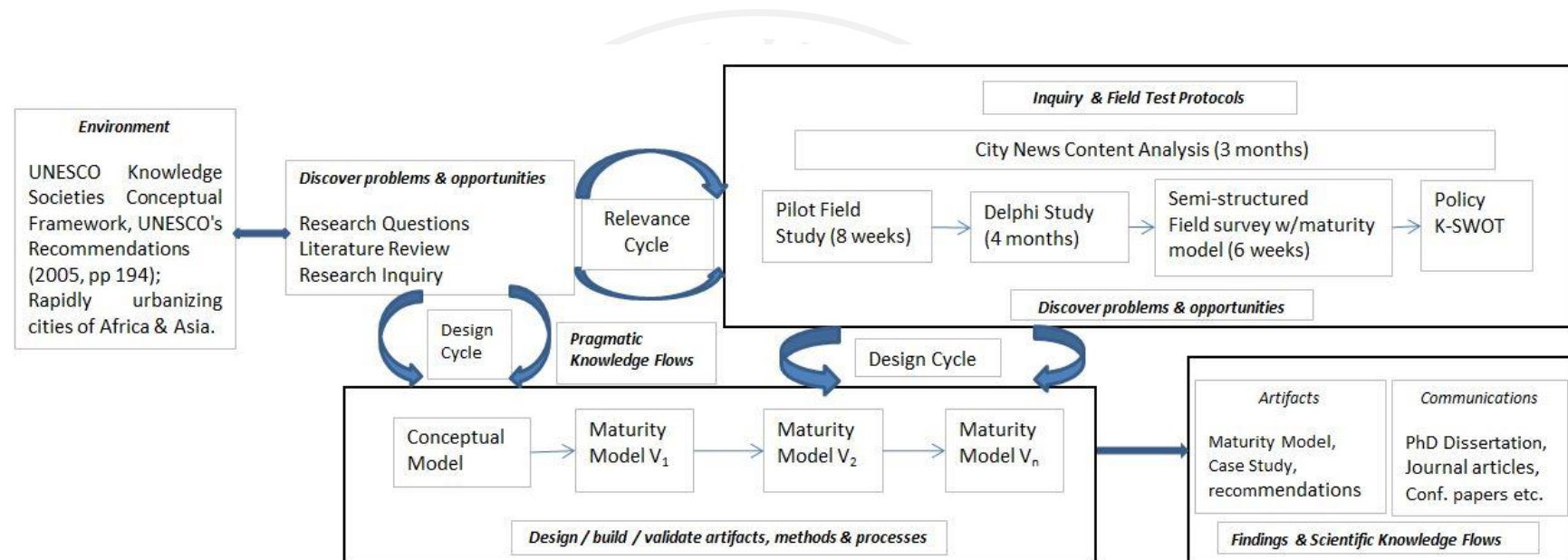
Figure 31.   Research Sequence followed in the Study, Indicative Time Frames and Links to Design Science Research Cycle and Outputs (After Briggs & Schwabe, 2011; Hevner, 2004; Hevener & Chatterjee, 2007)
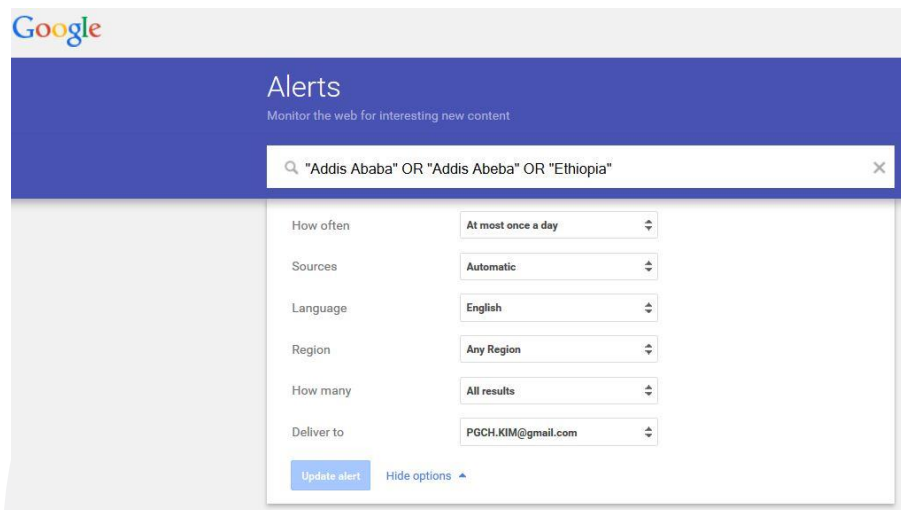
3.10.2 City News Content Analysis Coding Form

Intrinsic to the ontological and epistemological paradigms of pragmatic Design Science Research is the ongoing development of design responses within the problem situation. As the researcher does not live within the problem situation, it is therefore necessary to immerse him into the situation so that a better understanding of both the physical as well as the socio-cultural norms and mores that impact the problem situation can be obtained. Given the limitations on the researcher's ability to travel to the research sites the researcher will use free on-line newspapers to gain a better grasp of the context and evolving developments in the selected cities.

Google's News Alerts service was selected to obtain online newspaper articles about the selected cities. Google was selected as they are the leading online search engine. The alert service enables the user to set the parameters of the news items that are to be retrieved. Figure 32 presents the graphical user interface for setting search parameters. The search parameters selected are discussed below and presented in Table 20.

Search terms: The search term field is set by the user. Search terms used were English-language spellings of the name of the city as well as commonly used variations, along with the city's name in the local language. The name of the country in which the city is located was also included as it was felt that this could provide insight into other factors that could potentially impact the city.

How often: This field enables customization of the frequency of receiving news items. The drop-down menu offers 3 choices, namely i) As-it-happens, ii) At most once a day, and iii) At most once a week.

Figure 32.   Google Graphical User Interface for setting News Alerts Parameters

Option ii was selected as it facilitated receiving search results in a single daily e-mail rather than multiple e-mails which would be more difficult to manage. In addition, this allows the researcher to collect data on a daily basis. The researcher is unaware of the archiving practices of the various sources that would be retrieved by the search so daily checks rather than weekly ones were advisable.

Sources: This parameter offers the choices of automatic, news, blogs, web video, books, discussion and finance. The automatic category retrieves from all of the subgroups, while news retrieves journalistic content; blogs contain personal and institutionally maintained opinion pieces, web video is audiovisual content, books are

printed content, and discussions are generally opinions which may be moderated that have been posted in forums or as comments.

While news stories are expected to benefit from greater editorial oversight, the variety and richness of viewpoints from a range of actors and stakeholder groups point to the benefit of collecting a range of content types. Furthermore, as newspapers in both countries receive considerable government scrutiny, sources outside the "news" categories may provide uncensored viewpoints.

Language: To facilitate data collection only content available in English would be considered.

Table 20.   Google News Alert Parameter Settings for the Retrieval of News Items

	City		
	Addis Ababa	**Bangkok**	**Kampala**
Search term	Addis Ababa, Addis Abeba, Ethiopia	Bangkok, Krung Thep, Krungthep	Kampala, Uganda
How often	At least once a day	At least once a day	At least once a day
Sources	Automatic	Automatic	Automatic
Language	English	English	English
Region	Any region	Any region	Any region
How many	All results	All results	All results

Region: This option allows the search to be restricted to specific countries or regions. As cities provide important connecting points between nations and the rest of the world, allowing content from around the globe to be retrieved can provide insights into the city's international reach and impact.

How many: This provides an option of retrieving "all results" found or "only the best results". As Google does not indicate the criteria it uses to assess "best" the researcher therefore prefers to self-select.

Deliver to: This user-provided field indicates the e-mail address – that of the Researcher - to which the search results are to be sent.

3.10.2.1   Approach to Analyzing City News Content

A thematic content analysis approach will be adopted and the maturity model parameters used as a coding frame. The coding frame will use the 9 constructs in the maturity model and the four international development priority areas identified by the United Nations in the post-2015 Sustainable Development Agenda to examine and classify the search items retrieved. This exercise will be undertaken over a period of 3 months with up to 45 minutes allocated per day, per country. The first 10 days of the data collection period will serve as a pilot phase. During this time an inter-coding analysis will be undertaken with two Programme Specialists from UNESCO's Communication and Information Sector. Aspects of the study such as the news alerts selection parameters and search terms may be modified taking into account factors such as the relevance, quantity and quality of items retrieved.

Both quantitative and qualitative data will be gathered from this exercise. Quantitative data analysis is expected to include descriptive data such as frequencies of constructs and development priorities cited in the news, sources of information, regions and cross-country linkages as well as correlations and possibly other inferential statistical

measures. Qualitative data analysis will seek to explore the nature of the problems and opportunities, identified under each of the constructs in the coding frame. Comparisons of the constructs, both within and across cities will be analyzed.

The content analysis coding form is presented in the Appendix.

3.10.3 Delphi Study

A Delphi study is used to validate the knowledge-based development model. Panel members are drawn from academics and practitioners in the field of knowledge-based development. This Delphi study is expected to take place in three rounds. The criteria for selecting the experts, convergence criteria and details of the questions used are presented in the Appendix. The aim of the Delphi study is to provide face and content validity and to assess the reliability of the procedures used in its development.
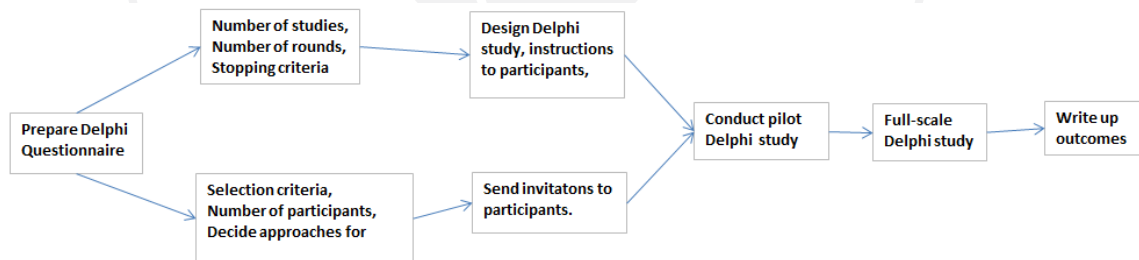
Figure 33.   Key Stages in preparing, conducting and analyzing the Delphi Study (Day & Bobeva, 2004; Donohoe et al., 2012; Linstone & Turoff, 2002)

The Delphi rounds are concerned with assessing whether i) The qualitative indicators and criteria adequately covered the model constructs, ii) The maturity stages in the model are distinct and build on each other; iii) Other constructs or indicators should

be incorporated into the model; iv) The plausibility of the proposed scenarios in the model. Figure 33 identifies key stages of the Delphi study.

3.10.4 Knowledge Strengths Weaknesses Opportunities Threats (K-SWOT) Analysis

This analytical process follows the methodology developed by Sharma et al. (2009) based on Zack's (1999) approach to developing a knowledge strategy.

A focus group of policy-makers knowledgeable about the city and preferably from the city to be assessed is convened. An overview of the model is presented. For each of the 9 primary constructs in the knowledge-based development maturity model, the group of policy-makers are then invited to discuss the internal and external factors that in their view could enhance the city's ability to enhance its rating for each of the given constructs. Internal factors are considered to be the city's strengths and weaknesses while external factors relate to opportunities and threats that could impact the city's ability to perform on the given measure. Each of these four components are ranked on a scale of 1 to 10 and a net score for strengths (strengths minus weaknesses) and for opportunities (opportunities minus threats) evaluated. Policy-makers are also invited to identify additional constructs that they consider to be relevant to the city's knowledge maturity but which are not included in the model.

Following this exercise, the case study for the city is prepared based on the use of the full set of 35 indicators and discussed with the policy-makers. This discussion seeks to critique the recommendations made based on the case study, and to identify reasons for divergence and convergence of viewpoints as well as gaps within the model. The policy-

makers then complete an evaluation form to assess the session and share final comments.

Questions explored with the policy-makers include:

1) In your view what are the three most important challenges that your city faces?

2) How useful is the concept of a knowledge city to enabling your city to achieve address these challenges? (scale 1 to 5)

3) How would rate each of the 9 constructs in the model on its ability to positively enable your city to improve its socio-economic situation?

4) What additional construct(s) do you think should be included in the model? Please explain.

5) Investing in projects linked to which three areas of the model do you think would bring the greatest benefit to your city? What actions would you suggest and where/how would you carry them out?

6) How has participation in this session benefitted you?

7) What will you do differently as a result of this workshop?

Table 21.   "Foundation" Constructs that Contribute to the Maturity of Knowledge Societies

Dimension	Claims based on the literature	Qualitative Measures
Human needs and rights	Respect for human rights establishes societal norms that promote social cohesion, provide ethical and value frameworks that inform governance processes and which shape societal choice making and strategic direction in conformity with international law thereby enhancing predictability. In this regard accountability, awareness, non-discrimination, participation and structural measures play key supporting roles. Human rights & needs enhance creation and development of social, human and structural capital.	To what extent is information on the city affairs made available to citizens? What is the level of civic and institutional awareness of human rights?; What measures and redress against discrimination exist?; To what extent is participation in public life enabled? What mechanisms has the city established to protect & promote human rights?
Pluralism	Enabling social diversity to become a social good through active interventions across political social, economic and educational systems ensures the rights and place for all citizens and creates social cohesion. In today's globalized heterogeneous societies pluralism is central to sustainable growth and development and creation of social capital.	To what extent do visible minorities (racial and ethnic groups, persons with disability) find it easy to live in the city? To what extent are immigrants integrated? To what extent is there openness to non-mainstream views and values? To what extent can broad-based support for strategic goals while addressing stakeholder conflicts?
Inclusion	Allowing segments of their population to remain impoverished, un-empowered and uninvolved in civic/social life prevents a society from leveraging and benefitting from the full breadth of its human capital. This represents a high opportunity cost and may also trigger social instability and unrest. Enhances the development of human, social and structural capital.	To what extent is the city support access to safe and decent work? To what extent is the participation of women in professional life supported? To what extent can citizens access basic services? To what extent are all citizens able to exercise civic and political rights?
Equity	The ability for all members of a society to access economic opportunity, to be fairly treated with regards to the proportion of societal costs and rewards they bear and to be able to consistently access quality social services – e.g. health and education – are good predictors for performance across a range of economic and non-economic measures. Equity also implies the development of measures to enable/advocate for vulnerable groups. Enhances social, human and structural capital.	To what extent are citizen's basic needs met? What measures exist to share benefits and manage adverse impacts? To what extent are gender-sensitive policies enacted? To what extent is information on accessing social services made available?
Openness	Openness contributes to improved decision-making, creativity and innovation by broadening participation of citizens in decision-making, providing access to a greater ideation pool and supports creation and access to knowledge-based goods, services and infrastructure at a lower average cost. Enhances social, human and structural capital.	To what extent are citizens involved in setting strategic goals and evaluating their outcomes?; To what extent are broad-based partnerships used to achieve development targets? To what extent does the city promote open models?

Table 22.   "Principle" Constructs that contribute to the Maturity of Knowledge Societies

Dimension	Claims based on the literature	Qualitative Measures
Freedom of expression	A climate that fosters the public dissemination of diverse viewpoints, their interrogation, comparison, validation, absorption and remixing to create new ideas and knowledge is fundamental to the development of knowledge societies and economies. Enhances social and relational capital.	To what extent does a climate for free discussion and exchange exist? Do sustainable channels for diverse & independent viewpoints exist? Does the media practice high professional standards? Are public service broadcasters delivering on their mandate (effective, transparent, independent)?
Universal access to information and knowledge	Promoting universal access to information and knowledge provides a competitive advantage, enhances efficiency, effectiveness, participation and socio-economic well-being. Effective transport infrastructure for movement of people, goods and services; access to local and global digital communications as well the requisite skills are crucial. Enhances social, human and structural capital.	To what extent are transport network & infrastructure effective? To what extent can citizens access government services on-line? To what extent is city ensuring affordable access to Internet services? To what extent is capacity of citizen's to utilize networks and content being developed?
Cultural and linguistic diversity	Fostering cultural and linguistic diversity provides a means for reaffirming the cultural identity and self-worth of all citizens. It supports the transfer of local knowledge vital for survival – which may not yet be known to the scientific community. Linguistic diversity can support the cross-fertilization of ideas leading to creativity and innovation. Cultural expressions can be leverage to advancing the city's socio-economic well-being and vitality. Enhances social and human capital.	To what extent are expressions of the city's diversity and heritage promoted? To what extent is the use of local regional and international languages promoted? To what extent are cultural industries promoted and valued as sources of socio-economic growth?
Education for all	Human capital is the key to success – economic, social, and environmental – in knowledge societies. Cities which are best able to develop, attract, retain human capital and equip them with the skills and attitudes to effectively participate as global citizens in the glocal world are likely to do better in solving their problems, setting and achieving development targets. Enhances social, human and structural capital.	To what extent is the city nurturing and investing in its human talent? To what extent are efforts to systematically and strategically attract talent? To what extent is the city supporting global citizenship education? To what extent is the city supporting development of media and literacy skills among its citizens?

3.11 Ethical Concerns

Bell and Bryman (2007) identify ten principles that a researcher must address in order to ensure that their research practices are ethical. These principles are presented in Table 23 below. The interview protocol used in the research process provides disclosures, outlines the purpose of the research and informs the respondent of their rights and how data is to be used. Explicit requests for their permission to undertake various actions, such as including their names in the study and to record interviews are also made. An overview is provided of how this study takes into account these ethical principles.

Table 23.   The 10 Key Principles of Research Ethics (Bell & Bryman, 2007 adapted

by Easterby-Smith et al., 2008: 134)

Ethical Principles to be Observed in Research
Ensure that no harm comes to participants
Respecting the dignity of research participants
Ensuring a fully informed consent of research participants
Protecting the privacy of research subjects
Ensuring the confidentiality of research data
Protecting the anonymity of individuals and organizations
Avoiding deception about the nature or aims of the research
Declarations of affiliations, funding sources, and conflicts of interest
Honesty and transparency in communicating about the research
Avoidance of any misleading or false reporting of research findings

3.11.1 Influence of Bell and Bryman (2007) on this Research

The maturity model contains constructs such as "freedom of expression" and "human rights" which are regarded as highly contentious and politically sensitive in some

countries. Past and current events in the three countries where data is being collected for this research suggests that discussions around these aspects, particularly if perceived as critical of the authorities, could attract unwelcomed attention both for the informants and the researcher. Prospective participants were broadly informed of the subjects to be discussed and had the option to decline to participate and interviews were conducted in settings in which participants could expect privacy. Further, the interview protocol explicitly allows participants to respond only to those questions which they were comfortable in answering, to decide whether recording took place and to stop the recording at any time. All data obtained was digitized, encrypted and maintained under the researcher's control.

In various instances, access to informants was obtained through a trusted intermediary. To respect the trust shown to the researcher and to ensure that the relationship between the intermediary and the informant was not impaired, the researcher sought to be informed of and observe all necessary cultural formalities and protocols.

The Researcher's conditions of employment with UNESCO and the document *Standards of Conduct for an International Civil Servant* restrict the researcher from overtly disclosing/volunteering in the course of this research his relationship with the Organization, to avoid a presumption that he is acting on their behalf. In cases where asked by participants, the Researcher clarified that although an employee he was acting independently. As some informants were recruited from specific communities on Linkedin the Researcher's employment status was known, in such cases his role as an independent actor was asserted.

In reporting on the research, limitations are noted and the misrepresentation of facts is avoided. To support rigor, methodological processes are established and followed. When practice reveals a need to amend the procedures adopted, these changes are noted accordingly.

3.12   Research Reliability and Validity

This study employs a mixed methods design which brings together model building with qualitative as well as quantitative approaches to assess the use and application of the model developed in the problem situations it seeks to investigate. Issues of validity and reliability are relevant to this research as it seeks to develop a new instrument for use in the context of knowledge-based development. As pointed out earlier, knowledge-based development offers the promise of supporting solutions to strategic problems facing cities. Consequently, the ability of the model to measure the constructs that it seeks to assess with accuracy and precision are critical markers of its usefulness and applicability. An overview of validity and reliability is presented and their relevance as well as how these aspects are addressed in the various phases of the research project is presented.

3.12.1 Overview of Validity and Reliability

Gilbert (2003) and Bhattecherjee (2012) define reliability as consistency from one measurement to another while they define validity as the accurate measurement of a construct in which the researcher is interested. Figure 34 below provides an introduction to this discussion by providing a pictorial contrast of reliability and validity.

Figure 34.   Highlighting the Differences between Validity and Reliability

3.12.2 Reliability

Reliability is concerned with the repeatability and consistency of the data collection techniques and analytical procedures used by the researcher (Bhattecherjee, 2012; Creswell, 2009; Gilbert, 2003; Saunders et al., 2012). Repeatability suggests that the context/circumstances – physical, socio-cultural-emotional-psychological atmosphere – as well as the research treatment that was applied – can be recreated in the same way. Consistency suggests that there are no major fluctuations over time in the phenomena or context that is being investigated. The degree of control that the researcher may have during the investigation process is dependent on the phenomena being investigated and the research design selected, but, in general, this control is lower when dealing with social research contexts such as wicked problems.

When there is a high level of repeatability and consistency, findings obtained after re-measuring are likely to be very similar to those obtained during the first measurement. Conversely, a low level of repeatability and consistency would likely reveal significant

changes between earlier and later measurements. Influences such as subjectivity or bias of the researcher or respondents, imprecise or ambiguous questions and consulting participants with limited knowledge and interest in the research topic, as well as errors made by the researcher or respondent, are identified as threats to reliability in research (Bhattecherjee, 2012; Creswell, 2009; Gilbert, 2003; Saunders et al., 2012).

Yin (2014) emphasizes the role of documenting processes and procedures as a means of minimizing errors and bias as well as ensuring the replicability of all phases of the study. This involves the development of a research audit trail.

Creswell (2009) quotes Gibbs (2007) in referring to qualitative reliability which he defines as the consistency in the approach adopted by the researcher in approaching different projects and researchers. Accordingly, by establishing procedural checks and following them consistently a high level of qualitative reliability can be assured. Creswell therefore suggests using measures such as checks of inter-coder agreement; routine and regular rechecking of notes; as well as establishing and maintaining the definitions of variables and constructs throughout the project.

Bhattecherjee further distinguishes between four forms of reliability, namely inter-rater reliability, test-retest reliability, split-half reliability and internal consistency reliability.

Inter-rater reliability – This aspect of reliability is concerned with assessing the difference in observations reported when the same phenomenon is studied by two or more independent observers; the greater the difference in the observations, the lower the inter-rater reliability. The differences in observations could result from the observers

using different criteria, definitions or performing the observations in different ways. Ensuring that all observations take place under similar conditions and that observers follow similar procedures as well as having shared understanding and definitions of the constructs investigated, and make measurements in the same way will lead to greater coherence in the findings.

Test-retest reliability – This is an assessment of the consistency of subsequent measurements. If we assume that there are no changes in the phenomena being studied, repeating the test or intervention should yield virtually identical results.

Split-half reliability – If a particular test composed of various elements is applied to the phenomena under study it would be reasonable to expect that by randomly assigning the components into two equal halves and applying both to the phenomena the overall results should be the same obtained as when the entire test is applied. Under a split-half reliability test, the correlation between the responses obtained for each randomly assigned half is assessed. So having similar levels of correlation would suggest that split half reliability is present.

Internal consistency reliability – This provides a statistical measure that is somewhat similar to the split-half reliability. In this case, if a construct is decomposed into its constituent parts, it would seem rational that the responses across these constituents would be similar. The greater the extent to which these responses deviate from each other the less internal consistency they exhibit. The greater the deviation, the less likely it is that these constituent parts are measuring the same construct (characteristic, skill or quality).

3.12.3 Validity

Validity, often referred to as construct validity (Bhattecherjee, 2012; Saunders et al., 2012), provides an assessment of the extent to which the specific concept or construct of interest to the researcher is being measured (Bhattecherjee, 2012; Saunders et al., 2012). Validity therefore provides insights into how well the theoretical concepts that are being investigated are reflected in the operational measures that will be used to assess the phenomena under study.

Bhattecherjee, (2012) Cresswell, (2009), Gilbert, (2003) cite two major aspects of validity, namely external and internal validity. External validity primarily focuses on the extent to which findings and inferences from the research activity can be applied to other situations. Within the positivist perspective the ability to extend findings to other domains, that is to say generalizability, is considered to be a mark of validity. However, in line with the interpretivist perspective of subjective, situated world views, less emphasis is placed on the notion of generalizability within qualitative studies; rather, the concept of transferability is often preferred by some researchers (Guba & Lincoln, 1989, 2005).

Internal validity is focused on a) The rigorousness of the design of the research, for example, the extent to which procedures are defined as well as implemented and b) The extent to which alternative explanations for the relationships that are studied in the research have been explored. Saunders et al., (2012) identify a number of factors that can erode internal validity. These include: a) Changes in the perceptions of participants as a result of events that have taken place, b) Behavioral changes as a result of participating in

a test, c) Changes in behavior due to the introduction of new processes or technologies, d) Participants inability to complete their participation in the study, e) External changes unrelated to the study that materially affect the behavior and attitudes of participants, and f) Lack of clarity around causality.

Quoting Creswell & Miller (2000), Creswell (2009) qualifies validity in the context of qualitative research as the accuracy of findings when viewed from the perspective of the researcher, persons participating in the research study or persons who may come to learn of the research outcomes. Validity in the qualitative context thus becomes synonymous with authenticity, credibility and trustworthiness (Creswell, 2009). Similarly, Bhattecherjee (2012) emphasizes the role of dependability, credibility, confirmability and transferability. In his view dependability in the interpretivist tradition is the corollary of reliability in the positivist tradition and seeks to ensure that multiple researchers arrive at the same conclusions, that is to say, test-retest stability is present. Credibility, in Bhattecherjee's view, is akin to internal validity and a measure of the extent to which inferences drawn are believed. Here methodological approaches such as data triangulation and the maintaining of accurate and meticulous records of decisions are viewed as important contributors. Confirmability is concerned with achieving a high level of agreement between the inferences made by the researcher and by participants who contributed to the study. Finally, transferability is used by Bhattecherjee in the same manner as generalizability is used by Creswell. This feature is similar to that of external validity and is concerned with the extent to which the findings are thought to hold in other places and circumstances.

As in the case of reliability, Creswell (2009) advocates for procedural rigor, going into considerable greater depth than Bhattecherjee in suggesting some approaches that can serve to enhance the validity of the research process. These approaches include: a) using different sources of information or strategies of information collection and combining them to gain a more holistic understanding, of the research interest, a process known as triangulation; b) Having participants assess the final outcomes of the research effort or conduct follow-up interviews to receive comments on findings; c) Developing rich and detailed descriptions of findings and other aspects of the research subject; d) Encouraging reflexivity by the researcher in order to enhance awareness of personal biases, assumptions and world views that may influence the research and its conclusions; e) Presenting contradictory or unexplained findings that have emerged during the research process; f) Increasing familiarity and deepening awareness of the research situation by spending time within its context so as to gain a heightened understanding and awareness of meaning; g) Explaining the research that has been undertaken to others who have not participated in the project and responding to their questions; and h) Involving an external auditor to review the entire project and check for errors.

Bhattecherjee (2012) and (Saunders et al., 2012), cite four aspects of construct validity, namely face validity, content validity, convergent validity and predictive validity. These are detailed below:

Face validity – is an expert assessment of the reasonableness of the suitability of the selected indicators to measure a construct of interest. Bhattecherjee (2012) advocates

that when the conceptual issues being investigated are highly abstract, that expert panels be used to review and advise on these indicators.

Content validity – shares some similarities to face validity. It serves as a means of assessing the extent to which the construct of interest has been adequately covered by the measuring model. Typically, content validity is achieved through the literature review, which may be supplemented by the assessment of an expert panel who seeks to assess whether each measurement of the construct is "not necessary", "useful but not essential", "essential" (Bhattecherjee, 2012; Saunders et al., 2012).

Convergent validity – seeks to assess how closely a measure converges to the construct that it is seeking to measure. Related to convergent validity is the concept of discriminant validity which seeks to assess the extent to which related constructs are not measured. Statistical measures such as bivariate correlations and exploratory factor analysis are necessary for assessing this form of validity.

Predictive validity - examines the ability of measures to support predictions; this is referred to as predictive validity or criterion-related validity. Statistical tests such as correlations are used to assess predictive validity and to assess hypotheses and relations in nomological models (Bhattecherjee, 2012; Saunders et al., 2012).

3.12.4 Assessing threats and remedies to research validity and reliability

3.12.4.1   Procedures Adopted to Ensure Validity and Reliability

This research focuses on the development, validation and application of a maturity model to selected cities of the developing world. The following

discussion identifies the various threats to reliability and validity for each phase of the research and efforts undertaken to mitigate them.

3.12.4.2 Development of the Maturity Model

The development of the maturity model was oriented by the guidelines of Mettler (2009) and Hevner et al., (2004) and informed by recommendations from Wendler's (2012) systematic review of the development of maturity models. The maturity model also has instructions on how it is to be used, includes an example and provides definitions for the concepts/constructs it uses. Following and documenting the process and explaining the choices and underlying rationale of the author provides an audit trail which subsequent researchers, reviewers and users can follow. These factors assure the reliability of the model and contribute to the inter-rater reliability during its use.

Population of the model was conducted using the extant literature. Scholarly as well as reputable grey literature sources spanning different disciplines were used to identify indicators and the methodology for generating scenarios in the model. This process is fully described and illustrated in Chapter 4. These processes enhance content validity.

3.12.4.3 Validation of the Model

Validation of the model involves three phases: a) presentation to subject experts at UNESCO to receive their comments, b) pilot testing of the model in one of the selected cities and c) use of the model with a Delphi panel. All three approaches serve as successive, iterative approaches to refinement and provide a way of assessing mainly the

content and face validity of the model and achieving triangulation. The pilot testing within a selected field site provides a means of assessing the model's relevance and thus its credibility. Clear criteria are established *a priori* for termination of Delphi.

Purposive selection and snowballing is used to select persons to participate in the validation of the model. A set of relevant criteria are established and prospective participants identified. Including participants from different stakeholder groups allows a variety of perspectives to inform the process. In addition to ensuring that knowledge experts are selected aspects such as time availability and interest of these potential participants in the exercise are taken into account to ensure that interviews take place and are completed, and that the participants are engaged in the process. The development and use of research protocols provides structure, uniformity and furthermore, the taking of notes and recording of sessions and the sharing of these with the participants support accuracy and credibility of findings. These factors contribute to the reliability and validity of the exercise.

The success of the Delphi technique is highly dependent on the quality of the experts involved in the study, the continued participation of experts throughout the study and ensuring a panel size of between 10-18 persons. To ensure that these quality criteria were met, extensive efforts were made using multiple criteria - academic qualifications, publications, experience, knowledge of developing country context, and proficient use of English - to compose a strong panel. To address the problem of drop-out, a large number of participants were enrolled to maintain the number of participating experts in at least the range of 10 -18 persons. Furthermore, the study was designed in advance and

conducted electronically so that rounds could be completed quickly and the interest of participants sustained.

3.12.4.4 Field testing of the Model

The field testing of the model involved the purposive selection of qualified and knowledgeable participants and interviewing them using the maturity model. An interview protocol for conducting the interviews was developed and adhered to and interview findings shared with participants to confirm their veracity. To gain greater insight into the context of each city the researcher read on-line newspapers gathered on a daily basis through Google news alerts.

A coding frame based on the maturity model was used to provide an alternative means of assessing the knowledge maturity of the city over a 60-day period. An inter-coder reliability test using two independent researchers trained to code in line with the definitions in the model was used to support reliability and validity.

The discussion of the researcher findings and recommendations with a select group of policy-makers during the K-SWOT exercise provided a final check on the model and its relevance.

The collection of both qualitative and quantitative data within the maturity model, as well as their subsequent analysis, was used to support triangulation and to obtain richer insights into the problem situation.

3.13 Limitations

The model proposed contains nine constructs and over 30 indicators. Testing of the model is envisaged with a relatively small number of purposefully selected respondents. This study is not expected to generate sufficient statistical data to assess predictive and convergent validity of the model.

The terms city/urban and rural are complex and multi-disciplinary concepts without globally-agreed definitions (Rashed & Jürgens, 2010; UNDESA, 2014). While cities provide a staging ground for important economic, social, political and environmental activities, a large part of the success of cities – access to food, trade, human capital etc. – is dependent on stakeholders, infrastructure, processes and products that are outside the boundaries of the city. So the rural and urban are often closely intertwined. Persons who work in cities may reside beyond city boundaries for a variety of reasons and commute to jobs in the city. Similarly, diaspora through their remittances, knowledge transfers and political activism may create significant changes in cities from a distance that may not always be readily visible (Arizpe et al., 2000; Lisi & Biondo, 2013; Tyson, 2011). Thus cities may cluster or subsume effects that are not necessarily generated or attributable to them.

A rigorous and transparent approach was used in justifying the selection of Addis Ababa and Kampala as suitable sites for exploring the challenges that cities in Africa are likely to face. However, some historical factors may possibly restrict the comparability and transferability of findings from Ethiopia to other African countries. With the exception of a five-year period from 1935 to 1940, when Ethiopia was occupied by

Italian military and the Emperor sent into exile, the country has been able to maintain

self-rule for over 3000 years (Akpan, 1985; Chenntouf, 1993). On the other hand, all

other Sub-Saharan countries in Africa with the exception of Liberia have been colonized

by European powers (Akpan, 1985). The colonization experience is thought to have

created power relations and structures that continue to perpetuate past dependencies

(Mazrui, 1993; Sow & Abdulaziz, 1993). For example, while Ethiopia continues to

strongly emphasize the use of national languages in its educational system and

government service, other Sub-Saharan African countries give greater emphasis to and

focus on the languages of the colonial era (Mazrui, 1993; Sow & Abdulaziz, 1993). In

addition, Addis Ababa's role as the political capital of Africa (UNECA, 2014), due to the

presence of the African Union, the Economic Commission for Africa and more than 100

embassies and UN offices, provides it with characteristics that are globally distinctive

(Hector, 2009). Further, Ethiopia is the origin of the major tributary of the river Nile. The

government of Ethiopia is currently undertaking major infrastructure investments to

capture this river's hydro-power potential to meet the needs of the country and to export

the surplus to neighboring countries.

Administratively, Addis Ababa is a chartered city with the same level of

administrative authority as a Federal state and is thus able to exercise a high level of self-

autonomy. In contrast, Kampala like many sub-Saharan cities is subject to the whims of

the national government who exercise considerable control over the city (Green, 2012;

Goodfellow & Titeca, 2012; Goodfellow, 2012). In Kampala the actions of the national

government have delayed decision-making and prevented the implementation of an effective urban planning and management programme.

The Design Science Research perspective adopted contends that reality is situational. In order to fully comprehend the reality of the situation the researcher must therefore be present in the problem situation to understand its past, present, aspirations, cultural dimensions, belief systems and the physical reality amongst other nuances. The relatively short time spent in the specific sites for data collection therefore presents a limitation to obtaining these insights. However, by drawing on the researcher's past experiences in Africa and Thailand, the use of online newspapers and contacts with colleagues from these countries and by being mindful of these challenges and reflexive in the inquiry processes, the impact of these limitations may be reduced.

The focus of this research is on gaining insights into complex issues – social and economic inclusion, sustainable development, peace and security – which are dynamic wicked problems that resist resolution. Adopting the maturity model as a lens of inquiry based on UNESCO's Knowledge Societies Conceptual Framework provides a means of making sense of what is going on. However, this lens of inquiry, by its very definition, makes choices about what is important and relevant. Consequently, it implicitly rejects as unimportant what is not contained within it and therefore misses out on other potential interpretations and sources of meaning.

Although UNESCO's Knowledge Societies Conceptual Framework espouses an outlook that is egalitarian and inclusive, the research is largely informed by, and therefore privileges, the views of elites and experts. While the research does seek to bring different

stakeholder views into perspective by interviewing policy-makers, academics and representatives of the private sector, civil society and international organizations, these groups nevertheless have specific agendas which they advocate and do perpetuate forms of elite capture.

Gilbert (2003) highlights bias and selectivity in editorial policies – how information and events, persons, places etc. are portrayed as well as what is included or excluded from coverage – as amongst the issues that researchers must consider when using media content in research. Gilbert also points to factual and technical errors and distortions, whether inadvertent or intentional, as well as the intended audience and their socio-cultural context who the media content is intended for as aspects that may impact the quality of research and the ability of the researcher to 'read' reliably, use and accurately interpret or make sense of media content. These challenges are perhaps increased when media content such as blogs and videos, and other user generated formats that may speak authoritatively, are created without reference to professional journalistic criteria such as objectivity, proportionality and humanity (White, 2008).

Other limitations also arise from the fact that only content available on-line and in English is sourced for the three cities. In Uganda and Ethiopia most media content is distributed in local languages on radio and in print.

To overcome these limitations related to issues of bias and selectivity, the researcher seeks to gain insights from persons knowledgeable about the three cities regarding the journalistic reputation of each newspaper included in the sample to factor into the analysis influences such as their political stance and target audiences.

When possible the coverage of a news item in multiple media sources are compared; however, as many news channel may depend on a single wire service as their source, this may not provide a reliable cross-check.

The relatively high cost of Internet access to incomes in Uganda and Ethiopia, coupled with low levels of persons completing secondary education (see Table 24), suggests that English-language news media is targeted to elites, diaspora and foreigners. Consequently, the content portrayed may not accurately reflect the experiences or perspectives of the majority of citizens.

Table 24.   Literacy and Secondary Education Rates for Target Countries (Adapted from UNDP, 2014: Table 9, p. 193)

Country	Literacy Rate (15 years and older, 2005 – 2012)	Literacy Rate (15 – 24 years old 2005 – 2012)	Population with at least some Secondary School Education
Ethiopia	39	55	12.5
Thailand	93.5	98.1	38.1
Uganda	73.2	87.4	28.8

3.14   Research Assumptions

This research makes several assumptions. Firstly, that UNESCO's Knowledge Societies Conceptual Framework, Castell's work on informational cities and the other literatures in knowledge-based development provide a comprehensive and sound theoretical basis for this work. It is also assumed that the concepts identified are universally applicable and understandable in the cities to be investigated.

Secondly, the Researcher assumes that the use of the extant literature to identify indicators for the model coupled with the combined use of individual experts, a Delphi panel and field tests are sufficient for validating the model.

Thirdly, the Researcher assumes that knowledgeable experts proficient in the use of the English language will be found in all of the countries across all stakeholder groups identified as relevant for this research study. Further, that the regular reading and review of on-line newspapers will provide adequate sensitization of the researcher to the problem situation for the purposes of the study.

Periodic meetings with persons native to the cities under study employed at UNESCO and known to the researcher were also held to discuss the news items selected and to gain additional insights into the news items, foreign language terms and other references included in the news articles.

CHAPTER 4

BUILDING THE MODEL

4.1   Overview

This chapter presents the process of transforming UNESCO's Knowledge Societies Conceptual Framework into a maturity model that can be applied to cities to assess their knowledge maturity.

The model is developed by addressing the critiques presented in the literature review of the UNESCO Knowledge Societies Conceptual Framework. The model building process commences by developing links between the Knowledge Societies Conceptual Framework and intellectual capital from which an initial conceptual model is developed. This intermediary model is inspected, contrasted and informed by earlier models reviewed in the literature, and a new conceptual knowledge-based development model synthesized. From the literature, the constituents of the constructs in the Knowledge Societies Conceptual Framework are identified. Using Mettler's (2009) framework of decision parameters and Hevner's (2004) Design Science Research process a maturity model is elaborated. A generic set of questions based on the Post-2015 Sustainable Development Agenda (UN, 2014) that seek to support probing and the identification of context-specific challenges and opportunities is prepared and appended to the maturity model.

4.2   Revisiting the Critique of UNESCO's Knowledge Societies Conceptual Framework

In the critique of UNESCO's Knowledge Societies Conceptual Framework, a number of limitations to the operationalizing of this framework were noted. By comparing the UNESCO model with other models reviewed and critiqued the following measures were identified to address these limitations:

i.   Establish or demonstrate plausible links between UNESCO's conceptual framework and knowledge-based development paradigms such as intellectual capital;

ii. Develop a conceptual model which links input, outputs or processes to desired strategic goals;

iii. Empirically demarcate or situate the societies that UNESCO seeks to assess so that they may be identified observed or measured;

iv. Identify indicators from the literature for the constructs contained in the UNESCO framework as well as the target indicators or measures of societal challenges to be addressed in knowledge societies; and

v.   Validate this newly developed model.

4.3   Linking UNESCO's "Foundation" and "Key Principles" to KM

UNESCO's assertions regarding its foundation and key principles have legitimacy when viewed against the backdrop of the Organization's mandate and international

human rights law. What scientific support exists for these assertions in the theoretical paradigms of Knowledge Management?

Intellectual capital, which was introduced in Chapter 2, provides a useful Knowledge Management conceptual frame for examining UNESCO's assertions. Intellectual capital refers to the intangible assets - such as the skills and knowledge of employees, intellectual property, and relationships with creditors and customers - that may be leveraged to generate wealth for the firm (Edvinson & Malone, 1997; Johnson, 1999; Sharma et al., 2008; Yi-Chun & Yen-Chun, 2010). Intellectual capital is viewed as having three constituent elements - human capital, relational or social capital and structural or organizational capital (Johnson, 1999; Roos et al., 2001; Yi-Chun & Yen-Chun, 2010). Human capital is the knowledge (tacit as well as explicit), abilities and capacities within and used by the individual; relational/social capital is the knowledge embedded in and available through social networks, while structural/organizational capital refers to the codified processes, infrastructures, values and systems for making decisions and delivering goods and services and for setting and achieving goals.

While the foregoing authors focus on the firm, the World Bank (2006) has sought to apply the intellectual capital concept at the national level. The World Bank characterizes intellectual capital as the labour force's skills and know-how (human capital), degree of trust among people in the society and their ability to work together towards common purposes (social capital) and governance elements such as an effective judicial system that contributes to boosting the socio-economic life (structural capital).

The foundations and key principles expressed in the UNESCO vision of Knowledge Societies are correlated with the constituents of intellectual capital as described by the World Bank but go well beyond these in considering non-economic and social aspects. For example, the foundational principles of human rights, inclusion, diversity and participation can all be seen as contributing to strengthening societal/relational capital and therefore facilitating the human interactions necessary for creating new knowledge. As mentioned in the literature review there is also growing work by noted economist and other academics such as Sachs (Helliwell, Layard & Sachs, 2012), Sen (1999) and Stiglitz (2012), amongst others, who endorse and provide face validity, that is to say expert assessments of appropriateness and suitability, for the relevance of the constructs in the UNESCO Knowledge Societies Conceptual Framework.

On this basis, I therefore posit that the Knowledge Societies model proposed by UNESCO, though developed and grounded in the philosophical and normative perspectives of international human rights laws, offers strong causal contributions to the development of intellectual capital and claim face validity. In the following section KM processes are examined within the context of UNESCO's ongoing work that may provide insights into how the intellectual capital of societies may be leveraged.

4.4   UNESCO's 4 "Building Blocks" Identifying Societal Level Knowledge Processes

The four UNESCO building blocks of knowledge creation, knowledge preservation, knowledge dissemination and knowledge utilization reflect processes readily observed in many KM process cycles at the organizational level; for example the Wiig KM Cycle(1993), Meyer and Zack KM Cycle (1996), McElroy Cycle (1999) and the Bukowitz and William KM Cycle (2000) (Dalkir, 2011). UNESCO seeks to apply these processes at the societal level through programmes consistent with the foundation and key principles of the Knowledge Societies Conceptual Framework adapted to societies in their specific local contexts. We now explore how UNESCO has been operationalizing societal level processes in these four knowledge management areas as well as relevant theoretical support in the academic literature.

4.4.1   Knowledge creation - UNESCO'S Creative Cities Network

Nonaka and Takeuchi (1995) described knowledge creation as a social process between individuals involving multi-directional, interactive and spiraling knowledge transformations. In firms or organizations seeking to create knowledge, Nonaka and Takeuchi argued that it was necessary to develop processes that could amplify the knowledge creation processes among individuals and to then make this knowledge widely available for use within the firm. While a useful model, the knowledge required to address a particular problem, especially those involving a range of actors with different motivations and objectives is often not well understood. Social heterogeneity may further

amplify ambiguity and so the solution finding process requires that stakeholders engage, recognize and resolve contradictions and conflicts. Social knowledge processes are therefore fundamentally dynamic (Cook & Brown, 1999; Engeström, 2001). Along with Nonaka and Takeuchi's spiral, concepts such as Ba spaces can provide insights into how social interactions and exchanges can be enhanced to optimize the co-creation of relevant knowledge.

The Creative Cities Network (UNESCO, 2012) fosters interactions to share best practices and create new knowledge within and across cities. This UNESCO network focuses on seven creative fields: Literature, Cinema, Music, Crafts & Folk Art, Design, Media Arts and Gastronomy. Currently, the network has 34 member cities from 6 continents. While any city may join the network, to do so they must establish a multi-stakeholder team – composed of representatives from the public sector, private sector, civil society, etc. – engaged in the target creative field, to prepare a formal proposal identifying the city's cultural assets and a plan for developing them. The proposal must also be endorsed by the city's Mayor.

Network members participate in activities such as conferences, study tours and online communities of practice that stimulate exchanges and knowledge creation. These efforts have served to develop cultural assets, the organizing of artistic festivals, cultural tourism and other activities which promote innovation of local cultural forms and lead to activities that are supportive of social, economic and environmental goals. Bringing together broad-based groups within and across cities stimulates the important

socialization, externalization, combination and externalization processes required to support knowledge creation at the societal level.

4.4.2   Knowledge Preservation - Intangible Heritage Programme

The Convention for the Safeguarding of Intangible Cultural Heritage (UNESCO, 2003) characterizes Intangible Cultural Heritage as traditions or living expressions inherited from ancestors and passed on to descendants. They include oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts. This knowledge is shaped and interwoven with various socio-cultural norms as well as specific notions of space, place and time.

Factors such as urbanization, globalization, the use of a few major languages in mass communication and education, etc. have altered the structure of traditional societies and inter-generational knowledge exchange (UNECO, 2005). Consequently, the oral transmission and renewal of intangible cultural heritage and knowledge (Dalkir, 2011) that enabled some groups to survive for thousands of years, is being threatened.

Embedded in the intangible cultural heritage are knowledge and skills with social and economic value. The survival and building of a sense of esteem around these expressions may be particularly important for minority groups and contribute to intercultural dialogue, mutual respect and the promotion of a shared national identity. While priority is given to technological and scientific knowledge in the developed post-industrial world, traditional and indigenous knowledge nevertheless continues to play an important role. The World Health Organization (2003) reports that traditional knowledge

and medicines support the health care needs of over 80% of populations in Africa and Asia, with revenues of around US$5 billion in Western Europe alone in 2003 to 2004.

The Convention and its activities therefore provide a global support system for preservation and global access to this knowledge, while "respect[ing] the customary practices governing access to specific aspects of such heritage, for example, sacred intangible cultural heritage manifestations or those that are considered secret" (UNESCO, 2003). This effort involves inventorying intangible heritage and establishing registries for safeguarding them, knowledge capture and transmission from experts and groups and promoting the implementation of national legislation, and policies. As Dalkir (2011) notes, capturing intangible expressions through audio-visuals enables preservation, but even more importantly provides a permanent record of task knowledge. These efforts have also served to enhance the status of groups who have developed this knowledge and enabled its wider use and application in ways that support social, economic and environmental goals.

4.4.3   Knowledge Sharing - UNESCO's Open Educational Resources Programme

Open Educational Resources (OERs) are educational materials already in the public domain or introduced through the use of an open license (D'Antoni & Savage, 2009; Atkins, Brown & Hammond, 2007). OERs take many forms and formats such as textbooks, curricula, notes, tests and audio-visuals. The open nature of these materials allows for their legal copying, adaptation and redistribution, reducing barriers - e.g. cost and intellectual property restrictions - to the sharing and dissemination of knowledge

products. Initially, UNESCO focused on OER for higher education but has expanded this work to all education levels (D'Antoni & Savage, 2009; Atkins, Brown & Hammond, 2007).

OERs are an important element for knowledge-based development and realizing the right to information (United Nations, 1948) by providing low-cost access to quality educational content and information needed for people's daily lives. The ability to freely adapt OERs, - e.g. through translation - promotes its sharing. The lower-cost and open model for producing OERs offers significant cost savings to students, educational institutions and governments in building human capital.

To promote the uptake of OERs, UNESCO has developed an online platform of resources and communities of practice aimed at stimulating the sharing of experiences, resources and lessons across countries as well as the translation and adaptation of this content. Several regional meetings culminated in the first World OER Congress in June 2012 at UNESCO's Paris headquarters. These events enabled governments, OER experts, NGOs, and educators to discuss and share the world's best examples of OER policies and initiatives. Participants at the Congress adopted the 2012 Paris OER Declaration (UNESCO, 2012) to support global promotion and use of OERs. The Declaration advocates for: open licensing of publicly funded educational materials; improved sharing of OERs; OER research; development of quality OER materials and promoting the use of open licensing frameworks and policies.

4.4.4 Knowledge Utilization - Information for All Programme

UNESCO's Intergovernmental Information for All Programme (IFAP) was established in 2001 to provide a platform for international policy discussions and guidelines for action in the area of access to information and knowledge (UNESCO, 2000). IFAP has six priority areas: Information Access, Information for Development, Information Ethics, Information Literacy, Information Preservation and the promotion of Multilingualism in Cyberspace (UNESCO, 2014b). By facilitating the exchange of best practices, policy guidelines and resources, IFAP helps governments to access information and knowledge and to integrate and adapt it in policies and practices that respond to their national needs.

In Nonaka and Takeuchi's (1995) knowledge spiral, knowledge application or internalization occurs when individuals understand content and concepts, become convinced that these approaches are valid, and consequently apply this knowledge to real life situations. Cook & David (1999) and Engeström (2001) complement this view, acknowledging the need for stakeholders to reflect and realign their contradictions, before the consolidation, learning and adoption of new practices and behaviors can occur. IFAP facilitates such forms of exchange and reflection at the international and regional levels which are then translated into national actions in the form of newly developed policies.

4.5   Linking UNESCO's Knowledge Societies Conceptual Framework to

Intellectual Capital

Based on the earlier propositions we seek to integrate Intellectual Capital into the

UNESCO Knowledge Societies Conceptual Framework. The foundations and key

principles as defined earlier represent the societies' collective structural, relational and

human capital. By selecting and mobilizing knowledge processes at the societal level, the

society would be able to increase its intellectual capital over time.
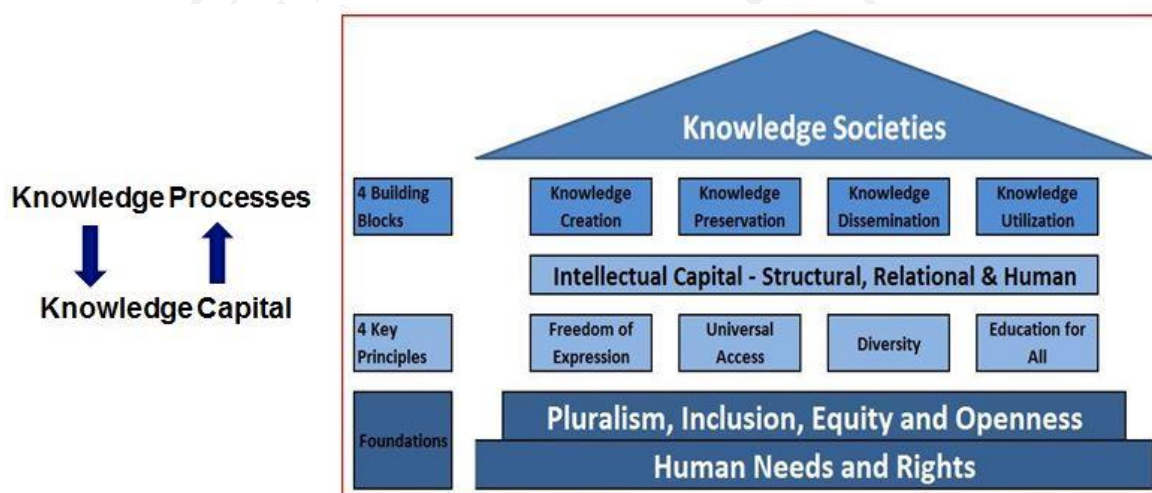
Figure 35:   Modified   UNESCO   Knowledge   Societies   Conceptual   Framework

Incorporating Intellectual Capital Processes (Hector & Ermine, 2013)

This combination of increased intellectual capital and enhanced ability to

appropriately select and use knowledge processes would enhance its ability to meet the

goals of being a knowledge society.

With a view to operationalizing the UNESCO's conceptual framework, Hector and

Ermine (2013) have shown its relation to knowledge management and intellectual capital

(see Figure 35). In the Hector-Ermine model the principles, foundations and the human actors are viewed to constitute a society's intellectual capital. Consequently, a society's ability to identify, grow and renew this capital and effectively leverage it to create, preserve, disseminate and utilize knowledge to address its specific challenges will determine the effectiveness of its knowledge-based development actions and success in achieving its societal vision.

4.6 Developing a Conceptual Model for Knowledge-based Development

Revisiting UNESCO's definitions for Knowledge Societies we see that the concept is essentially about using dynamic knowledge-based processes to solve social, economic and environmental problems within a societal system that values and prioritizes specific ethical principles. The types of societal knowledge processes that could be selected, and how effectively they could be utilized, depend on the capabilities of the society as well as the "rules" that govern how the society organizes itself. Presumably, contextual circumstances such as tangible resources and the types, quality and quantity of human capital skills, amongst others would influence the strategic goals different societies would pursue and influence the types of knowledge processes that could be selected as well as how effectively they could be utilized.

Navarro et al.'s., (2012) Model for Estimating the Intellectual Capital of Cities (MEICC) integrates efficiency indices which assess the imperfections inherent in converting tangible and intangible resources into desired end goals. However, this efficiency measure would not be static as it would likely be influenced by learning,

societal changes and a range of other factors such as motivation that could augment or even decrease efficiency of conversion processes over time. The concept of a maturity measure could readily accommodate and explain these shifts.

Model's like those of Marti's (2005), Yigitcanlar and Lönnqvist (2013), MaKCi (Garcia, 2008; Garcia & Leal, 2010) and Käpylä et al.'s. (2012), point to tangible resources as important components in the process of knowledge-based development. These links are not made explicit in the UNESCO Knowledge Societies Conceptual Framework. In reality, it is only through the application of knowledge in its myriad of forms – know how, know why, know where, know when, know what, know do – to tangible as well as tangible assets that social, economic and environmental goals can be attained. Again, the tangible resource base is also an important consideration in terms of the options available to a society.

To summarize the above conceptual reflection, it is deduced that:

Knowledge societies seek to satisfy the collective and individual social, economic and environmental needs (strategic goals) of their members in line with a set of ethical values and principles. To attain their strategic goals and address key challenges, they apply knowledge processes to their tangible and intangibles assets. The effectiveness of any given knowledge society in applying and selecting knowledge processes to its tangible and intangible assets to achieve its strategic objectives depends on its level of efficiency in applying these knowledge processes. This efficiency is reflective of that society's level of maturity as measured against the principles and foundations as defined in the UNESCO Knowledge Societies Conceptual Framework.

A conceptual model reflecting the above statement is presented in Figure 36.

The research conducted in this dissertation is limited to exploring the development of the knowledge maturity framework and its two components of societal values and frameworks and individual capabilities and capacities.

4.6.1 Delimiting the Boundaries of the Knowledge Societies to be Investigated

In line with the earlier indicated research questions, this model will adopt the city as the societal unit of analysis. In line with the research questions being investigated, the focus is on cities of the developing world.
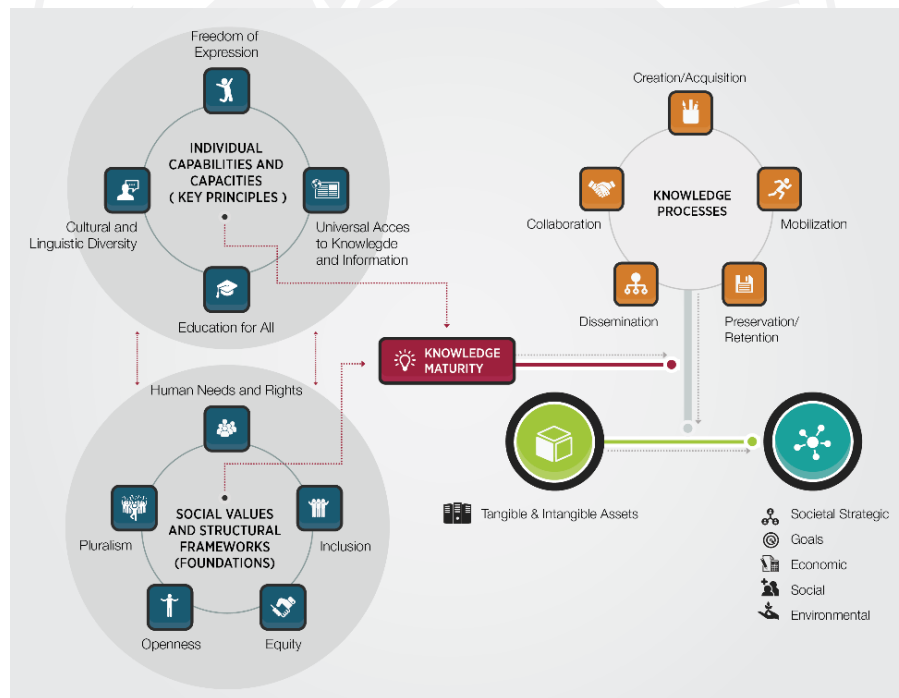
Figure 36:   Proposed Knowledge-based Development Model for Knowledge Societies

4.7   Building the Knowledge City Maturity Model

As indicated in the knowledge-based development model for societies, the effectiveness of selecting and leveraging knowledge processes is dependent on the society's knowledge maturity. To evaluate this maturity, we develop a maturity model which is determined by their achievement on the Foundations – societal values and frameworks and the Principles – Individual capacities and capabilities. To ensure that the research can be completed within the time allocated for the doctoral programme the model building exercise is limited to investigating and developing criteria/indicators for the individual capabilities and capacities (key principles), the social values and structural frameworks (foundations) and seeking to understand the relationships with other components of the model (see Figure 37).
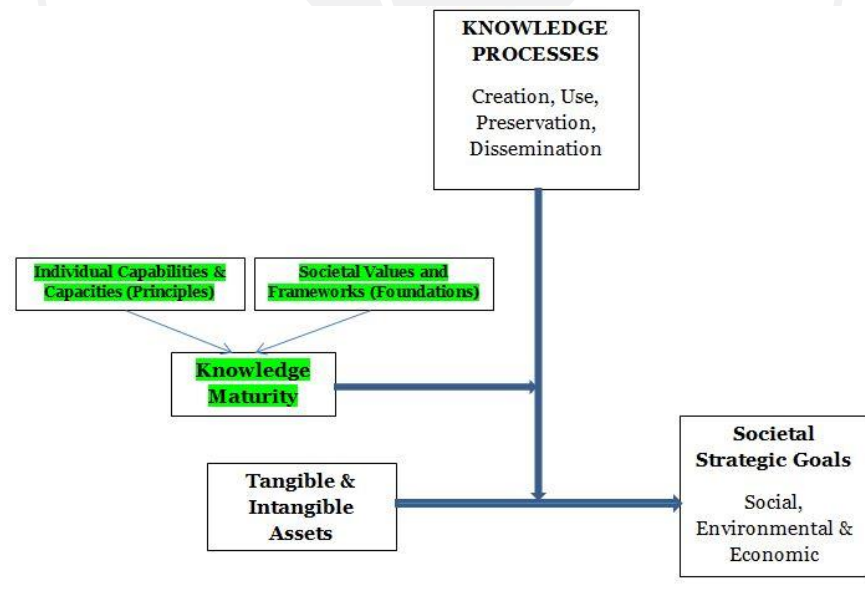
Figure 37:   Overall Conceptual Model with Components to be Developed in this
Research Highlighted

4.7.1 Overview of the Maturity Model Development Process

Hevner et al.'s, (2004) Design Science Research guidelines provide an overarching framework for structuring the model building process through the various phases from design to the communication of outcomes. Mettler (2009) provides specific model building procedures which complement Hevner et al.'s framework (SeeTable 10) and ensures rigor and validity.

For each construct within UNESCO's Knowledge Societies Framework its principle components are identified, and from the literature relevant indicators for these components are identified. These indicators are then used to populate the model.

Face validation of the model through the use of expert panels is described. The process for selecting experts, eliciting and analyzing their inputs on the model – as well as incorporating proposed amendments - is presented. The subsequent pilot testing of the maturity model in Addis Ababa as well as through a Delphi panel - including the selection of experts, the eliciting and analysis of their responses as well as the revision of the maturity model - is described in subsequent chapters.

4.7.2 Description of the Knowledge City Maturity Model

Design Science Research (Hevner et al., 2004) presents a set of guidelines that provide a rigorous methodological approach to problem solving. In addition to using these guides, development of the Knowledge City Maturity Model is further enhanced by taking into account the parameters identified by Mettler (2009) in Table 25. Together

these processes support a rigorous application of the Design Science Research approach

and contribute to validity and rigor in the model development process.
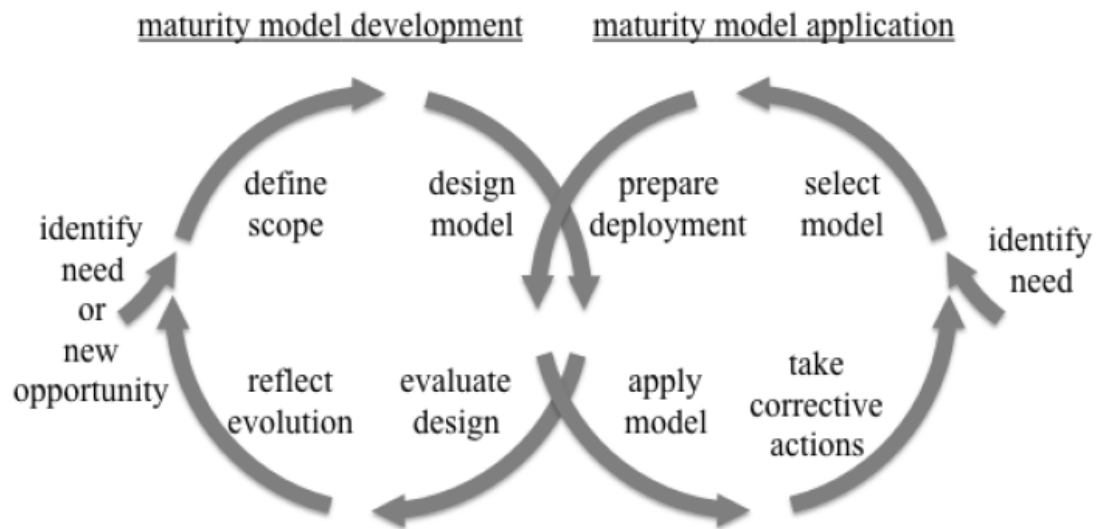
Figure 38:   Interplay between Model Development and Application (Mettler, 2009: 8)

Mettler's approach supports a reflexive and ongoing iteration and interaction

between the process for the development of the model and the application of the maturity

model in the specific problem situation (See Figure 38). According to Mettler (2009), the

development and application of maturity models often occur as disparate processes. As a

result, users of the model are unaware of assumptions made by the developer. This lack

of awareness may in turn limit the scope and usefulness of the maturity model. By linking

the design with deployment the maturity model's suitability and validity within a specific

context for the needs of the end user may be enhanced. Making explicit these links, as

well as by documenting the underlying assumptions made during development can serve

to bridge the challenges identified in the literature and enhance the quality of the design

process (de bruin et al., 2005; Maier et al., 2009; Mettler, 2009; Sen, 1999; Wendler, 2012).

The literature highlights two main approaches to how performance improvements towards maturity are attained, namely the potential performance and life cycle perspective (Crosby, 1979; McBride, 2010; Nolan, 1979; Wendler, 2012). Inherent within the life cycle perspective is an assumption that organizations evolve and improve over time and that this is accompanied by increasing maturity across all performance criteria (Raschke and Sen, 2013; Wendler 2012). This suggests that maturity models designed from a life cycle perspective enable benchmarking and improvement by comparing the maturity of the entity with the expected performance it should demonstrate based on its current position in the lifecycle.

Table 25:   Decision Parameters for developing the Maturity Model (Mettler, 2009: 8)

Phase	Decision parameter	Characteristic			
Define scope	Focus / breadth	General issue		Specific issue	
	Level of analysis/ depth	Group decision-making	Organisational considerations	Inter-org. considerations	Global & societal considerations
	Novelty	Emerging	Pacing	Disruptive	Mature
	Audience	Management-oriented	Technology-oriented	Both	
	Dissemination	Open		Exclusive	
Design model	Maturity definition	Process-focussed	Object-focussed	People-focussed	Combination
	Goal function	One-dimensional		Multi-dimensional	
	Design process	Theory-driven	Practitioner-based	Combination	
	Design product	Textual description of form	Textual description of form and functioning	Instantiation (assessment tool)	
	Application method	Self-assessment	Third-party assisted	Certified professionals	
	Respondents	Management	Staff	Business partners	Combination
Evaluate design	Subject of evaluation	Design process	Design product	Both	
	Time-frame	Ex-ante	Ex-post	Both	
	Evaluation method	Naturalistic		Artificial	
Reflect evolution	Subject of change	None	Form	Functioning	Form and functioning
	Frequency	Non-recurring		Continuous	
	Structure of change	External / open		Internal /exclusive	

On the other hand, the potential performance perspective takes a somewhat more pragmatic and dynamic approach by recognizing that improvements have resource as well as efficiency and effectiveness implications (Crosby, 1979). From a potential performance viewpoint, the levels of maturity indicate different possible states to which an entity may aspire. Improvements are not automatic, but rather can be purposefully pursued if the incremental costs of improvements are offset by the accompanying increase in value they offer. The potential performance perspective implies a thoughtful, ongoing process of stakeholder engagement in the decision to pursue or not pursue improvements based on the specific criteria, context and perceived value for users.

Consequently, the development of this maturity model is grounded in the potential performance perspective.

The use of the potential performance approach as well as the detailing of the assumptions made in the development of the model are likely to enhance understanding of the model, as well as its potential limitations. Greater understanding of the model is therefore likely to lead to users having greater confidence in the recommendations that result from the model's application and also an appreciation for the conditions under which these recommendations are likely to be valid (Mitchell, 1993; Pidd, 2009).

Development of the model involves a field testing pilot phase during which an application of the initial model is made and refined accordingly.

4.7.3 Defining the Parameters of the Maturity Model

As indicated previously, the schema developed by Mettler (2009) is used to define the parameters of the Maturity Model that is developed by this study.

4.7.4 Defining the Scope of the Model

4.7.4.1 Focus and Breadth

The knowledge city is the specific conceptual area of focus for the maturity model under development. The concept of a knowledge city offers a multi-dimensional perspective of inquiry into the life of the city that is grounded in the knowledge-based development viewpoint (Carrillo, 2004; Carrillo and Batra, 2012; Ergazakis & Metxiotis, 2011). Currently, the research in the area of knowledge cities is focused on global cities in developed countries (Carrillo, 2004; Dickman, 2012; Ergazakis et al., 2006; Florida,

2004; Luethge & Byosiere, 2006; Sharma et al., 2008, 2009; Yigitcanlar et al., 2007).

This maturity model is, however, addressed to the developing countries.

Biao et al. (2013), Jenkins (2013), Roy (2005) and Sietchiping et al. (2012),

drawing on the experiences of urbanization in Africa, demonstrate that urbanization

processes in the developing world are intrinsically different with regard to their social,

political, economic and technological context from those of the developed world.

As a result, different approaches which are grounded in the contextual reality of

these countries are essential. This view is also supported by the findings of other

development researchers (Atiqul Haq, 2012; UNDESA, 2012; UN-HABITAT, 2014)

who point to limitations in such areas as national statistical capabilities and institutional

capacities. Consequently, the maturity model is designed to use, as its data input,

qualitative assessments of city maturity obtained by interviewing experts knowledgeable

about the city and its specific context.

4.7.4.2   *Level of Analysis and depth*

This maturity model is intended to support macro-level analysis of the city with

regards to understanding the interactions and relationships between stakeholder groups

and constituencies in the city. The model is expected to support decision-makers within

the city in understanding the factors that influence societal knowledge flows and the

mobilization of collective knowledge assets. The current study considers these groups of

municipal-level actors to be from governmental, civil society, private sector and

academics as well as intergovernmental development bodies (bilateral and multilaterals including the United Nations System).

It is acknowledged that information and knowledge systems and flows allow actors who are spatially distant to significantly impact activities within the specific knowledge city. Such actors may include members of the diaspora, who may be engaged in various activities such as investments, providing remittances and political campaigning amongst others (Tyson, 2011; World Bank, 2012). The involvement of these "external" actors in the city's knowledge processes is considered primarily through the influence and interactions with their counterparts based in the city under investigation.

4.7.4.3   *Novelty*

The concept of the knowledge city - like those of the knowledge economy, knowledge-based development and knowledge society are emerging areas of policy and academic attention, which as indicated earlier are new disciplines and fields of academic inquiry that are still not fully understood (Carrillo, 2004; Yigitcanlar, Ergazakis & Metaxiotis, 2011; Yigitcanlar, 2014). While efforts related to knowledge-based economies have begun in developed countries, this area of research represents novel concepts for most developing countries (European Commission, 2010; European Union, 2000; OAS, 2006; OECD, 1996). Consequently, while the potential of knowledge-based development is well recognized, there is still a lack of agreed references, indicators and development assessment frameworks, as well as methodologies, for understanding,

applying and leveraging knowledge processes in societies (Carrillo, 2004; Ergazakis & Metaxiotis, 2011).

4.7.4.4 Audience

As a macro-level analytical tool, the Knowledge Society Maturity Model is conceived primarily as a decision support tool for key city actors from government, civil society, the private sector, and academia. The model development approach assumes that wide support for multi-stakeholder frameworks, such as public-private partnerships is reflected in practice through arrangements such as cooperation and a consultative working approach. Given the important role of intergovernmental bodies, such as those of the United Nations System in providing technical and financial assistance to developing countries, this tool is also expected to be of relevance to them. The model is expected to support collaborative programme development and planning amongst these actors in that it is aimed at fostering and nurturing activities favouring knowledge processes that enhance progress towards realizing or shaping the city's goals, vision and international development targets.

While primarily conceived as a macro-level analytical tool, as indicated by de Bruin et al. (2005), the information produced by a maturity model can nevertheless support the development of information that can enable actions and roles of a strategic, operational or tactical nature.

The important role and contribution of technology and technology-based systems in supporting the optimization and effectiveness of knowledge management as well as the

digital divide is well established (Castells, 1989, 2000; Mansell, 2012; Souter, 2010; UNESCO, 2005, 2014a, 2014b). However, UNESCO's concept of the knowledge society emphasizes the humanistic and "soft aspects" of the knowledge society. Consequently, while not ignoring the role of technology, the model is focused on the management of the non-technological aspects and processes that foster the creation of enabling environments, which in turn allow people, who are the creators, disseminators, users and guardians of knowledge, to thrive.

4.7.4.5 *Dissemination*

UNESCO's concept of the knowledge society views collaboration and the participation of citizens, for example in the governance process, are of paramount importance, particularly with a view to supporting peace and the well-being of all persons. Article 27(1) of the Universal Declaration of Human Rights (United Nations General Assembly, 1948) stipulates that, "Everyone has the right to freely participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits". In the spirit of these values, the results of this Maturity Model are expected to be openly disseminated facilitating greater engagement, new knowledge generation and collective investment and ownership in this societal endeavour. Again, in line with Mitchel (1993) and Pidd (2009), promoting understanding and awareness is expected to enhance confidence in the tool and build commitment to implementing its findings.

4.7.5   Model design

4.7.5.1   Maturity Definition

UNESCO's Knowledge Societies concept is humanistic and people-focused in its conception. It promotes values that emanate from the Universal Declaration of Human Rights and relates to international normative Human Rights instruments. These legal instruments form part of the international standards and norms and consist of documents of a binding and/or declarative nature that have been voluntarily adopted by Member States.

The creation of an environment in which persons can attain their full potential therefore depends on the extent to which governance, institutional, societal and other processes have been adequately enabled to facilitate the creation and maintenance of an enabling environment (UNESCO, 2005).

Evidence of an enabling environment is reflected in the presence of national and municipal laws and institutions that support the attainment of these goals (objects), as well as programmes and projects that support implementation and give effect to the laws and vision of the institutions (processes), which in turn support the building of the related human capacities so that citizens can realize their full potential (people). In line with these underlying values, this maturity model is considered across all three dimensions. However, it is important to recognize that for any selected criterion, increasing maturity does not necessarily imply simultaneous and equal improvements along the dimensions of people, processes and objects (Mettler, 2009).

While maturity models appearing in the academic literature vary with regards to the number of maturity stages they contain, - four to six stages being common - the most important criteria to be respected are i) distinct maturity stages and ii) successive stages build on previous ones (Becker, 2009; De Bruin, 2005; Wendler, 2012).

The selection of a four-stage maturity model was influenced by advice from UNESCO's Internal Oversights Service (IOS) who are responsible for the internal audits, programme evaluations and reviews. IOS indicated that where odd-number responses are required, such as 5 response Likert questions, their experience with policy respondents often indicated a tendency to select the middle option. However, the use of even numbered responses "forced" respondents to provide a clearer indication of whether conditions relating to the factor concerned were on the positive or negative side.

A four level maturity ranking with stages denoted as: initial, defined, managed and integrated was adopted for the model.

The Initial level is characterized by low levels of public awareness, a lack of policies to support key processes and a high level of insularity; in addition, governance and decision-making is conducted in a top-down and parochial manner.

At the Defined level the development of new laws, policies and practices, for instance the alignment of national laws with international legal obligations, such as human rights standards, are being undertaken. Institutions and national human capacity infrastructure is still weak and external resources (technical, financial) play important roles in sustaining development with considerable net inflows of expertise and knowledge. The greater awareness being generated however opens up not only new

possibilities such as greater scope for participation in governance, opportunities for innovation and expectations for accountability but also resistance to change as the status quo is challenged. Efforts to build human capacity bring about attitudinal as well as behavioural changes that facilitate the creation of an enabling environment that gives effects to new policies, processes and possibilities; change management programmes are particularly important at this stage.

At the Managed level an enabling environment supported by institutionalized processes, policies and political support exists. State as well as non-State actors recognize gaps, are motivated and empowered to collaborate, seek information and knowledge, self-organize and support the shaping of a city's vision. There is a willingness to seek out best practices, whether within the city or elsewhere, and to adapt these learnings to the needs of the city in order to solve existing problems, better leverage its resources or prepare for possible challenges.

At the Integrated level, the city has already successfully managed major change and is able to set stretch goals, it is recognized as a leading example of best practice and is actively engaged in collaborating internally and with other cities to support its ongoing renewal, learning and forward-looking goal setting and visioning.

In the Model, numerical scores of 1 to 4 are allocated to the maturity levels Initial to Integrated, respectively. It is also possible to provide intermediate rankings such as 0.5, 1.5, 2.5 etc.

4.7.5.2   Goal Function

As identified in the UNESCO conceptual framework, knowledge societies are diverse and pluralistic. Furthermore, they are based on a set of constructs which span aspects such as societal norms and values, and the capacity of institutions and citizens as well as other factors that influence the ability to exchange information and knowledge to address societal challenges. The goal of the model therefore, is multi-dimensional assessing performance across nine constructs: human rights, inclusion, pluralism, equity, openness, freedom of expression, universal access, cultural diversity and education for all. In line with the definitions presented earlier and reviews of the literature on these constructs, an initial set of 37 indicators was proposed. Using the potential performance perspective and the definitions developed for the maturity levels, their characteristics are also defined.

4.7.5.3   Design Process

The design process draws on both theory and practice. The Knowledge-based Development Model for Knowledge Societies derived from UNESCO's Knowledge Societies conceptual framework provides an overarching theoretical basis for the maturity model. The extant academic literature provides definitions for the constructs in this framework as well as insights into the selection of relevant indicators for each construct whose maturity is to be assessed. Interviews with subject specialists having relevant experience provided additional insights that span theoretical as well as applied knowledge. For each construct at least three subject specialists were consulted. As the

model is being developed based on UNESCO's conceptual framework, the subject specialists consulted were UNESCO employees at Headquarters or in Field Offices. A purposeful sampling approach was adopted. As most persons consulted had expertise in two or three of the construct areas a relatively small sample of reviewers were able to ensure that all dimensions of each construct were addressed in the selected indicators. Furthermore, the involvement of subject specialists provided insights into challenges around the selection of indicators.

As the field of knowledge-based development is an emerging one, without full consensus on agreed references, indicators, development and assessment frameworks and methodologies (Carrillo, 2004; Ergazakis and Metaxiotis, 2011), the involvement of subject specialists supported the validation and grounding of the model.

The field testing of the model with a cohort of experts representing intended user groups provided further understanding of the model and ensured rigor in the design process.   These consultations were undertaken with experts during field visits to Addis Ababa, Ethiopia and Bangkok, Thailand in May 2014 and October 2014, respectively.

A detailed treatment of the selection of indicators and the population of the maturity model is provided later in this Chapter**.**

4.7.5.4   *Design Product*

The result of the design process is a knowledge-based development model and a maturity model, which consists of a set of constructs drawn from UNESCO's Knowledge Societies Conceptual Framework, indicators for each construct and a structured question

for each indicator, as well as a set of prescribed hierarchical responses that map to each of the four levels of maturity. A set of open ended questions addressing the four strategic areas of the United Nations post-2015 development plan, namely economic inclusion, environmental sustainability, peace and security and social inclusion, serve as probes to gain further insight into specific areas where the city faces challenges.

This model has been instantiated in the form of a computer model, created in Excel, which facilitates the interview process and through its graphical output supports further exploration with users, develops descriptive statistics and supports visual investigation of the resulting data to identify trends in real-time. The model is also available in paper-based format; subsequent data processing allows the same insights to be obtained.

4.7.5.5   Application Method

The Maturity Model is intended to be used by certified professionals and third-parties. Both Mitchell (1993) and Pidd (2009) highlight the challenges faced by in-house consultants in having their findings accepted within their organizations. In addition, they may be unable to adopt sufficient distance and objectivity to the problem situation needed to question accepted assumptions, challenge organizational hierarchies and advocate for change. Accordingly, the model is not intended for a self-assessment role. As recommendations from any investigation or model are unlikely to be adopted by any organization unless confidence in the methodology and its workings exists (Mitchell,

1993; Pidd, 2009), application of the model would be accompanied by relevant presentations on the model's theoretical underpinnings and its development process.

Initial applications of this Maturity Model will be within the context of the preparation of a doctoral dissertation. This process will provide the researcher, as the developer, with additional insights that are likely to result in the model's further evolution and refinement.

4.7.5.6 *Respondents*

This model seeks to gain insights into the perspectives of the stakeholders who are thought to play key roles in influencing and setting strategic goals and visions, selecting strategies as well as designing city policies for achieving these goals and visions. Five groups of municipal stakeholders and actors were identified, namely, governmental, civil society, private sector academics as well as intergovernmental development bodies (bilateral and multilaterals including the United Nations system). While recognizing that groups who may be located within and/or outside the national borders can also influence these processes, this study concerns itself primarily with the actors present within the city. A set of criteria that considers the role, experience, authority, impact and stakeholder group membership is used to guide the purposeful selection of respondents. Snowballing, the process whereby respondents are requested to identify additional qualified participants is also employed (Deslandes et al., 2010; Skulmoski et al., 2007; Wakefield & Watson, 2014).

4.7.6   Design Evaluation

4.7.6.1   *Subject of Evaluation*

Mettler (2009) recommends that both verification and validation of maturity

models be undertaken. Referring to Conwell et al. (2000) he defines these two terms as

follows:

Verification is the process of determining that that the maturity model "represents

the developer's conceptual description and specifications with sufficient

accuracy" and validation is the degree to which a maturity model is "an accurate

representation of the real world from the perspective of the intended uses of the

model".

(Mettler, 2009: 9)

Verification of the Maturity Model was assured through compliance with the

protocol selected for the development of the maturity model. During the model building

process, the assistance of subject experts was engaged to assess the indicators and to

review the process used in the development of the model. Subject experts were also

invited to review the completed Maturity Model. Validation of the model was performed

by conducting a pilot field-test with respondents selected from the stakeholder groups

with whom the model is intended to be used in the country context where the model will

be applied, and also with a Delphi panel. During piloting of the model, respondents were

also requested to indicate the relevance and the applicability of the Maturity Model to

their practical situation. A K-SWOT session with a group of policy-maker will be used to

assess the relevance of the model's findings to support actions by policy-makers.

4.7.6.2   Time-frame for Conducting Model Evaluation

Evaluation of the model was conducted throughout its development and following its completion. This was achieved by applying the protocol described by Mettler (2009), grounding the model's development in the literature and seeking the insights and advice of subject specialists. Once developed, the model was field tested through a pilot targeting respondents who matched the profiles of the audience the model was designed to address. Consequently, both ex-ante and ex-post evaluation was conducted.

4.7.6.3   Evaluation Method

The evaluation of the design process and product was carried out through joint reviews of the indicators and model by subject specialists. During these meetings, I provided an overview sheet that explained the various constructs and provided additional information. Modifications to the model were then made as appropriate.

During the field testing process, two modes for evaluating the model were applied. The first involved presenting and discussing the model with specialists and the second, guided the stakeholders through an actual application of the maturity model. During its development, the maturity model has been presented at two international research conferences where it was subjected to a peer review process. Doctoral seminars have also provided opportunities for the model and its development process to be critiqued.

4.7.7　　　Reflecting the Model's Evolution

4.7.7.1　　　Subject of Change

The interactions with subject specialists in the model development phase, with typical respondents during the field piloting phase as well as feedback gained during the presentation of this research during academic conferences and doctoral seminars have supported the ongoing evolution of the model. The changes during this process have been mainly related to the form of the model. These have included:

- modifications to the structure of the questions and scenarios depicting the maturity levels,
- the number and sequence of questions asked,
- the development of a paper-based questionnaire format of the model in addition to the Excel based format, as well as,
- the inclusion of additional questions that aim to systematically support the identification of strategic problems that the society needs to address as well as constraints and resources that may impact them.

4.7.7.2　　　Frequency

The model development is a key part of a doctoral dissertation. The evolution of the model is therefore expected to continue guided by the theoretical goal of achieving saturation as well as practical constraints such as the duration of the doctoral programme. Additional research is also envisaged for the researcher's post-doctoral activities.

4.7.7.3   *Structure of Change*

The Maturity Model has not yet been published and is still under development, consequently, changes can only be made at this stage by the researcher.

4.7.8   4.7.8   Schematic View of the KMCC's Structure

The two components of the Maturity Model are schematically presented in Figures 39 and 40.

4.8   Populating the KMCC Structure

In line with the design principles and processes outlined in the preceding section, the schematic KMCC Structure is populated. This involves defining and grounding each of the constructs in UNESCO's Knowledge Societies Conceptual Framework in the literature. From the literature, relevant indicators are identified for each construct. A minimum of three indicators are selected for each construct taking into account factors such as robustness, pertinence, parsimony and peer acceptance, based on the need to obtain data and ensure its quality (Council of Europe, 2011; OECD & European Commission, 2008; Pidd, 2003). For each indicator, an object, people, process or combination approach to maturity is adopted. Using the defined maturity levels, maturity scenarios are developed for each indicator.

		Societal Values and Frameworks																					
Maturity Levels		Human rights and needs					Pluralism				Inclusion				Equity				Openness			
		Level of human rights awareness	Structural measures - National human rights institutions established	Anti-discrimination measures established	Access to public services and to participate in public life	Accountability information on t city affairs made available to citizenry	Integration of other ethnicities, races and persons with disabilities.	Integration of immigrants/migrants into social life	Welcoming different religious and political beliefs and values	Willingness to actively see/engage with other points of view	Access to safe and decent work	Women's participation in economic life promoted	Access to health, food, shelter under goverment programmes	Citizen's ability to eexercise civil and political rights	Citizens' basic needs are being met	Social burdens and rewards	Gender advocacy and monitoring in planning, policy & monitoring	Citizen awareness of basic services programmes	Transparency in decision making, goal setting and assessment	Broad-based partnerships & collaborative solution finding	Use of open standards/solutions for public information services
1	Initial																				
2	Defined																				
3	Managed																				
4	Integrated																				

Figure 39:   Maturity Model Structure and Components for Constructs in the Societal Values and Frameworks (Foundations)

		Individual Capabilities and Capacities												
Maturity Levels		Freedom of expression				Universal Access to information and knowledge				Cultural & Linguistic diversity			Education for All	
		Climate for free discussion and exchange.	Diversity, independence and sustainability	Professional standards	Transparent and independent regulation	Transportation network	Government information and services	Afordability of Internet services	Supporting human capacity to use Information and knowledge networks	Promoting diverse cultural heritage	Promoting multilingualism	Promoting cultural industries	Nurturing talent	Attracting and retaining talent	Global citizenship education	Media and information literacy
1	Initial															
2	Defined															
3	Managed															
4	Integrated															

Figure 40:   Maturity Model Structure and Components for Constructs in the Individual Capabilities and Capacities (Principles)

4.8.1   UNESCO's foundations

The foundations - respect for human needs and rights; pluralism, inclusion, equity and openness - represent values aimed at guiding the development of the societal architecture that informs and shapes societal choice making, goal-setting and strategic direction. The foundations are therefore concerned with informing such questions as "what is the good life" and "how should the good life be pursued?" On this basis, governance structures, laws and processes for organizing and achieving the strategic goals can be formulated. Fulfilling human rights and needs reduces poverty and poverty-related causes of strife, and are central to human dignity. Other foundational values such as openness, equity, inclusion and pluralism serve to promote attributes such as participation, justice and respect which in turn contribute to dignity and social cohesion. Societal norms that are grounded in the ethical and value frameworks of the foregoing concepts inform and shape societal choice making, goal-setting and strategic direction.

4.8.1.1   Human Needs and Rights

Human rights are rights inherent to all human beings, irrespective of nationality, place of residence, sex, national or ethnic origin, color, religion, language or any other status. All are equally entitled to human rights without discrimination. These rights are interrelated, interdependent and indivisible (De Beco, 2008; OHCHR, 2012; UN, 1948; UN, 2012).

UNESCO promotes knowledge societies that are people-centred, development oriented and based on human rights (UNESCO, 2013). Respect for human rights establishes societal norms that promote social cohesion and provide the ethical and

value frameworks that inform and shape societal choice making and strategic direction. At the international level and in international law, the concept of human rights has been defined in a variety of internationally adopted texts of the United Nations Systems, which are of either a legally binding or declarative nature (OHCHR, 2012b). Declarative texts, while not legally binding, have implicit moral weight and over time, as more and more states accept and follow their guidance, they form part of the international customary law and gain the effect of law. An example of this is the Universal Declaration on Human Rights (UN General Assembly, 1948), which given its status as a declaration does not create enforceable, binding international human rights law. On the other hand, the International Covenant on Economic, Social and Cultural Rights (UN General Assembly, 1966a) and the International Covenant on Civil and Political Rights (UN General Assembly, 1966b), amongst others (OHCHR, 2012), are international treaties that legally bind State signatories.

In addition to the international human rights treaties, three regional instruments advance human rights in three regions of the world, namely, Africa and Europe as well as North and South America. These regional treaties are the African Charter on Human and Peoples Rights for Africa (OAU, 1981), the American Convention on Human Rights (OAS, 1969) and the European Convention on Human Rights (COE, 1950). States in turn give effect to these regional and international treaties though their national laws and institutional processes.

Table 26:   The "Foundations" Construct in UNESCO's Knowledge Societies

Conceptual Framework

Name of Construct	Definition	References in the Literature
Human Needs & Rights	These refer to the set of basic needs for survival and the guarantees of human dignity afforded under the international human rights law	De Beco, 2008; OHCHR, 2012; UN, 1948; UN, 2012
Pluralism	An energetic engagement with diversity and expressed through processes such as the active seeking and building of understanding across lines of difference, involving both criticism of another viewpoint & active self-criticism as well as reflection on one's own viewpoints.	Eck, 2006; Global Centre for Pluralism, 2012; UNESCO, 2000
Inclusion	The ability of an individual to fully exercise and claim the social, cultural, political and other rights afforded to them under the international and national laws.	De Beco, 2008; OHCHR, 2012; UNESCO, 2005
Equity	The belief that people's basic needs should be met consistently and adequately, that burdens and rewards should not be spread too unevenly across communities, and that policy should be applied impartially, fairly and justly to achieve these goals.	Beder, 2000; Clark, 2012; Dulal et al., 2009; Falk et al., 1993, UNESCO, 2005
Openness	A hybrid concept embodying three distinct aspects: transparency and participation in decisions that impact one's well-being; curiosity and willingness to venture outside one's frame of reference; and the use of open standards, collaboration and the sharing of knowledge assets	Downes, 2007; Educational Technology & Media Massive Open Online Course 2013; European commission, 2001; Gisselquist, 2012; Judge et al., 2013, Matthews et al., 2004; McCrae et al. 1992; UNESCO, 2005

4.8.1.2   *Developing Indicators for Human Rights*

Currently, there are 10 international normative treaty instruments and the Universal Declaration on Human Rights that define the set of internationally recognized human rights (OHCHR, 2012). These treaties cover a broad range of issues ranging from protection against torture to ensuring access to education. These treaties are monitored by committees of independent human rights experts who are nominated and elected by State parties. It is, therefore, infeasible to cover every aspect of human rights in this model.

The use of indicators, which address so-called cross-cutting rights, that is to say, rights which are common to all human rights treaties as barometers of the human right situations is an established method for conducting human rights assessments (De Beco, 2008; Naval et al., 2008; OHCHR, 2012b). The practices of **non-discrimination**, the **participation** of citizens in decision-making, **accountability** of persons with responsibility for ensuring the enactment and realization of human rights and **awareness** of the roles of duty-bearers and right-holders are regarded as cross-cutting indicators.

In selecting indicators to assess human rights, these authors (De Beco, 2008; Naval et al., 2008; OHCHR, 2012b) further advocate the use of a configuration of structural, process and outcome indicators as a mechanism to assess the realization of human rights under each cross-cutting measure. Firstly, the use of structural, process and outcome indicators is considered to be a best practice in this field. Secondly, it is not usually feasible to identify a single indicator which addresses all three aspects of this configuration (OHCHR, 2012a).

According to OHCHR (2012a), structural indicators demonstrate the acceptance, intent and commitment of the State to meet its human rights obligations as defined in the international human rights instruments. Structural measures indicate, at the most basic level, whether the State has ratified relevant treaties and undertaken efforts such as establishing national policies, laws and institutions to give effect to the treaties' requirements. Process indicators serve as measures of performance, that is to say, the efficiency or effectiveness in the implementation of structural measures - national laws and policies - that have been established. For example, process indicators may seek to assess to what extent institutions required to implement the national laws and policies have been established and are adequately resourced to carry out their statutory functions. Process indicators may also assess the effectiveness of policies and programmes by assessing their outreach to their target populations. Outcome measures reflect the achievements made in realizing the human rights commitments whether at the individual level – for instance, every accused person, irrespective of their financial capability, receives adequate legal representation to ensure a fair trial – or, at the collective level, – 97% of all school age children are enrolled in an educational institution. Outcome measures are generally, therefore, achieved over the longer-term (De Beco, 2008; OHCHR, 2012).

Based on the literature and practices in the field of human rights, indicators covering the core dimensions of Human rights were selected. These indicators are awareness, accountability, non-discrimination, participation and structural measures. From the literature, relevant definitions were found to be:

a) Awareness relates to the provision of information aimed at supporting advocacy, education and subsequent behavioural change amongst all

stakeholders so as to enable those who have a responsibility to respect, protect and fulfil human rights (duty-bearers) to do so, and for those entitled to these protections (rights holders) to be empowered to stake their claims and hold duty-bearers accountable (OHCHR, 2012b);

b) Accountability ensures that actions and decisions taken by public officials are subject to oversight so as to guarantee that government initiatives meet their stated objectives and respond to the needs of the community they are meant to be benefiting, thereby contributing to better governance and poverty reduction (De Beco, 2008; Naval et al., 2008; OHCHR, 2012b);

c) Non-discrimination, as used in the Covenant, is understood to imply any distinction, exclusion, restriction or preference which is based on any ground such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status, and which has the purpose or effect of nullifying or impairing the recognition, enjoyment or exercise by all persons, on an equal footing, of all rights and freedoms (General Comment No. 18 Human Rights Committee for the International Covenant on Civil and Political Rights United Nations Compilation of General Comments, p 134, paragraph 1);

d) Participation in political and public life is a human right as well as an important step in the process of enjoying other human rights. It encompasses the right to vote and the right to be elected. However, it goes beyond formal democratic processes and includes broader participation, such as participation in decision-making on law and policy as well as participation in development and humanitarian assistance. Participation is an affirmation of the right of

every individual and group to take part in the conduct of public affairs, but

also a part of the solution to poverty and social exclusion (United Nations

Human Rights, 2011; United Nations Human Rights, 2013); and

e) Structural measures indicate at the most basic level whether the State has

ratified relevant treaties and undertaken efforts such as establishing national

policies, laws and institutions to give effect to the treaties' requirements (De

Beco, 2008; Naval et al., 2008; OHCHR, 2012b).

Table 27:   Indicators and Criteria obtained from the Literature for assessing Human
              Rights

Name of Indicator	Criteria
Accountability	Is information on the operation of the city government and municipal affairs made available to the citizenry?
Awareness	What is the general level of awareness in the city around human rights?
Non-discrimination[27]	What measures has the city established to prevent discrimination (on the basis of gender, religion, sexual orientation, race, disability, etc.)?
Participation	What measures exist to ensure that citizens have equal access to public services and to participate in public life (education, health, employment, governance and decision-making)
Structural measures	What support has the city demonstrated in establishing mechanisms (institutions, policies and programmes) to protect and promote human rights?

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[27] The principle of equality and non-discrimination does not mean that all distinctions between people are illegal under international law. Differentiations are legitimate and hence lawful provided that they: pursue a legitimate aim such as affirmative action to deal with factual inequalities, and are reasonable in the light of their legitimate aim. Alleged purposes for differential treatment that cannot be objectively justified, measured and which are disproportionate to the attainment of a legitimate aim, are unlawful and contrary to international human rights law. To ensure the right to equality, states may have to treat differently persons whose situations are significantly different. Pages 655 - 656, Human Rights in the Administration of Justice: A Manual on Human Right for Judges, Prosecutors and Lawyers
(United Nations New York and Geneva, 2003), pages 655 -656 Rights, U. N. O. of the H. C. for H., & Association, I. B. (2003).)

Within the Maturity Model a qualitative question, that is to say a criterion, regarding each dimension of the indicators, is proposed to the respondent. A prescribed set of hierarchical scenarios, developed in line with the maturity levels and taking into account the importance placed on defined processes and outcome measures, are presented. The proposed indicator set for this construct is presented in Table 27.

4.8.1.3 *Pluralism*

Eck (2006) identifies four defining characteristics of pluralism, namely an energetic engagement with diversity, the active seeking of understanding across lines of difference, the encounter of commitments and a process of engagement based on dialogue.

According to Eck, pluralism is an active process. While globalization has resulted in a marked increase in the heterogeneity of our societies, this high level of diversity does not imply that the various groups within the society are interacting. According to Eck, pluralism is materially different from tolerance. Though considering tolerance as a "necessary public virtue", Eck laments that tolerance does not require different groups within the society to seek to learn about each other. Pluralism, on the other hand, seeks to overcome ignorance and to challenge and go beyond stereotypes by seeking to learn about the "others". Pluralism does not require groups to reconcile or renounce their positions but rather to have greater self-awareness of their positions, recognize the right of other groups to do so and reflect on how these different positions relate to each other and what their potential implications may be. Finally, Eck views pluralism as a commitment to a dialogue

with the others as well as with oneself that is both externally and internally self-reflective and critical. Eck emphasizes the importance both of speaking and listening, identifying areas of common ground as well as points of divergence. Dialogue, according to Eck, does not represent a commitment to converge or agree on all issues but rather a commitment to be actively engaged in this process of external and internal discourse.

A different conceptual approach is evident in the European Union's project ACCEPT PLURALISM which was developed as part of the European Commission's Seventh Framework Programme for Socio-economic Sciences & Humanities (Zapata-Barrero & Triandafyllidou, 2012). The project seeks to develop policy responses and key messages that can guide the work of policy-makers by supporting the development of a theoretical and normative framework for understanding intolerance to diversity.

In particular, the project seeks to provide guidance in understanding when liberal tolerance or egalitarian tolerance is preferable. Liberal tolerance is considered to be the non-interference in practices or forms of life of a person even if one disapproves of them, while egalitarian tolerance refers to institutional arrangements and public policies that seek to counter negative stereotyping and to promote positive inclusive identities as well as to reorganize and adapt the public spaces in order to accommodate the social diversity that exists (Zapata-Barrero & Triandafyllidou, 2012).

The Accept Pluralism approach is different to that of Eck, as it is focused less on dialogue and group interaction, appears to give greater emphasis to consensus and does not necessarily appear to stimulate or incorporate, at the individual or group

level, the self-reflection and curiosity that Eck promotes. Furthermore, in Eck's view tolerance is not enough, "Tolerance is too thin a foundation for a world of religious difference and proximity. It does nothing to remove our ignorance of one another, and leaves in place …. the fears that underlie old patterns of division and violence. In the world in which we live today, our ignorance of one another will be increasingly costly" (Eck, 2006, p.1).

Mr. Koichoro Matsura, former Director-General of UNESCO, in the World Culture Report 2000: Cultural Diversity, Conflict and Pluralism (UNESCO, 2000), agrees that pluralism is about living together. Pluralism, in his view, lies in according and respecting the equal dignity inherent in all cultures and acknowledging their interdependence. Such an outlook and approach brings "harmony into our lives". The UNESCO perspective, however, moves beyond a conception of diversity as a mosaic composed of different, but separate points to an ongoing and perhaps chaotic interplay of difference. In the same UNESCO report Arizpe et al. (2000) further develops Matsura's perspective to show that the process of achieving harmony is not one of passivity. Rejecting the thesis that conflict is an inevitable outcome of diversity and difference, Arizpe et al. (2000) identify the sources of conflict as emerging from "opposition, conflict and struggle". In pointing out that "It is not a matter of avoiding conflict but of finding ways to pursue it without humiliation, violence or death", Arizpe et al. (2000, p30), like Eck, supports the need for active engagement, dialogue and commitment of encounter.

The Global Center for Pluralism is an international, non-profit research and educational foundation in Canada that was established by the Government of Canada and His Highness the Aga Khan in 2006. The Global Center for Pluralism (2012,

2013) also expresses similar views to those of Eck and UNESCO. According to the

Center, pluralism is not synonymous with diversity but rather emerges when societies

undertake active interventions across their political, social, economic and educational

systems to ensure the rights of all citizens. Embracing pluralism does not remove

human differences but rather redefines diversity as a collective source of common

good, which when enabled becomes a foundation for social cohesion.

4.8.1.4   Developing Indicators for pluralism

The work of these authors therefore suggests that tolerance, pluralism and

social cohesion are distinct phenomena. From this literature it is inferred that

tolerance may provide a foundation or starting point on which pluralism may be

developed and that pluralism in turn may result in social cohesion. Ritzen et al.

(2000), researchers at the World Bank and the Club of Madrid (2011) point to positive

socio-economic outcomes as an emergent property of cohesive societies. This

provides further support for the proposition that pluralism contributes to a society'

intellectual capital (Hector & Ermine, 2013).

The role of difference and diversity in the discussion around pluralism

suggests that factors or markers of difference amongst the members of a society and

the way in which individuals, groups and social institutions respond to these types of

differences provide useful and valid means for generating indicators.

A review of social indicators related to cultural diversity, pluralism and social

cohesion in the literatures, including policy documents and surveys (United Nations

General Assembly, 1948; UNESCO (Becker, 2000); The World Values Survey (2010,

2005)28; The World Bank (Ritzen et al., 2000); OECD, 2014) suggest the following

groupings as key sources of differences around which pluralism may be assessed:

Table 28:   Indicators and Criteria obtained from the Literature for assessing

             Pluralism

Name of Indicator	Criteria
Pluralism - Ethnicity, disability, race	To what extent do people who are visibly different find it easy to live in the city?
Pluralism - Immigrants/migrants	To what extent are immigrants/migrants integrated into life in the city?
Pluralism - Openness to religious, political beliefs and value systems	Is your city a good place for persons with different religions, values and ways of living?
Pluralism - Willingness to actively see other points of view	To what extent is the city able to develop broad-based support for initiatives that address the strategic challenges of the city while responding to the conflicting concerns of stakeholder groups?

a) Differences around value systems such as those relating to liberal/conservative

   or secular/religious differences which may exhibit themselves in religious or

   political preferences and attitudes to sexual orientation;

b) Differences around citizenship and national identity which may affect

   immigrants and migrants;

c) Differences that arise from group power dynamics such as membership in a

   social class or caste; and

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[28] Since 1981 a global network of social scientists has been conducting research into the impact on social and political life of changing values, beliefs and motivations of people around the world through a longitudinal study called the World Values Survey. Using a common questionnaire, the survey has been conducted in nearly 100 countries which contain around 90% of the world's population. This study is the largest non-commercial, academic, trans-national, time series investigation of its kind that covers the full range of global cultural and economic variations. Over 400,000 respondents participated in this survey. Further information on the study, questionnaire and its results are available at www.worldvaluessurvey.org .

d) Differences that relate to visible differences in physical appearance such as those which relate to ethnicity[29], disability[30] or race[31].

Scenarios were then proposed for each maturity level ranging from levels 1 to 4, assuming that at Level 1, low pluralism meant certain hardship for persons with these attributes while at level 4 they did not in any way detract from an individual's ability to advance. The proposed indicator set for this construct is presented in Table 28.

4.8.1.5 Inclusion

Deficiencies in social structures and barriers inherent in social systems may prevent individuals and social groups from accessing services, opportunities or resources to which they are entitled under the provisions of international, regional and national laws. These barriers, which are often unnoticed, are thought to result from poverty in combination with one or more social exclusionary factors such as illiteracy or linguistic barriers, as well as processes related to the way in which social services

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29 Ethnicity refers to shared cultural practices, perspectives, and distinctions that set apart one group of people from another; that is, ethnicity is a shared cultural heritage. The most common characteristics distinguishing various ethnic groups are ancestry, a sense of history, language, religion, and forms of dress. Ethnic differences are not inherited; they are learned. http://www.cliffsnotes.com/sciences/sociology/race-and-ethnicity/race-and-ethnicity-defined
30 Disability is an umbrella term covering impairments, activity limitations, and participation restrictions. An impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations. Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the society in which he or she lives. Overcoming the difficulties faced by people with disabilities requires interventions to remove environmental and social barriers. World Health Organization and the World Bank. (2011).
31 The term race refers to groups of people who have differences and similarities in biological traits deemed by society to be socially significant, meaning that people treat other people differently because of them. http://www.cliffsnotes.com/sciences/sociology/race-and-ethnicity/race-and-ethnicity-defined

are conceived, designed or delivered. Overcoming such factors is the key to ensuring

inclusion (Atkinson et al., 2011).

Social exclusion is thought to be the result of formal or informal rules that

constrain the ability of persons to access services, and opportunities and take part in

the life of the community (Gandelman et al., 2011; Sen, 1999). Social exclusion is

linked in the literature to inequality, relative poverty, lack of voice and power in the

society, constraints in accessing labor markets and a variety of social services

(Atkinson et al., 2011; Bhalla & Lapeyre, 1997; Gandelman, 2011, Justino &

Litchfield, 2005; Robinson, 2008; World Bank, 2013).

Individuals and groups with shared characteristics such as membership in

ethnic groups, gender, race, criminality, literacy levels, female-headed household,

disability and social status may be at an increased risk for social exclusion (Bhalla &

Lapeyre, 1997; Gandelman, 2011; ILO, 2012; Justino & Litchfield, 2005; World

Bank, 2013). However, the particular nature of the groups that face systemic

exclusion may vary both across time and place. Underlying causes or sources of these

social exclusions may be based on factors as varied as historical legacies,

demographic patterns and rural isolation as well as major political, social or economic

shifts that lead to the loss, or rise, of different industrial sectors and social, religious

and power classes (Atkinson et al., 2011; Bhalla & Lapeyre, 1997; Gandelman, 2011,

Justino & Litchfield, 2005; Robinson, 2008; World Bank 2013). Social exclusion and

the dissatisfaction it generates may also contribute to social disruptions such as riots

or even escalate to civil conflict.

Poverty arises when individuals lack the economic resources that enable them

to fulfill their needs, and this inadequacy of resources may prevent them from

overcoming related barriers (Atkinson et al., 2011). Numerical thresholds that take

into account family size, the country or place and purchasing parity are often used to

set so-called poverty thresholds based on annual or daily incomes (European

Commission – Eurostat, 2014; US Census Bureau, 2014). Inadequate economic

resources, in particular a low income, may reduce one's ability to access adequate

food, educational opportunities or health care. These conditions may in turn lead to

situations which prevent persons from obtaining opportunities that would enable them

to achieve their full productive capability. This inability to increase productivity

creates a vicious cycle leading to increased poverty.

Sen (1999) does not limit poverty solely to that of economic resources, more

specifically low income, but rather adopts a much broader perspective which

considers poverty to represent an individual's state of capability deprivation. He

argues, for example, that an individual with a high income but who, due to a disability

which deprives him of certain capabilities, would require additional assistance to

overcome functional limitations. Without an enabling environment, for example

provisions that address the removal of physical access barriers, this individual is

unable to exercise and develop capabilities to fully participate in public life.

Furthermore, depending on the cost of assistance, the individual, despite having an

income above the official poverty threshold, could also become economically

impoverished. Sen also highlights the roles of choices in families, such as

disproportionately allocating resources to children of a given gender, thereby resulting

in deprivations to other children of food, education and other opportunities necessary

for their present and future potential. The multi-dimensional and complex nature of

inclusion and its underlying causes of poverty and social exclusion are further illustrated in Figure 41.

Inclusion is therefore concerned both with the causes of social exclusion and of poverty. It can be understood from the foregoing that social exclusion and poverty are mutually reinforcing, so ensuring inclusion requires measures that address these two dimensions. Access to decent work and employment thus, becomes an important aspect. Consequently, measures that ensure fair access and transparency in the labor markets and provide opportunities for persons to express their viewpoints and participate in social life as well as to have access to basic social services such as shelter, food and health care, have been identified as key contributors to ensuring inclusion (World Bank, 2013). Women make up on average 50% of the population, but issues related to women's ability to independently own, control and operate property and business, to be equally remunerated as well as to challenge culturally and socially defined roles that limit their opportunities, remain important obstacles to women's inclusion (ILO, 2012; Kranthi & Rao, 2009; Sen, 1999, UNESCO, 2005).

Exclusion prevents the society from realizing the full potential of its members, and so the society itself is deprived of their contributions. For example, the lack of tertiary education opportunities in rural areas could pose difficulties for persons living in these areas, such as single mothers, in accessing these services. Excluded persons may also be unable to change their situation without external support. Active efforts to identify and remove these barriers and also change social attitudes are necessary to bring about social inclusion (UNESCO, 2005).
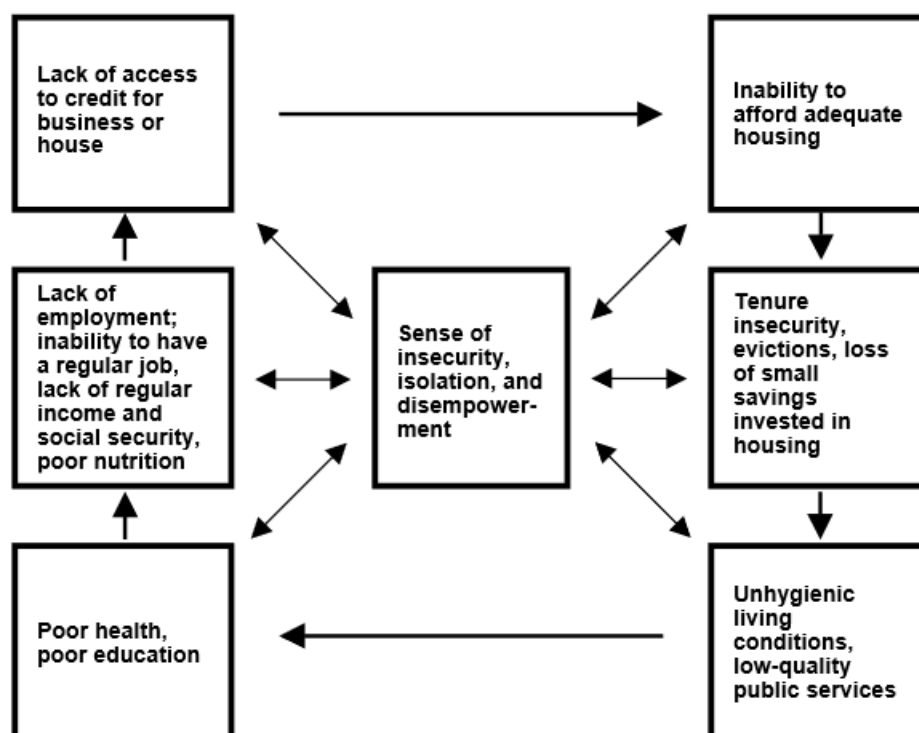
Figure 41: Complexity of Selected Relationships Between Poverty and Inclusion
(Adapted from Baharoglu & Kessides, 2002: 127)

4.8.1.6   Developing Indicators for Inclusion

Following from the interdependence between poverty and participation in social life to ensure inclusion, it therefore becomes important to develop indicators that address these two dimensions of inclusion. In developing indicators for poverty it is necessary to take into account the economic aspects of poverty but also Sen's broader concerns about capability. Given the key role played by the labor market in addressing poverty, an assessment of the employment climate and the adequacy of provisions that ensure adequate and safe work conditions and protection from risks that may predispose workers to losses of capability are important. As women comprise around half of the population, their ability to participate in economic

activity offers an important measure of the society's attitudes to the participation of vulnerable groups.

Table 29:   Indicators and Criteria obtained from the Literature for assessing

Inclusion

Name of Indicator	Criteria
Inclusion – Access to safe and decent work opportunities	To what extent has the city established measures to support the creation and access to safe and decent work opportunities?
Inclusion – Supporting women's participation in economic activities	To what extent is the city supporting the participation of wome in business activities and the workplace?
Inclusion – Access to basic social services	To what extent are the city's citizens able to claim and access basic services (health, education, food and shelter) under the relevant government programmes?
Inclusion – Access to civic and political space	To what extent are the city's citizens able to exercise their civil and political rights?

The ability of citizens to access the basic social services they require, such as access to shelter and health, under relevant government programmes, represents another area for consideration. Poorly designed processes for offering these services can provide barriers to inclusion; factors such as effectiveness, consistency and quality of service delivery also require attention. The level of receptivity to the creation of public spaces and provision of opportunities for civic and political engagement and expression also has a significant influence on inclusion. The proposed indicator set for this construct is presented in Table 29.

4.8.1.7   Equity

Along with self-sufficiency, health and social cohesion, the OECD identifies equity as an important and longstanding recognized objective of social policies

(OECD, 2012). In the OECD's view, equity is a multi-dimensional concept that is concerned both with people's ability to access resources, that is to say, social services as well as economic opportunities, and the outcomes they are able to achieve. The OECD sees equity as being mediated by two aspects, namely the societal status of the individual or group of interest and the response of the society to the group or individual. Factors such as poverty, levels of income inequality, and differences in the opportunities available to men and women as well as employment are important factors that indicate societal status. On the other hand, decisions related to the allocation of public resources such as through the proportions of GDP or the policy attention given to factors which influence societal status indicate the society's response. According to the OECD, increases in GDP and other economic measures appear to be accompanied by an increase in the Gini coefficient32. However, the OECD argues that the direction of change in the Gini rather than its value is of greater policy relevance.

Rather than equity, Stiglitz (2012) focuses on inequality, though largely within the context of the United States of America. Like the OECD, he also sees inequality as a multi-dimensional challenge and points to the role of factors, such as access to economic opportunities and social services, as key determinants of inequality. However, Stiglitz also points to other aspects such as fairness, structural advantages and market distortions which can further embed inequality. In particular, Stiglitz points to the role of powerful interests in hijacking the media to shape the public

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32 The Gini index measures the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. http://data.worldbank.org/indicator/SI.POV.GINI

policy agenda, perspectives and debate through the distortion of information. Stiglitz further extends this argument to show how such forces could distort policy and law making processes. To counter these challenges, Stiglitz advocates strongly for education, which he regards as a critical determinant of economic opportunity and as a counterguard - through the development of critical thinking skills – to the hijacking of the public agenda.

In the globalized, knowledge-based economies shifts in the economic landscape are frequent; so strong social protection programmes that ensure access to health care, shelter, as well as training programmes that enable workers to develop new employable skills are viewed by Stiglitz as critical elements. Like the OECD, Stiglitz also sees the societal responses, particularly, through public expenditure and policy choices, as an important barometer of attitudes to equity. On the other hand, Stiglitz sees the Gini coefficient as having a strong normative and predictive value. He asserts that societies with Gini coefficients of less than 0.3 have less inequality and exhibit better performance across a range of economic and non-economic criteria.

Beder (2000) borrows from Falk et al. (1993) to define equity as the belief that people's basic needs should be met, that burdens and rewards should not be spread too unevenly across communities and that policy should be applied impartially, fairly and justly to achieve these goals. While agreeing with the thrust of this earlier work, Dulal et al. (2009) emphasizes the importance of qualitative aspects, such as consistency and quality of service, and the observance of democratic processes in the delivery of goods and services. In addition, Dulal et al. also underline the importance of assessment measures to determine whether policies and programmes deliver the same impacts and outcomes for all groups. The foregoing authors and others such as

Clark (2012) and UNESCO (2005), also see the democratic process as an important social value that supports and shapes a human-centered development agenda and contributes to social justice. These perspectives are also shared by Stiglitz and the OECD.

4.8.1.8   Developing Indicators for Equity

The literature, while not providing clear benchmarks for "acceptable" levels of inequality, emphasizes that specific attention be focused to the needs of the most vulnerable groups.

In line with the above literatures, measures in four areas appear particularly relevant to the equity construct:

a) A measure that seeks to assess the level of access to services such as health, education and shelter;

b) Measures of how social costs and benefits are distributed across citizens;

c) Measures of the mainstreaming of the needs of vulnerable groups in the city's strategic planning processes; and

d) In line with the concept of democratic service delivery, fairness and a level playing field a measure of the extent to which citizens are aware of the goods and services available to them and the processes for accessing them.

A range of groups are vulnerable and face challenges in having equal access to opportunities. Equity on the basis of gender, for example represents an area of such significance that it has been formally incorporated into the Millennium Development Goals (United Nations, 2014). Gender achievements with regard to equity therefore provide a useful bellwether for the progress amongst other vulnerable groups. Within

the scenarios developed for each of the four classes of indicators identified above, attributes such as service quality, consistency and adoption of assessment to support improvement are incorporated. The proposed indicator set for this construct is presented in Table 30.

Table 30:   Indicators and Criteria obtained from the Literature for assessing

Equity

Name of Indicator	Criteria
Equity – Citizens' basic needs are being met	To what extent are the basic needs of the city's citizens' being consistently and adequately met?
Equity – Social burdens and rewards spread evenly across citizens	To what extent is the city taking active measures to ensure that the benefits of development are spread widely and to ensure that adverse impacts are better managed and anticipated?
Equity – Gender mainstreaming	To what extent does the city conduct gender advocacy and monitoring within its strategic planning, policy development and service delivery?
Equity – Policies addressing basic needs are adequately communicated and applied fairly	To what extent has the city taken measures to ensure that beneficiaries have adequate information about policies and programmes for access to basic services – health, housing, education, training etc. – for which they are eligible?

4.8.1.9   *Openness*

UNESCO (2005) uses the concept of openness in three ways. The first relates to transparency and participation around public decision-making and its outcomes; the second concerns curiosity or willingness to venture outside one's frame of reference, while the third aspect of openness is related to the "open movement", which promotes the free sharing and co-creation of information and knowledge-based goods and services, particularly those essential for human development within the public

domain, characterized by the use of open intellectual property standards as well as the promotion of collaboration and the sharing of knowledge assets.

Openness, as used in the first sense, is widely regarded as essential for good governance (European commission, 2001; Gisselquist, 2012; UNESCO, 2005). However, there is confusion within the literature and amongst experts regarding the use and definitions of the terms transparency and openness. According to Judge Kenneth Keith of the United Nation's International Court of Justice, transparency and openness are equivalent terms (Keith, 2012).

However, Bugaric (2004) sees these terms as quite distinct with the principle of openness being a broader term than that of transparency. According to Bugaric, transparency is limited to the ability to access the information of public administration services. Openness, on the other hand, entails the features of transparency along with the ability to engage in discourse and cooperate with the public administration, thus influencing decision-making activities. In contrast to these perspectives, Elisabeth Ungar, Member of Transparency International's Board of Directors and Executive Director of Transparency International's activities in Colombia, views openness as a stepping stone to transparency (Ungar, 2012). Finally, Bannister and Connolly (2011), while acknowledging the plurality of views around transparency and openness, consider transparency to be the operationalization of openness.

For the purposes of the first concept of Openness, the broad perspective and approach to this term adopted by UNESCO is retained.

The second use of openness can be linked to work in the area of psychology, in particular the work of Paul Costa and Robert McCrae who developed a personality model based on five factors, one of which is the openness to new experiences (Judge

et al., 2013; Matthews et al., 2004; McCrae et al. 1992). The openness to new experiences personality factor is associated with receptivity to inner feelings and emotions, a willingness to try different activities, a preference for variety rather than the familiar, receptivity to new ideas, as well as a liberal spirit and readiness to adopt progressive and even anti-authoritarian positions (Judge et al., 2013, Matthews et al., 2004; McCrae et al. 1992). This perspective is therefore much richer than the corresponding UNESCO definition.

Various studies have shown correlations between low levels of Openness with insularity, religious fundamentalism and authoritarian behavior and a preference for the familiar (Saroglou, 2002; Sibley & Duckitt, 2008). Conversely, creativity is positively linked to openness (McCrae et al., 1992; Williams, 2004). Research on the effect of personality types on the creativity of groups suggests that groups, whose members have a high level of openness to experience are likely to produce creative solutions to problems (De Dreu et al., 2006; Goncalo et al., 2009). However, this research also suggests that the inherent questioning nature of teams with a high level of openness may lead them to be less likely to implement the solutions they develop.

The final aspect of openness emphasizes promoting access to knowledge and information, and the use of technical systems that facilitate collaboration, which are premised on the use of interoperable and open platforms for information management. According to the Educational Technology & Media Massive Open Online Course (2013), the Open Movement is an umbrella term used to describe several related movements that, collectively, advocate the concept of a free and open society in the arts, education, government, software and hardware development, manufacturing, research, publishing, intellectual property, technology, medicine, and other emerging

areas. These activities are often prefixed by the term "open"; for example open content, open access journals, open data, open government and open source software as well as open educational resources. According to Downes (2007), while the term "open" in this context implies at a minimum no cost to the person who uses or consumes the resource, other conditions may be stipulated by the creator of the resource. These may include an obligation that the use of the resource be non-commercial, that products resulting from the use of the resource be redistributed under the same terms as the original resource and that there be attribution or acknowledgement of the resource author in any derivative works that are created (Bissell, 2009).

Various types of open licenses, such as the Creative Commons license, support this approach. Underlying the movement are certain distinct perspectives such as i) the existence of a knowledge commons which predicates that knowledge should be economically free and also able to be adapted and changed over time to serve the needs of users; ii) teaching and learning as creative processes that should not be constrained; and iii) unconstrained environments as optimal conditions for creativity and innovation (Bissell, 2009, Bissell & Boyle, 2007). These approaches favor co-creation and non-hierarchical peer to peer networks that focus on creating value often for the common good. In addition, by bringing together multiple communities of actors, they are often able to sustainably address problems which are too risky, resource intensive or complex for a single actor or institution to undertake. Inherent in the discussion around the open movement is the belief that these conditions create opportunity for democracy, for the best ideas to be discovered and for processes based on merit and fairness.

At the same time, however, there is concern about the ability of open models to deliver on their promises on grounds of sustainability and technology (Rhoads, 2013; Vardi, 2014; Wolf, 2014). While the marginal costs of distributing digital products are low, the initial development costs are often considerable. For large open courseware projects, such as those developed by MIT, Yale and Harvard, the cost of producing a single course is reported to be in excess of $500,000 (Rhoads, 2013). Entrants must therefore negotiate a number of significant barriers of an economic and technical nature as well as the dissemination of their resources. Furthermore, the offerings that are made available also indicate and reflect choices which have values such as what is determined to be useful or valid knowledge, who can participate and so on. Consequently, the portrayal of the open movement as a leveler of inequality and as a promoter of inclusion of the marginalized, does not adequately take account of the entire ecosystem or the complexity that must be managed in order to adequately address and respond to these challenges.

Within the context of open government, projects that support access to the research of public institutions, to data collected through government resources as well as educational content, are being made available and accessible through open government and open data initiatives. In parallel, relevant policies to support the use and re-use of this data, the training of government employees as well as citizens, the deploying of infrastructure such as community Internet access points and providing Wi-Fi coverage and developing portals which allow citizens to report problems, to conduct business with governments, to participate in decision-making and access virtual spaces for self-organizing are underway. These initiatives are still in their early

stages and have much to learn but are likely to grow in importance and will likely need to evolve and mature to overcome the initial drawbacks.

4.8.1.10 Developing Indicators for Openness

Based on the foregoing discussion, indicators addressing each of the three dimensions of openness have been proposed and presented in Table 31. Attention is given to:

Table 31: Indicators and Criteria obtained from the Literature for assessing Openness

Name of Indicator	Criteria
Openness – Transparency of decision making processes	To what extent are the citizens informed and provided opportunities to contribute to setting the city's strategic goals, attaining and knowing their outcome?
Openness – Willingness to venture outside frames of reference	To what extent is the city using broad-based partnerships and collaborative approaches to more effectively meet its development targets?
Openness – Open standards, collaboration and knowledge sharing	To what extent does the city use open standards (open source, open data, open access, open educational resources etc.) to promote access to public information and unlock the value of public data?

a) Transparency of decision-making processes along with opportunities for participative engagement;

b) The willingness to actively work with non-state actors to arrive at solutions; as well as,

c) The support provided for non-proprietary technical standards, interoperability and other frameworks that support the exchange and re-use of data and information.

4.8.2   UNESCO's Key Principles for Knowledge Societies

The principles - freedom of expression, universal access, and diversity and quality education for all presented in Table 32 – serve to provide the means for developing the processes, skills and competencies needed for citizens to operationalize and achieve the goals of the society in a manner that is coherent with its ethical values. Advocating for the principles of freedom of expression, universal access, cultural diversity and education are also integral to UNESCO's role and mandate as a specialized agency of the United Nations System.

4.8.2.1   Freedom of Expression

Article 19 of the Universal Declaration of Human Rights (United Nations, 1948) lays out the following provisions:

Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.

Knowledge societies are premised on the use of information and knowledge for societal development. Freedom of expression is therefore essential for the dissemination, interrogation, comparison, validation and absorption of knowledge as well as the creation of new information and knowledge (UNESCO, 2005). Thus freedom of expression plays a normative and quality assurance role, supporting the strategic role of information and knowledge in today's contemporary life. Without freedom of expression the exchange of views is not encouraged and without this dialogue there can be no sharing of knowledge and hence no knowledge society.

Table 32:   "Key Principles" Construct in UNESCO's Knowledge Societies

Conceptual Framework

Construct	Definition	References in the Literature
Freedom of Expression	The right of every individual to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.	United Nations 1948
Universal Access	Equitable and affordable access by all citizens to information infrastructure (notably to the Internet) and to information and knowledge essential to collective and individual human development.	UNESCO 2003
Cultural Diversity	Culture takes diverse forms across time and space. This diversity is embodied in the uniqueness and plurality of the identities of the groups and societies making up humankind. As a source of exchange, innovation and creativity, cultural diversity is as necessary for humankind as biodiversity is for nature. It is the common heritage of humanity and should be recognized and affirmed for the benefit of present and future generations.	UNESCO 2001
Education for All	The Provision of quality basic education for all children, youth and adults to provide the foundation and skills to effectively navigate social changes and to equip citizens with the skill needed for learning to learn and to fully participate in their societies.	United Nations 1948, UNESCO 1990

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strategic role of information and knowledge in today's contemporary life. Without

freedom of expression the exchange of views is not encouraged and without this

dialogue there can be no sharing of knowledge and hence no knowledge society.

From this perspective it becomes clear that freedom of expression and freedom of information are fundamental to the construction of the knowledge societies.

Freedom of expression is, therefore, an area of concern and relevance not only for journalists and human rights specialists but for every citizen. Nevertheless, in democratic societies the media is expected to play an important role in the free flow of information, in particular by, at a minimum, providing a forum for public discussion, facilitating and safeguarding the flow of information and preventing the abuse of power (Peters, 2010; Starr, 2009; Trappel & Maniglo, 2009; UNESCO, 2005, 2010).

The presence of a diversity of views and perspectives is relevant to ensuring that citizens are well informed of events and developments that impact their lives and are adequately prepared and equipped to exercise their rights and responsibilities as members of their communities (UNESCO, 2005; Valcke, 2009). Societies must often make complex choices that have long term impacts and trade-offs; consequently, adequate sources of information about options and their benefits and potential risks are required for informed and participative decision-making. Powerful stakeholders with a vested interest in the outcomes of such decisions processes may wish to influence public sentiments. Having a diversity of information channels can, therefore, contribute to improving the overall understanding of the issues at stake.

A diversity of information channels – public address systems, radio, television, mobile telephony, print, Internet, posters, town hall meetings, mailings, etc. – can ensure that there is a better flow of information in terms of geographic, socio-economic and demographic coverage. In a similar way, information flows and

channels must also take account of factors such as linguistic diversity, literacy levels and disabilities.

Furthermore, a mix of ownership models – community based, for-profit, public broadcasters, etc. - can also contribute to ensuring that media perspectives reflect and address the heterogeneity of the various stakeholders present in the communities. In addition, a plurality of media ownership models also ensures that values other than economic ones determine the editorial choices made in the types of content and information that is prioritized (Peters, 2010; UNESCO, 2010). For example, despite the widespread availability of blogging, the high cost of conducting quality investigative journalism coupled with the precarious situation of current media models has resulted in a reduction of the media's capability to play its traditional role as a watchdog (Peters, 2010; Starr, 2009). Thus, the sustainability of a diversity of media channels and the independence of these media channels have important implications for the quality of information available to citizens and their ability to play their role as active informed participants in a democratic society.

In order for the media to adequately conduct their role of creating a space for public discussion, facilitating the flow of quality information on relevant issues and serving as a check on the abuse of power by the powerful, it is essential for media practitioners to receive adequate professional preparation to develop the skills needed to undertake these tasks (Peters, 2010, Trappel & Maniglo, 2009). Ideally, an ecosystem of institutions is needed to support this role. These include training institutes such as universities and colleges, as well as professional bodies which, through codes of ethics and practices, serve to monitor the conduct of media professionals' thereby ensuring objective and balanced reporting, providing

mentorship and ongoing professional development and advocating for the profession. The importance of ongoing professional development cannot be over-emphasized, as is evidenced by the major shifts that have resulted from the shifts to digital production and digital channels. This in turn has led to the need for new infrastructure, new workflow processes and new competencies in areas such as intellectual property, which were not required before, as well as the entry of new competitors, and a need for new business models (Peters, 2009). The emergence of new fields of interest and subjects of concern to public policy, such as climate change, privacy and the emergence of non-state actors as key players in the society, all present areas where debate is required and of which the media itself needs to be aware of, if it is to adequately play its role.

As sovereign state signatories and ratifiers of the various international human rights conventions, each nation has a responsibility to give effect to their obligations under international law by establishing within their territories the relevant national legislation, policies, programmes and institutions as well as providing adequate resources for their citizens (OHCHR, 2012). As part of these obligations, states are expected to create an enabling environment in which media can operate with a view to ensuring national service coverage and supporting the creation of a national identity and sense of community, avoiding conflicts of interest, as well as providing space and access for stakeholders and minority groups. Through their national broadcast and information policies, establishing regulatory frameworks conducive to the dissemination of diverse viewpoints - public, commercial, community and other stakeholders - is an important role and responsibility of the State. Within this

mandate, States are expected to create an enabling environment for a public broadcasting function.

According to Banerjee & Seneviratne (2005), public service broadcasting (PSB) is broadcasting made, financed and controlled by the public for the public; in addition, it is free from political interference and pressure from commercial forces and is neither commercial nor state-owned. PSBs provide broadcasts across a range of media; they seek to reach every citizen, encourage the creation of a public space for exchange of views and facilitate citizen's participation in public life. Furthermore, by informing and developing the knowledge of citizens about events and concepts in the community and the world, citizens' perspectives can be enlarged and their self-awareness and critical thinking enhanced (Banerjee & Seneviratne, 2005; UNESCO & World Radio and Television Council, 2001). Ensuring public ownership, operation and funding are an important measure that enables independent functioning that is guided solely with a view to serving the public's interest. This is crucial to maintaining objectivity both in the content, coverage and the ability of the PSB, if needed to provide scrutiny of the State or senior public figures; for example, by investigative reporting into allegations of impropriety. Therefore, the extent, to which PSBs are able to conduct their operations in an environment that supports the spirit of their mission, provides an important measure of the extent to which freedom of expression is enabled within a given society.

4.8.2.2 *Developing Indicators for Freedom of Expression*

Based on the foregoing discussion, it can be concluded that freedom of expression is crucial to ensuring the free flow of information and consequently, the

construction of new knowledge as this information is internalized, discussed, debated and reconstructed in the public spaces. Communities are seldom homogeneous; therefore, the information needs should vary. Thus different sources should be available to provide this information under a variety of business and service models with clear guidelines that create a level playing field. The information circulating should be accurate and subject to quality assurance. In addition, there should be channels available which are free from the influence of special interests who may seek to distort the information available by controlling what is discussed and how information is presented.

Table 33: Indicators and Criteria obtained from the Literature for assessing Freedom of Expression

Name of Indicator	Criteria
Freedom of expression – Climate for free discussion and exchange.	To what extent does a climate which support freedom of expression and the exchange of views; including freedom of the press; encouraged in the city?
Freedom of expression - Diversity, independence and sustainability	Is the city's media landscape characterized by a diversity of choices, viewpoints, independence and sustainability?
Freedom of expression - Professional standards	Do the media practice high levels of professional standards?
Freedom of expression - Transparent and independent regulation	Do public service broadcasting regulations exist and if so are they implemented (effectively, transparently and independently)?

On this basis, relevant indicators for freedom of expression would provide insights into:

a) The extent to which citizens feel free to share their viewpoints;

b) The availability of diverse types of information delivered under a range of sustainable business/service model operating under clear frameworks;

c) Measures for providing quality assurance of the information provided; and

d) Presence of information channels that operate independently of political and commercial influence and interests with a view to keeping the public informed.

Based on the foregoing discussion, Table 33 provides a depiction of the criterion and corresponding maturity levels for this indicator.

4.8.2.3   Universal Access to Information and Knowledge

To enable the contribution and participation of all citizens, the means for accessing and shaping the various knowledge streams, whether digital or analogue, is necessary. In addition to infrastructure and hardware, other aspects such as cost, language, and format, availability of relevant content and adequate user capabilities as well as adaptations for persons with disabilities need to be addressed. Societal norms and governance structures can also impact and influence the ease of access. The ability to access the information and knowledge channels therefore has implications on one's ability to exercise the right to freedom of expression and freedom of information.

Transportation systems play an important role in determining the ability of citizens to congregate and to obtain a variety of opportunities, services, social networks and goods. The importance of transportation takes on heightened relevance in light of the shift to rapid urbanization and urban forms which often appear to embody dependence on cars as an implicit assumption (Mees, 2010; Jenkins, 2013; Sietchiping, et al. 2012; UN-HABITAT, 2009).

Mobility, the ability of individuals to move around and accessibility, the degree to which services, goods and activities can be reached, play an important role in the creation of social capital and positively influence the quality of the citizen's life; this relationship has been demonstrated in various studies around the world (Gray et al., 2006; Lamont et al., 2013). Inadequate transport links have been shown to lead to adverse effects in key areas such as employment, as well as in accessing educational, health and government services (Hine & Mitchell, 2003; Lucas, 2004). Work by Sietchiping et al. (2012) points to the dependence of mobility on income levels in sub-Saharan Africa, where due to the inadequacy of public transportation the majority of the population must walk long distances or bike as part of their daily commute. In addition, they face road conditions that are both chaotic and dangerous (Biao et al., 2013). The time spent on these efforts precludes the ability to access opportunities such as continuing education which could enable them to enhance their social mobility and contribute to the city's advancement. However, enhancements to the urban road network without commensurate consideration for public transportation brings benefits to owners of private vehicles, but have limited outcomes for those without vehicles.

Inadequacies in the city's structural capital linked to the transportation network do not facilitate the development of either its human or social capital (Biao et al., 2013; Sietchiping et al. 2012). Consequently, in seeking to enhance transportation networks, both mobility and accessibility must be addressed.

In the case of public transportation the adopted measures must also ensure affordability, reliability and adequate spatial coverage, as well as operating hours that match the needs of users; attention is also necessary to ensure that public

transportation users feel safe and welcome to do so (Hine & Mitchell, 2003; Lucas, 2004; Delbosc & Currie, 2011). Other measures that can seek to augment mobility and accessibility include adopting urban planning policies that serve to enhance people's ability to complete their major activities such as accessing services, employment, goods and recreation within a given area. This feature is often referred to as walkability and is a prominent feature of sustainable urban design (Azmi & Karim, 2012; Frank, 2006). Other studies also suggest that walkability is correlated with enhanced neighborhood desirability and improved health outcomes (Frank et al., 2006; Yin, 2013).

WSIS was the first ever Summit of States convened by the United Nations to discuss the development of the information society[33]. This Summit took place in two phases which were held in Geneva and Tunisia in 2003 and 2005, respectively. The first phase focused on developing political consensus for concrete actions that reflected the interests of the varied stakeholders – governments, inter-governmental organizations, private sector, civil society and the Internet technical community. The second phase, on the other hand, focused on implementing the Geneva Plan of Action as well as reaching agreements on the establishment of financing mechanisms for overcoming the digital divide and for administering Internet governance. The first phase of the Summit was attended by over 11,000 participants and representatives of 175 countries, with over 19,000 participants and 174 country representatives at the second phase[34].

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[33] The UN General Assembly Resolution 56/183 (21 December 2001) endorsed the holding of the World Summit on the Information Society (WSIS) in two phases. The first phase took place in Geneva from 10 to 12 December 2003 and the second phase took place in Tunis, from 16 to 18 November 2005.
[34] See Basic information about WSIS available at: http://www.itu.int/wsis/basic/about.html

To facilitate the implementation of the Geneva Plan of Action and coordinate subsequent follow-up, responsibility for implementing various aspects of the Plan was allocated to various stakeholders. "Action Line C7, ICT applications: benefits in all aspects of life", sought to ensure that the potential of ICT could be leveraged across fields such as, education, health and agriculture and contribute to human development and the well-being of every person. Within this Action Line governments committed to establish e-government systems to support transparency of public administration and democratic processes and accountability, as well as to ensure efficiency and timely response to the needs of citizens and the business sector (Partnership on Measuring ICT for Development 2011). In particular, Governments were mandated to develop "e-government strategies… for strengthening relationships with citizens"[35]. As a result of this internationally agreed decision, all governments were required to develop infrastructure aimed at supporting the internal connectivity of government departments and to also provide platforms which enabled citizens to electronically interact with governments.

Implicit in the roll-out of e-government strategies to strengthen relations between governments and citizens and also with business is the assumption that these individuals and institutions are able to access and use the information systems that enable them to participate in the e-government relationships.

Abdelghaffar and Elmessiry (2012) in their investigation into the readiness of small and medium enterprises (SMEs) in Egypt to use government services, identified the presence of human capacity to use ICT as well as the existence of ICT

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[35] Action Line C7,15,a) ICT applications: benefits in all aspects of life, http://www.itu.int/wsis/docs/geneva/official/poa.html#c7-15

infrastructure within SMEs, as necessary conditions for the uptake of e-government services. With regards to infrastructure, Abdelghaffar and Elmessiry identified computer ownership, the presence of telephone lines, the existence of e-mail accounts and adequate Internet speed as key success factors. Their research also found that while the human capacity of employees to engage with government services depended on the employees' computer knowledge, Internet knowledge and regular use of the Internet.

Ayanso et al. (2011) conducted principal component analysis (PCA) on the 192 e-Government Readiness Country Database developed by the United Nations Public Administration Network (UNPAN). The UNPAN database is created on the basis of regular national assessments of e-government websites, telecommunication infrastructure and human resource endowments. On the basis of the measures collected under these three areas, a composite index, which is the arithmetic average of the indicators collected, is generated. With a view to obtaining greater insight into the factors that most significantly influence e-readiness the researchers undertook PCA. Their findings suggested that the most important predictors of e-government readiness were Internet penetration, adult literacy and intensity of Internet usage. Consequently, their policy recommendations emphasized the need to focus efforts into improving Internet infrastructure and also boost human resources through formal and informal training programmes as well as by supporting ease of access to ICT infrastructure.

These findings also support the conclusions of other researchers who have investigated the digital divide over the past (Campbell, 2001; Bhatia, 2001; Lu, 2001). The digital divide is generally conceptualized as the difference in the ability between

countries, within countries (e.g. between rural and urban areas), between individuals, groups of individuals and institutions to access, use and benefit from information and communication technologies (Schlichter & Danylchenko, 2014). Fundamental to overcoming this challenge is the removal of infrastructural barriers and the development of the necessary skills and human capacities.

Universal access to information is also critical for cities in ensuring their ability to participate in global activities across a range of fields that are facilitated by global platforms like the Internet. The ability of cities to access these networks enable citizens and institutions alike within the city to participate in and influence global information flows and access a range of social, economic and environmental benefits.

According to Castells (1989), access to global networks enables cities to participate in the flows of power, finance and information that occur on these networks. These flows, facilitated by global telecommunications, connect local and global processes and enable city actors to exert their influence across space and time and to create and harness opportunities. This situation also opens up the possibility that access to information networks could make cities vulnerable to others who are better positioned. Accordingly, Borja and Castells (1997) encourage cities to pursue a mixed strategy that involves upgrading their ICT infrastructure, building citizen's human capital, addressing broader social welfare and involving citizens in the decision-making process.

4.8.2.4   *Developing Indicators for Universal Access to information*

The foregoing review of the literature highlights four key areas or aspects within which indicators may be derived to understand and assess conditions that

signify maturity along the universal access to information dimension. Transportation systems play an important role in supporting access to services, processes and goods and facilitate the participation of citizens in various knowledge activities. States have affirmed their intention at the highest level to support improved relations with citizens and businesses and to engage them in joint decision making in the context of national governance processes through the creation of information systems which support closer engagement. Research has underscored the importance both of human skills and Internet infrastructure in the realization of e-governance and consequently this establishes an implicit obligation on the state to support the creation of the enabling environment required to fulfil their international obligations.

On this basis, relevant indicators for universal access to information would provide insights into:

a) The adequacy of the transportation networks to support effective communication through the movement of people, goods and services, particularly those with mobility challenges;

b) The progress made by the government in operationalizing access to its services and participation in the governance process with citizens and businesses;

c) Measures taken by governments to overcome infrastructure barriers that citizens may face in accessing information networks; and,

d) Measures taken by the government to support citizens in acquiring the relevant capacities to utilize the e-governance systems and digital networks.

Table 34:   Indicators and Criteria obtained from the Literature for assessing

                  Universal Access to Information

Name of Indicator	Criteria
Universal Access to information and knowledge - Transportation network	To what extent does the transportation network and infrastructure facilitate communication and the movement of people, goods and services?
Universal Access to Information and knowledge - Government information and services	To what extent can Citizens access information and government services on-line?
Universal Access to information and knowledge - Affordability of Internet services	To what extent is the city government involved in ensuring that citizens have affordable access to Internet services?
Universal Access to information and knowledge - Supporting human capacity to use Information and knowledge networks	To what extent is the city developing the capacity of its citizens to utilize ICT networks and content?

Based on the foregoing discussion, Table 34 provides a depiction of the

criterion and corresponding maturity levels for this indicator.

4.8.2.5   Cultural Diversity

Cultural diversity refers to the mixture of variety, balance and disparity

present in a system or society (Ranaivoson, 2008; UNESCO-UIS, 2011). Variety

examines the number of categories (e.g., social classes, religions, ethnic groups),

balance considers their relative presence (e.g., proportion of each social class in a

society) and disparity looks at the differences between categories (e.g., difference in

income between classes). Diversity is often viewed as a source of stability, for

example in biological systems (Stirling, 1998; Moreau and Peltier, 2004).

Globalization is increasing the heterogeneity of societies bringing together new

groups and new ideas and creating opportunities for new ideas, creative expression

and innovation. Stock (2011) cites a study by Nathan and Low (2010) in London, which found correlations for firms engaged in knowledge intensive activities between innovativeness and the diversity of its workforce.

However, the reduction in homogeneity and the encounter with new value systems and outlooks may lead to societal stresses. Values of pluralism and openness can play an important role in coping and making senses of such changes and can facilitate and support cross-cultural dialogue through which self-reflection, self-discovery, learning and new knowledge is created.

UNESCO's Convention on the Protection and Promotion of the Diversity of Cultural Expressions is an internationally-binding legal instrument that was adopted by UNESCO's General Conference in October 2005[36]. In March 2007 the Convention entered into force following ratifications by 30 Member States. By the end of 2014 some 130 Member States and the European Union had become signatories of the Convention[37].

The Convention was developed to address three principal challenges, namely:

a) To effectively address the two independent roles played by cultural activities, goods and services as (i) transmitters of cultural identity, value and meaning, as well as (ii) carriers of economic and commercial value;

b) To safeguard the cultural expression of social groups including minorities and indigenous groups; and,

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[36] Convention on the Protection and Promotion of the Diversity of Cultural Expressions available at http://portal.unesco.org/en/ev.php-URL_ID=31038&URL_DO=DO_TOPIC&URL_SECTION=201.html

[37] Parties to the Convention on the Protection and Promotion of the Diversity of Cultural Expressions, Paris, 20 October 2005, available at http://www.unesco.org/eri/la/convention.asp?KO=31038&language=E&order=alpha

    c) Manage the potential risks that accompany the imbalances in flows of cultural

expression between countries, particularly developed and developing

countries.

To address these challenges, the Convention has sought to build awareness

and reinforce the capacities of States to undertake an active role in the development of

national policies and programmes in the field of culture; promote international

cooperation aimed at promoting the cultural expressions of all countries, particularly

in those countries which face challenges related to the creation, production and

dissemination of their cultural goods and services; support recognition of the cultural

goods and services as carriers of identity, values and meaning; and bring greater

recognition and awareness of the dual economic and cultural nature of cultural

activities, goods and services.

An important aspect addressed by the Convention is related to providing

support for the full breadth of cultural expressions in regions. Work by Looseley

(2004) points to practices evident in various countries where State-supported activities

in the area of culture are narrowly focused on exposing persons, viewed as

disadvantaged, to 'high culture'. In this context, the term "high culture" is reserved for

professionally-produced excellence in the traditional arts and heritage that is thought

to reflect and embody intellectual rigor. Appreciation of high culture, though it can be

developed through education, is thought to depend to a large extent on one's social

origins. Consequently, the gains that could be achieved by such programmes *a priori*

is limited (Clements, 2006; Hill, 204; Vromen, 1992). As a result, these efforts

produce what authors like Burri (2013) and Pyykkönen (2012) may refer to as cultural

imperialism in which positive value or cultural legitimacy is attributed only to a

narrow range of cultural expressions and the individuals who are able to appreciate them.

These experiences support the view proposed by Pierre Bordieu under the concept of cultural capital that in each society not all modes and forms of cultural expression receive the same level of respect or value, but are rather organized by that society's hierarchal norms (Hill, 2004; Vromen, 1992). The use of terms such as "high culture", "popular culture", "indigenous culture" and "post-modern culture" are therefore troublesome, because beyond their surface role as descriptors, they also imbed implicit and sometimes explicit social exclusionary and normative markers of quality, virtue and value (Clements, 2006; Hill, 2004). The UNESCO Cultural Convention, with its efforts aimed at promoting and broadening the ambit of cultural legitimacy of expressions, can therefore be seen to be diametrically opposed to these perspectives.

The UNESCO Convention views linguistic diversity as a fundamental element or building block for achieving cultural diversity. The Convention therefore encourages the promotion of linguistic diversity and proactive measures against factors such as rapid urbanization, the Internet and other modern mass media and the loss of intergenerational transfer of memory. UNESCO recognizes that maintaining the regular use of languages in everyday life is the most effective way to safeguard languages (UNESCO, 2003, 2005). Through other instruments, such as the Recommendation Concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace[38], the Organization has been advocating for the

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[38] The Recommendation Concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace available at http://portal.unesco.org/en/ev.php-URL_ID=17717&URL_DO=DO_TOPIC&URL_SECTION=201.html

presence of all languages on the Internet so that language barriers to the production, dissemination and use of educational, cultural and scientific content for all languages, including indigenous ones, can be removed.

Johnstone (2002) and Skutnabb-Kangas (2002) argue for the preservation of linguistic diversity on the basis of its economic value and its contribution to human survival and sustainable development. According to Johnstone, multilingual persons exhibit higher levels of creativity than monolingual ones as judged on their performance across a range of aptitude tests that assess skills in areas such as divergent thinking and cognitive flexibility that are positively correlated with creativity. Accordingly, in an information and knowledge society where knowledge and information creation are drivers of economic production, linguistically diverse cultures could potentially display superior economic performance; this potential may be moderated by cultural and contextual factors such as attitudes to risk, willingness to take action amongst others.

Both, Johnstone and Skutnabb-Kangas point to causal links between linguistic diversity and biodiversity. Knowledge of sustainable ecological management practices and relationships is contained in the languages that evolved in these environments, much of which is not yet documented by "scientists". Ensuring the survival of these languages, is therefore crucial for the protection of endemic, rare and endangered species and the habitats in which human beings live.

Research within multinational organizations points to language competence in multiple languages as being associated with the ability to network effectively and capture knowledge, particularly outside formal channels (Lønsmann 2014, Marschan-Piekkarie et al., 2009). Persons with high language competence can participate in

small talk, jokes and other forms of informal knowledge sharing. This facilitates the advancement of individuals with high language competence. Participants in Lønsmann's study with limited language competence highlighted forms of social exclusions they encountered which reduced their ability to participate in formal as well as informal activities organized around work, and reduced their opportunities for career advancement. Consequently, in multilingual societies, while it is important to provide opportunities for various groups to use their languages, it is equally important to launch efforts aimed at supporting cross-cultural and trans-linguistic competence.

While fully conscious of the role and value of cultural expressions as transmitters of cultural value, the UNESCO Convention also seeks to enhance the role of these expressions as a source of economic dynamism for the respective communities. This approach also recognizes that the survival of cultural expressions is tied to its ability to become part of the daily life. UNESCO programmes, such as the Creative Cities Network, provide examples of how cultural expressions can form the basis for cultural industries that support economic value while reasserting cultural meaning[39]. The Creative City Network currently consists of 28 cities in 19 countries focused on cultural activity in 7 thematic areas, namely literature, film, music, crafts and folk art, design, media arts and gastronomy. Through the promotion of creative tourism[40], this network is contributing to job creation, the economic development of

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[39]UNESCO Creative Cities Network is focused on establishing hubs that promote socio-economic and cultural that foster diversity and social cohesion in cities of the developed and developing world. http://www.unesco.org/new/en/culture/themes/creativity/creative-cities-network/

[40] "Creative Tourism" involves citizen-like interactions in which visitors have an educational, emotional, social, and participative interaction with the place, its living culture, and the people who live there. UNESCO (2006). Towards sustainable strategies for creative tourism http://unesdoc.unesco.org/images/0015/001598/159811E.pdf

cities and regions as well as the revival of cultural practices and knowledge that were in danger of disappearing.

Buri (2013) credits the UNESCO Convention with establishing cultural diversity as a global public good, thereby creating space for the development of a range of policy and regulatory measures at the international and national level. In addition, the Convention has resulted in a range of international cooperative actions. However, even though legally binding, Buri (2013) cites the Convention's lack of a mechanism for implementing and enforcing sanctions, coupled with the track record of human rights violations of various signatories, as a reason for measured optimism in its ability to achieve its goals.

4.8.2.6   Developing Indicators for Cultural Diversity

In developing indicators, the UNESCO Convention is taken as the frame of reference. Accordingly, indicators were selected based on their ability to assess progress along the axes of the challenges and the objectives this Convention was designed to address.

Thus relevant indicators would seek to assess:

a) The extent to which the forms and types of cultural expression that exist in the city receive public support, space and are identified with by city inhabitants;

b) The extent to which multilingualism is fostered; and

c) The extent to which the economic potential of culture is recognized and fostered by the city.

Based on the foregoing discussion, Table 35 provides a depiction of the criterion and corresponding maturity levels for this indicator.

Table 35:   Indicators and Criteria obtained from the Literature for assessing

Cultural Diversity

Name of Indicator	Criteria
Cultural and linguistic diversity - Promoting diverse cultural heritage	To what extent are cultural heritage and expressions that reflect the city's diversity promoted and valued?
Cultural and linguistic diversity - Promoting multilingualism	To what extent is the use of local, regional and international languages promoted?
Cultural and linguistic diversity - Promoting cultural industries	To what extent are cultural industries promoted and/or valued as an engine for socio-economic growth?

4.8.2.7   Education for All

The concept of a knowledge society is premised on the role of knowledge,

often referred to as an intangible asset, as the most critical resource for development,

production and competitive advantage. Knowledge is the capacity, actual or potential,

for effective action (Bennet & Bennet, 2007). Edvinsson and Malone's (1997)

concept of intellectual capital represents knowledge as stocks embedded in

individuals (human capital), social relationships (social capital) and in governance

processes and structures (structural capital) that serve to moderate interactions

between individuals and which can serve to direct the distribution and uptake of

knowledge. Human capital consists of the expertise, experience, knowledge,

reputation and skills of an individual as well as his/her motivation to apply these skills

(Becker, 1964; Coleman, 1988; Gamerschlag, 2013; Schultz, 1961). Whatever one's

conception of knowledge – a flow, a stock, a capacity – knowledge is widely regarded

as a human quality that is shaped by the varied learning experiences across the varied

spectrum of formal and informal settings, explicit and tacit, that people - whether

individually or as a collective have been exposed to. These experiences constitute the process of education. Education is widely regarded to be the principal contributor to the development of human capital (Blaug, 1976; Gamerschlag, 2013; Keeley, 2007; UNESCO, 2005).

Human capital theory sees the development of human capital as the key driver of economic growth, so in the context of the knowledge society, education is crucial to economic growth (Becker, 1964, Gilles, 2011). The quality of these educational processes whether formal or informal, their focus as well as their ability to generate knowledge that is relevant to the problems to be solved within the particular society, will determine the immediate value of this human capital. The ability to acquire new skills, that is, the ability to master learning to learn, will ensure longer term relevance and provide the foundation and skills that individuals require to effectively navigate societal changes.

Education is recognized in the Universal Declaration of Human Rights and international law as a human right of particular significance, given its fundamental and essential role in enabling and realizing other rights (UN, 1948). While supported by economic perspectives, such as human capital theory, there is growing recognition of education's broader social impact and its role as a public good (Bounfour & Edvinsson 2005; Gillies, 2011; Keeley, 2007; Souter, 2010; Stiglitz, 2012; UNESCO, 2005). Attention to broader measures of societal well-being can also be seen in the Human Development Index (HDI), a composite measure developed by the United Nations Development Program (UNDP) that seeks to emphasize people and their capabilities rather than just national economic growth (Malik et al., 2014). The HDI

takes into account health and lifespan, education and a decent standard of living based on income levels.

In the globalized and highly mobile environment of knowledge workers, cities compete to attract, but also to retain the human capital that is critical to success in the knowledge society and knowledge economy (Činčikaitė & Paliulis, 2013; OECD, 2005; Singhal et al., 2013; Yigitcanlar et al., 2007; Yigitcanlar & Lönnqvist, 2013). The factors that contribute to making a city attractive are subjective, multi-dimensional and complex and there is no single definition, nor agreed set of measures, for assessing the competitiveness of cities. Research by Parkinson (2004) highlights the importance of aspects such as economic diversity, skilled workforce, connectivity, quality of life, innovation, and entrepreneurship. Overlaps with Parkinson's findings can also be seen in research by Dijk (2006), which emphasizes supporting environments for business, innovation and entrepreneurship as features that make cities competitive and attractive to knowledge workers. Yigitcanlar et al. (2007) found that factors such as quality childcare and education for school age children, cultural amenities such as historical places and entertainment, affordable housing and private healthcare were particularly important to knowledge workers. Dickmann (2012) in his study of motivators for expatriates to take up jobs in London, identified location-specific factors such as personal safety, prestige and reputation of the city and standard of living as well as family-related factors such as educational opportunities as key determinants, in addition to career advancement opportunities that influenced their decision. Florida (2002) underlines the importance of developing what he terms "an attractive people climate" by promoting such intangible factors as diversity,

openness and tolerance as well as the more traditional aspects such as good

infrastructure and cultural life, in order to attract human capital.

Tharenou's (2003) exploration of receptivity among Australian graduates to

opportunities for international work in developing countries is of particular interest,

given the focus of this research on cities in developing countries. Tharenou's work

pointed to the role of factors such as political stability, danger, country undesirability

and low standards of living as deterrents to expatriates seeking work opportunities in

developing countries.

Another challenge of particular importance to developing countries is that of

the brain drain (The World Bank, 1999). This term was initially conceived to describe

the mass loss of scientists and engineers from the United Kingdom to the United

States of America in the 1960's (Tyson, 2011). However, today the term brain drain is

used almost exclusively to refer to the loss of the most skilled segment of populations

in developing countries who have tertiary-level educational qualifications that enable

them to be internationally mobile and to seek professional opportunities in the

developed world. These qualifications may have been obtained either in-country or

overseas. This is often perceived as a loss of key human capital and the expected

return on the investment made by the government in the educational systems;

however, the reality is far more nuanced (Arizpe et al., 2000; Lisi & Biondo, 2013).

Through their remittances, the diaspora often makes significant contributions to the

economic development of their home countries. Furthermore, in cases where they

decide to return home – sometimes in response to government incentives - the foreign

experience gained during their absence can have significant benefits and impacts that

would not have materialized had they not gone abroad (Arizpe et al., 2000; Lisi & Biondo, 2013; Tyson, 2011).

The role of cities as connecting points between nations, cross-roads for trade both in tangible and intangible assets, tourism destinations and global magnets for human capital point to the growing importance of the multicultural skills of citizens to support these networks (Scott, 2008; OECD, 2013). The ability to work in a multicultural environment involves not only linguistic skills but also cognitive and affective attitudes, including behaviors and judgments, that affect the self-identity and interactions with others; together, these are referred to as intercultural competence (Bazgan & Popa, 2014;). Intercultural competences play an important role in the successful transition of expatriates into new positions. Companies can and have incurred significant costs when assignments go wrong; furthermore, the loss of confidence and potential derailment of the careers of previously successful staff represents another significant loss (Tung, 1987). Amongst firms operating in cross-cultural environments, the ability to successfully manage inter-cultural contacts and support productive and harmonious encounters with persons of differing values and belief systems has been consistently been shown to be a source of significant competitive advantage (Bok, 2009; Ng et al., 2007; Sousa & Bradley, 2006; Yitmen, 2013). Just as in the case of international companies, high intercultural competencies amongst its citizens can therefore be regarded as a source of competitive advantage for cities.

Information and communication technologies such as computers, telecommunication systems and a host of other devices often connected to the Internet are critical infrastructure that enables the operation of global networks that facilitate

the flow of information, knowledge goods and services. The ability of the citizenry to maintain and operate these systems and participate within these networks is therefore vital to a city's ability to be effective and efficient nodes in this global network architecture.

4.8.2.8 *Developing Indicators for Education for All*

Based on the foregoing discussion we may conclude that education is the prime determinant of the level and quality of the human capital of a city and a key indicator of the ability of the city to achieve success.

Table 36: Indicators and Criteria obtained from the Literature for assessing Education for All

Name of Indicator	Criteria
Education for all - Nurturing talent	To what extent is the city seeking to nurture and invest in its human talent?
Education for all - Attracting and retaining talent	To what extent is the city seeking to systematically attract and retain the necessary human talent to support its ongoing development and the realization of its strategic vision?
Education for all - To what extent is the city supporting greater global citizenship education?	To what extent is the city preparing its inhabitants to participate in an environment which increasingly involves participation in diverse, multi-cultural international teams at work study and leisure?
Education for All - Media and information literacy	To what extent is the city preparing its inhabitants to develop the media and information literacy skills required to live, play and work in an environment where ICT and ICT based content is a common feature?

The effectiveness of this human capital is therefore, affected by the quality and breadth of the education the city provides to its citizens; the ability of the city to provide an attractive living and working environment that enables it to retain its skilled citizens and to attract skills it requires from other cities; the level of openness

to the outside world that is cultivated amongst its citizens and, finally, the capability

of its citizens to master the new literacies required for utilizing the information and

communication systems that form the backbone of the global communication network

that supporting the knowledge society and the knowledge economy.

Based on the foregoing discussion, Table 36 provides a depiction of the

criterion and corresponding maturity levels for this indicator.

4.9   Establishing the Prescribed Maturity Level Scenarios

For each construct in the UNESCO Knowledge Societies Conceptual

Framework, indicators were identified from the extant literature and criteria for

evaluating each indicator established. For each indicator/criteria pair, scenarios

corresponding to each of the defined maturity levels - initial, defined, managed and

integrated - were then generated. The following section illustrates this process using

one indicator for each of the selected criteria.

4.9.1   Human Rights - Structural Measures

The criterion for this dimension of Human Rights seeks to assess: What

support has the city demonstrated in establishing mechanisms to protect and promote

human rights?

From the literature, it was shown that structural measures relate to the

supporting infrastructure that enables the State to play its role as a monitor, promoter,

protector and guardian of human rights within its territories, in line with its

international obligations.

Consider the extreme maturity levels. At the initial level, it is not expected that explicit mechanisms in the form of national human rights institutions for fulfilling these obligations - such as an office of the ombudsman/woman, human rights commission or similar entities that undertake the implementation of the provisions of the treaties – will exist..

Table 37:   Sample Indicator with Criteria and Scenarios for one Dimension of Human Rights

Sub-theme: Human Rights - Structural measures			
Criteria	What support has the city demonstrated in establishing mechanisms to protect and promote human rights?		
1 - Initial	2 - Defined	3 - Managed	4 - Integrated
No specific human rights institutions have been established.	National human rights institutions newly established and seeking to develop their internal capacity and raise awareness of city departments to incorporate human rights based approaches in their policies and service delivery.	National human rights institutions in place, developing longer term plans for their growth. City departments have established data collection and monitoring plans on the roles of their services in contributing to realization of human rights targets. Local funding is the main source of support.	National human rights institutions conducting Capacity-building, involved in monitoring and assessment and supporting policymaking. Active in sharing practices nationally, regionally and internationally and effective in supporting their funding.

On the other hand, at the highest level of maturity, integrated, these mechanisms would be fully functional, adequately resourced and conducting their activities independently. Such mechanism would be world class and actively engaged in sharing practices and serving as benchmarks of best practices.

The other two levels would fall between these two extremes. At the lower level, development of structural processes is still at an early stage, - development of monitoring systems, recruiting and training local staff, understanding and informing others of their role. The focus is on the short-term and getting the system to operate, and there is still a dependence on external expertise.

At the higher level, developments have advanced considerably and though not yet having perfected systems for routinization in place, there is good understanding both internally and externally of the function, processes and responsibilities. In-house expertise has developed and is now capable of handling most issues, and occasionally there are opportunities to present success and gains.

Based on the foregoing discussion, Table 37 provides a depiction of the criterion and corresponding maturity levels for this indicator.

4.9.2 Pluralism – Willingness to Actively See Other Points of View

The criteria for the dimension of pluralism seeks to assess: To what extent is the city able to develop broad-based support for initiatives that address the strategic challenges of the city while responding to conflicting concerns and interests of stakeholders?

Consider firstly the extreme maturity levels namely, Initial and Integrated. At the Integrated level all stakeholders are able to explore together through open

consultations and debate the various issues of concern to understand the merits and
disadvantages of all proposals. The final course of action selected is context-optimal
with regards to the city's strategic goals and well-being.

Table 38:   Sample Indicator with Criteria and Scenarios for one Dimension of
              Pluralism

Pluralism - Willingness to actively see other points of view			
Criteria	To what extent is the city able to develop broad-based support for initiatives that address the strategic challenges of the city while responding to conflicting concerns of citizens/stakeholders?		
1 - Initial	2 - Defined	3 - Managed	4 - Integrated
Lead / influential actors are confident of the merit of their analysis, approaches and legitimacy. Accordingly in line with their responsibility they implement relevant programmes and policies to address the problems they have identified without much if any discussion with stakeholders and affected parties.	Lead / influential actors present relevant programmes and policies to stakeholders and in the event of opposition pursue efforts to gain consensus by galvanizing support for the initiatives and removing or quelling dissenting voices.	City initiatives seek to develop win-win outcomes that maximize benefits and reduce possible adverse impacts on stakeholders. Consultations start early to develop a shared vision and understanding. Relevant expertise and experience from cities which have addressed similar problems is leveraged.	City has considerable experience in complex projects and negotiations and draws on networks of external partners, case studies, mediation and various dialogue building and conflict resolution processes to arrive at agreed context-optimal solutions. High level of trust exists. City regularly shares its experiences with other cities.

At the Initial level there is little effort made to build or consider the prospect of broad-based support. The only concerns taken into account are those of the powerful stakeholders/decision makers.

The other two maturity levels fall within these two extremes. The Defined level is characterized by a somewhat softer authoritarian style, there is no real debate or consultation rather an effort to gain endorsement and support through lobbying for the decisions that have been made by the influential stakeholders.

The Managed level is characterized by a commitment to informed decision-making processes that seek to involve all concerned stake-holders. The emphasis on win-win outcomes and consensus building may, however, result in outcomes that do not necessarily generate the best outcomes.

Based on the foregoing discussion, Table 38 provides a depiction of the criterion and corresponding maturity levels for this indicator.

4.9.3   Inclusion – Women's Economic Participation

The criterion for this dimension of inclusion seeks to assess: To what extent is the city supporting the participation of women in business and the workplace?

The literature has demonstrated the positive role played by access to economic opportunities in eradicating poverty-related barriers. Furthermore, since women compose around 50% of all populations, they may be considered as an initial bellwether for the access to economic opportunity for other groups.

Consider firstly the extreme maturity levels, namely, Initial and Integrated. For the Initial level we assume that no enabling initiatives have been undertaken in this area. Extensive global campaigns highlighting and advocating for women's rights

have been undertaken; consequently, even where no enabling measures have been launched there is growing awareness of the need to initiate improvement actions. At the Integrated level we assume that all barriers to women's participation have been removed and consequently women are closely involved as actors and agenda setters in the city's economic programmes.

Table 39:   Sample Indicator with Criteria and Scenarios for one Dimension of Inclusion

Inclusion - Economic 2 - women's participation			
Criteria	To what extent is the city supporting the participation of women in business and the workplace?		
1 - Initial	2 - Defined	3 - Managed	4 - Integrated
No specific initiatives have been launched by the city as yet to address this area, but there is growing awareness of relevant regional/ international normative standards in this area as well as interest in improving and strengthening the city's commitment to human rights and empowerment of citizens.	Impediments to women's participation in the workforce have been identified in consultation with societal actors. Policies e.g. childcare and training is being encouraged or established to address the challenges identified and to develop pilots.	Legal, social and cultural barriers to women's ownership of property and business have been addressed. Advocacy along with the monitoring of women's participation in economic activity is identify new trends, needs and to support relevant responses. These efforts are undertaken in concert with other city actors particularly women's groups.	Broad-based social and political support for women's participation, effective women's rights groups and broad-based cross-sectoral partnerships provide multi-tiered responses for equal economic opportunities linked to the city's strategic plans and vision. City is recognized as a leader in this area.

The other two levels lie between these two extremes. At the Defined level, the awareness of the constraints to women's economic participation is leading to the initiation of actions to remove barriers and to create affirmative actions and other opportunities for their advancement. At the Managed level, a whole range of barriers, legal, social and cultural, have been removed and the society as a whole and women in particular are now adjusting to the new meaning and implications these processes have created.

Based on the foregoing discussion, Table 39 provides a depiction of the criterion and corresponding maturity levels for this indicator.

4.9.4 Equity – Social Burdens and Rewards Spread Evenly Across Citizens

The criterion for this dimension of equity seeks to assess: To what extent is the city taking active measures to ensure that the benefits of developments in the city are spread widely and to ensure that adverse impacts are better managed and anticipated?

As a result of globalization and the shift to knowledge-based economies, cities and regions are exposed to more frequent shocks such that may test and even significantly alter within a relatively short time the socio-economic fabric.

Considering the first two extreme levels, cities which are at the Initial level of maturity are unable to respond quickly to new challenges and opportunities and consequently their policies no longer address the current sources of inequity. On the other hand, cities at the Integrated level are regularly assessing the socio-economic climate and monitoring evolving demographics as well as other trends and emerging relationships, to gain insight into the potential future impacts on social groups. On this basis, forward-looking policies and programmes are being created that benefit from

foresight and other forward-planning activities to minimize adverse impending

impacts.

Table 40:   Sample Indicator with Criteria and Scenarios for one Dimension of

Equity

Equity - Social burdens and rewards spread evenly across citizens.			
Criteria	To what extent is the city taking active measures to ensure that the benefits of developments are spread widely and to ensure that adverse impacts are better managed and anticipated?		
1 - Initial	2 - Defined	3 - Managed	4 - Integrated
Where they exist, measures for the fair sharing of social burdens and rewards no longer reflects the current context and are largely inadequate to achieve their desired goals.	Existing policies are being updated to take into account current challenges of vulnerable groups, to support progressive assessment schemes - e.g. in the area of taxation - that spread citizens contribution to city's upkeep more evenly. Similarly, efforts to provide social services and create opportunities for less well citizens such as access to education are being formulated.	Multi-dimensional criteria used to develop, interpret and assess impacts of city initiatives and minimize adverse unforeseen or counter-intuitive outcomes. Social impact assessments, community consultations and related mechanisms support this process offering richer insights and the identification of better solutions.	Regular compliance inspections, longitudinal studies and updating of policies to reflect changes in underlying policy assumptions and new emerging trends. Where justified affirmative or special situation initiatives developed. Cross-sectoral cooperation and networks support the exchange of information and best practices.

At the Defined level, policies are being shaped in a reactive fashion to address

the new challenges, but with continued focus and attention to traditional areas of

intervention and groups. The Managed approach rather than restricting its analysis to traditional groups seeks to understand how the society as a whole is changing and to understand how these evolutions impact the meaning of inequality. By taking a larger view and working with community actors, greater insights and the potential to take advantage of emergence, leads to policy frameworks and processes that are more relevant and responsive.

Based on the foregoing discussion, Table 40 provides a depiction of the criterion and corresponding maturity levels for this indicator.

4.9.5 Openness – Willingness to Venture Outside One's Frame of Reference

The criterion for this dimension of openness seeks to assess: To what extent is the city using broad-based partnerships and collaborative approaches to more effectively realize its development targets?

The extant literature points to the role of different view-points in supporting creative, inventive and innovative processes. City governments play an important role in leading, coordinating and moderating other city actors. The dimension of openness can therefore provide a gauge of the likelihood that the city government is able to effectively use its role to leverage the human capital in the city.

Considering the first two extreme levels, at the Initial level, we propose that the city government is unable to exert a unified or whole-government approach to city stakeholders due to a lack of coordination or even willingness to cooperate across its departments. At the Integrated level, we propose a situation where the city is focused on promoting and assessing on an ongoing basis its collaboration internally and with city stakeholders to improve its services and the results that the city achieves.

At the Defined level, we see recognition for the need to enable the city government to act in a more unified manner across departments and systems. This recognition in turn stimulates both informal and formal measures to improve internal coherence. At the Managed level, government is acting as one and has established formal mechanisms that support collaboration with experts from key stakeholder groups that support strategic orientation, planning and action.

Table 41:   Sample Indicator with Criteria and Scenarios for one Dimension of Openness

Openness - Willingness to venture outside one's frame of reference			
Criteria	To what extent is the city government using broad-based partnerships and collaborative approaches to more effectively realize its development targets?		
1 - Initial	2 - Defined	3 - Managed	4 - Integrated
Little collaboration between branches of government in developing, delivering and assessing their administrative or development programmes leading to duplication and conflict.	Contribution of interdepartmental collaboration for more effective service delivery of government services is being recognized and informal and formal enabling mechanisms to build internal partnerships are being established.	Setting of strategic goals and vision is informed and undertaken through broad-based, diverse, stakeholder consultations. The city regularly seeks advice and input from various panels composed of experts and representatives of stakeholders groups and commissions studies to inform its actions.	Action oriented tools such as 360° reviews used to assess value of collaborations and in turn drive improvements that enhance the delivery of services. City also invites citizens' opinions through polls and other surveys.

Based on the foregoing discussion, Table 41 provides a depiction of the criterion and corresponding maturity levels for this indicator.

4.9.6 Freedom of Expression – Climate for Free Discussion and Exchange

The criterion for this dimension of freedom of expression seeks to assess: To what extent is a climate which supports freedom of expression and the exchange of views, including freedom of the press, being encouraged in the city?

The contribution of Freedom of expression to knowledge-based development through its role in supporting the dissemination, comparison, validation, creation and absorption of information and knowledge has been previously highlighted.

Considering the first two extreme levels, at the Initial level, we propose a scenario where the exercise of this human right is not supported by the social and cultural norms or by the existing legal framework or practices. At the Integrated level, we propose a situation where powerful and less powerful stakeholders regularly exchange viewpoints without fear of reprisal to help shape the city's public policy agenda.

At the Defined level, progress has been made in adopting and enacting legislation and policy norms that support free expression; however, public practice still lags these provisions and there is still reluctance to openly discuss public affairs and others matters. At the Managed level a public space has been created and people now feel comfortable to engage in "knowledge moments", that is to say the public sharing of ideas. There are still incidents of censorship and Internet blocking but these

are both disclosed and publicly debated with opportunities and the expectation of

redress available.

Table 42:   Sample Indicator with Criteria and Scenarios for one Dimension of

              Freedom of Expression

Freedom of expression - Climate for free discussion			
Criteria	To what extent does a climate which support freedom of expression and the exchange of views; including freedom of the press; encouraged in the city?		
1 - Initial	2 - Defined	3 - Managed	4 - Integrated
An enabling environment for exercising this rights is not yet in place, no freedom of information laws. Censorship & Internet filtering; laws that criminalize libel, lack of protection for journalistic sources dissuade the exercise of this right.	People are generally reluctant to share their views not necessarily due to a fear of reprisal but also out of concern to avoid unintended embarrassment of others. International commitments to the protection and promotion of freedom of expression have been enacted in local law and the constitution	Citizens feel confident to express themselves freely and clearly and discuss with others. They also appreciate that mutual agreement is not always possible in the diversity of opinions present in the community. Nevertheless discussion and debate are seen as important contributors to building understanding and social cohesion. Censorship is disclosed and open to appeal.	Public officials, citizens, civil society, private sector and other stakeholders actively and constructively engage in shaping public policy discourse.

Based on the foregoing discussion, Table 42 provides a depiction of the

criterion and corresponding maturity levels for this indicator.

4.9.7   Universal access to Information and Knowledge – Supporting
Human Capacity to use information and Knowledge Networks

The criterion for this dimension of universal access to information and

knowledge seeks to assess: To what extent is the city developing the capacity of its

citizens to use ICT networks and content?

Table 43:   Sample Indicator with Criteria and Scenarios for one Dimension of

Universal Access to Information & Knowledge

Universal Access to information and knowledge - Supporting human capacity to use Information and knowledge networks			
Criteria	To what extent is the city developing the capacity of its citizens to utilize ICT networks and content?		
1 - Initial	2 - Defined	3 - Managed	4 - Integrated
Focus on training of staff in government services to use ICT tools that support effectiveness and efficiency of government services.	ICT skills training and ICT-enabled national education learning pilots undertaken at tertiary, secondary and primary levels.	Progressive introduction of ICT skills training and ICT-enabled education all teacher training programmes as a core skill in national educational curricula at tertiary, secondary and primary levels.	Multi-tiered formal and informal education programmes focus on all citizens with specific programmes to address the capacity-building needs of marginalized and vulnerable populations.

The role of information and communication networks as important enablers in

the global knowledge economy and society has been emphasized. For cities to

participate and benefit from these networks requires the skilled human capital to

operate, use and maintain these systems. City governments have a key role to play in developing the capacities of their citizens.

Considering the first two extreme levels, at the Initial Level, we propose a situation whereby the city government is focused only on building the capacity of government employees. On the other hand, at the Integrated level we propose that the city government will be actively engaged with a range of state and non-state actors to ensure that all citizens have the possibility to develop the skill base needed to acquire these new literacies.

At the Defined level, the city government is progressively integrating ICT-based pilots into the national education systems at the tertiary, secondary and primary levels. While at the Managed levels we see systematic inclusion of ICT-skills and ICT-enhanced pedagogy in all teacher training programmes.

Based on the foregoing discussion, Table 43 provides a depiction of the criterion and corresponding maturity levels for this indicator.

4.9.8 Cultural and linguistic Diversity – Promoting Diverse Cultural Heritage

The criterion for this dimension of cultural and linguistic diversity seeks to assess: To what extent are cultural expressions that reflect the city's diversity being promoted and valued?

The role of cultural and linguistic diversity as a contributor to human survival and sustainable development and as a source of economic value has been previously highlighted. Furthermore, the positive linkage with creativity is of key importance in the knowledge economy and society, and thus of critical importance to knowledge-based development in the city.

Table 44:   Sample Indicator with Criteria and Scenarios for one Dimension of Cultural & Linguistic Diversity

Cultural and linguistic diversity - promoting diverse cultural heritage			
Criteria	To what extent are cultural heritage and expressions that reflects the city's diversity promoted and valued?		
1 - Initial	2 - Defined	3 - Managed	4 - Integrated
Very little activity in the way of preserving or promoting the tangible or intangible cultural heritage and expressions. Those which are depicted are mainly those associated with high culture, dominant groups or which have attracted the interest of external supporters.	Policies and programmes are being established to support a more diverse representation of cultural heritage and expressions and to support related public awareness and education. Tensions between the past and present e.g. between modernity and present goals/values current and past social orders etc. have not yet been collectively resolved and pose challenges for its preservation and role in society .	Tensions around culture and its expression have been resolved. Cultural institutions and other specialized groups are present and play an active role in supporting the development of expression/cultural heritage in a range of areas - food, handicraft, performing arts, sports, civilization - from a theoretical / academic perspective but also as a contributor to the city's collective identity, place and space.	Cultural diversity is articulated as a contributor to the city's development goals (social, political, economic), as a positive contributor to civic life, social cohesion and a shaper of the city's vision and future. This importance is reflected in public funding, events, the design and use of public spaces and the city's memory and contemporary programmes as well as the city's international perception and reputation.

Considering the first two extreme levels, at the Initial Level, we propose a situation whereby attention is only given to developing limited aspects of the city's cultural heritage, with an emphasis on those that are favourably considered by the

elites, the high culture. On the other hand, an Integrated level would see a much richer breadth of culture being promoted, potentially enabling unique and distinctive aspects to draw positive worldwide attention to the city.

At the Defined level, one could expect to see cultural tensions such as those between high and low culture, traditional and modern beginning to be questioned and mediated. At the Managed level, these tensions have been resolved and there is now a focus on developing these forms of expression and gaining greater insights into their contribution to identity, economy and other aspects.

Based on the foregoing discussion, Table 44 provides a depiction of the criterion and corresponding maturity levels for this indicator.

4.9.9 Education for All – Attracting and Retaining Talent

The criterion for this dimension of education for all seeks to assess: To what extent is the city seeking to systematically attract and retain the necessary human talent to support its ongoing development and the realization of its strategic vision.

In the globalized knowledge economy of today human capital is the source of competitive advantage and cities and regions are engaged in competition for this resource. A city's ability to nurture, attract and retain talent is critical.

Considering the first two extreme levels, at the Initial Level, we propose a situation whereby the city has either not yet recognized the importance of attracting and retaining human capital or simply failed to put in place policy or other measures to support this. At the Integrated level however, there is a high level of awareness and understanding of the role of human capital, and efforts linked to retain and attract

those skills which support the city's strategic goals are being pursued across a number of dimensions.

Table 45:   Sample Indicator with Criteria and Scenarios for one Dimension of Education for All

Education for all - Attracting and retaining talent			
Criteria	To what extent is the city seeking to systematically attract and retain the necessary human talent to support its ongoing development and the realization of its strategic vision?		
1 - Initial	2 - Defined	3 - Managed	4 - Integrated
No specific measures have been adopted by the city to address this issue.	The loss of qualified citizens to "brain drain", coupled with the lack of mechanisms to support knowledge transfer and capture between external experts brought in to support the city's development needs are being recognized as unsustainable and a barrier to the city's future growth. This is in turn prompting the formulation of relevant policy measures.	The city continues to assess its skill and talent needs across a range of sectors. Various pilot projects based on identified sectoral needs are being implemented to attract key talent identified and to generate these skills. Ongoing monitoring and assessment undertaken to understand the impact of these programmes in achieving desired goals. Identified gaps and learning used to refine and improve programmes.	City's has developed a vision for its current and future orientation which is clearly articulated and well communicated. Policies to attract and retain talent both local and foreign are established and linked to its strategic vision. These policies are trans-sectoral and seek to address both tangible and intangible aspects that make the city both a good place to work but also a good place in which to live.

At the Defined level, we see the loss of home-grown human capital coupled with unsustainable reliance on cycles of foreign expertise and knowledge loss acting as catalysts for policies to overcome these challenges. At the Managed level, we see programmes being launched to attract talent in line with current labor market needs and forecasts coupled with ongoing assessment of success and failure being used to improve these programmes and associated policies.

Based on the foregoing discussion, Table 45 provides a depiction of the criterion and corresponding maturity levels for this indicator.

4.10   The Knowledge-based Development Maturity Model

The full Knowledge-based Development Maturity Model is available in tabular form in Appendix 1. A digital version of the model is implemented on the MAGPI cloud-based platform and deployed through an Android-based App on a tablet or smartphone. The tool supports real-time data visualization. Data can be exported from MAGPI into EXCEL to support the generation of radar plots and descriptive statistical measures.

4.10.1 Applying the Model

Using the model to assess the knowledge maturity of a city involves the following steps:

a) Building a database of relevant experts with their contact details and qualifications from the five stakeholder groups of government, civil society, private sector, academia and international organizations using purposeful sampling and snowballing;

b) Conducting literature reviews of the target city and city news sources (social media, newspapers and other communication resources to gain additional understanding of the target city. The City News Coding form provides a way for developing an overview of the city;

c) Based on the literature review the generic set of indicators/criteria in the model are reviewed and revised. A pilot survey is conducted to assess their relevance and to further refine them;

d) Inviting about 30 persons, with more or less equal representation of each stakeholder group to be interviewed. Each stakeholder group should be represented by experts of both genders, with the representatives from each stakeholder group selected being the most qualified/knowledgeable experts available to participate;

e) The maturity model serves as the survey questionnaire. In addition to indicating the perceived maturity level of their city, respondents are invited to provide justifications for their rankings and provide any additional comments aimed at identifying key development challenges, local resources, mindsets and other factors that could hinder or help the process and identify other stakeholders that should be associatd to the process;

f) Interviews should be recorded, if possible transcribed and reviewed with the respondent;

g) If the paper-based version of the study is used then the qualitative data for each interview can be recorded on the Data record sheet;

h) The qualitative and quantitative data inputs collected with the aid of the maturity model are summarized and presented as a case study with proposals for action. Particular attentions should be given to:

    a. Identifying areas of similarity and divergence across participants taking into account aspects of the heterogeneity (stakeholder group, gender, experience, age etc.) of respondents and stakeholder groups;

    b. Evaluating average values at the construct, principles, foundation level and maturity level, along with descriptive statistics and simple measures of dispersion adequate for the quantitative analysis;

    c. Identifying themes and trends identified during the interviews in response to the individual indicator questions as well as with regards to the identified strategic challenges and opportunities;

    d. Identifying external and internal factors that could impact the process.

i) The case study is submitted to all participants in advance and a 1-day session is convened by the research team to present and discuss the case study with informant and obtain feedback. This process serves to validate the work conducted, identify priorities and to plan follow-up actions.

j) Group-oriented facilitation tools and methods such as the Knowledge Strengths, Weaknesses, Opportunities and Threats (K-SWOT) and the Strategic Choice Approach are used to identify and plan next steps.

4.10.2 Further Development and Application of the Maturity Model

This research will undertake a Delphi study to validate the Knowledge-based Development Maturity Model. In particular, this process will seek to:

1) Confirm the conceptual model for knowledge-based development of societies

    and propose additional elements;

2) Develop weightings for each of the constructs in the maturity model;

3) Confirm relevance of the various indicators under each construct and rank

    them;

4) Inspect the questionnaire on strategic challenges.

CHAPTER 5

MODEL VALIDATION, FIELD TESTING AND DISCUSSION OF FINDINGS

5.1   Overview

This chapter presents the process by which 1) the Knowledge-based Development Maturity Model and its constituent indicator/criteria sets were validated using a Delphi study; 2) a pilot field–test of the proposed model was undertaken in two of the identified pilot cities, and 3) the model was critiqued by selected knowledgeable experts on the policy relevance of the model in their specific cities. The results and finding of these processes are discussed.

5.2   Validation of the Knowledge-based Development Maturity Model

5.2.1   Design and Implementation of the Delphi

The Knowledge-based Development Maturity Model and its constituent indicators were validated using a Delphi Panel. The overall design and conduct of the Delphi study was influenced by the work of Day and Bobeva (2004), Donohoe et al. (2012) and Linstone and Turoff (2002). The stages of this process are reflected in Figure 42 and briefly presented in the following section**.**
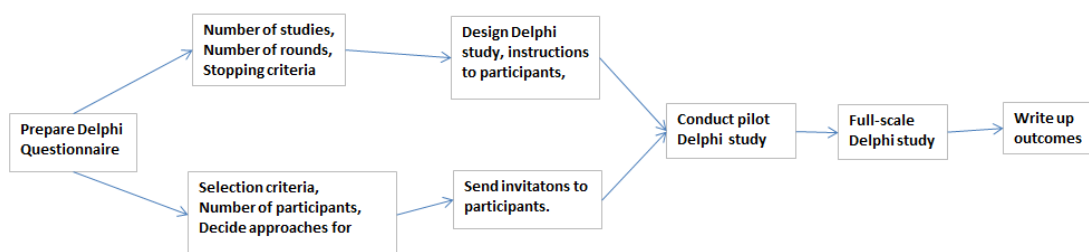
Figure 42:   Key Stages in Preparing, Conducting and Analyzing the Delphi Study

(Day & Bobeva, 2004; Donohoe et al., 2012; Linstone & Turoff, 2002)

5.2.2   Preparation of the Delphi questionnaire

The structure and content of the Delphi questionnaire was informed by the Research Questions. Accordingly the study served to assess whether the proposed Knowledge-based Development Model: 1) reflected the underlying constructs, ideas and orientation of UNESCO's framework; 2) provided a plausible mechanism for knowledge-based development processes; 3) contained comprehensive and adequate constructs to provide the model with explanatory power; and 4) indicators/criteria were appropriate for measuring constructs in the model.

Since Delphi studies are iterative, only the first round questionnaire could be completely prepared by the Researcher. Comments received in successive rounds, informed preparation of subsequent questionnaires. The questionnaires developed in the study are presented in the Appendices.

5.2.3   Number of Studies, Rounds and Stopping Criteria

Consideration was given to launching separate studies to examine the model and each of the nine constructs. This would ensure that each construct was assessed by specialists. It was estimated that this approach it would require almost 15 months to complete sequential Delphi studies as coordinating simultaneous studies was

infeasible. Separate studies however risked overlooking the interactions between constructs in the model. In order to overcome these drawbacks, a single study with heterogeneous experts was planned with up to four rounds foreseen. A longer questionnaire covering aspects not within the core knowledge of all experts would be necessary and with this the potential for a higher rate of abandonment of the survey. The researcher countered this by:

- Preparing and sharing with panelists in advance background information on the study's goal as well as the Delphi process;

- Investing greater effort in identifying experts interested in the topic who were presumably more highly motivated;

- Preceding the study by a pilot to uncover and resolve potential problems;

- Sending personalized and prompt responses to panelists and engaging in e-mail, skype and face to face discussions about their comments;

- Sending out reminders to complete the study and minimize the time between successive rounds including sending out copies ; and

- Designing the Delphi on-line survey to enable panelists to complete it over several days.

Typically, three rounds are adequate (Linstone & Turoff, 2002), but given the broad range of disciplinary knowledge in the model a Delphi with four rounds was foreseen. Eventually three rounds proved to be adequate.

Multiple stopping criteria were used. Qualitative assessment involved examining panelists' responses for areas of agreement and discord. These were addressed through the summary reports for each round and communications with

panelists and by taking these comments into account in the questionnaires of the successive round.

Quantitative measures for assessing consensus included:

- Setting a minimum percentage for majority agreement of 51% (Linstone & Turoff, 2002);

- Calculating for each round the Average Percentage of Majority (APMO) which establishes an evolving lower bound for consensus based on responses of panelists (Cottam et al., 2004). See Appendices;

- Assessing between round stability of opinions with a +/- 15% change or a Convergence of Group Opinion coefficient below 1 were used as signs of consensus (Linstone & Turoff, 2002); and

- Using non-parametric statistical measures including median, inter-quartile ranges, Spearman's rank order with established cut-offs from the literature (Gracht, 2012; Holey et al., 2007; Kalaian & Kasim, 2012; Murphy et al., 1998; Rayens & Hahn, 2000).The Delphi study used questions based on a 5-point Likert Scale, so an interquartile range of 1 signified consensus. Using an Alpha value of 0.05, calculated values were compared with the critical values to assess consensus.

In-round consensus was assessed by the first two criteria. Where the APMO values did not meet the consensus value but were within -5% additional tests of inter-quartile range were conducted. Between-round consensus was calculated from the second round onwards. Table 46 presents the criteria for establishing consensus as well as the round when this was achieved.

Table 46:   Achievement of Consensus and related Quantitative Assessment

Criteria across the Delphi Study

Construct	Consensus Achieved When Assessment Applied? (Yes / No)				Round Where Consensus Achieved
	Panelists Consensus > 51%	APMO	Interquartile Range & Median	Between Round Stability of Opinions	
Coherence with the UNESCO Conceptual Framework	Yes[$]	Yes[$]	Yes	----	2
Adequacy of KBD Model	Yes[$]	Yes	Yes	Yes	3
Human Rights and Needs	Yes[$]	Yes[$]	----	----	1
Pluralism	Yes[$]	Yes[$]	Yes	----	2
Inclusion	Yes[$]	Yes[$]	Yes[$]	----	2
Equity	Yes[$]	Yes[$]	----	----	3
Openness	Yes[$]	Yes[#]	Yes	Yes[$]	2
Freedom of Expression	Yes[$]	No	Yes	Yes	2
Universal Access to Information	Yes[$]	No	Yes	----	3
Cultural & Linguistic Diversity	Yes[$]	No	Yes[$]	Yes[$]	2
Education for All	Yes[$]	Yes[$]	----	----	3
Notes: --- : Omitted due to strong performance on APMO X[$] : Strong performance on measure X[#] : Marginal performance, on verge of quantitative threshold for this measure					

5.2.4   Selection Criteria and Number of Delphi Panellists

Table 47:   Comparison of actual and target/expected Delphi Panel Composition

across Key Selection Criteria

Key selection criteria	Actual	Target
Number of pre-qualified experts	66	80 - 145
% Experts with PhD	41%	45%
% Experts with Master	93%	100%
% Females	33%	40%
% > 10 year professional experience	87%	75%
% who have authored or reviewed at least one edited peer-reviewed journal articles, technical report, book , conference proceeding	97%	100%
% of panelists with developing country professional experience	68%	40%
% of panelists living in developing countries	46%	40%
Sectoral representation • Private sector • Government • Academia • Civil Society • International Organizations including the United Nations	 30% 11% 57% 19% 22%	 20% 20% 20% 20% 20%
% with experience in 2 or more sectors	22%	10%
Pre-qualified panelist participating in Delphi (Number / %) • Round 1 • Round 2 • Round 3 • Round 4	 42 / 63% 40 / 61% 35 / 53% Consensus	 32 – 58 / 40% 24 – 43 / 23% 18 – 32 / 17% 13 – 24 / 13%

Table 47 presents key selection criteria established for determining the

composition of the Delphi panel and provides a comparison between what was

planned and achieved. Potential panelists were identified based on their expertise in

the trans-disciplinary fields related to the knowledge-based development model and

the context in which it is to be applied on the basis of a knowledge resource nomination worksheet (Okoli & Pawlowski, 2004) presented in Table 48.

Criteria used included academic qualification, relevant professional experience, and involvement as authors, editors, reviewers of journal articles and technical reports. It was considered important to have a minimum of 40% of panelists who were working and living in developing countries, gender balance between participants was also sought with a target of at least 30% female panelists. Detailed information on the international experts who completed the pre-registration form and were subsequently prequalified to participate is provided in the Appendices. Some of the pre-qualified panelists are internationally renowned experts and thought leaders in the emerging fields of knowledge-based development. The pre-qualification questionnaire is also included in the Appendices.

As can be noted from Table 47, most targets were met or exceeded. The lower than anticipated level of female panelists and representatives from the governmental sector may have resulted in some issues relevant to these stakeholders not being sufficiently represented. Conversely, the high proportion of academics may have led to a greater focus on theoretical and measurement aspects.

Table 48:   Knowledge Resource Nomination Sheet established to identify Potential Delphi Panellists

Stakeholder Groups	Organizations	Related Literature	On-line Communities

1.   Academics
-        Networks, programmes, chairs
-        Journals
-        Conference Proceedings
2.   Practitioners & Private Sector
-        Communities of Practice
-        Consulting firms
-        UN-HABITAT lists of experts
3.   Government
-        Municipality Officials
-        Ministries of urban development
4.   Intergovernmental Bodies
        –   United Nations
        -Bilateral and Multilateral
5.   Civil Society/NGOs
	1. UN Agencies: UN-HABITAT, UNESCO, UNECA, UNDESA, UNESCAP
	2. OECD
	3. African Union; African Development Bank
	4. USAID
	5. World Capital Institute
	6. The World Bank
	7. Slum Dwellers International
	8. Universities with programmes on knowledge based urban development, knowledge cities etc.
	9. USAID
	10. World Alliance of Cities Against Poverty
	11. Cities Alliance
	12. Habitat for Humanity International
	13. Slum Dwellers International
	14. International Chamber of Commerce
	15. Knowledge Dialogues
	16. AGECSO
	17. IKI-SEA
	18. Institute for Innovation & KM
	19. Bangkok Municipal Authority
	20. Municipal Authority of Ethiopia
	21. Kampala Municipal Authority
	22. McKinsey Global Institute
	23. Economist Intelligence Unit
	24. National League of Cities
	25. Sustainable Cities International
	26. Arup
		Academic:
		
		1. International Journal of Knowledge-based development
		2. International Journal of Knowledge Management
		3. Cities
		4. Urban
		5. Journal of Intellectual Capital
		6. Proceedings of the World Summit on Knowledge Cities (2007 – 2015
		7. Knowledge Cities: Approaches, Experiences, and Perspectives (Carrillo, 2005)
		8. Knowledge & the City: Concepts, Applications, Trends of Knowledge-Based Development: Concepts, Applications and Trends Carrillo et al., 2014
		9. Intellectual Capital for Communities Bounfour & Edvinsson, 2005
		
		Policy-maker/Practitioner:
		
		1. OECD Urban Policy Review
		2. Cities Alliance Knowledge
		        World Bank Institute Publications
			1. The New Club of Paris
			2. Creating Healthy, Livable Cities
			3. Green Cities
			4. Knowledge for Development
			5. Megalopolis
			6. Smart Cities and City 2.0
			7. Research Gate.com
			8. Academia.edu
			9. Knowledge for development

5.2.5   Design of Delphi stuydy and Instructions to participants

Table 49 presents the planned Delphi study design and its actual

implementation. The main changes are the use of fewer rounds due to consensus

being achieved earlier than expected, and more participants per round due to a larger

number of qualified and interested participants than anticipated. New literatures

uncovered (Gracht, 2012; Rayens & Hahn, 2000) enabled the study to be informed by

a richer set

Table 49:   Delphi Study, its Design and actual Implementation (Adapted from Day
            & Bobeva, 2004)

DESIGN CRITERIA	OPTIONS			
Purpose	*Theory/model building*	Exploration	Hypothesis testing	Evaluation of options
Participants	Homogeneous		*Heterogeneous*	
Anonymity	Full	*Partial*		Not Anonymous
Maximum number of rounds	2	*3*	*4*	>4
Participants per round	*10-18 panelist per round; minimum acceptable 7 panelists* **Round 1 – 42, Round 2 – 42, Round 3 - 33**			
Concurrency of rounds	*Sequential*		Simultaneous	
Mode of operation	Face to face	Hybrid		*Remote*
Communication media	Postal mail	Telephone Face to face Skype	Fax	*E-mail/Internet*
Other termination criteria	*Concensus > 75%; All questions resolved; fewer than 7 panelist in final round;* APMO; Between round stability <15%; and non-parametric statistical measures IQR<=1			
Key				
• *Planned implementation* (If no change indicated this was actual) • Additional elements incorporated • *Alternative implemented*				

of guidelines for assessing consensus and stability of opinions. In addition, to enhance engagement with panelists and encourage a higher level of participation, more modes of communication were utilized.

The Researcher provided panelists with a background paper that provided information on the Delphi technique, the study's motivation, UNESCO's Conceptual Knowledge Societies Framework and related aspects. These materials served to ensure a common basis for approaching the study amongst panelists and is included in the Appendices.

5.2.6   Sending Invitations to Participants

An e-mail invitation outlining the scope and purpose of the study was sent to prospective panelists requesting them to complete the online pre-qualification questionnaire. Panelists were also informed how their contact details were obtained. The background paper and a unique link to the on-line survey created on the Survey Monkey platform was e-mailed to pre-qualified participants.

5.2.7   Conduct Pilot Delphi Study

A pilot study with two volunteers served to ascertain that the Delphi questions were clear and logically structured. Volunteers also tested the functionality of the online Survey Monkey tool.

5.2.8   Full-scale Delphi Study

The full-scale Delphi study was undertaken from 11 May 2015 to 30 August 2015. Each round allowed up to 3 weeks for participants to complete the survey questionnaire and 1.5 weeks for the researcher to conduct the quantitative and

qualitative analyses, prepare the survey report and revise the questionnaire for the successive round. Each panellist received a copy of their questionnaire responses and the summary round report. While the identity of each panellist was known to the researcher, no comments were attributed to any individual.

5.2.9   Outcomes of the Delphi Study

Tables 50 to 56, inclusive present the outcomes of the Delphi study. The Delphi study resulted in:

- The validation of a Knowledge-based Development Model grounded in UNESCO's Knowledge Societies Conceptual Framework. (See Figure 43 & 44);

- The refinement and validation of indicators / criteria for model constructs. The initial model contained 35 indicators/criteria with 46 in the final model. Table 50 presents the evolution of the indicators/criteria over the course of the study. The updated set of criteria/indicators allowed the maturity models to be refined (See Tables 54 and 55);

- The relationships captured in the validated Knowledge-based Development Model points to eight propositions that can be empirically examined and developed in future studies. These propositions are presented in Table 51;

- The identification of weighting/importance factors for indicators /criteria. (See Table 52). The process for developing weighting is presented in the Appendix;

- A call from panelists for follow-up empirical investigation of the knowledge-based development model through further field tests.

Table 50:   Evolution in the Number of Indicators/Criteria per Construct from

Rounds 1 to 3

	Round 1	Round 2	Round 3
Construct	**No. of Indicators**	**No. of Indicators**	**No. of Indicators**
Human Rights and Needs	5	5	5
Pluralism	4	4	4
Inclusion	4	5	5
Equity	4	5	5
Openness	3	5	5
Freedom of Expression	4	5	5
Universal Access to Information	4	5 to be selected from 7	7
Cultural & Linguistic Diversity	3	5	5
Education for All	4	5	5

5.2.10 Discussion of Delphi Outcomes

A detailed discussion and presentation of the outcomes of each round of the

Delphi study, data, qualitative as well as quantitative analyses are presented in the

three Delphi Reports that have been included in the Appendix. This section serves

mainly to present and briefly discuss key outcomes and findings.

5.2.10.1   Delphi Model

The final validated Knowledge-based Development Model is presented in

Figure 44. In line with the recommendations of the Delphi panelists a graphic artist

was commissioned to enhance the model's ability to communicate these relationships.

This improved model is presented in Figure 43.

5.2.10.2   Model Propositions

Following Swanson and Chermack (2013), eight propositions were elucidated

from the model's structure and are presented in Table 51. An empirical investigation

of these propositions is beyond the scope of the current study. However, some

possible implications and insights these propositions may offer include:

Table 51:   Propositions identified from the Knowledge-based Development

Model

Propositions based on the validated Knowledge-based Development Model
Proposition 1: A city's response to the evolving societal and strategic goals and challenges it faces is influenced by the available tangible and intangible resources and the knowledge maturity it is able to apply to these resources.
Proposition 2: The portfolio of knowledge processes that a city can mobilize influences how effectively its tangible and intangible assets are in addressing the evolving societal strategic goals and challenges.
Proposition 3: The knowledge maturity of a city influences how it conceptualizes what are its evolving societal strategic goals and challenges and formulates responses.
Proposition 4: The knowledge maturity of a city influences the composition of the portfolio of knowledge processes available to it.
Proposition 5: The knowledge maturity of a society influences its ability to identify and harness its tangible and intangible assets.
Proposition 6: The knowledge maturity of a city is influenced by its ability to leverage and nurture the individual capabilities and capacities of its citizenry.
Proposition 7: The knowledge maturity of a city is influenced by its system of social values and structural frameworks.
Proposition 8: Interdependencies exist between the individual capabilities and capacities and the social values and structural frameworks within a city.

- Proposition 1 provides an explanation for the inability of countries with high

    levels of natural resources but low levels human capacity and institutional

    structures to adequately address societal challenges. It therefore provides

    support for investment in human capacity (Blaug, 1976; Bounfour &

Edvinsson 2005; Gamerschlag, 2013; Gillies, 2011; Keeley, 2007; Souter, 2010; Stiglitz, 2012; UNESCO, 2005).

- Proposition 2 points to the role of knowledge sharing and collaboration in supporting awareness and developing response to the unknown unknowns (Bennet & Bennet, 2004; Snowden & Boone, 2007). Only when new ways of thinking, doing and being are introduced can new, and sometimes even old, opportunities and challenges be understood and seized.

- Proposition 3 serves to highlight that societal problems are by nature wicked problems (Ramaley, 2014), so it is only by bringing and ensuring that inclusive, diverse perspectives are brought to bear can the full extent of the impacts and responses needed to contain or manage these problems can be elaborated (Camillus, 2008; Darlsgaard, 2014; Farrell and Hooker, 2013; Rittel & Weber, 1973; Schön, 1987).

- Proposition 4 suggest that issues such as culture, openness to collaboration, openness to ideas, as well as the individual and societal capabilities, in short the "DNA" of the city, are all decisive influences in determining whether cities can leverage existing knowledge, find new knowledge change minds ets or chose to adopt not in my backyard (NIMBY) approaches (Lønsmann 2014, Marschan-Piekkarie et al., 2009).

- Proposition 5 points to the likely influence of individual capabilities, societal capabilities for longer term planning, self-governance and societal level organization that may be reflected in processes, physical infrastructure that may enhance resilience (PWC, 2014).

- Proposition 6 may serve to provide new inroads for understanding the influences of city attractiveness and growth (Dickmann, 2012, Florida, 2002; Tharenou, 2003, Yigitcanlar et al., 2007). For examples, some cities are able to increase their population and attract new residents, others attract visitors but not residents, some remain around the same size for generations and yet others see their populations shrink.

- Proposition 7 is also closely related to Proposition 6, and may reveal understanding around the role of social values and structural frameworks in influencing citizen attitudes and the types of persons who come and stay (Dickmann, 2012, Florida, 2002; Tharenou, 2003, Yigitcanlar et al., 2007).

- Proposition 8 serves to highlight that while the constructs and components in the Knowledge-based Development model are distinct, they interact and influence each other. For example, it may not be a far stretch to suggest that societies which are less open, with more restrictive intellectual property regimes may be less open to forms of collaboration in which ownership and control of knowledge processes and knowledge products is unclear. Attitudes to equity and cultural diversity and pluralism could potentially have moderating effect on preferences for control over IPR. The relative strength and moderating effects could potentially have policy implications. Similarly, different cultural and social setting may emphasize different constructs thereby giving rise to local "best" practices for achieving desired goals.

As has been emphasized, these eight propositions are based solely on the model structure as interpreted by the researcher. These propositions offer tentative and non-exhaustive avenues for future empirical exploration.

5.2.10.3   *Evolution of Consensus Around the model, Model Constructs, Indicators/Criteria*

As indicated in Table 50, while the number of constructs remained constant at nine, the indicators / criteria evolved over the course of the Delphi study validation from an initial set of 35 to 46. The increase in indicators represent both a disaggregation of existing indicators as well as the introduction and explication of new concepts – needs of the aged, role of IPR etc. – by panelists.

Consensus as measured by the average percentage of majority opinions (APMO) increased throughout the Delphi study (See Table 53). From an initial APMO value of 76.7 % in Round 1 consensus increased to 87.9% in Round 2 and increasing slightly and stabilizing in Round 3 at a level of 88.3%. Similarly, consensus across the constructs and model also increased from Round 1 to Round 3. In the case of the Knowledge-based Development Model a decline in consensus was observed between Round 2 (84.2%) to Round 3 (75.0%). The qualitative analysis of panelists' comments indicated that this reduction in consensus was due to concerns over the model becoming too complex for policy-makers to interpret. Some illustrative comments which capture these concerns follow:

- *I think this schema should be simplified*

- *The issues and relationships are accurate, but the model is becoming a bit complicated for non-academic stakeholders to easily understand*

- *The diagram captures key issues, but has now become very complex and difficult to follow. More importantly as it has become more complex, it has become subject to much greater interpretation by the reader/viewer, which is potentially problematic. I would suggest that the author consider simplifying*

the diagram and then using text to elucidate key complexities flowing from the diagram.

Further quantitative analysis revealed a value of 7.7% for the inter-round stability of consensus between Round 2 and Round 3. Consequently, the model developed in Round 3 was accepted and no further Delphi rounds were needed.

5.2.10.4   Relative Importance of Model Constructs and Their Constituent Indicators/Criteria

Drawing on the structural relationships in the validated Knowledge-based Development Model, Proposition 8 presents the interdependencies that exists and offers some tentative effects that may exist between the model constructs. To explore the relative contribution of the various indicators / criteria to the constructs, panelists were invited to rank these indicators / criteria based on their perceived relative importance. One limitation of the software tool used for the ranking was that it did not allow panelists to award equal rankings to indicators / criteria. On the basis of these rankings, weightings factors were then determined. Table 52 presents the rankings and weighting factors that were derived. The Round 3 report contained in the Appendix presents the approach used to calculate these weightings. In general, across the constructs, the most important indicator / criteria has a weighting twice as great as the least important one. Potentially, by taking into account relative weightings the total number of indicator / criteria could be reduced or a core set developed allowing for parsimony. This would however require substantial empirical data and an improvement in the calculation of rankings.

Table 52:   Knowledge-based Development Model with its constituent Hierarchical Levels, Constructs, Criteria/Indicators, Rankings and Weighting Factors

				Rank	Weighting factor	
KNOWLEDGE MATURITY	Societal Values & Structural Frameworks	Human Rights & Needs	HR1	1	0.27	Awareness
			HR2	3	0.20	Accountability
			HR3	4	0.18	Non-discrimination
			HR4	2	0.20	Participation
			HR5	5	0.15	Structural Measures
		Pluralism	PL1	1	0.29	Attitudes around disability/ethnicity/gender equality/race;
			PL2	3	0.19	Attitudes to immigrants/migrants;
			PL3	1	0.29	Attitudes to religious/political values/economic status/ sexual preferences or orientation
			PL4	2	0.24	Attitudes to multi-stakeholder coalition building
		Inclusion	IN1	2	0.25	Access to safe and decent work opportunities
			IN2	3	0.19	Level of support for the participation of vulnerable groups (women, youth, persons with disabilities, the elderly and retired) in economic activities
			IN3	1	0.27	Access to basic social services (health care, shelter, primary and secondary education etc)
			IN4	4	0.17	Access to civic and political space
			IN5	5	0.12	Access to credit/training (Level of support for entrepreneurial activity)
		Equity	EQ1	1	0.26	Access to basic social services including reproductive services
			EQ2	3	0.20	Evenness in the distribution of social costs and benefits
			EQ3	4	0.17	Gender mainstreaming in public policies
			EQ4	5	0.15	Adequate communication and fair access to social services and goods
			EQ5	2	0.22	Access to property ownership (land and housing) and security of tenure
		Openness	OP1	3	0.18	Willingness to explore unconventional approaches to solving societal challenges
			OP2	4	0.15	Promotion of open standards
			OP3	1	0.23	Transparency in public policy/decision-making processes
			OP4	2	0.19	Participation in public policy/decision-making processes
			OP5	5	0.13	Protection of personal privacy and personal data
			OP6	6	0.11	Promoting an equitable balance between public and private interests in IPR and developing the public domain.
	Individual Capabilities & Capacities (Key Principles)	Freedom of Expression	FE1	1	0.28	Societal climate for free discussion and exchange
			FE2	2	0.22	Diversity, sustainability and independence of media channels
			FE3	4	0.16	Professional standards amongst media practitioners
			FE4	3	0.18	Independence, effectiveness and transparency of public broadcasting services
			FE5	5	0.14	Media (on/off-line) regulatory frameworks
		Universal Access to Information & Knowledge	UA1	1	0.18	Affordability, accessibility and safety of Internet services
			UA2	2	0.17	Efforts to build human capacity to use ICT
			UA3	3	0.16	Access to reliable and affordable power supply
			UA4	4	0.15	Availability of on-line access to government services
			UA5	5	0.14	Adequacy and accessibility of the public transportation system
			UA6	6	0.10	Presence of local and regional knowledge clusters (including communities of practice, libraries, archives and universities)
			UA7	7	0.09	Support for traditional/local knowledge (preservation, valorization and mobilization)
		Cultural & Linguistic Diversity	CL1	2	0.21	Level of cultural heritage preservation efforts
			CL2	1	0.22	Level of capacity building in cultural expression sector
			CL3	3	0.21	Fostering and promotion of multilingualism
			CL4	5	0.18	Recognition and promotion of cultural industries
			CL5	4	0.19	Presence of local culture and languages in digital media
		Education for All	ED1	1	0.28	Ability of the city to nurture its human talent (through formal school settings, informal structures and civic spaces)
			ED2	2	0.22	Ability to attract and retain talent
			ED3	4	0.17	Support for global citizenship education (intercultural competence
			ED4	3	0.18	Efforts to enhance citizens' media and information literacy (digital literacy)
			ED5	5	0.14	Support for inter-generational transfer of traditional and local knowledge.Ability to attract and retain talent
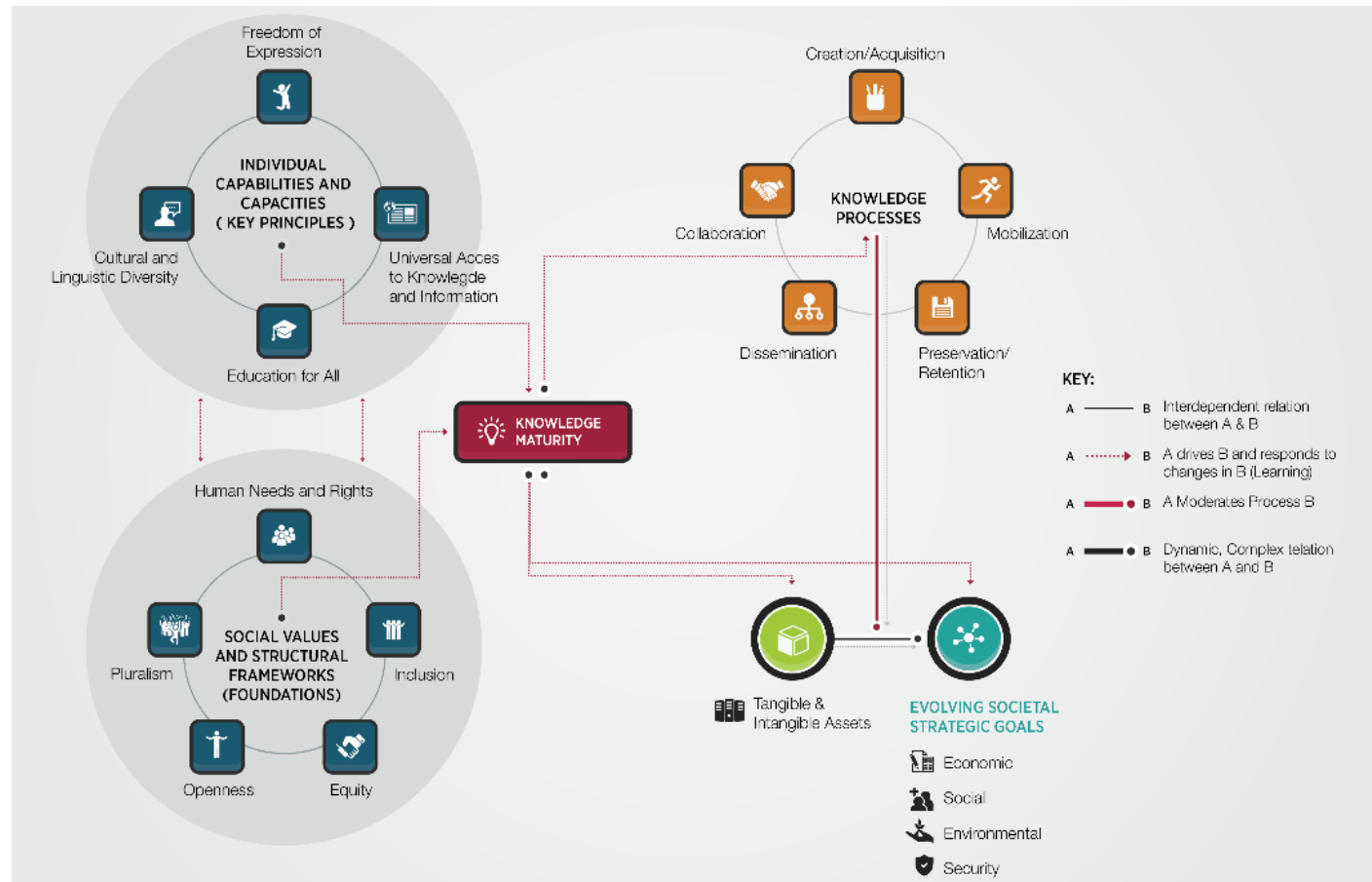
Figure 43:   Final Knowledge-based Development Model (based on Figure 44) following the Commissioning of a Graphic Artist
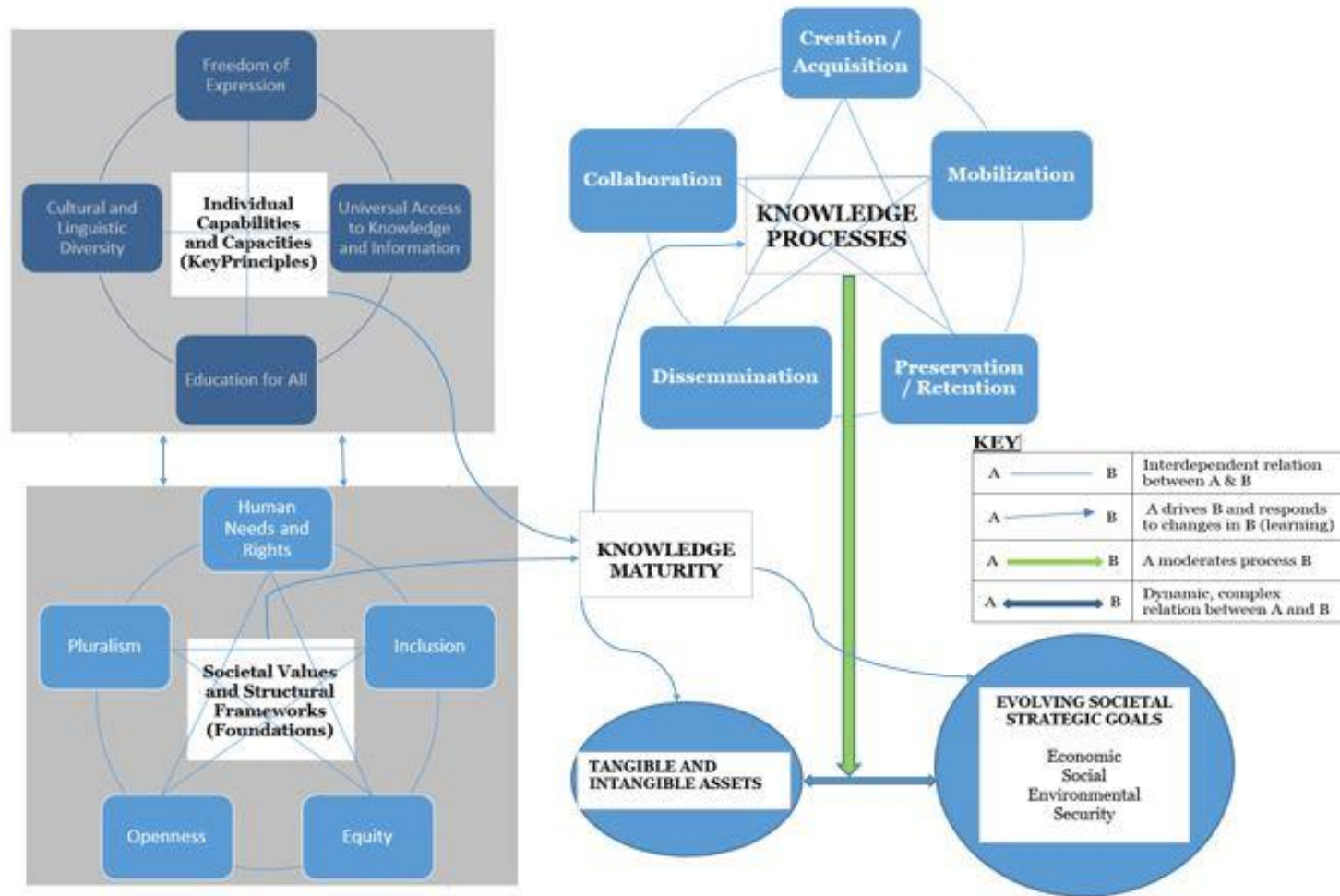
Figure 44:   Knowledge-based Development Model validated by the Delphi Panel

Table 53: Evolution in Consensus on Constructs and the Knowledge-based Development Model from Rounds 1 to 3

	Round 1	APMO = 76.7%	Round 2	APMO = 87.9%	Round 3	APMO = 88.3%
Question	% Agreeing	Consensus (Yes /No)	% Agreeing	Consensus (Yes /No)	% Agreeing	Consensus (Yes /No)
Does the knowledge-based development model capture the concepts presented in the UNESCO's Knowledge Societies Conceptual Framework?	57.6	No	92.1	Yes	--	--
From a big-picture or macro-level policy perspective does the **Proposed Knowledge-based Development Model's** represent the role of knowledge in driving or supporting development?	57.6	No	84.2	No	75.0	YES[2]
Are the five indicators/criteria adequate for assessing the **Human Rights and Needs** climate/environment of a city?	87.9	Yes	--	--	--	--
Are the four indicators/criteria adequate for assessing the **Pluralism** climate/environment of a city?	65.5	No	92.1	Yes	--	--
Are the five proposed indicators/criteria adequate for assessing the level of **Inclusion** in the city?	75.0	No	94.7	Yes	--	--
Are the five proposed indicators/criteria adequate for assessing the level of **Equity** in the city?	75.0	No	--	--	90.6	YES
Are the five proposed indicators/criteria adequate for assessing the level of **Openness** in the city?	81.3	Yes	89.2	Yes[6]	--	--
Are the five proposed indicators/criteria adequate for assessing **Freedom of Expression** in the city?	87.5	Yes	86.5	Yes[2]	--	--
Are the seven proposed indicators/criteria adequate for assessing **Universal Access to Information** in the city?	56.3	No	--	--	87.5	YES[2]
Are the five proposed indicators/criteria adequate for assessing the **Cultural & Linguistic Diversity** of the city?	71.9	No	83.8	Yes[2]		
Are the five proposed indicators/criteria adequate for assessing the **Education for All** construct within the city?	75.0	No	86.5	No	90.6	YES

Table 54:   Final Maturity Model for Individual Capabilities & Capacities (Key

Principles)

Individual Capabilities & Capacities (Key Principles)	Freedom of Expression	Societal climate for free discussion and exchange			
		Diversity, sustainability and independence of media channels			
		Professional standards amongst media practitioners			
		Independence, effectiveness and transparency of public broadcasting services			
		Media (on/off-line) regulatory frameworks			
	Universal Access to Information & Knowledge	Affordability, accessibility and safety of Internet services			
		Efforts to build human capacity to use ICT			
		Access to reliable and affordable power supply			
		Availability of on-line access to government services			
		Adequacy and accessibility of the public transportation system			
		Presence of local and regional knowledge clusters (including communities of practice, libraries, archives and universities)			
		Support for traditional/local knowledge (preservation, valorization and mobilization)			
	Cultural & Linguistic Diversity	Level of cultural heritage preservation efforts			
		Level of capacity building in cultural expression sector			
		Fostering and promotion of multilingualism			
		Recognition and promotion of cultural industries			
		Presence of local culture and languages in digital media			
	Education for All	Ability of the city to nurture its human talent (through formal school settings, informal structures and civic spaces)			
		Ability to attract and retain talent			
		Support for global citizenship education (intercultural competence			
		Efforts to enhance citizens' media and information literacy (digital literacy)			
		Support for inter-generational transfer of traditional and local knowledge.			
Maturity Levels		Initial	Defined	Managed	Integrated
		1	2	3	4

Table 55: Final Maturity Model for Societal Values & Structural Frameworks (Foundations)

Societal Values & Structural Frameworks	Human Rights & Needs	Awareness				
		Accountability				
		Non-discrimination				
		Participation				
		Structural Measures				
	Pluralism	Attitudes around disability/ethnicity/gender equality/race;				
		Attitudes to immigrants/migrants;				
		Attitudes to religious/political values/economic status/ sexual preferences or orientation				
		Attitudes to multi-stakeholder coalition building				
	Inclusion	Access to safe and decent work opportunities				
		Level of support for the participation of vulnerable groups (women, youth, persons with disabilities, the elderly and retired) in economic activities				
		Access to basic social services (health care, shelter, primary and secondary education etc.)				
		Access to civic and political space				
		Access to credit/training (Level of support for entrepreneurial activity)				
	Equity	Access to basic social services including reproductive services				
		Evenness in the distribution of social costs and benefits				
		Gender mainstreaming in public policies				
		Adequate communication and fair access to social services and goods				
		Access to property ownership (land and housing) and security of tenure				
	Openness	Willingness to explore unconventional approaches to solving societal challenges				
		Promotion of open standards				
		Transparency in public policy/decision-making processes				
		Participation in public policy/decision-making processes				
		Protection of personal privacy and personal data				
		Promoting an equitable balance between public and private interests in IPR and developing the public domain.				
		Maturity Level	Initial	Defined	Managed	Integrated
			1	2	3	4

Table 56: Sample Knowledge Maturity Calculation Sheet

KNOWLEDGE MATURITY DATA RECORD SHEET

City:				Date:			
Interviewer:		Interviewee Code:			Survey Sheet #:		

Constructs	Number of indicators	Indicator	Score (A)	Total A	Maximum Possible Construct $\sum(A)$	Weighting Factor from Delphi ($0 \leq B \leq 1$)	A * B	Construct Score with Weighting ($\sum A * B$)
Human Needs & Rights	5	HR1	1	14	20	0.27	0.27	2.59
		HR2	3			0.2	0.6	
		HR3	4			0.18	0.72	
		HR4	2			0.2	0.4	
		HR5	4			0.15	0.6	
Pluralism	4	PLU1	1	7	16	0.29	0.29	1.63
		PLU2	3			0.19	0.57	
		PLU3	1			0.29	0.29	
		PLU4	2			0.24	0.48	
Inclusion	4	INCLU1	2	14	20	0.25	0.5	2.5
		INCLU2	3			0.19	0.57	
		INCLU3	1			0.27	0.27	
		INCLU4	4			0.17	0.68	
		INCLU5	4			0.12	0.48	
Equity	5	EQ1	1	14	20	0.25	0.25	2.82
		EQ2	3			0.19	0.57	
		EQ3	4			0.27	1.08	
		EQ4	4			0.17	0.68	
		EQ5	2			0.12	0.24	
Openness	6	OP1	3	18	24	0.18	0.54	2.71
		OP2	4			0.15	0.6	
		OP3	1			0.23	0.23	
		OP4	2			0.19	0.38	
		OP5	4			0.13	0.52	
		OP6	4			0.11	0.44	
Freedom of Expression	5	FE1	1	14	20	0.28	0.28	2.46
		FE2	2			0.22	0.44	
		FE3	4			0.16	0.64	
		FE4	3			0.18	0.54	
		FE5	4			0.14	0.56	
Universal Access to Information & Knowledge	7	UA1	1	22	28	0.18	0.18	2.92
		UA2	2			0.17	0.34	
		UA3	3			0.16	0.48	
		UA4	4			0.15	0.6	
		UA5	4			0.14	0.56	
		UA6	4			0.1	0.4	
		UA7	4			0.09	0.36	
Cultural & Linguistic Diversity	5	CL1	2	14	20	0.21	0.42	2.75
		CL2	1			0.22	0.22	
		CL3	3			0.21	0.63	
		CL4	4			0.18	0.72	
		CL5	4			0.19	0.76	
Education for All	5	ED1	1	14	20	0.28	0.28	2.5
		ED2	2			0.22	0.44	
		ED3	4			0.17	0.68	
		ED4	3			0.18	0.54	
		ED5	4			0.14	0.56	
Theoretical Maximum Knowledge Maturity					184			

Score (A) Values	1	Initial	
	2	Defined	
	3	Managed	
	4	Integrated	
	DK	Do not know	
	DW2S	Don't want to say	

Note: Use decimals if Interviewee stands between two Scores

5.3 Field-testing of the Knowledge-based Development Maturity Model

Field-testing of the Knowledge-based Maturity Model was undertaken in Addis Ababa, Ethiopia and in Bangkok, Thailand[41]. These field-tests served to inform all three research questions:

- RQ1: How can a Knowledge-based development model be operationalized to address the strategic challenges that cities face?

- RQ2: What insights does a knowledge-based approach reveal when applied to cities? and

- RQ3: What contribution does the Knowledge-based approach provide to bench-learning and the possible orientation of action plans for policy-makers in the cities?

With respect to RQ1, the field test provided a concrete means of establishing whether the concepts and constructs embodied in the UNESCO Knowledge Societies Conceptual Framework and instantiated in the form of a knowledge-based development maturity model was accessible, that is to say, made sense to the target stakeholder groups. For RQ2, applying the knowledge-based development model provided a baseline for the knowledge maturity, insights into the conditions that contributed to it as well as whether respondents involved in the field test considered the findings valid. With respect to RQ3, field testing enabled key challenges faced by stakeholders, as well as critical information and knowledge processes required for effective interventions to be identified. The field test showed that the model was relevant to city policy-makers.

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[41] Resource constraints led to the cancellation of the Field-testing envisaged for Kampala, Uganda.

5.3.1   The Addis Ababa field test

5.3.1.1   *An Overview of Addis Ababa*

The city of Addis Ababa is situated at an altitude of around 2,300 m. The city

began its life in 1886 as one of the traditional roving capitals that Ethiopian monarchs

created during their rule (Getahun & Kassu, 2014). The establishment of Addis Ababa

as a permanent capital resulted from a confluence of circumstances – the successful

growth of groves of eucalyptus that provided an ample source of firewood, the

availability of fresh water and hot springs, as well as the growing presence of foreign

embassies as a result of Ethiopia's increasing efforts to engage and establish

diplomatic contacts with foreign nations (Baumeister & Knebel, 2012).

Present day Addis Ababa is completely surrounded by the Oromiya State,

although ruled by the Amhara ethnic group it was regarded as both the national capital

and the capital of the Oromiya people (See Figure 45). The Oromiya State is the

largest Federal State in area and population with ethnic Oromiya comprising almost

1/3 of the country's population (Federal Government of Ethiopia, 2010). This state is

second to Addis Ababa in terms of its contribution to national GDP. Efforts to

establish States along ethnic lines and to designate Addis Ababa as an autonomous

region in the new Ethiopian Constitution adopted in 1994, saw the Oromiya being

obliged to cede Addis Ababa (which is known as *FineFine* in the Oromiya language)

as their capital and to establish a new state capital about 100 km North of Addis

Ababa named Nazareth or *Adama* (in the Oromiya language). In line with the

autonomous status conferred by the Ethiopian Constitution (1994), citizens of Addis

Ababa are entitled to elect their representatives who hold seats on the Council of

Peoples' Representatives, the highest authority within the Federal Government.

Nevertheless, the Constitution recognizes the importance of Addis Ababa to the

Oromiya people and the role of that state in the city's administrative processes:

> *The special interest of Oromia in Addis Ababa shall be respected in the*
>
> *provisionof social services, the utilization of natural resources and in joint*
>
> *administrative matters arising from the location of Addis Ababa within*
>
> *Oromia State. The law shal specify the particulars.*
>
> Constitution of Ethiopia, 1994 (Article 49.5)

Furthermore, the Ethiopian Constitution guarantees citizens the rule of law

and democratic order, regards human rights and freedoms as inviolable and

inalienable (Article 10), commits to the conduct of government affairs in a public and

transparent manner (Article 12) and consider that all citizens have a Right to

development (Article 43).

Figure 45:   Administrative Regions and Zones of Ethiopia (UNDP, 2000)[42]

Today, Addis Ababa covers an areas of 540 km^2 has a population of over 3 million inhabitants, and a population density of around 8000 persons/km^2 (Cox, 2012). Administratively Addis Ababa comprises 6 zones also referred to as sub-cities which are further divided into 28 *Woredas*. *Woredas* are further subdivided into some 305 neighbourhoods or *Kebeles*. It is one of the fastest growing capitals in the world and also one of 10 Sub-Saharan African cities whose populations are expected to double and see economic outputs triple by 2030 (UN-HABITAT, 2013; PWC, 2014). Addis Ababa's Bole Airport provides international flight connections to destinations in Africa, Asia, Europe, North and South America cementing its role as an international hub and the diplomatic capital of Africa. The African Union

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[42] Image obtained from http://reliefweb.int/map/ethiopia/administrative-regions-and-zones-ethiopia

Headquarters is located in Addis Ababa as are more than 20 Specialized Agencies,

Funds and Programs of the United Nations System, over 100 embassies and a variety

of international NGOs and companies (Hector, 2009). A number of historic building

and cultural institutions such as theatres, palaces, orthodox churches and mosques as

Figure 46:   Informal Housing in Addis Ababa (©Wendell Cox, 2012)

well as the Mercato, one of the largest open air markets in Africa, provide a contrast

with modern influences such as the electronic stock exchange, new glass and steel

buildings – shopping malls, hotels and business towers (Figure 46 & 47). These

factors contribute to the city's cultural and economic dynamism and its ability to

attract some 48% of direct foreign investments being made in Ethiopia (Regassa,

2013), as well as rural migrants seeking better lives and opportunities (IRIN, 2007).

While per capita incomes are estimated to be six times higher than the national

per capita income of $1000 per year (PWC, 2014), unemployment in the city

according to a 2011 UN-HABITAT study is around 32%. Nevertheless, the city's

population is expected to grow at an annual rate of 3.8% for the next 15 years. In Addis Ababa, rich and poor persons live side by side but violent crime is rare, furthermore all of the more than 80 ethnic and religious - Christian, Muslims, Animists - groups in the city live in relative harmony (Baumeister & Knebel, 2012; IRIN, 2007). Some 80% of the city's housing stock has been classified as slum dwellings (See Figure 46), with 70% of these slums dwellings comprising government rental units UN-HABITAT (2008, 2011) and according to IRIN (2007) over 100,000 street children live in city. Other soft and hard infrastructural services are under strain as they seek to cope with the increased demand in a context where maintenance levels are low. To consolidate the important gains and emerging areas of promise it is essential that the city seek to build and engage the full breadth of its human capacity to successfully navigate its economic, social and environmental challenges and opportunities (See Figure 47).

Figure 47:   Addis Ababa's changing Skyline (©Aaron Maasho, 2014)

5.3.1.2   *Respondents and Conduct of Data Collection*

The Addis Ababa field test was conducted over a two-week period. Respondents were selected purposefully with a view to ensuring that the five stakeholder groups - academia, civil society, government, intergovernmental organizations including the United Nations and the private sector – considered to be critical players in shaping policy decisions in the city, were represented. Interviews were scheduled in advance with 12 respondents, (2 - civil society, 2 – academia, 2 – government, 3 - private sector and 3 – intergovernmental organizations). Three of these respondents (2 – government, 1 – academic) later declined to participate. Due to time constraints it was not possible to obtain replacements.

The selected respondents had at least a Masters degree, were fluent in English and were all long-time residents of the city. All participants were active in key areas and organizations that participated in cross-sectoral cooperation with other city actors such as the chambers of industry and commerce, departments involved in urban planning and implementation, policy monitoring/data collection, as well as conducting research and training activities linked to the MDGs. Respondents ranged between 30 to 50 years of age, travelled regularly in their professional capacities both within Ethiopia and to other developed and developing countries. All had lived in developed countries for extended periods either in the context of university education or employment and were familiar with cities in other developing countries of Africa and/or Asia. All interviewees were recognized national experts in their respective fields. As the researcher had lived and worked in Addis Ababa respondents were identified through his professional network and a snowballing process.

The interviews were structured around two formats. The first consisted of a semi-structured interview that used the Knowledge-based Development Maturity Model as a questionnaire to evaluate the city's knowledge maturity as well as an open ended supplemental questionnaire that invited respondents to identify key strategic challenges, stakeholder opportunities and threats. In addition to providing a rating for the city using the scenarios presented, each respondent qualified their rating by providing a narrative or other experience to substantiate their claim. Four persons participated in interviews of this format. Interviews of this type required about 3 hours to be completed. The second format omitted the assessment of knowledge maturity, focusing on the open ended questionnaire to identify strategic challenges, stakeholders and resources; it required about 1.5 hours to be completed. All sessions provided rich, contextual insights and highlighted ongoing changes occurring in the city. The questionnaire is presented in the Appendices.

Respondent availability was the key factor used to allocate participants to a particular question format. Three participants in the first group allowed their sessions to be recorded, while only one participant in the second group consented to the recording of the interview. Concerns about possible reprisals from government agents for expressing comments that may be seen as unfavourable to the government were cited as reasons by those who declined to have their interviews recorded. Interviews were held in locations such as offices, home or other environment where respondents had a reasonable expectation of being able to converse freely without interruptions.

Where recording was not allowed, notes were taken by the researcher. In the case of recorded interviews these were transcribed and the transcripts shared with informants for verification. As it was not possible for the researcher to complete the

transcription process during the 2-week field visit it was necessary to e-mail the transcripts to respondents. Due to concerns about the interception of communications, files were sent in an encrypted form.

An archival review of local English-language newspapers covering a 2-month period just prior to the visit was undertaken to obtain additional contextual information on the city.

5.3.1.3 *Application of the Knowledge-based Development Maturity Model*

This section describes the findings obtained for each construct in the model and presents the average of the ratings assigned by respondents for each indicator/criteria.

Human Rights and Needs.

Figure 48 presents the consolidated assessment of respondents regarding human rights and needs in Addis Ababa. Structural measures was the indicator/criteria under this construct where the city had the highest level of attainment. Contributing factors cited included the active and visible presence of institutions such as the Ethiopian Human Rights Commission. This institution was established by the Government of Ethiopia with the support of the United Nations and various international donors. This commission has played an important role in conducting various human rights training activities for municipal staff and civil society actors. Public awareness campaigns undertaken to outlaw the traditional practice of female genital mutilation (FGM) in support of the national legislation established to criminalize this traditional practice were also referenced as areas where the city was

advancing and advocating for human rights. Participation was also viewed favourable given the city's efforts to support power sharing and access to opportunities through affirmative action programmes that sought to ensure the participation of a variety of ethnic groups in the civil service.

In contrast, accountability was ranked lowest by participants. Respondents pointed to such factors as a city government dominated by civil servants whose political allegiances to the ruling party were more important than their performance. This in turn they explained led to cliques and impunity and laid the grounds for corrupt practices and the loss of accountability.

Discussion with respondents revealed that although the government has been vocal and active in raising awareness and public debate around issues such as FGM; an issue which receives considerable attention from donors; other aspects of human rights, particularly those related to the exercise of civic and political freedoms, were restricted. The adoption of a law (Proclamation No. 621/2009, 3.14.2 j, k, l, m, n) which restricted civil society organizations that received more than 10% of their revenue from foreign sources from undertaking activities that relate to the advancement of human and democratic rights, the promotion of equality, the rights of persons with disabilities and children's rights, conflict resolution and reconciliation was seen as a major setback[43]. In addition, this law established an Agency for implementing this law with statutory powers that some persons viewed as excessive.

Several respondents therefore felt that the government's approach to human rights was a strategic one that sought to ensure access to international ODA by

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[43] Proclamation No. 621/2009 - Proclamation to provide for the registration and regulation of charities and societies available at http://www.mfa.gov.et/docs/Charities%20and%20Socities%20Legislation.pdf

showcasing substantial progress on issues that were of great international importance while stymying efforts in areas perceived to potentially threaten the government's local position.
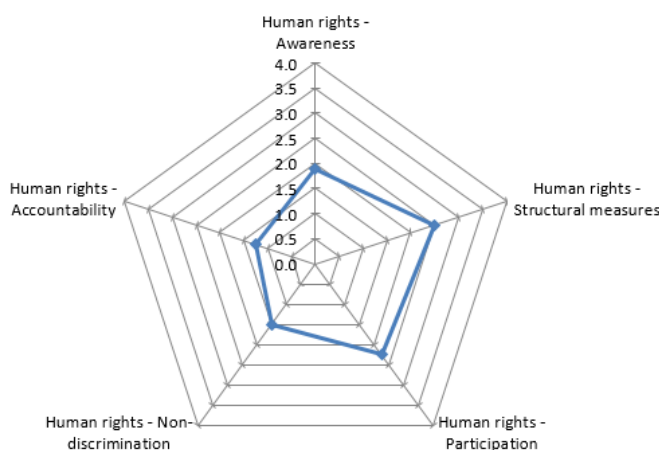
Figure 48:   Performance of Addis Ababa on the Components of the Human Rights and Needs Construct

Pluralism

As a city with over 80 native ethnic groups and a centuries-old legacy of peaceful co-existence between Christians, Muslims and animist religions, the city exhibits a spirit of religious pluralism perhaps not found in many Western societies. On the other hand, political views not in line with the government view point or value systems are not welcomed. Value systems such as homosexuality that are counter to the religious codes of the Ethiopian Orthodox Church and Muslim faith are also not appreciated. The growing political capital and affluence of the LGBTQS lobby in donor nations had placed this issue on the official development assistance (ODA)-sensitive human rights agenda with calls echoed by many donor nations to decriminalize such practices. In this regard, respondents felt that a pragmatism based

in the socio-economic reality was facilitating an ability to see other viewpoints. Within the context of Ethiopia, ethnicity was regarded as being largely more relevant as an indicator than race or disability. For many years Addis Ababa University had been noted for its higher education programs for the visually impaired and attracted students from other African countries. There were parliamentarians, judges and teachers who were visually impaired and many organizations were engaged in developing and creating opportunities for persons with this type of disability and seeking to ensure their full participation in social life. However not all types of disabilities are as well received.

The role and relevance of immigrants as an indicator for pluralism was contested. Respondents were of the view that immigration taking place in the city consisted largely of expatriate nationals involved in business, the international development sector or employees engaged in projects funded by the Chinese State. These groups were not seen as immigrants or particularly well integrated into the society as they often left following the end of their contract. On the other hand economic status in the Ethiopian context was an overlooked aspect that respondents felt should be captured in the pluralism construct. Figure 49 presents Addis Ababa's ratings on the criteria/indicators as evaluated by respondents.
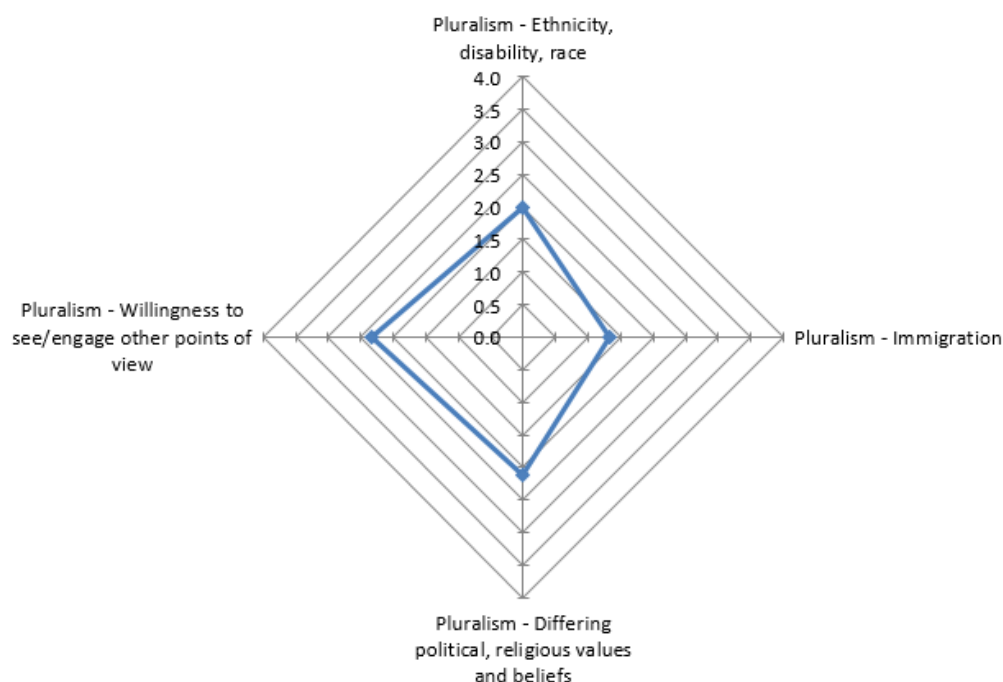
Figure 49:   Performance of Addis Ababa on the Components of the Pluralism
              Construct

Inclusion

Performance across all areas were considered low but efforts in areas such as improved shelter under the massive government housing programme were considered steps in the right direction, particularly in light of an earlier assessment by UN-HABITAT (2007, 2010) that classified 80% of the housing in Addis Ababa as slums.

Significant efforts had also been made in enacting legislation which enabled women to inherit and own property as well as to operate businesses in the formal as well as informal sectors. The civic and political space were particularly seen as under threat as the Federal Government, following the elections of 2005, had been taking efforts particularly in Addis Ababa where its support base had been eroded, to reduce and prevent dissent.

There appeared to be little government oversight or regulations regarding occupational safety and health of domestic workers in Ethiopian homes. Likewise, in the construction sector both men and women are engaged in heavy manual labor often with little safety protection. Respondents were also unaware of any city regulations or agencies with oversight for this area. Various neighborhood improvement programmes that focus on small-scale construction and ancillary works initiated by the city as part of a youth employment programme were seen as a move in the right direction but insufficient to meaningfully impact the city's high unemployment levels. Figure 50 presents Addis Ababa's ratings on this criteria/indicators as evaluated by respondents.
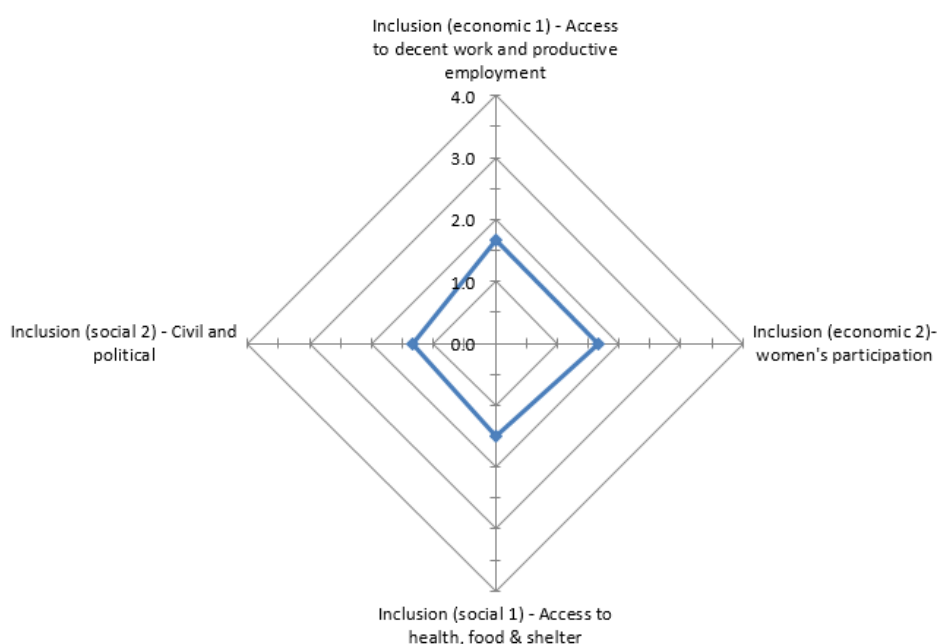
Figure 50:   Performance of Addis Ababa on the Components of the Inclusion Construct

Equity

Respondents indicated that practices such as the caring for the poor and destitute, as well as the giving of alms to beggars was a common feature of Ethiopian society and linked to the religious tradition. According to one respondent the Amharic term for a beggar *Lemagn*, may also be translated as "someone like me". The beggar is thus not seen as "the other", but rather as one with whom the individual empathizes, identifies with and is concerned about. In addition, the practice of "*mixity*" creates a social-urban fabric that combines in a single space commercial and residential areas, high and low income groups, low and medium-rise construction, multi-use spaces that support a variety of functions and creates social cohesion and generates value that may not be immediately apparent (Baumeister & Knebel, 2012; Linares, 2013). For example, where people of widely differing social classes live in close proximity this enables "infrastructure built for high-income houses (sewage, water, electricity, telephone) to be shared (or tapped) by low-income neighbors" (Baumeister & Knebel, *2012:159).* This also points to an inherent sense of equity at the communal level.

Legislative reforms, the emergence of more female role models, ODA programmes that focus on the needs of women as well as active and well organized grassroots organizations have helped to advance women's equity in face of cultural traditions and practices that value men over women. While some success had been achieved it was felt that continued efforts were needed to consolidate the gains that have been made.

Respondents cited various initiatives being launched to meet citizen's basic needs such as shelter, healthcare, and education. However, the large and rapidly growing population coupled with challenges such as illiteracy, wide-spread poverty

and a majority of substandard housing means there are persistent and unmet urban needs. In many cases, inadequacies and unpredictability of services made it essential for private citizens to be proactive in order to survive. Respondents pointed to the water supply infrastructure as an area where due to the city's inability to play its role, it became incumbent on householders to ensure their access to a water supply. This resulted in some houses developing innovative approaches for securing auxiliary water supplies. One building professional pointed to the potential dangers to public safety and property that could result from these well-intentioned citizen-initiated measures. Potential impacts cited included the collapse of inadequately designed makeshift water towers and other informally constructed water storage tanks and "swimming pools" inside apartment complexes that had been constructed in response to the water shortage. Figure 51 presents Addis Ababa's ratings on the criteria/indicators as evaluated by respondents.
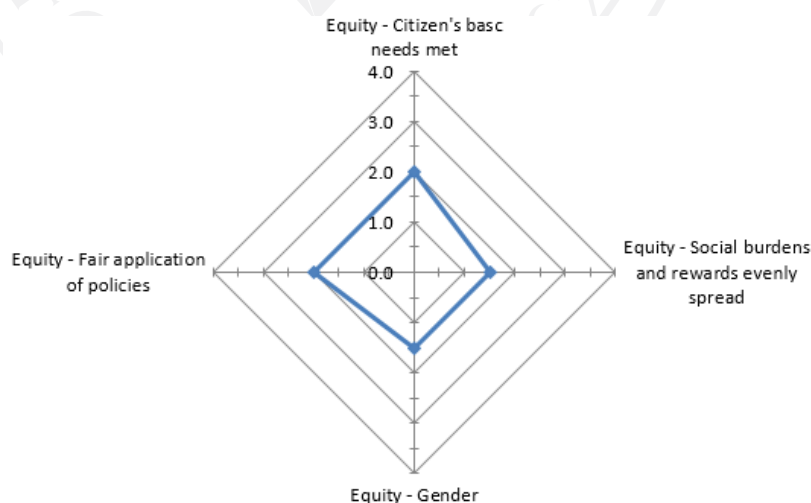
Figure 51:   Performance of Addis Ababa on the Components of the Equity
              Construct

Openness

Respondents were of the view that a low level of maturity existed at all three components of the Openness construct. Several respondents asserted that government decisions were communicated to citizens with little opportunity for real dialogue or consultation. On occasions communities would be gathered town-hall style but with little opportunity to influence the process. A local term "*participated*" was coined to describe the process where communities or individuals were convoked to a meeting to be informed of a decision. E.g. "I was participated to the meeting for the new road tax". On occasions opportunities do arise at the community level, that is to say the *Kebele* to provide input to processes, but these were regarded as exceptions.

While there was discussion about free and open source software (FOSS) and the role of ICT in development, no critical mass in terms of a local industry had been achieved as yet. At present such issues as open data, open standards and open government were not regarded as relevant or a priority for citizens.

Party loyalties were thought to bind civil servants together which in turn led to good formal and informal working operations between most governmental departments. However, large departments particularly those involved in the provision of utilities were perceived as less cooperative with other parts of government and this was thought to result in inefficiencies. Figure 52 presents Addis Ababa's ratings on the criteria/indicators of this construct as evaluated by respondents.
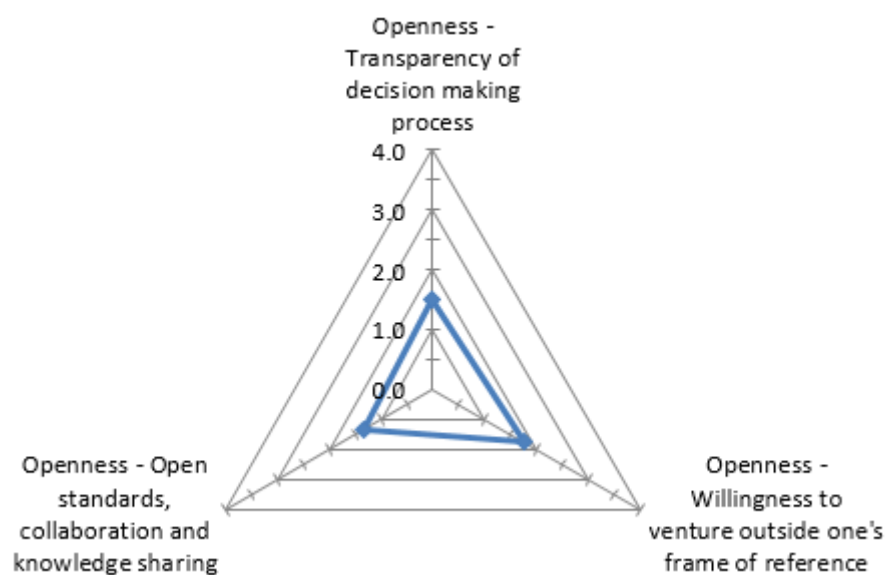
Figure 52:   Performance of Addis Ababa on the Components of the Openness Construct

Freedom of Expression

The Government of Ethiopia has been widely criticized by bodies such as Amnesty International, Freedom House and the Committee to Project Journalists (CPJ) for the difficulties that independent journalists face in conducting their profession. Various donor countries and international development agencies have also expressed similar concerns. According to the CPJ in 2014, some 30 journalists, sought asylum in neighboring countries to avoid arrest during a crackdown on media establishments the government accused of "promoting terrorism and damaging the economy[44]". In various cases, following lengthy jail stays journalists are released or have their charges dropped. These conditions were thought to contribute to self-censorship, with only the most courageous or obstinate journalists daring to challenge

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[44] Mission Journal: Ethiopian journalists must choose between being locked up or locked out https://cpj.org/blog/2014/12/mission-journal-in-ethiopia-journalists-must-choos.php#more

the *status quo.* Various entities including the UN, Foreign governments and other entities either publicly or through diplomatic channels seek to improve the climate for free expression in Addis Ababa and the rest of the country.

According to Skjerdal (2011) there is a historically entrenched view in Ethiopia of the media as a tool for supporting the political leadership. Where the media plays a role in raising public awareness and behavior change around issues such as reproductive health, gender equality, water conservation or development-focused issues, journalism is welcomed. However, the critiquing of the leadership and its policies is not.
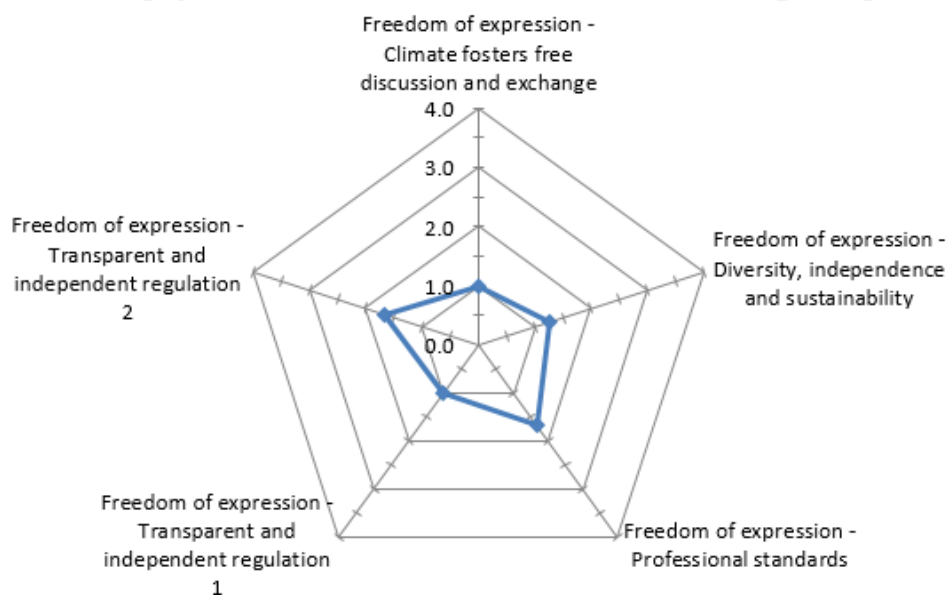
Figure 53:   Performance of Addis Ababa on the Components of the Freedom of Expression Construct

Respondents indicated that while no censorship law or body, a number of mechanisms or structures nevertheless served to achieve the same result. Through the bodies responsible for assessing the structural safety of public signage; a concentration of ownership of major printing presses amongst a small number of

media houses; as well as strict control over the issuing of printing, radio and television broadcast licenses; provide effective means of influencing editorial content and encouraging self-censorship. Mention was made of diaspora communities, notably in the United States of America who provide internet-based commentary in the form of blogs as well as television and radio programming, though these services are reportedly blocked by the government.

In 1995, the Ethiopian Mass Media Training Institute (EMMTI) was established to provide both national and regional journalism training. EMMTI was integrated into Addis Ababa University in 2006 as the undergraduate programme of journalism. The university also offers a Master Degree programme in journalism established with the Norwegian government as part of its official ODA to Ethiopia. A variety of short courses are also regularly organized by international development agencies. Nevertheless, respondents were mixed in their assessment of the level of professionalism amongst Ethiopian journalists. Given the powerful role of the government respondents were not confident that media regulation was being conducted with transparency and independence.

Figure 53 presents Addis Ababa's ratings on the criteria/indicators of this construct as evaluated by respondents.

Universal Access to Information and Knowledge

By the end of 2015, the public transport network in Addis Ababa is expected to include a 32-kilometer light rail system constructed by the China Railway Group Limited with funding from the Export-Import Bank of China. This network with some 39 stations will augment the current public transport system that consists of public

buses and privately operated taxi mini-buses and cars. The public bus network is extensive in its coverage of the city and affordable but inadequate for the demands placed on it, the light rail is expected to improve this situation. Traffic congestion is a challenge and accidents are reported to be common.
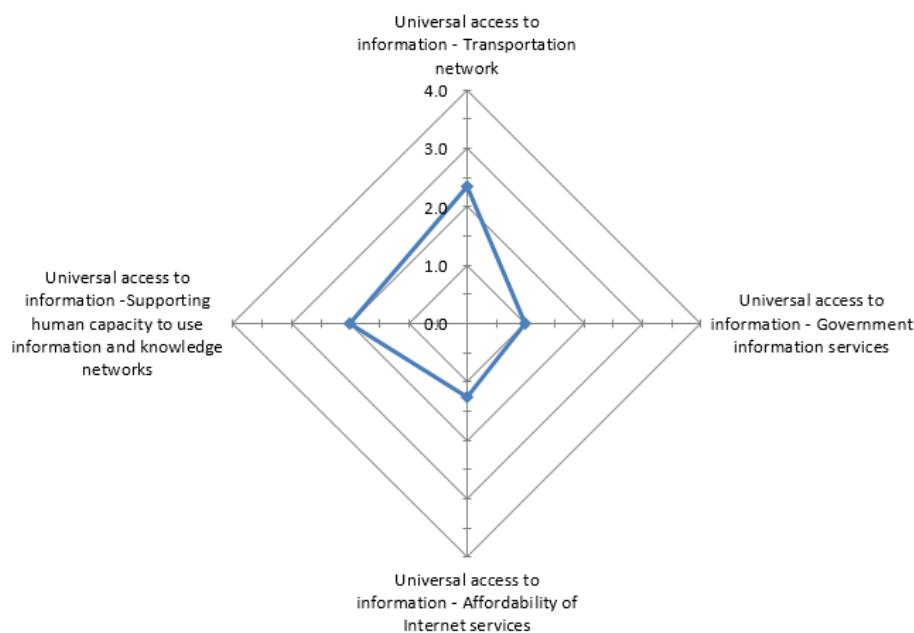
Figure 54:   Performance of Addis Ababa on the Components of the Universal Access Construct

The city is benefiting from a nationwide upgrading of the communication network which the Federal Government has launched by partnering with international firms like Alcatel, Huawei and Sony-Ericsson. A number of development oriented projects undertaken in partnership with the World Bank and other initiatives such as the One Laptop per Child Programme are supporting capacity-building of civil servants, students and the public. Various programmes for the local manufacture of low-cost smartphones and computers have been launched and efforts to support the use of the local script Amharic in the digital environment as well as software tools are

advancing well. Cybercafés are common and while respondents were unaware of government subsidies for Internet, the use of pre-paid smart phone as well as per minute use of cybercafés allowed users to manage costs. However, an unreliable power supply, with frequent and unpredictable outages adversely affected the quality of electricity and internet services and were a constraint to the ICT sectors as well as the more rapid uptake of ICT.

While some government documents can be accessed online, they do not provide on-line services nor are these websites regularly updated. So transactions and information gathering often still needs to be undertaken face to face in the respective department. Addis Ababa is a city with a large and growing youth population where unemployment in excess of 30% is recognized as a challenge and a source of potential unrest (UN-HABITAT, 2011). Embracing ICT and their prospect for greater efficiency and labor saving represents a paradigm challenge to a vision which still appears to see the government and state-owned corporations as the primary employer and where illiteracy is still high. Figure 54 presents Addis Ababa's ratings on the criteria/indicators of this construct as evaluated by respondents.

Cultural & Linguistic Diversity

The country's more than 80 distinct ethnic groups are represented in Addis Ababa. Power sharing relationships and religious traditions have helped allay ethnic rivalries. Mutual appreciation for the diverse ethnic traditions and the ability to freely practice them have contributed to social cohesion and a relatively conflict-free existence.

Addis Ababa's museums, royal palaces, churches and other historic site showcase a rich historical legacy that begins with the oldest hominid, Lucy, or as she is known in Amharic *Dinkanesh*, to the present time. Emperor Menelik who reigned at the turn of the 20th Century is regarded as a great modernizer, but more recent leaders have a more uneasy place in the minds of the city. Emperor Haile Selassie who was deposed in 1974 in a coup was a symbol for pan-Africanism and founder of the Organization of African Union. The *Derg*, leaders of the coup and followers of the Marxist-Leninism philosophy to enhance their legitimacy diminished the legacy and achievements of the emperor and monarchy. When the *Derg* was deposed their legacy and achievements met a similar fate. Heritage institutions such as the Institute of Ethiopian Studies therefore play a contested role, in that they seek to preserve and reflect on linkages with a past that is bloody, recent and sometimes unresolved.

Addis Ababa's role as the diplomatic capital of Africa and headquarters of the African Union is part of the legacy of Emperor Haile Selassie. In Addis Ababa, Africa's Heads of State and global leaders meet to craft and create a modern Africa. With more than 100 permanent embassies the city is exposed to a variety of displays of foreign culture. Foreign cultural centers such as Germany's Goethe Institute, China's Confucius Institute, and British Council amongst others are creating opportunities for inter-cultural exchange, language learning and study abroad opportunities.
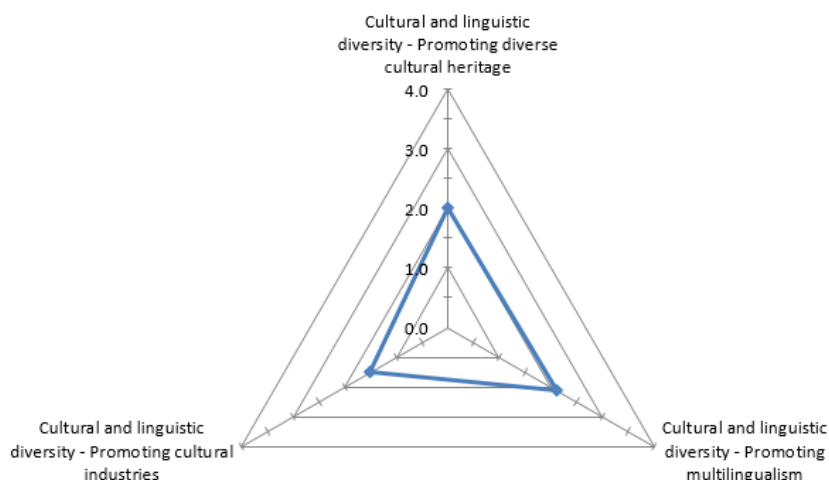
Figure 55:   Performance of Addis Ababa on the Components of the Cultural &
              Linguistic Diversity Construct

As the only un-colonized country in Africa, Addis Ababa is seen by some as a
city that should reaffirm Africa's indigenous roots (Baumeister & Knebel, 2012). Yet,
historically Ethiopia has been insular and apart from other African countries. While
proud of its history, Addis Ababa is nevertheless seeking to shape off connotations of
a poor, famine-stricken country by taking on the signs of modernity such as replacing
heritage architecture with western-style buildings and infrastructure; promoting
national and international film, music and art festivals; reinventing itself as a
conference center city and as a travel hub and gateway to Africa. Traditional crafts in
cotton, silk, leather, silver, amber, ceramics infused with contemporary adaptations
are emerging and making their way to the high streets of New York and other global
capitals. Respondents were convinced that the old and new can co-exist, though
overcoming disparities and inequities and successfully navigating a course through
the opportunities and challenges is not a straight-forward process. Figure 55 presents

Addis Ababa's ratings on the criteria/indicators of this construct as evaluated by respondents.

Education for All

Addis Ababa's citizens have been benefitting from a variety of government programmes aimed at increasing access to primary and secondary education leading to increases in literacy for the under 15 age group. Recognition of education as a path to social mobility has also led to young men and women in their 20's and 30's attending evening classes, their first opportunity to pursue primary school education at the growing number of for-profit schools. Similarly, tertiary education institutions in
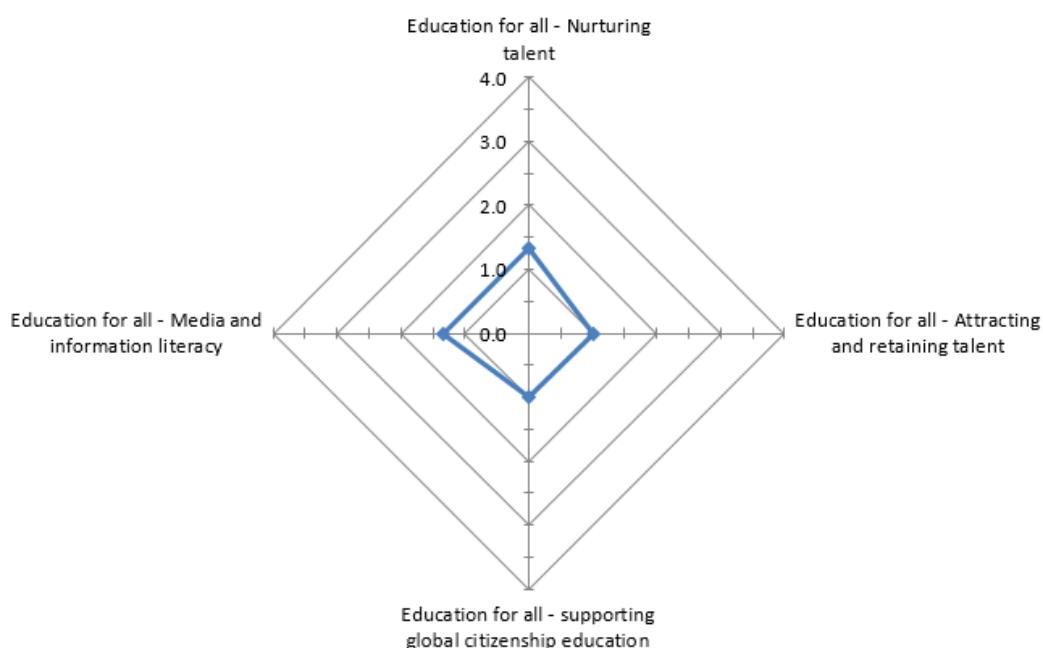
Figure 56:   Performance of Addis Ababa on the Components of the Education for All Construct

fields from computer science to healthcare, though not always accredited, are emerging. Programmes targeting disadvantaged groups such as orphans, children with disabilities

supported by charities are also active. The challenge of insufficient classrooms has led to some public schools reportedly operating assembly-style and offering 2 or 3 sessions per grade level each day.

At the same time however, there are a number of private international schools offering a variety of national curricula – American, British, French, German, Greek, Indian, Italian, Norwegian, Russian, and Turkish, amongst others. These schools are primarily aimed at expatriates, though scholarships and discounted tuition are awarded to Ethiopian students. Aspects such as a hospitable climate, amenities targeted to expatriates, safety and a low cost of living enable the city to attract expatriate families as well as established Ethiopian professionals in the diaspora. Duty-free importation of household goods and vehicles to Ethiopian nationals who acquired higher degrees abroad once existed but was suspended due to concerns around the administration of this programs.

The use of ICTs in public schools are being supported, from the primary to tertiary level, but here too challenges of power supply, connectivity and adequately trained teachers exist. The city with its numerous cultural activities, diverse expatriate presence, international organizations, as an air gateway to Africa presents opportunities for citizens of all ages to enhance their awareness of other cultures and develop global citizenship values. However, the high cost of living for Ethiopian families, the shift to an increasingly market-driven economy with fewer social welfare offerings presents challenges. Primary and secondary students may need to spend time engaged in the informal economy in order to contribute to their family's lives. Figure 56 presents Addis Ababa's ratings on the criteria/indicators of this construct as evaluated by respondents.

Assessment of Addis Ababa's Knowledge Maturity

Table 57.   Sample Knowledge Maturity Assessment Sheet

KNOWLEDGE MATURITY DATA RECORD SHEET							
City:						Date:	
Interviewer:			Interviewee Code:			Survey Sheet #:	
Constructs	Number of indicators	Indicator	Score (A)	Total A	Maximum Possible Construct ∑(A)	Weighting Factor from Delphi (0 ≤B≤ 1)	A * B	Construct Score with Weighting (∑A * B)
Human Needs & Rights	5	HR1	1	14	20	0.27	0.27	2.59
		HR2	3			0.2	0.6	
		HR3	4			0.18	0.72	
		HR4	2			0.2	0.4	
		HR5	4			0.15	0.6	
Pluralism	4	PLU1	1	7	16	0.29	0.29	1.63
		PLU2	3			0.19	0.57	
		PLU3	1			0.29	0.29	
		PLU4	2			0.24	0.48	
Inclusion	4	INCLU1	2	14	20	0.25	0.5	2.5
		INCLU2	3			0.19	0.57	
		INCLU3	1			0.27	0.27	
		INCLU4	4			0.17	0.68	
		INCLU5	4			0.12	0.48	
Equity	5	EQ1	1	14	20	0.25	0.25	2.82
		EQ2	3			0.19	0.57	
		EQ3	4			0.27	1.08	
		EQ4	4			0.17	0.68	
		EQ5	2			0.12	0.24	
Openness	6	OP1	3	18	24	0.18	0.54	2.71
		OP2	4			0.15	0.6	
		OP3	1			0.23	0.23	
		OP4	2			0.19	0.38	
		OP5	4			0.13	0.52	
		OP6	4			0.11	0.44	
Freedom of Expression	5	FE1	1	14	20	0.28	0.28	2.46
		FE2	2			0.22	0.44	
		FE3	4			0.16	0.64	
		FE4	3			0.18	0.54	
		FE5	4			0.14	0.56	
Universal Access to Information & Knowledge	7	UA1	1	22	28	0.18	0.18	2.92
		UA2	2			0.17	0.34	
		UA3	3			0.16	0.48	
		UA4	4			0.15	0.6	
		UA5	4			0.14	0.56	
		UA6	4			0.1	0.4	
		UA7	4			0.09	0.36	
Cultural & Linguistic Diversity	5	CL1	2	14	20	0.21	0.42	2.75
		CL2	1			0.22	0.22	
		CL3	3			0.21	0.63	
		CL4	4			0.18	0.72	
		CL5	4			0.19	0.76	
Education for All	5	ED1	1	14	20	0.28	0.28	2.5
		ED2	2			0.22	0.44	
		ED3	4			0.17	0.68	
		ED4	3			0.18	0.54	
		ED5	4			0.14	0.56	
Theoretical Maximum Knowledge Maturity					184			

Score (A) Values	1	Initial
	2	Defined
	3	Managed
	4	Integrated
	DK	Do not know
	DW2S	Don't want to say

Note: Use decimals if Interviewee stands between two Scores

5.3.1.4   Discussion of Findings from the Application of the Maturity Model in Addis Ababa

Respondents found the maturity model easy to use and the scenarios in the maturity model relevant to the realities of the city. The concept of knowledge maturity was felt to be intuitive and the levels of maturity distinct, meaningful and hierarchically ordered. Both groups considered the questions concerning strategic challenges, strengths, weakness, opportunities and stakeholders as a useful lens for helping to prioritize action and inform the actions of policy-makers as well as other stakeholders.

Respondents varied in their level of optimism as to whether given the current balance of political power if the city's leadership would voluntarily adopt a more collaborative and inclusive approach to governance.   Nevertheless, they shared the view that the maturity model provided a useful basis for gaining systematic insights into the city and supporting the assessment, cross-sectoral brainstorming and collaboration processes that could support innovation, shared vision, prioritization and implementation of strategic actions that could enable the city to harness its collective knowledge to address the increasingly complex challenges facing it. The use of such a tool was thought to be useful in fostering an awareness and recognition of the value of a more inclusive approach to planning.

The qualitative aspects of the model served to unearth some important perspectives and assumptions that would have been lost in a quantitative model. In the maturity model the presence of institutions such as an independent Human Rights Commission as well as relevant policies and laws is a characteristic of the **Managed** maturity level. While acknowledging that the country had a number of laws that were

internationally recognized as "best in class", respondents were of the view that actual practices did not reflect this.

> *So I would say, politics - zero tolerance, zero, unacceptable. You can't come in with your own political views. You just have to accept what's here and love it.*
>
> *Absence of non-partisan spaces to engage in political dialogue*
>
> *The overly aid dependent Ethiopia has signed up to every imaginable international human rights laws and charters to gain favourable repute at the international level. Addis Ababa, like all other administrative structures under the federal government, by default subscribes to these laws and charters as adopted by the Federal Government. Awareness, implementation and enforcement is variable depending on the interests of the ruling ethnic based party.*
>
> *Human rights awareness and related activities have been curtailed since the enactment of the 2009 Charities and Societies law which prohibits local organizations receiving funding from abroad to engage in human rights issues. A lot of local organizations capacities have been hindered given funding shortages to carry out their activities.*

Respondents also considered the decision by authorities to establish various laws and institutions as being guided more by pragmatism than a belief in the improvements that these changes could bring; these changes were often conditions for the receipt of international assistance from Western donors. In a similar manner, they explained that while censorship laws had been repealed, a variety of quality control systems for the mounting of public banners, advertisement on radio, television and in public spaces continued to maintain these former practices. It was essential to

understand the context and underlying meanings to correctly interpret and assess the situation.

>*We do a lot of media placements and in Ethiopia there is no censorship law. There is no censorship, but we go into a lot…; it takes 6 to 7 months to approve a TV commercial before you produce because, "Oh you can't do this because it's socially inappropriate, or oh, you can't do that because it makes you look like you're politically against someone, or…. you can't use that, because it looks underage." I mean the kind of censorship that they put us through is….*

Furthermore, while considerable attention was given to publicizing consultation meetings organized on key public policy issues - such as the new development plan for the city of Addis Ababa - in their view these town hall meetings were largely one-way processes staged for external consumption by international organizations and donors as they merely served to inform the public of the decisions that had already been made by the government with no real opportunities for influencing or shaping these processes. Examples cited included the new urban housing plan and transport plan under development.

>*To organize yourself after 2005 [politically] is also a problem on the urban level due to the anti-terrorism law. even if they have concerns, for the fear of something that might happen, people are self-censoring themselves, they will not voice their concerns... not even the academicians..., so that is the censorship issue that we have. And for the sake of communicating things, people say we have discussed this. They [Government officials] bring you, some two guys will talk, they tell you what will happen and then it's done, then*

it's reported that people have been consulted, that there has been a town hall

meeting.

The new light-rail project was not discussed, the civil society has been

emasculated or feminized whatever you want to call it… the government

decides on it... first they scare you, then you get adjusted to it and by the time

they tell you to leave its okay, because you've already adjusted to it.

Respondents also expressed the view that these development were not pro-poor, were serving to create distinct districts based on socio-economic status and were counter to the practice of "*mixity*" which had served to ensure social cohesiveness in the city across the many religious, ethnic and socio-economic divides. Mixity is considered to provide a distinctive and defining character that is part of the traditional heritage of Addis Ababa which should be protected (Linares, 2013). There have also been incidents of the urban poor having their dwellings demolished with little or no warning during road and other urban construction activities (IRIN, 2007). This meant a loss of shelter as well as the material resources these individuals and families had been able to accumulate. This points to inequities in the distribution of benefits of urbanization. However, due both to the limited sample size and the lack of quantitative data it is difficult to assess the extent of these actions.

A new creed of urbanity is being imported... people can't locate themselves. In

France you think in streets and avenues, here you think in places, so this is a

big jump. The orientation is a big thing, how to find oneself in the city? That is

one of the challenges that I can see. There is a loss of memory of the places

that shaped the cohesiveness of the city…Now we are seeing the signs of gated

communities, the haves and the have nots. These areas used to be very mixed

but not anymore....

Physical upgrading of the city has come at a great cost with most historical

buildings and sites razed without even documentation. Groups who tried to

intervene have been silenced.

These viewpoints are also supported by other academic researchers

(Baumeister & Knebel*, 2012;* Ejigu, 2012). Baumeister and Knebel (2012) highlight

the uniqueness of Addis Ababa's indigenous urban landscape pointing out that:

"These patterns and qualities together form a city model that can overcome

the centric city models introduced by colonialism and modernism and

establish a non-hierarchical, non-segregated, non-functionalist city that can

grow endlessly without changing its appropriateness to cater to the majority

of its inhabitants - the urban poor. [Baumeister & Knebel, 2012:160]

While recognizing the adverse impacts, respondents supported and appreciated

the important role of urbanization, if adequately harnessed and holistic, in enhancing

life for all citizens. There was also confidence that Addis Ababa had the ability and

the networks available to tap into the experiences of other cities and to adapt them to

produce local solutions that avoided the perpetuation and exacerbation of current

problems:

The creating of green areas and spaces I think is a major challenge for the

city's environmental sustainability. I think this is related to lack of awareness

and a lack of will for the need of such spaces. The current thinking towards

city growth is continuation of massive concrete jungles with little reverence

for green areas. I think there is opportunity to learn from the strong national

partnership created with China and how Chinese cities have grown to include green spaces in their growth agenda.

For the construct of cultural and linguistic diversity, there were some sharply contrasting views. Some respondents saw the city as a good example of ethnic diversity which other cities could learn from. Others saw a more complex picture of a carefully preserved coexistence based on fear and co-dependence, yet others pointed to this as a potential source of future conflict:

The majority of Addis Ababa, of Ethiopia is Oromo, yet it's been ruled by the Amharas for 100s of years, yet now the ruling party is actually Tigrayan which is a minority ruling the majority of Oromos and Amharas. But you also know that here in Addis lies parliament, and a government centered around [on], built around ethnic divisions, and so everyone's voice is heard!

This is a very ethnic-based society, so if you want to discuss the constitution or other things that have been done then people get a bit quiet, they just start to look around... One, because of fear, two because in the [previous] socialists society everything was monitored and now we have jumped to a society where everything is freer. So it is a new society but with an old moral and values and no one wants to be targeted - in the past people would be exiled, jailed, ostracized...

Misguided ethnic awakening has led to a level of political polarization which will be very difficult to tone down.

Some respondents viewed the ethnic based affirmative action programmes as a positive step to promote harmony, cohesion, correct old injustices and leverage cultural diversity as an asset. Other respondents however viewed these efforts as

linked to practices aimed at coalition building and the consolidation of political power by some ethnic groups. Others questioned whether it was now time to re-assess what the basis of a shared national identity and its impact and implications for the city especially as all ethnicities were represented in Addis Ababa:

> *Even though Addis Ababa has a majority population who is Orominya the language of schooling is English and the official languages of Government are Amharic and English.*
>
> *The gray society is a very big problem. By this I mean the civil servants who are politically affiliated, so government and party are the same. So for the leadership the professional capacities of these civil servants to meet the needs of the people are far less important than their level of trust and affinity to the party.*
>
> *Because of the ethnic politics that are being played out, meritocracy is out the window with government positions being allocated to various ethnic groups. So even if you are the best, if you are not from the right ethnic group you can't get the job.*
>
> *The Government has given ethnicity prominence but what about religious diversity? If you are going to use a cultural issues as a way of building a shared national identity then ignoring the religious aspect, seems to sideline it [religion] especially as this is becoming an areas of tensions recently which the governlent is trying to contain. So the inclusion of diversity is perhaps one area where the Ethiopian state has perhaps gone overboard.*
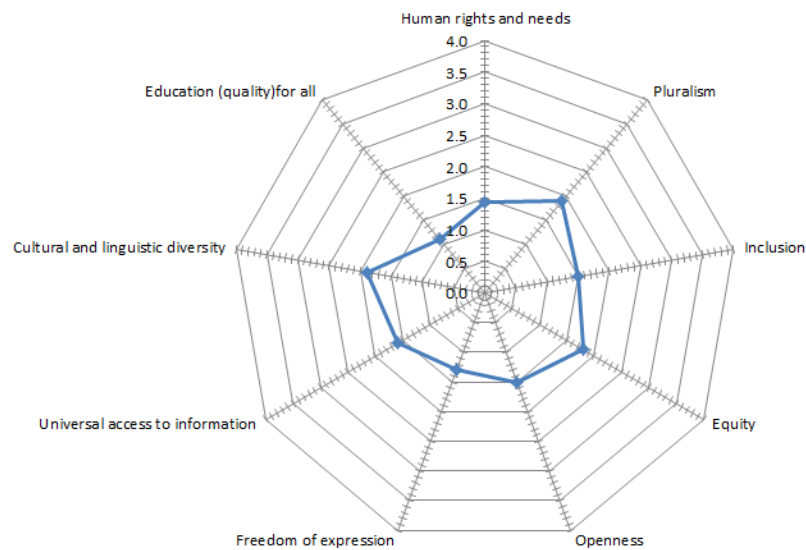
Figure 57: Addis Ababa's Knowledge Maturity assessed on the basis of the
Knowledge City Maturity Model

As a nation with 85 languages and 81 ethnic groups (Lewis, 2009) all of
whom are represented in Addis Ababa, such sharply divergent views may suggest that
ethnic based tensions exist. Various ethnic based groups have historically launched
armed conflicts (Gashaw, 1993; Lewis, 2009). Consequently, in future work the
influence of ethnic affiliation on respondents reported perceptions in the city should
be investigated. Efforts aimed at improving the understanding of these tensions and
seeking to manage them could potentially enable them to be addressed without
conflict. As shown in Figure 57, average rankings on the indicators used in the model
for the city's knowledge maturity ranged from 1 to 2.5, with most rankings clustered
around 1, indicating general agreement that there was a low level of knowledge
society maturity and considerable opportunities for improvements. Figure 58 presents
a detailed snapshot of individual ratings. Respondents were of the view that these
ratings presented in their views a realistic snapshot of the current situation in the city,

they further pointed to their ability to cite multiple examples as validity for their rankings.

Respondents cited pollution and waste management, water management and gender based violence as the most critical challenges facing the city. Ensuring inclusion, equity and participation of women could potentially be an area that would require extensive interventions and awareness building both amongst men and women. According to one participant:

Gender-based violence is being dismissed as a non-issue. Furthermore, we have culturally sanctioned double standards that does not view violation of women's rights as a real threat to peace and security. We need interventions at the highest level, from the Prime Minister, we also need more research to document the violence against women that is happening in every city.

With respect to water supply respondents pointed out that daily water cuts were a common experience and there were part of the city where water cuts for up to one week were occurring. One respondent pointed out the irony of this situation, as a prime reason for the founding of the city was the abundant fresh water springs in the area from which the city drew its name Addis Ababa, which means new flower. Deforestation, fueled both by the need of poor persons to obtain affordable fuel, a desire to cover everything in concrete or asphalt as a sign of modernity, as well a as low level of investment in water infrastructure and training of the relevant staff, were cited as contributing factors. These challenges were in turn thought to be amplified by the effects of global warming which were inducing changes in weather patterns such as a shorter rainy season. High population growth and poor governance were also

deemed to be critical cross-cutting triggers that could retard the city's current progress and which required urgent attention.

Practices and assets that were seen as a source of strength and resilience were the strong religious, family and cultural ties as well as the high level of patriotism. In the past, even in the face of internal divisions the country would come together and successfully repel invaders. It was now essential to redraw on this ethos and shape a city identity and vision to combat the challenges of urbanization. While cultural practises such as female circumcision received considerable attention, as examples of negative cultural practise, there were cultural institutions such as the *Edir* and *Iqub* that played important positive social and economic roles in a country where financial services and access to credit were still largely undeveloped. The *Edir* were neighbourhood groups that supported community solidarity and which contributed to the tremendous financial, logistical and social obligations associated with funerals. Membership lasted for life with members contributing financially and with time each month. The *Edir* facilitated the costs and operations associated with the traditional mourning periods and the associated rituals and extensive logistics required. During this period, entire communities would visit the family home of the bereaved. This often required the blocking off of portions of the street so that hundreds of mourners could be received, fed and accommodated. The first mourning period lasted several days with similar commemorations taking place at specified intervals that extended over a 1 year period. Without the *Edir,* the costs and preparations for meeting these traditional obligations would be beyond the means of any single family. As a result of the social capital, structural and human capital they leveraged, *Edirs* often played an

important role in dispute resolution, facilitating community actions and provided a means for airing community grievances.

In a similar manner, the *Iqub* provided an informal, rotating, lending pool among trusted members to which contributions were made at weekly or monthly intervals. In turn the *Iqub* would make lump sum pay-outs on a predictable basis to each member, providing access to a large lump sum that allowed the member to make large purchases. In a society conditioned to make purchases with payment in full and where credit was frowned upon and also largely unavailable, the *Iqub* represented a principal source of finances for major events both planned and unplanned that required substantial resources.

However, the urban transformation and the resulting breaking up and haphazard resettling of communities were leading to *Edirs* and *Iqubs* which had existed for generations and were based on trust becoming fragmented. Often, it was only once a sense of place or belonging to the new social and physical community was established that these groups which were based on trust, could emerge. Other social groupings such as the Circle of Elders had also showed their continued relevance during the post-2005 election violence and it was thought that without their intervention the conflict may have been longer in duration and with a higher death toll. The fragmentation and dismantling of these traditional institutions were creating a vacuum and also leading to a loss of social cohesion and threatening sustainability at the individual and group level.
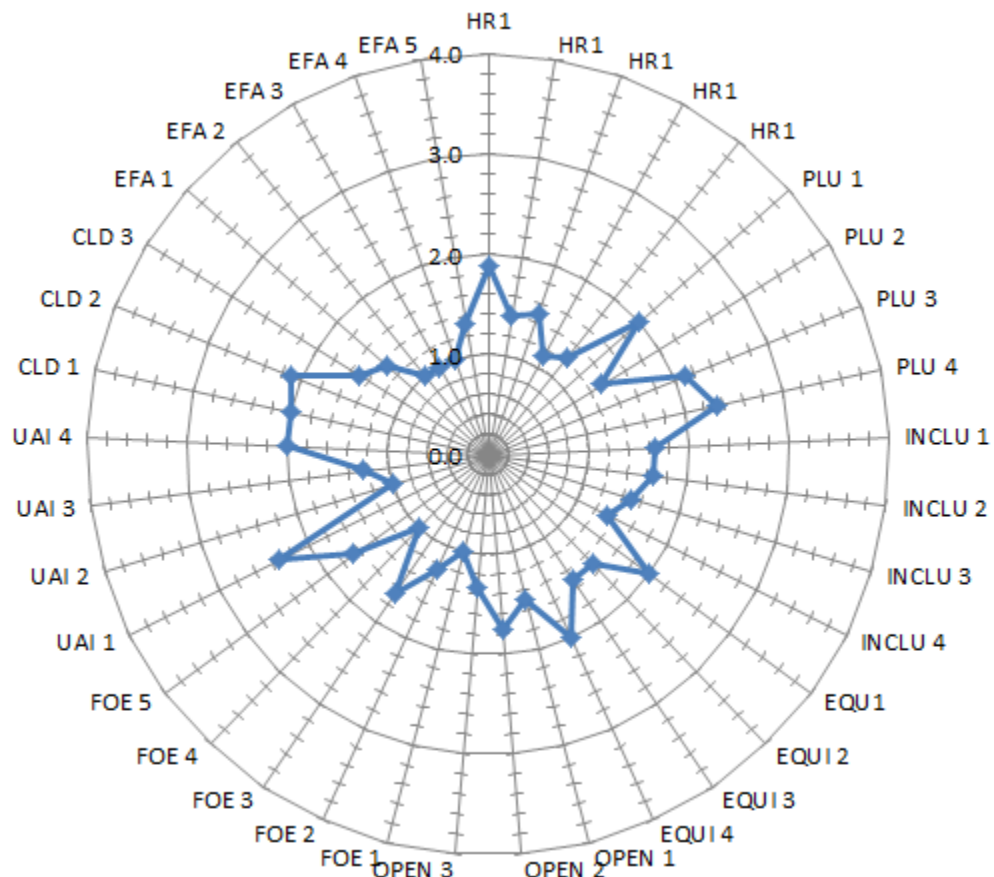
Figure 58:   Addis Ababa's ranking for each Construct / Indicator in the proposed Knowledge City Maturity Model

5.3.1.5   *Addis Ababa Through Castells' Informational City Lens*

Castells (1989) identifies information, finance and political power as the three forces that shape spatial relations in cities and in turn alter the social fabric. In Addis Ababa, the influence of financial and political forces are very much evident. These two factors are coming together strongly as is reflected in the loss of "mixity" that is being enabled by policies that are favouring upscale and high density developments as well as the resettling of residents from desirable locations to make way for gated communities and shopping centers.

At present the role played by information in redefining the city's spatial contours may not be so clear, if we only think in terms of traditional ICT-based services. It is however essential that the city context and the heavily oral nature of the city be considered both by the presence and absence of information means. As mentioned earlier, the government exerts significant control over information services such as radio, television, print media, public assembly and signage, as well as through limitations on what civil society actors may engage on. This control is also exerted through the monitoring of internet content, particularly politically motivated social content from diaspora groups who seek political change. Information channels such as mobile phone communication, particularly mobile messaging services, satellite television and a local film industry appear to offer areas where control is limited. Perhaps they offer potential for altering this balance of power by creating new platforms for information flow, social mobilization and organization. As an oral society where literacy is still a challenge, the emergence of the light rail which enables the greater movement of people, goods and service in the city is likely to have a significant impact on information flows. Potentially, coupled with services like mobile phones, they may be able to re-establish the ruptured lines of trusted communication amongst members of *Edirs* and *Iqubs* that have been disrupted by the city's shifts.

Ethiopia with a highly ethnically diverse society living within the borders of their own country represents a situation significantly different from that of cities in most developed countries where the "ethnic" groups are migrants. This suggests that new categories for understanding how power is wielded, shaped and understood may be required to enrich those envisaged by Borja and Castells (1997). There is also a

growing class of globally mobile and connected, world-wise Ethiopians diaspora living in cities like Oslo, Geneva, Minneapolis and San Francisco who have been educated in some of the best schools and are now returning to invest and do business in their country. They represent a potential new source of power who may drive other spatial changes that go beyond the gentrification and gated communities.

The foregoing factors are resulting in the expansion of the city's boundaries, and leading to the loss of a green belt that encircles the city. Furthermore, they are giving rise to tensions between Addis Ababa and the surrounding Oromiya Federal State. Despite the significant economic contribution of the Oromiya State which comprises almost 1/3 of the country's population, the Oromiya have not traditionally been in positions of either political or economic leadership. In recent times, respondent indicated that the position of Federal President has been "allocated" to the Oromiya. While the position of President has high status this role is more considered as a representative than a decision-making one and some groups feel that the Oromiya are neglected. The growth of Addis Ababa, the prospect of a new city plan with enlarged boundaries that could extend into Oromiya territory – and which had not been the subject of a public discussion either within Addis Ababa or the Oromiya State - led to conflicts in May 2014, some of which turned violent (Hassam, 2014).

Jordi and Castells (1997) point to the role of efforts aimed at supporting economic productivity and competitiveness, socio-cultural integration as well as ensuring political representation and decision-making as effective and necessary counter-measures to the negative proclivities of the information city. Efforts aimed at supporting economic productivity and competitiveness in Addis Ababa are evident. In contrast, discussions with respondents during the field visit as well as stories in the

local and international press do not appear to suggest that a similar level of effort is being invested into socio-cultural integration nor the widening of the political sphere. Paradoxically, the Ethiopian Constitutions clearly affirms the right of the citizens and the role of the State in the realization of thus issues which are at the core of the fundamental freedoms enshrined in the Universal Declaration of Human Rights (1948) and the sustainable development goals. On the current trajectory of systematic, though unintentional, dismantling of traditional social institutions such as the *Iqub* and *Edir* much of the social cohesion and social resilience is likely to be ruptured. The shift to market-oriented approaches to social services in a country with a narrow middle and upper class will likely exacerbate these challenges. The lack of space for political discourse and problem solving, in a setting where ethnicity and political affiliations play an increasingly important role is a major cause for concern.

Ethiopia and its diplomatic capital Addis Ababa have continued to play an important role as a regional peace broker and symbol of stability in a region where violence based on religious extremism and ethnic conflict is rife (Kyriel & Duggan, 2015; Shiwesh, 2015). If the city is unable to resolve its own internal tensions much of the economic success it has been making may be jeopardized.

Castells' informational city concept offers an important conceptual basis and entry point for the macro-level analysis of the city. By extending and adapting the conceptualizations of power and information to the city context we can obtain increased understanding of the city. However, the more detailed insights provided by the knowledge-based development model across its nine conceptual constructs enable a more fine-grained understanding and analysis of the challenges facing the city.

5.3.1.6 Possible Responses to Model Limitations Identified During Field Testing

Respondents pointed to the importance of the need for a deep understanding of the social, political, cultural and other aspects of the local context to accurately assess conditions with preconceived indicators. Insights into the power relationships in the community, values and such being played out were needed to understand the factors that influence behaviour and interpret the indicators and criteria.

For example, some respondents held the view that participation in youth and other community groups, in particular those sponsored by the *Kebeles*[45] and registration on electoral lists were not a reflection of citizens' engagement in and a desire to influence the political process but rather a response to daily survival realities. Citizens felt obliged to subscribe or enroll in community groups to avoid being viewed as having anti-governmental views, thereby averting potential risks such as various forms of reprisal including unnecessary administrative processes, being deemed ineligible for jobs or other government controlled resources such as housing plots or apartments. Respondents were of the view that this attention by the government to overt signs of citizen involvement was a consequence of overseas development assistance (ODA) disbursements by international being linked to measures of participatory government.

Respondents suggested the disaggregation of criteria/indicators under the Inclusion construct (access to basic social services - health, food, shelter, education; Citizen's ability to exercise civic and political rights) and the Pluralism construct (Is

---

[45]A Kebele is the smallest administrative unit of government, they act at the community of neigbhourhood level and have responsibility for about 500 households or about 5000 persons.

your city a good place for persons with different religions, values and ways of

living?). Some respondents were of the view that it was useful to bear in mind

variations across social classes and therefore the need to have the knowledge maturity

assessment informed by a range of persons to ensure validity of findings. For

example, while transportation was not a problem for the upper and middle classes this

represented a real challenge for the urban poor.

> *It varies on your [social] class, I mean, if you're using public transportation,*
> *it's very difficult. Some people suffer a lot and we're [the city] dealing with it*
> *-and the government is doing something about it, I mean actively. If you're*
> *dealing with my [social] class which represents the top 3% of the city, of*
> *course it's accessible; I have a car and travel. So it depends on who you ask,*
> *you need to think about that…*

To address this challenge it becomes essential to ensure that the stakeholders

interviewed include not only decision-makers but importantly expected beneficiaries

from across a range of societal groups and with respect to their vulnerability. To

successfully obtain this broader range of inputs it was necessary for the model to be

made available in the Amharic language and that interviews be conducted with the

assistance of an interpreter. This was felt to be particularly useful for obtaining the

perspectives of civil society and the governmental sector who the respondents felt

would be less able to express their concerns and insights in the English language.

Some respondents felt that within the Ethiopian context the terms "Human

rights" and "Freedom of expression" were contested, politically charged and could

potentially dissuade respondents from participating in any knowledge maturity

assessment study. Furthermore, due to the current political context this could lead to

any such action attracting adverse scrutiny from certain stakeholder groups in the city. It was therefore important to avoid such impacts as they could serve to overshadow and prevent the benefits that the model offered for positive policy actions.

While appreciating the insights that the model provided, some respondents expressed the view that it would be useful to customize or tailor the model further in order to take into account cultural, social and other contextual sensitivities and specificities.

The questionnaire is in some ways too generic. Ethiopia has a lot of unique features which may not be best captured using the current format.

Against the backdrop of the Addis Ababa Field Test it may be concluded that while convenient and logically derived from a theoretical and taxonomical perspective, the components within constructs and their related criteria/indicators have varying degrees of relevance and significance within any given society. Consequently, while not negating the theoretical basis used to identify the various criteria and indicators, this raises the importance of further disaggregation or stratification in order to identify the indicators, criteria and issues that are most significant and salient for the particular city that is being assessed. To achieve, this a small-scale pilot study to detect and eliminate those indicators and criteria that may produce spurious results in that city may be conducted city prior to launching a full-scale study using this methodology. This process may also serve to identify indicators and criteria that more adequately depict conditions in that particular city and reflects the disproportionately influential role of each unique context and its associated meanings.

This proposed approach is contrary to the dominant trend and preference for measures of global comparability, standardization and benchmarking (Käpylä, 2012). Cities, though similar at a macro-level are unique instantiations. It is only by seeking, recognizing, and leveraging its own set of unique attributes and constraints may each city achieve its optimal position. We must overcome the cognitive dissonance associated with searching for "that something unique and special that gives a country its competitive advantage over other countries… [by seeking] to capture this uniqueness [by] using the same indicators for every country and compare them on that basis" (Käpylä, 2012: 294). So while benchmarking and learning from other cities is useful, each city must create its own path to success. So a base set of criteria /indicators should be complemented by city specific measures.

5.3.2   The Bangkok Field Test

The Bangkok field test was also undertaken over a two-week period. While the Addis Ababa field pilot emphasized the development of a baseline for the city's Knowledge Maturity, the Bangkok study focused on seeking to identify the processes that had enabled Bangkok to overcome challenges around pollution and waste management, water management, high population growth and poor governance that Addis Ababa currently faced. As a city which had achieved notable successes, the focus was on seeking to identify potentially useful lessons and practices from Bangkok that could inform Addis Ababa's efforts to combat and resolve the challenges to growth that it faced. All consultations in Thailand were held with the most senior government officials from the Bangkok Metropolitan Waterworks Authority (MWA) and the Department of City Planning of the Bangkok Metropolitan

Administration (BMA). In both cases, the meetings were convened with the most senior officials of these organizations, along with key technical staff. These meetings were facilitated by a senior government official who represented the government of Thailand on various UNESCO bodies. The Bangkok field test therefore provided a contrasting perspective or in the words of Yin (2014) theoretical replication.

The field tests used a semi-structured interview based on a modified version of the questionnaire that was employed with respondents in the second group in Addis Ababa. To reflect the differences in responsibility and scope of the two organizations a modified question format was used. These questionnaires are included in the Appendices. As requested by the respondents, the survey questionnaire was sent in advance so that the appropriate specialists could be identified to participate in the interview.

5.3.2.1 *An Overview of Bangkok*

Bangkok is located in Central Thailand in the Chao Praya River Delta. The city's origins can be traced back to the 15th Century when it was established as a trading post during the Ayutthaya Kingdom. Its strategic estuarial location close to the ocean, relative to the capital Ayutthaya, which was over 100 kilometres inland, coupled with the openness of the Ayutthaya Kingdom to trade with foreign nations contributed to its expansion and growth. The invasion of the Burmese army and the fall of the Ayutthaya Kingdom in 1767 led to the establishment of Thonburi in 1768 as the capital. Internal conflicts amongst the ruling class resulted in the emergence of the Chakri Dynasty as the rulers and resulted in the shift of the capital from Thonburi to Bangkok in 1782.

Successive waves of events have spurred Bangkok's growth leading to social, political and economic opportunities which have encouraged large-scale migration from other parts of the country and also attracted foreigners to the city. Following the Second World War, Bangkok benefitted from development aid from the United States of America that supported reconstruction efforts. In the late 1950's, the government began promoting tourism. Then in the mid-1960's Thailand hosted US military bases during the Vietnam War, with Bangkok designated as a rest and recuperation location for US servicemen. The 1980's and 1990's saw inflows of foreign investment and creation of export industries in the Bangkok metropolitan area. The Asian economic crash in the late 1990's led to a slow-down but the recovery that has followed coupled with Thailand's strategic location in the South Asia region and the emergence of the ASEAN block have continued to support growth. As the political capital, Bangkok has been the scene of various political transitions, some of which have resulted in loss of life and destruction of property – for example, clashes between the "Red shirt" and "Yellow Shirt" in May 2010 resulted in 91 deaths and around US$1.5 billion in arson damages.

Nevertheless, the city has continued to show tremendous resilience with growing influence nationally, regionally and internationally. Examples of this influence include its role as the regional headquarters for various intergovernmental, private sector and civil society organizations, an important transportation link and as an emerging regional centre for finance and culture (See Figure 59).

Figure 59:   The Bangkok Skyline presents a Blend of Tradition and Modernity (©
              GoToLaunch, 2015)

Today with a population in excess of 9 million persons (UNDATA, 2014),

Bangkok accounts for some 12% of Thailand's national population and around 30%

of the National Regional Product (NESDB, 2013). During its rapid urbanization

Bangkok which has grown without much in the way of formal planning (King, 2008),

has made headway in addressing urban problems such as slums, waste management

and an inadequate water supply (UN-HABITAT, 2014).

Despite these successes economic, social and gender inequalities remain.

According to ILO, women in Bangkok earn on average 16% less than men (UN-

HABITAT & UNDP, 2012). In addition, the benefits of Bangkok's success have not

been evenly shared; see Figure 60; "while the urban poor provide the labor to build

and service a city like Bangkok, they nonetheless cannot gain access to adequate and

affordable housing, basic amenities, or affordable services" (Daniere et al., 2008: 73).

Unemployment in Bangkok, as in much of Thailand is below 1%. Factors contributing

to this situation are the lack of a welfare system or social safety net which forces

persons to find work in the informal sector as well as a low fertility rate which is below the replacement rate (Fernquest, 2015). The country reportedly attracts more than 1.5 million foreign workers and by 2030, despite the low birth rate, Bangkok is projected to become one of 41 global mega-cities with a population in excess of 10 million (UNDESA, 2014).

Figure 60:   Bangkok's Klong Tooey Slum in Bangkok (© Phil America, 2013)

The city's location in the low-lying delta previously contributed to its establishment and growth. These factors are now a source of risk in the face of global warming and sea-level rise which makes the city prone to flooding and is a challenge to its environmental sustainability. While this threat is recognized the lack of coordination within the city administration is preventing effective implementation of flood mitigation measures (Saito, 2014). To continue on the trajectory of success, it is essential that the city leverage its strengths and act in a coordinated manner to address the economic, social and environmental challenges and opportunities ahead.

5.3.2.2 *Insights from the Bangkok Metropolitan Waterworks Authority (MWA)*

The management of water resources and city waste were amongst the top three challenges that respondents indicated Addis Ababa needed to urgently address and master if it were to successfully and sustainably grow and develop. The MWA, was therefore thought to be especially relevant for Addis Ababa. The MWA is a State Enterprise initially established in 1914, within the Department of Sanitation in the Ministry of Municipality. Its reporting lines changed several time over the next five decades until 1967 when it became an autonomous body. The MWA serves more than 2 million customers in Bangkok as well as Nonthaburi Province, and Samut Prakan Province with a population well over 10 million persons. Since the 1960's Bangkok's population of just over 2 million has quadrupled to its current more than 8 million. Through various expansion programmes such as the construction of dams, the improvement of pipelines, training of its staff, conducting demand forecasts, cooperation with customers as well as the introduction of new technologies has enabled the MWA to keep pace with the growing demand for reliable water supply. Current projections foresee a continued growth in demand for water driven by further population growth in the Bangkok Metropolitan area as well as continued intensification of industrial activities in this region.

At present, the greatest challenges to meeting this demand are the impacts of climate change, primarily droughts of longer duration as well as reduced annual rainfall. In addition, increases in mean sea level are leading to saltwater intrusion in many of the rivers from which water is drawn. Treatment costs are significantly higher so in concert with the Royal Irrigation Department, the controlled withdrawal

and diversion of water from various sources are being undertaken as a mitigation measure. Various pipeline projects are also underway to bring water from the East of the country. Internal staff training programmes, in partnership with local universities as well with similar organization in both more and less advanced nations has been contributing to the strengthening of the organization's human capital. This in turn has served to improve management, the use of knowledge and information systems and to support innovation. Various quality certification programmes have also been implemented. Together these developments have enabled the MWA to profitably meet the water needs of all citizens, including the urban poor.

The MWA also cited a number of partnerships as a major source of resources, information, insights that triggered innovation, and networks of influence. These partnerships have involved other governmental departments, academic institutions, private sector and citizen/civil society organizations. For example, in concert with the Thailand Institute of Scientific and Technological Research (TISTR) an interlocking brick made from silt had been developed. This allowed silt from dams to be made into a much needed construction material, furthermore these blocks encouraged infiltration of water. With the Bangkok Metropolitan Administration (BMA) they ensured that the water network reached all current and planned communities providing an adequate quantity and quality supply. In turn, through regular interactions with communities, they were helping to shape customer behavior to more effectively and efficiently use water and to capture complaints and suggestions for improvement.

In addition to its city-wide partnerships the MWA is collaborating with international partners to share best practices and enhance the knowledge and competencies of employees. Since at least 1987, the MWA has been benefitting from

partnerships with Japan in the framework of the Japanese International Cooperation Agency (JICA) and with the cities of Nagoya, Osaka and Tokyo which have contributed to the training of staff and the establishment at the MWA of the of National Waterworks Technology Training Institute (NWTTI). In concert with UN Agencies such as WHO the NWTTI has been hosting national as well as regional training programmes. The MWA presents scientific papers at a variety of regional and international conference including those of the International Water Association (IWA). Recently the MWA has been providing technical support for an internationally funded water system upgrade programme being conducted in Laos.

The MWA does not play a role in the discussions about what the city's vision should be, however it is committed to ensuring that water supply and quality issues do not constrain Bangkok's future growth.

Pointing to the high cost of treating water, the MWA emphasized the importance of measures such as decreasing water loss through inspections of pipe leakages, pipe repairs and the timely replacement of old pipes. Management techniques such as the metering of water supplies and monitoring of water pressures were cited as relatively low cost approaches that enabled enormous gains to be made.

5.3.2.3 Insights from the Central Planning Department of the Bangkok Metropolitan Administration (BMA)

For the past 200 years Bangkok has been the primate city in Thailand. The Bangkok Metropolitan Administration (BMA) was created in 1985 with a wide range of functions and responsibilities including the establishment of laws, infrastructure

and planning. Like Addis Ababa, Bangkok is a Special Administrative Area which elects its own leadership and has been given legal authority to manage its own affairs.

The Central Planning Department has ostensibly had a key role in shaping and driving the city's past successes. It was therefore viewed as a source of experiences and lessons on responding to anticipated as well as unforeseen changes and offering insights into preparations for demographic shifts, climate-change, greater regional integration and other major transformations that could assist Addis Ababa. Not surprisingly, the Central Planning Department's vision for Bangkok is one of a sustainable city (UN-HABITAT, 2010).

According to the Department, over the past 15 years the city has been focused on addressing deficiencies in its infrastructure with an emphasis on ensuring that the needs of the urban poor are met. They felt that these efforts have been bearing fruit as reflected in Bangkok's top tier rating in a number of international city rankings.

Limited financial resources is one of the challenges that the BMA faces. Although Bangkok generates some 30% of the nation's GDP (NESDB, 2013), the BMA's main source of revenue comes from the city's property taxes which it says have historically been kept low. According to the BMA the rates of property taxes are the lowest among the ASEAN countries. While low taxes have served to propel growth in the private sector and attract residents, this has constrained the BMA's ability to monitor and manage the city's growth. Furthermore, while Bangkok's status as a Special Administrative Area provides a broad ambit for self-governance and administrative control over the city, in practice the long tradition of a centralized nation ruled by a monarch appears to have entrenched a strong tendency for centralization and control in the national government. This results in significant

limitations on the BMA's ability to govern and have a margin for maneuver adequate to meet the needs of a fast-moving global city. According to some respondents, the political forces within the city and national government are so strong that it appears that these shifts could only be realized through external forces such as the actions of the private sector and the influence of globalization.

Implementation of the Association of South East Asian Nations (ASEAN) 2015 Plan could provide such an impetus for change. Thailand is one of the five founding nations (Indonesia, Malaysia, the Philippines, Singapore and Thailand) who created this regional bloc in 1967 in an effort to advance greater economic, political and socio-cultural integration across the region. The 2009 - 2015 ASEAN Roadmap has served to increase both regional and global attention (See Table 58) on a region which in 2020 is expected to have some 400 million middle class consumers. The size of this market will exceed that of the combined middle class in the USA, France, Germany and the United Kingdom (Nielsen, 2013). Bangkok, being at the heart of these changes will likely need to see its governance adapted or lose out to nimbler administrations.

To overcome some of these governance and resource limitations while responding to demands, the BMA has been partnering with other stakeholders, notably the private sector, universities and community organizations to advance a number of urban renewal and upgrade initiatives. The largest of these projects is focused on the city's historic district along the Chao Praya River. The project seeks to preserve the architectural, social and cultural aspects while at the same time adding and creating new value. According to the BMA "we believe that the old and the new can live together, we don't need to destroy the old ones". Despite a proliferation of

centuries-old temples, shrines, palaces and other historical artifacts and other unique sites there are no UNESCO World Heritage sites in Bangkok. According to the BMA, "UNESCO has a lot, a lot of regulations, many criteria, it is hard to achieve success with UNESCO", this has made obtaining such a designation difficult.

Table 58: ASEAN Group and its Regional and Global Partners (Legget, 2014: 4)
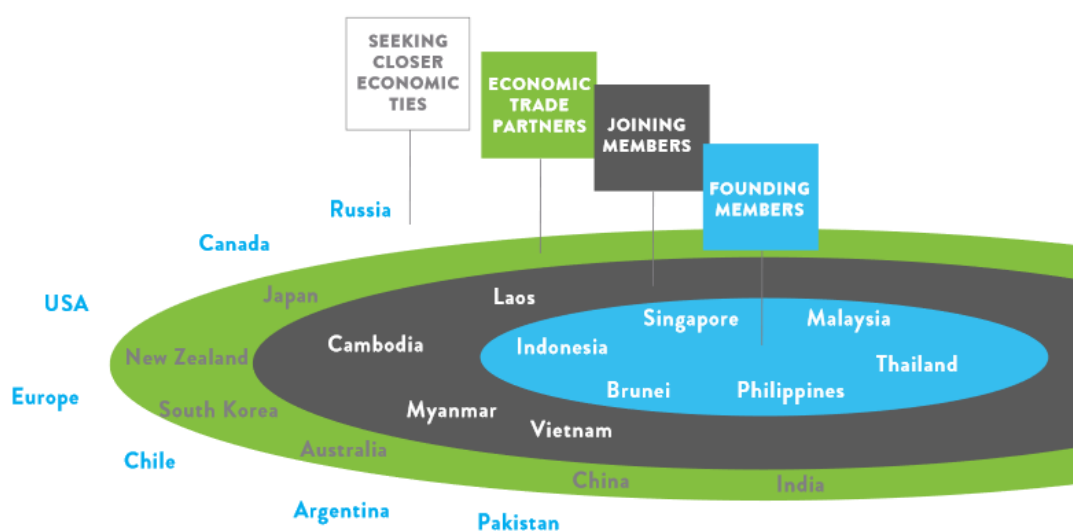
Another project underway is the upgrading of a 2 kilometer section of the Lamini Road which has brought together homeowners, businesses, embassies and others along the road to be involved in the aesthetic, functional and technical design aspects and choices. A very high level of progress and cooperation has been achieved. However collaboration with government units responsible for services such as water, electricity, telephone and other services required for the overall success of the project was not advancing as smoothly. These departments were better resourced, there was no shared knowledge or information management systems and while a Joint Steering Committee existed for sharing information, apparently this information was neither communicated nor integrated into the operational plans and activities. While the

Department of City Planning had established a vision for the city of Bangkok it was

not clear how in its formulation and implementation this was linked to the vision

established by the Governor of Bangkok for the city.

> *I don't know [who has the big picture of what is happening in the city]. I know*
>
> *what I am doing, the City Planning Department knows what it is doing. The*
>
> *Authority of the Electricity they know what we are doing. It doesn't mean that*
>
> *we know each other…. I tell you frankly we create our vision by our own.*

Such experiences are also reflected in the literature. For example, Saito (2014)

who conducted a study in Bangkok to assess flood management interventions being

undertaken due to heightened risk from climate change found that, "There is no

systematic coordination among departments, and the lack of coordination makes it

impossible to develop a comprehensive, coherent and cost-effective plan. Each

department potentially relevant to flood management measures is working in 'silo'"

(Saito, 2014:97).

While there was a 12-year plan with targets and indicators developed to

support Bangkok on its path to becoming a sustainable city, implementation was

lagging as many aspects of the plan were under the responsibility of other parts of the

national government. It was therefore not clear from the discussions with the BMA to

what extent their interventions were shaping Bangkok's success and its continued

growth as a global city. The BMA official expressed the opinion that the private

sector and the vision of leaders in this sector were an important source of direction.

With respect to international cooperation and exchanges with other cities

Bangkok had successfully established more than 20 sister-partnerships and was a

member of several international coalitions of cities. A number of training visits and

staff training programs mainly within the framework of cooperation with Japan had been undertaken. The durations of these exchanges ranged from 2 weeks to as long as 3 months but it was unclear how these events had benefitted the BMA.

According to the BMA the most important lessons for cities of the developing world was to constantly focus on addressing the needs of the urban poor. It was crucial to ensure that basic needs, such as access to food, access to water, shelter and transportation was available to vulnerable groups. One landmark project *Baan Mankong* had enabled slum dwellers in Bangkok to improve their circumstances by purchasing land or property within their communities or by relocating to other areas of the city (Archer, 2012). The project was supported through the creation of a revolving fund seeded by government but administered at the community level by community members. Greater autonomy for Bangkok would foster innovation in the public sector and allow more rapid response to the demands of citizens and global forces.

5.3.3 What can Addis Ababa and Bangkok Learn From Each Other?

By comparison of the experiences and insights shared by respondents participating in the two city field visits, the following are practices from Bangkok which the city of Addis Ababa could seek to adopt and adapt to enhance success in addressing development challenges of the city.

5.3.3.1 *Develop Strategic Collaborative Partnerships With Other Cities*

The partnerships established by the BMA and MWA with Osaka and Tokyo and other cities have enabled these city bodies to be exposed to new knowledge and approaches relevant to key functions they undertake. In addition, these partnerships have provided

support in the technology / knowledge transfer and adaptation. Staff from the collaborating organizations participated in extended study tours typically of 3-month duration though some lasted up to 6 months. Time was spent both in the "knowledge donor" organization and in the "knowledge receiver". This provided context on both sides and therefore enabled explicit, but also importantly tacit knowledge and knowledge embedded in routines and system to be appropriated and then adapted and implemented in the "receiving" city.

5.3.3.2   *Enhancing Coordination Between Departments*

Discussions with the respondents suggest that this is an area in which both Addis Ababa and Bangkok could improve. In the case of Bangkok, the briefing meetings between city departments need to go beyond informing about achievement and plans towards a more operational level. This could involve ensuring that representatives with managerial seniority as well as operational insight be involved in the meetings. In addition, mechanisms for communicating this to relevant persons or sections within each department and suitable follow-up mechanisms could be established.

Shared access across city departments to regularly updated platforms such as geographical information systems (GIS) would support access to real-time information necessary for operational as well as strategic planning. Perhaps systems which highlight the interdependencies and points of interface between departments could foster collaboration.

5.3.3.3   *Invest in the Training of City Personnel in Utility and Basic Services*

The experiences of the MWA underline the important capability gains that can result from the systematic and sustained training of personnel. The resulting improved understanding of infrastructural networks such as water and transport systems could then enable targeted responses that lead to high value outcomes. According to UN-HABITAT

(2008), poor maintenance practices are a major contributor to water shortages; with around 35% of water being lost due to faulty piping. Increasing the water supply to the city must necessarily involve not only extracting more water but also ensuring the delivery with minimal wastage to end-users. Enhancing the effectiveness and efficiency of staff, management and practices through training can lead to savings and better enable the city to cope with the growing demands and challenges.

5.3.3.4 Encourage Research and Innovation

Training activities such as those undertaken by the institute established by the MWA and cooperation with industry and academic partnerships provided a critical mass of human capital seeking to address practical problems facing the water sector. This applied research led to process and product innovations - such as the interlocking bricks developed in concert with the TISTR – that lead to cost and time savings as well as the creation of new income streams. Existing research institutions such as the Addis Ababa University, as well as the growing number of technical training institutes and private firms, should be seen as key partners who the city should be enlisting to develop strategies for creating solutions to problems.

5.3.3.5 Develop Stronger Links With Communities

Both the BMA and MWA pointed to improvements that resulted when opportunities were created whereby they could engage with communities to discuss service delivery and receive feedback. According to the BMA, in addition to improving customer relationships these interventions also served to reduce wastage of water, improve planning and lead to savings. In some cases, customers may develop innovations to meet their needs which if identified and disseminated can lead to broader benefits. Customer feedback and co-design with customers has been

recognized as a useful and powerful approach to value creation (Prahalad, 2006; Von Hippel, 1986). One respondent in Addis Ababa pointed to the massive housing development projects as an area ripe for this approach. These housing estates were modelled on projects from Europe, but were not functionally adapted to the lifestyles of Addis Ababa inhabitants. In their previous houses interior and exterior spaces had multiple purposes as areas for home businesses, for keeping and slaughtering animals; cooking, drying and preparing various traditional foods, hanging clothes and as play or meeting areas (Baumeister & Knebel, 2012). As a result, many residents felt it necessary to retrofit their new residences to make them functional and liveable. Ensuring that these retrofits do not compromise the structural integrity is essential but also point to the importance of involving citizens in these processes. By taking into account such cultural factors, it may be possible to keep social structures such as the *Iqubs* and *Edirs* which are key to resilience and cohesion intact during the urban transformation.

5.3.3.6   *Addressing the needs of the Urban Poor*

Respondents spoke of a practice in Addis Ababa involving the rounding up and forced transportation of itinerant and homeless persons from the city to distant areas outside the city in preparation for major summits of Heads of States and other events that attract international attention. Many of these persons participate in a large but unseen informal economy. They also conduct a range of services such as recycling and waste disposal without which life in the city would probably be intolerable. The BMA and MWA spoke of the importance of addressing the needs of the urban poor and enabling and providing them with services and also providing them with

opportunities to self-organize and solve their problems. One example of this was a program that enabled slum communities to acquire title to land and build homes or relocate to new areas together. The communities were supported in self-organizing and provided with business mentoring and a seed fund to provide loans to community members in developing dual businesses housing spaces. As loans were paid back new loans could be made.

5.3.3.7 *Maintain Cultural and Historical Landmarks and Spaces*

The BMA in concert with private sector and academic partners is supporting the restoration of historic landmarks and zones within the city. In addition to creating and maintaining distinctive aesthetic spaces, through tourism related activities they contribute to the preservation of the various intangible and tangible cultural, artistic, culinary and other forms of activity and expression associated with these spaces. These spaces provide a means of preserving identify and navigating the complex evolving relationship between the past, present and a desired future.

5.3.4 Policy Critique of the Knowledge-based Development Maturity Model

5.3.4.1 *Overview*

To gain further insights into RQ2 and RQ3, the research methodology foresaw the convening of a policy forum/workshop in Addis Ababa with municipal representatives and key stakeholders from civil society, the private sector, academia and the UN. This event would provide an opportunity to apply the model to the city with key actors and receive direct feedback on its usefulness and acceptability. This process would involve collectively identifying the most urgent challenges affecting

the city within the four broad development areas (economic, social, environmental and security). From this subset the agreed most urgent challenge would then be selected for further examination with a view to identifying relevant stakeholders, knowledge and processes to be used in shaping possible interventions. Taking into account each construct in the knowledge-based development model and their respective indicators/criteria a K-SWOT (Sharma et al., 2009; Zack, 1999) would be undertaken. This would involve examining each construct with respect to the identified challenge and seeking to assess areas of strength, weakness, opportunity and threat. On this basis a series of possible policy responses could be formulated and prioritized. These recommendations could then be contrasted with existing programmes with a view to identifying potential gaps and areas for systematic strengthening.

A confluence of resource constraints and circumstances led the researcher to abandon this approach. Instead, a sub-group of international experts with experience in cities of developing countries in Asia and Africa were consulted electronically through a questionnaire similar to what was intended for the policy forum/workshop. While incapable of replicating the richness and city-specificity of an in-city policy/forum, this simulation nevertheless provided a further proof of concept for the model's ability to provide insights and support decision-making. The simulation was able to identify urgent problems and response in some primate cities in developing countries of Africa and Asia. The approach enabled possible challenges, including stakeholder groups likely to oppose certain measures, as well as belief systems and mindsets that could stymy progress to be identified and mitigation steps foreseen. Equally, the process enabled the identification of a variety of intangible and tangible

assets; including context-specific knowledge, relationships, locale specific attributes etc.; that policy-makers could draw on to support and pursue knowledge-based development strategies and shape solutions.

5.3.4.2 What are the barriers to knowledge-based development strategies and how can they be overcome?

Respondents identified 6 thematic groups of challenges that constrain the ability of city leaders and policy actors in developing countries to leverage-knowledge based development strategies, as well as 5 categories of responses for addressing these challenges. Many of the challenges identified are inter-related, hence the lack of a direct correspondence between problems and possible solutions. Challenges and responses that were identified included:

1) Ensuring access to critical infrastructures – Included in this category are difficulties in obtaining a range of health and educational services which contribute to a lower level of human capital, which in turn adversely impacts both the capability to develop and implement knowledge-based responses. In a similar manner, challenges such as the inadequacy of transportation and utility services, notably water, electricity and internet served to further aggravate challenges in education and health and issues of predictability and quality of utility delivery had knock-on effects that created instability and may serve to reduce accountability. Not surprisingly, investments in infrastructure were cited as a remedy. However, equally important was the attention given to the building of human capacity in this process. For example, respondents from Addis Ababa while noting the upgrades being made to the transportation networks observed that most of this work was being undertaken by Chinese

contractors using an almost exclusively expatriate workforce. Unless the infrastructural systems could be locally sustained the full potential could not be leveraged.

- *Basic issues such as access to electricity, quality education and public healthcare need to be addressed. Many prospective "Knowledge Cities" lack all of them.*

- *Access to basic utilities including power and affordable internet connectivity.*

2) Building human capacity, particularly the ability to develop responses to city problems in manners that were locally and contextually relevant was seen as key. In this respect local knowledge - including cultural values and belief systems as a source of self-identity and their valorization takes on a key role. This was particularly important for respondents from countries where extensive periods of colonization had occurred. Primate cities are exemplars of their national cultures but are also global gateways; so both local and global knowledge is relevant. The strengthening of civil society and community actors to play an important role in helping to bridge these two worlds was emphasized and in serving to support the creation of awareness, skills and pathways for accessing the financial, technical and political capital that promote effective action. The importance for human capacity development of policy-makers to provide the requisite skills necessary for leadership at a technical, ethical and interpersonal level was underscored. The role of youth and their inclusion in the human capacity building was critical to capturing and positioning cities in the developing world to reap this demographic dividend.

- *Policy-makers knowledge gaps routinely filled through training and access to critical information.*

- *Investment in human capital through the development of the basic literacy, numeracy and broad understanding and appreciation of individual potential to contribute to development.*

- *[strengthened] Civil society organizations and accountability based on identified core indicators*

- *Getting rid of corruption, bribery, nepotism and injustice.*

3) Investment in knowledge systems, in particular for education and research are logical extensions of the recognition of human capacity development and represent a source of future growth. Despite current problems it was also important to beginning building the capacities for responding to future challenges and opportunities.

- *Everybody must understand the knowledge is not a redundant skill, and is not a money-eater luxury topic. This [knowledge] is the only way to develop in national and individual level, too, and this is a way to grow GDP, happiness and the health of given society.*

- *Policies that value evidence based policy formulation and decision making, and supporting them with budgets (appropriate resources allocations).*

4) Multi-sectoral policies that were supported by research and followed up with implementation plans and continuous reviews were seen as necessary for delivering responses that were holistic, more robust and resilient. This approach however required a departure from traditional single-sector silo responses. Efforts were needed to stimulate a culture within public sector that favored the sharing of best practices, the establishment of communities of practice and research networks that included not only the public sector but also other stakeholders within the city as well

as from other regions. This sharing culture could also contribute to greater accountability and transparency.

- *For me, the challenge is to see development as a group of different strategies that will create capabilities*

- *Investing in research and development is low as % of GDP. This would enhance knowledge generation for development.*

- *It is of utmost importance that the most important society demands be articulated through dialogue and needs assessment surveys using participatory approaches to inform decision making.*

- *Forging of strategic partnerships and embracing multi-stakeholder models.*

    5) The protection of human rights and the strengthening of inclusive systems of governance was seen as key to enhancing better decision-making by fostering greater participation, a greater pool of perspectives and the facilitation of more pluralistic and also robust discussions. Key to achieving this was the creation of non-partisan public and civic spaces. Major shifts facilitated by education and stronger capacity of communities and civil society were needed to prepare policy-makers and individuals for this shift.

- *Participatory development and decision making should be encouraged, avoiding the people have conflict of interests.*

- *A generational gap coupled with the digital divide continues to be a challenge for policy makers as does true adherence to the fostering and protection of "freedom of speech".*

- *Open dialogues led by community priorities, E-literacy, E-participation*

- *Anti-corruption laws, education, skill development, free media, wider use of open sources for entrepreneurship, R&D funds and tax incentives*

6) Managing related societal shifts - The emergence of knowledge societies signifies a new paradigm in which existing skills and jobs may become irrelevant and in which new skills and attitudes are required. The scale and scope of competition shift from the local to the global bringing with it potential new opportunities but equally threats. Successfully navigating these new circumstances requires shifts in policies, the managing of societal expectations and concerns but also developing new capabilities and partnerships amongst others. Here too, the sharing of best practices and experiences are relevant. Greater awareness of the ethical dimensions of these societal shifts and the unforeseen impacts of policy actions also merit greater attention.

- *In ushering developing countries into the new millennium, two challenges need to be confronted; these are sustainable development and globalization. Indeed, striking the right balance between the demands of sustainable development and the goals of globalization is also a major challenge.*

- *We have lived roughly 2,500 years in a predominantly agricultural based global economy, only replaced by a 250 year period of industrial based global economy - and more recently, in historical terms, 25 years in a knowledge based global economy - the key challenge here for policy makers is to not let technology get too far head of the human ability to fully comprehend the impact today's advanced technology has on our overall ability to live decent lives.*

- *A complete re-think is needed regarding how we view education and how education is delivered, assessed and leveraged.*

- *Investment in human capital through the development of the basic literacy, numeracy and broad understanding and appreciation of individual potential to contribute to development*

5.3.4.3 How is the model relevant in developing responses to the identified challenges?

Respondents found the knowledge-based development model useful and relevant in supporting policy-makers in overcoming challenges to the shaping of knowledge-based strategies. The ability of the model to capture and foreground interdependencies was viewed as an important means for highlighting the importance of collaboration, ensuring the participation of a broad range of stakeholder and to underscore the importance of crafting more holistic responses to what are complex and multi-disciplinary challenges.

- *With the help of the model can easily be seen the coherence and the connection between knowledge, growing and disseminating knowledge to [address] goals.*

- *I think the problem to be solved is more to generate awareness. Knowledge issues are very much underestimated in politics and society, i.e. intensification of this agenda is needed.*

While embedded knowledge in the form of technical systems and processes is an important enabler and facilitator, knowledge originates in and from human experience and intellect. Respondents were of the view that the model served to

highlight the humanistic nature of knowledge and its potential for renewal and creation. In turn this served to emphasize the importance of human capital and the need for continual nurturing of human capacity across gender, ethnic and other divisions through a range of formal and non-formal educational modes and experiences.

- *The model goes a long way to indicating the elements, a guideline if you will, for moving forward as a global community. This is sincerely needed for developing countries, and perhaps will serve as a reminder for developed countries as well, where the focus on economic gains has a tendency to disrupt the joy of everyday life.*

- *The resources of a government could be easily directed to strategies aligned with specific indicators of the framework. Most importantly, those indicators could help to evaluate the performance of the programs and the decision-makers.*

The prescriptive aspects of the model which emphasized the role of human rights, as well as the use of maturity levels provided a set of hierarchical levels that could provide baselines and in turn establish benchmarks or targets. In this regard, the model was seen as providing guidelines for action and assessing progress.

While useful in providing insights to support action, the importance of following up with empirical testing was seen as an important and essential step in validating the model.

- *The knowledge-based development model can be of real use to policy makers only if the hypotheses are tested in real situations, ideally in their respective countries.*

- *The framework if proved with data will be useful.*

- *The framework represents the conceptual summary of the issue. Only after it is adopted by governments and put into practice wil it have the potential to support knowledge-based development.*

5.3.4.4 What are the most urgent economic, environmental and social challenges facing cities of developing countries of Africa and Asia?

Respondents were invited to indicate what they considered to be the most urgent problems in environmental, economic and social domains that cities in the developing countries of Africa and Asia were facing. These challenges which are all wicked problems (Ramaley, 2014) are listed in Table 59 under three categories. The cities most frequently cited by panelist as facing these problems were Accra, Ghana; Addis Ababa, Ethiopia; Bangkok, Thailand; Jakarta, Indonesia; Manila, Philippines; Nairobi, Kenya and Yangon, Myanmar.

It is important to note that these categories are not necessarily mutually exclusive, as a given challenge may manifest itself across several areas or be perceived in different ways (Rittel & Weber, 1973). For example, while a lack of political space has an obvious important social dimension, this condition may result in an inability to address environmentally and economically adverse conditions leading to their exacerbation. Similarly, the environmental impacts of squatter communities are reflective of economic and social problems.

Table 59:   Most Urgent Environmental, Economic and Social Problems facing

Cities of Developing Countries in Africa and Asia as cited by

Respondents

Environmental	Economic	Social
Inadequate city design and planning, Inadequate waste management, water supply/ drainage, Rapid population growth, Pollution, Inadequately regulated extractive industries, unplanned squatter settlements, Inadequate infrastructure	Youth unemployment, High cost of living, Lack of innovation, Unfavorable climate for Small & Medium Enterprises, Poverty, Unemployment, Inadequate power supply, Inadequate infrastructure	Lack of political space, Low level of security, Corruption, Lack of good governance and transparency, Low social cohesion, Inadequate access to utilities (water, electricity, etc.), Inadequate public recreational and civic spaces, Inequitable wealth distribution, Child labor.

The foregoing are all wicked problems and the responses point to their inter-

relatedness, complexity and consequently the need for concerted responses across a

range of fronts informed by a variety of perspectives. Groups, may conceive these

situations very differently, influencing aspects *inter alia* such as what is the problem?

How it should be addressed? Who is responsible for creating/resolving it? This in turn

will influence what is considered to be a successful outcome. These findings points to

the relevance of Rith and Dubberly's (2006) call for robust dialogue to achieve

common goals, definitions and actions around wicked problems. This view is also

supported in the literature by Camillus (2008) who emphasizes the role of stakeholder

engagement and dialogue, focus on action as well as the "feed-forward" orientation in

developing strategies to cope effectively with defining approaches to complex social

problems.

5.3.4.5 What are their main causes or contributing factors?

Table 60 presents the factors identified by the Respondents as the root causes of the challenges that cities face. From the list it can be seen that these root causes can be related to governance and societal management processes, human capabilities, availability of resources and the effectiveness of knowledge processes. These factors also appear in the Knowledge-based Development Model created in this study and point to its relevance.

Table 60:   Root Causes and main Contributing Factors to the Challenges facing Cities of Developing Countries in Africa and Asia

Root causes and main contributing factors
Short-term outlook, Inadequately developed human capacity, External factors, Unchecked corruption and power, Inadequate planning by authorities, corruption, Inadequate collaboration amongst stakeholders, Low civic awareness, Inadequate planning, Lack of IPR, Unemployment, Low-level of economic diversification, Poor governance, Inadequate planning, Inadequate infrastructure, Poor resource management, Lack of democratic culture, Inadequate flows of knowledge and information.

The identified root causes also serve to reinforce the importance of the three types of capacity – capacity at the level of the citizen, capacity of societal systems, particularly the governance and planning systems as well as the capacity of public infrastructures – that are central to a city's success and which also form part of its knowledge infrastructure (PWC, 2014). It may also be seen that these types of capacity are also linked to the three components - human, social and structural – of intellectual capital (Edvinsson & Malone, 1997; Marr, 2005). While, the Knowledge-based Development Model makes explicit mention of the role of transportation

systems as well as the availability of reliable power supply under the Universal Access to Information construct other forms of infrastructure are not explicitly referenced. The model's references to access to basic services – health, education, housing etc. - under the Equity and Inclusion construct nevertheless provides tangential references to the key role of other related underlying infrastructures within the city.

Table 61 presents a mapping of the root causes identified in Table 60 to each of the four main components of the Knowledge-based Development Model. As highlighted for the attribution of challenges to each of the evolving strategic societal goals, this process should be informed by discussion amongst stakeholders as it has implications for the problem solving process given the complexity and wickedness (Camillus, 2008; Darlsgaard, 2014; Farrell and Hooker, 2013; Rittel & Weber, 1973; Schön, 1987).

Table 61:   Mapping of Root Causes to Components in the Knowledge-based Development Model

Individual Capabilities & Capacities	Societal Values & Structural Frameworks	Tangible & Intangible Assets	Knowledge Processes
Inadequately developed human capacity, Low civic awareness,	Inadequate planning, corruption, Poor governance, Poor resource management, lack of democratic culture, Unchecked corruption & power	Low-level of economic diversification, Inadequate infrastructure	Inadequate knowledge & information flows, Inadequate stakeholder collaboration, Lack of IPR

5.3.4.6   Which are the key stakeholder groups and what can they

contribute in responding to the identified challenges?

Respondents identified a number of key stakeholder groups with varied roles

and contributions. Some were beneficiaries, others had technical, policy or other

Table 62:   Some Stakeholders and their Roles and Responsibilities as identified

by Respondents

Stakeholders identified	Expected roles and contributions
Local governmental actors	* Rethink the value added of their people * Reimagine the city and provide political will/ model for realizing a more democratic society * Job creation activities * Investing in knowledge channels
Civil society actors	*Hold politicians and bureaucrats accountable *Investing in knowledge channels
Academia and educational sector	*Collaborate with private sector to address societal challenges; *Initiate "do-it-yourself" citizen projects for students e.g. stop littering *Instill civic role/values in students
Private sector and industry	*Support collaboration with academia to develop collaborative platforms and partnerships to address problems *Support investment in youth *Support college students to develop projects in their areas of study that respond to city problems and needs
Various groups of individuals Socially advantaged classes Socially disadvantaged classess Youth Citizens	*Engage in social development rather than solely in activities for personal gain *Developing awareness /perspective that things can be different and taking ownership for bringing change *Contribute energy and ideas, participate in community projects, develop leadership capabilities *Take up role/responsibility as main stakeholders in the city

decision making roles while others could contribute specific knowledge to support the identification of feasible solutions. The more fine-grained the identification of these groups, particularly the vulnerable, the more specific the planning and implementation of responses and stakeholder involvement can be directed. While not necessarily easy, it is absolutely essential to avoid top-down solution development. Stakeholders must be involved and supported – if necessary to participate in the processes. This could be a long process involving not only the provision of information but also addressing social and cultural norms that may inhibit their participation. Some stakeholder groups identified in the simulation are shown in Table 62. An actual in-city exercise would likely allow for a more specific and focused effort with more stakeholders identified.

5.3.4.7 What factors may favor or retard collaboration amongst the stakeholders?

Addressing societal challenges may lead to a reconfiguring of the playing field and a change in the relative benefits, resources or advantages that groups have. This may lead to collaboration or adversity. Shared interest may provide a basis for overcoming historical adversity and mistrust, for example between rival ethnic groups, or may serve to further entrench these conditions. Again the findings support the approaches proposed in the literature in seeking to address wicked problems (Camillus, 2008; Darlsgaard, 2014; Farrell and Hooker, 2013; Rittel & Weber, 1973; Schön, 1987).

Table 63 below presents the factors identified by respondents. The list of areas of conflict and collaboration generated as part of this simulation was surprisingly

limited particularly as some participants have spent most of their lives in these cities and given their roles have deep knowledge of these cities. It however points to the types of challenges that need to be addressed in coming to grips with the value of intangibles (Carrillo, 2004, 2015; Edvinsson & Malone, 1997; López Ruiz et al., 2014; Salonius & Lönnqvist, 2012). It is essential to recognize that there may be barriers to collaboration and operationalizing the ideals captured in constructs such as pluralism, equity, inclusion and developing. Unless points of contention are at least acknowledged and/or common concerns identified, progress toward developing collective action may be unlikely. The ability to identify existing successful collaborations and directing attention to "what could be" thereby opening up mindsets to new possibilities and prospects for change cannot be over-emphasized.

Table 63:   Factors identified by Respondents that influence Stakeholder Collaboration / Conflict

Opposing goals/interest	Resource inequality, mistrust, profiling of minority groups, lack of stakeholder consultation by government, conflicting interests and goals (private - public), lack of trust, lack of team spirit, sectoral / stakeholder conflicts political interests, access to resources, economic interests, religious values
Shared goals:	Academic - industry collaboration to solve practical problems

5.3.4.8   *What resources or advantages can these cities leverage to overcome the identified challenges?*

Every city has specific and unique combinations of advantages whether tangible or intangible that it may enlist in its strategy to overcome or mitigate the development challenges that it faces. Conversely, many cities also have some

disadvantages. The ability to recognize and then take efforts to manage these potential opportunities or threats is necessary. Here too, perspectives, risk/reward tolerance may be affected by various factors making it sometimes necessary to reach agreement on what constitutes risks or opportunities. Factors such as indigenous knowledge, partnerships, climate, and location amongst others if identified can be potentially critical to shaping solutions.

Participants identified a range of attributes as well as affiliated communities, stakeholders and interested parties, sometimes in the diaspora that could be engaged to effectively marshal these resources. For the full potential of knowledge-based development to be leveraged, increasing comfort and ability to comprehend, identify and to even trade and recombine intangible assets in order to leverage the value that resides in these intangibles becomes increasingly important (Carrillo, 2004, 2015; Edvinsson & Malone, 1997; López Ruiz et al., 2014; Salonius & Lönnqvist, 2012). Table 64 captures the factors that were identified.

Table 64:   Tangible and Intangible Assets Respondents felt the Cities could leverage to overcome their Challenges

Tangible and Intangible Assets
Legacy of multi-cultural cohesion, openness to change, traditional values, legacy of successful public-private partnerships and government / NGOs partnerships, active and critical mass of effective civil society organization, good governance, city brand recognition/reputation, strategic location, educated population and flexible workforce, resilience, shared regional identity, history and values, freedom of movement in a regional economic area.

5.3.4.9   What specific mindsets or circumstances may retard efforts to overcome the identified challenges?

Unquestioned assumptions and beliefs, the unknown unknowns, traditions and cultural practices, attitudes and behaviors are among the factors that can prevent the finding of solutions, render potential solutions unworkable and introduce new forms of risk (Carrillo, 2015; David & Foray, 2002; Hansson, 2002). Table 65 lists the factors identified by respondents. The role of knowledge risks and cognitive barriers are perhaps even more important than intangible assets as they are unseen. Diversity, reflexivity and openness can play an important role in uncovering these unknown unknowns (Judge et al., 2013, Matthews et al., 2004; McCrae et al. 1992). The cultivation of efforts to challenge assumptions and critical thinking are important but there is a need for considerable conceptual and empirical work here that also takes account of behavioral factors. Counseling, coaching and other tools and the raising of self/collective awareness of these barriers and then taking steps to address them is of relevance. Table 65 presents some of the challenges that were identified by panelists.

Table 65:   Mindsets and Circumstances identified by Respondents that could hinder Cities from finding Solutions

Some Intangible Barriers and Mindsets that may Prevent Solutions
Gender inequality, administrative/political conflict at different levels of government, prejudices based on ethnocentricity and tribalism, winner take all attitude - zero sum outlook, corruption, strong hierarchies and high power distance that prevent collaboration and the question of authority, lack of national confidence, weak governance, religious dogmas, colonial legacy, inadequate self-knowledge and a lack of awareness, lack of transparency, wastage, inadequate management skills.

5.3.4.10   *How can the constructs that contribute to individual capacities and capabilities as well as societal values and frameworks contribute to efforts underway in the identified cities to resolve their challenges?*

Enhanced awareness of the constructs as well as the recognition that their development required consistent and ongoing investment was thought to provide a means for encouraging the longer-term thinking, planning and investment needed to effectively combat complex social, economic and environmental challenges. Some respondents also felt that exposure to the ideas contained in the knowledge-based development model could serve to set the stage for the mindset change that could facilitate experimentation and the creation of new spaces and forms of collaboration such as urban labs, civic labs and new spaces where different forms of learning could be freely tested, explored and experienced.

Awareness of the constructs was seen as also providing new lenses for exploring, raising awareness and identifying areas of vulnerability to which remedial actions could be directed. The expertise gained by persons and institutions involved in ongoing projects can be an important resource and provide lessons and useful practices that may inform the city's action. They also provide efforts that may be related and which could be scaled-up or replicated avoiding the need to begin from scratch. Such projects could serve as centers around which communities of practice could be developed.

Table 66 highlights some intiatives that respondents indicated were being carried out in their cities to leverage individual and societal capacities.

Table 66:   Some Efforts underway in Developing Cities that Respondents
              identified

Leveraging individual and societal capacities to develop responses
• Specific youth-oriented initiatives undertaken by municipalities aimed at addressing issues such as entrepreneurship, living together and pluralism are relevant to this goal.   • Efforts that focus on building trust, empathy and the changing of mindsets to create conditions for attempting new approaches to solving long-standing issues.   • Providing sustained resources and ongoing support for initiatives, knowing that changes in mindsets are often slow. Such efforts need to be supported by the development of requisite capacity. A shift to long term thinking is essential.   • The introduction of open data policies, anti-corruption and budgetary monitoring coupled with social media activism is bringing improvement in some areas.

Table 66 highlights some intiatives that respondents indicated were being

carried out in their cities to leverage individual and societal capacities.

5.3.4.11   *What information and knowledge processes could support/enable city stakeholders to develop responses to overcome the identified challenges?*

Respondents suggested the use of open information platforms to foster and

support transparent and public information exchange and debate between city

stakeholders. The platforms could serve to identify the challenges to be addressed,

explore possible solutions, establish processes for decision-making and provide

records against which progress could be made. The use of such technologies along

with off-line efforts aimed at developing outreach to communities could make these

processes, resulting policies and programmes more inclusive and participative.

Communities of practice and other structured form of collaboration with between citizens, specialists and stakeholders in other cities were seen as a source of value. Such collaborations could enable cities to learn about challenges that other cities were experiencing, and access tools, processes and other resources that may have been developed. The exchange could also serve to identify personnel that could provide training and other forms of expertise. Merit was also seen in the development and sharing of case studies that could systematically capture and disseminate these insights. These forms of collaboration were also seen as a catalyst for innovation which could in turn, through start-ups operating under for-profit or social-oriented entrepreneurship models contribute to developing solutions that may reduce city challenges while potentially generating positive spinoff effects such as job creation.

Recognizing that cooperation between stakeholders is not always comfortable, the process of trust-building was seen as vital. Efforts aimed at supporting bridge-building, supporting understanding and contributing to a more pluralistic outlook and greater social cohesion were needed. Professionals working in areas such as mediation, sociology, psychology and game theory as well as faith-based and community groups would be relevant in helping to change mindsets around incentives, rewards and what could be possible.

More inclusive approaches imply not only bringing new actors to the table but also preparing them to participate in these roles. This could involve education and awareness building among traditionally excluded groups so they could engage. Particularly where hierarchical or historical barriers based on social class, ethnicity, gender or other factors are great, additional efforts, such as coaching, to empower the

marginalized and promote acceptance of the changes to the status quo among the

dominant groups are needed.

Table 67:   Information/Knowledge Processes Identified by Respondents for

Overcoming Challenges

Identified information and knowledge processes for overcoming challenges
- Open information platforms that foster and support transparent and public information exchange and debate between city stakeholders along with outreach to communities that make these processes and resulting policies and programmes democratic and participative.   - Building closer linkages between international and regional actors and those at the grass root level to support adaptation and the creation of local activities.   - Communities of practice and other structured form of collaboration with other cities were seen as a source of value, as a catalyst for innovation among for-profit and/or social-oriented entrepreneurship activities.   - Sustained efforts to enable citizens to have greater awareness of their rights.   - Cooperation between stakeholders is not always comfortable, so the process of trust-building is vital. Professionals working in areas such as mediation, sociology, psychology and game theory as well as faith-based and community groups would be relevant in helping to change mindsets around incentives, rewards and what could be possible.   - More inclusive approaches imply not only bringing new actors to the table but also preparing them to participate in these roles through education and awareness building among traditionally excluded groups.   - Effective and meaningful communication of information and data to the public.

Effective and meaningful communication of information and data to the public

and all stakeholders was emphasized. Tools such as simulations, strategy games, art

installations, role play and dramatization, as well as the creation of special spaces for

collaborative action to support prototyping of solutions, were useful in building

engagement and a common understanding of the problems and serve to shape

solutions.

These approaches proposed by respondents represent societal-scale methods for enacting the critical knowledge processes of collaboration, mobilization, creation/acquisition and preservation. Together they contribute to greater awareness and civic mindfulness that serves to hold all stakeholders accountable in the shared effort to address agreed challenges.

Identifying the information and processes required for overcoming challenges is a crucial step that informs the outcome and serves to provide the actions that are to be implemented. This effort must build on the earlier steps and the findings undertaken in the data collection phase using the knowledge-based development maturity model and questionnaire. It is also important to conduct periodic reviews to understand how the problem situation is responding to the new measures that have been implemented and ensure that efforts are moving in the intended direction. Periodic longitudinal surveys of the environment to identify emerging concerns using the Knowledge-based development Maturity Model is relevant and useful to maintaining progress. The only certainty is change, so course corrections, whether small or major will be necessary.

5.3.4.12   *Synopsis of the policy-dialogue process*

Although synthetic and simulated, the Policy-dialogue drew on the very real lived experiences and knowledge of a diverse group of international expert panelists. The foregoing rudimentary outline presents the overarching elements of the process, the analysis of the findings and resulting proposals for action that emerged from this process. In an actual implementation, these activities would need to be followed up with an implementation work plan or roadmap that would need to be budgeted and

various project management, project mapping and project reporting elements

incorporated. The simulation though rudimentary provides a walk-through of the steps

needed to implement the methodology to identifying areas of opportunity and

challenges, ensure the buy-in and engagement of citizens and support cities in

mobilizing to achieve their goals.

5.3.5 Data Collection Tools and Resources Developed

In addition to the knowledge-based development model and the study

methodologies which have been detailed in Chapter 3 and Chapter 4, the study has

resulted in the development of various resources which have been implemented and

field tested during the course of this study, namely:

i. A Knowledge Maturity Evaluation Spreadsheet - of a city has been developed

    (See Table 56). The form supports the inclusion of weighting factors in the

    calculation process. The further development of this into a web-based tool that

    allows the results of a single evaluation or multiple evaluations to be

    combined and visualized as a radar plot is under development;

ii. A City News Content Analysis and Coding Form – Preliminary information

    regarding the context of the city, its challenges and opportunities can be

    obtained by reviewing a cross-section of news stories that are published on-

    line. The methodology for collecting news items is described in section 3.18.4

    of this study, the coding form is presented in the Appendix. The City News

    Content Analysis and Coding Form uses a matrix format for systematic

    capturing of information related to the constructs in the model from news

    articles. This tool provides a means for allowing an analyst who is unfamiliar

with the particular city whose Knowledge Maturity is to be assessed to obtain
an understanding of the city. The form still requires some further development,
in particular its validation through an inter-rater consistency assessment;

iii. A web-based tool using Google Docs for collecting and pre-qualifying
potential experts and a back-end searchable database for screening these
experts was developed. The survey form, Figure 61, may be accessed at the
following URL:

https://docs.google.com/forms/d/1aDMrrs_lxG3luYQQ67Wb3XBEnlXU_
sn5q48n4k_LiP8/viewform?usp=send_form

Figure 61:   On-line Expert Registration Sheet with a Back-end Searchable
Database Developed Using Google Docs

iv. A Knowledge-based Development Maturity Model has been implemented
both as a paper-based tool (See Appendix) and as cloud-based data application

for the Android operating on the open Magpi platform and deployable on

mobile devices, laptops and computers (See Figure 62). The mobile format

supports real-time data acquisition and analysis. Due to resource limitations

the freemium version of the Magpi Platform has been used in this study.
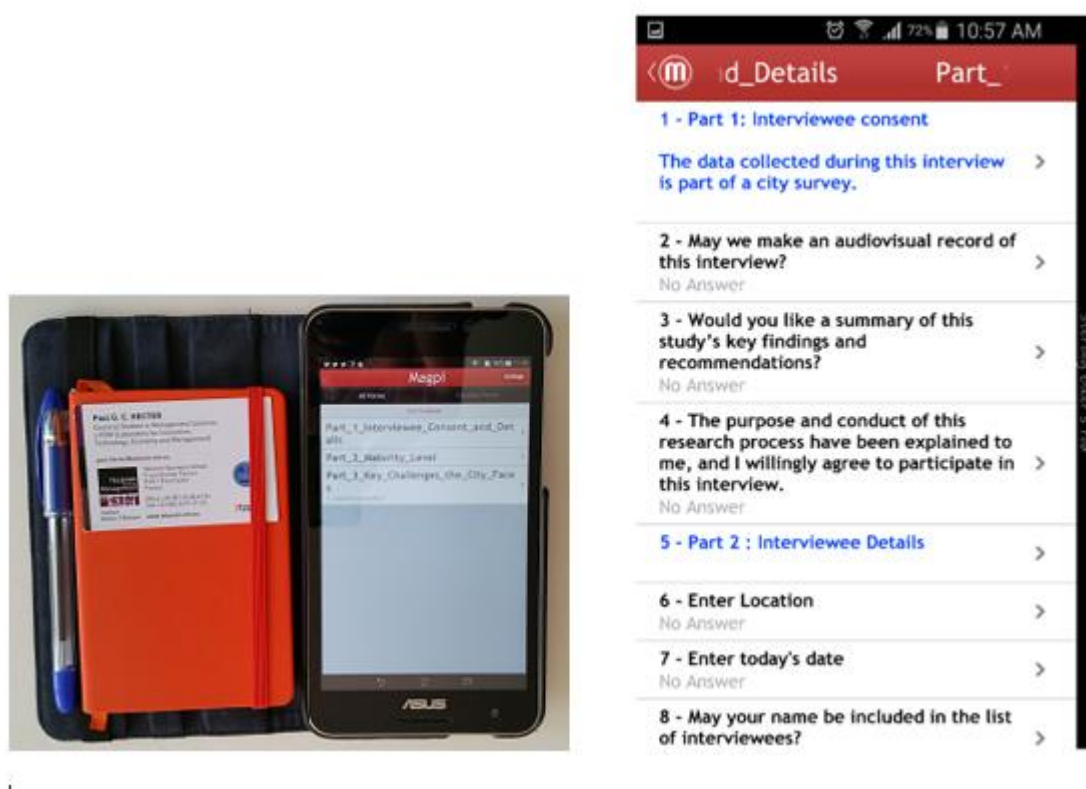
Figure 62:   Screenshot of the Android-based Knowledge Maturity Data Collection

Application developed on the Magpi Cloud Platform and installed on

an ASUS Fonepad 7 Dual Sim (ME175CG) Tablet for Field Data

Collection.

Based on the experiences gained through the use of these resources they

continue to be developed and refined along with requisite set of user-manuals. These

tools will be shortly made available on a purpose-built website for disseminating

resources and supporting data collection on cities in the developing countries of

Africa and Asia found at the following url: http://www.urbansolutions.city

CHAPTER 6

THEORETICAL & PRACTICAL CONTRIBUTIONS, LIMITATIONS AND RECOMMENDATIONS

6.1 THEORETICAL AND PRACTICAL CONTRIBUTIONS

6.1.1 Recapping the Gaps, Challenges and Research Questions this Research has Sought to Addresses

While knowledge-based processes are recognized as the most important sources of growth they nevertheless represent emerging disciplines and fields of academic inquiry that are still not well understood (Carrillo, 2004; Käpylä, 2012; Käpylä et al., 2012; Yigitcanlar, Ergazakis et al. (2006), Ergazakis & Metaxiotis, 2011; Yigitcanlar, 2014). Carrillo, (2004), and Ergazakis and Metaxiotis (2011), have therefore pointed to the need for indicators and development of assessment frameworks, methodologies, for understanding, applying and leveraging knowledge processes in societies. This study has therefore sought to encourage reflection, examination and the development of tools that seek to make visible and leverage the role that intangible assets and knowledge may play in addressing societal problems. This led to the development of a Knowledge-based Development Model (see Figures 43 & 44).

Current demographic trends point to rapid urban growth in developing countries of Africa and Asia, coupled with a lack of research to address the problems associated with this growth (UNDESA, 2014; UN-HABITAT, 2014). Cities, particularly primate cities, are the main engines of national economic growth and key

gateways to participation in global interactions. Unless these cities can safely navigate this challenge severe adverse national, regional and international impacts are likely. Knowledge is recognized as a potential game changer in addressing these challenges, however, work in the area of knowledge economies has not been viewed as immediately relevant to developing countries (European Commission, 2010; European Union, 2000; OAS, 2006; OECD, 1996; World Bank, 2011). However, Jenkins (2013), Roy (2005) and Schluter (2012) amongst others, have notably argued against the transfer of theories and policies created in the developed world to developing countries pointing to significant socio-cultural, political, economic and axiological differences. The study therefore set out to research how knowledge grounded in the needs, context and mindset of primate cities in the developing countries of Africa and Asia could be mobilized with a view to developing relevant solutions.

Of the three knowledge society archetypes presented in the literature, namely the economic focused (Britz et al., 2007; Organization of American States, 2006; Rohrbach 2007), technologically focused (Forfas, 2003; Lytras & Sicilia 2005) and human-focused (Al-Hawamdeh & Hart, 2001; UNESCO, 2005), the former two appear to have a dominant and hegemonic role. These three approaches also parallel those identified by Earl (2001) in his taxonomy of knowledge representations in knowledge management which he categorizes as behavioral, economic and technocratic based on their primary orientation or motivation. Efforts to replicate successful city experiences have often failed as they have focused on limited measures – often economic ones - and aspects of success (Bresnahan & Gambardella, 2004; Yigitcanlar et al., 2012; Yigitcanlar & Lönnqvist, 2013). Consequently, the

failings and limitation of economic-based and technophile approaches appears to be driving a shift toward more holistic orientations that seek to take into account human needs, sustainability of the planet as well as considerations such as inclusion, equity and social cohesion (Borja & Castells, 1997; Ergazakis & Metaxiotis, 2011; Stiglitz, 2012; Yigitcanlar & Velibeyoglu, 2008). Amongst the knowledge-based development models, the majority while claiming or seeking to be holistic, often prioritize economic measures. The focus in this study on a decidedly humanistic perspective, embedded in a conceptual framework that prioritizes human rights and other internationally adopted normative frameworks such as sustainable development, represents a novel point of entry that seeks to enrich the needs for methodologies, frameworks and indicators in this pre-paradigmatic discipline (Carrillo, 2004; Ergazakis et al., 2006).

UNESCO's (2005) World Report on Knowledge Societies recommended that indicators be developed to support policy-makers and stakeholders particularly those in the developing world in successfully navigating the paradigm shift to knowledge societies. This recommendation has not yet been implemented. However, policy-makers from developing countries continue to express interest in policy resources based on UNESCO's Knowledge Societies Conceptual Framework to assist them in attaining their national development goals. This study has sought to use the UNESCO framework for developing a model that seeks to respond to the needs of developing countries. Furthermore, in line with Recommendation 10 of the UNESCO study it sought to develop models and indicators to support improved understanding of the role of knowledge in development, particularly aimed at developing countries.

Problems in the realm of social and governance planning are necessarily ill-defined, essentially unique, without immediate or ultimate analytical solutions, rather they depend on political judgement for solutions. These broad classes of problems which cannot be exhaustively analyzed, nor for which clear cut problem solutions can be developed in advance, are referred to as wicked problems (Dalsagard, 2014; Ramaley, 2014; Rittel & Weber, 1973). The study serves to highlight that strategic societal challenges, such as those being addressed within the United Nations 2030 Sustainable Development Agenda are wicked problems (Ramaley, 2014). The importance of adequately addressing planetary-scale wicked problems such as climate change at the city, national and global level, lends further credence to the need for human-centred approaches that prioritize the participation and engagement of all stakeholders in governance and the collective defining of priorities as well as the negotiation of consensus on the nature of societies' strategic challenges and how they should be resolved (Camillus, 2008; Darlsgaard, 2014; Farrell and Hooker, 2013; Rittel & Weber, 1973; Schön, 1987). Principles such as human rights, participation, inclusion, equity, pluralism are therefore not merely nice to have but rather essential ingredient for planning and governing resilient, cohesive and sustainable cities.

Against this background this study has sought to address three research questions:

RQ1: How can a Knowledge-based development model be operationalized to address the strategic challenges that cities face? RQ2: What insights does a Knowledge-based approach reveal when applied to cities? RQ3: What contribution does the Knowledge-based approach provide to bench-learning and the possible orientation of action plans for policy-makers in the cities?

6.2   Answering the Research Questions

RQ1: How can a Knowledge-based development model be operationalized to address the strategic challenges that cities face?

Chapter 4 of this study details how the Knowledge-based Development Model (See Figures 43 & 44) as well as a Knowledge-based Development Maturity Model (See Tables 52, 53 & 54 and the Appendix) were developed. The Knowledge-based Development Maturity Model has been implemented both as a paper-based tool (See Appendix) and as a cloud-based mobile application operating on the Android platform (See Figure 62). A Knowledge Maturity Calculation Sheet (See Table 56) was also elaborated. These process drew heavily on the literature review presented in Chapter 2 as well as the methodological processes described in Chapter 3. A Delphi study in which more than 60 international experts, including global thought leaders in the fields of knowledge management and knowledge-based development participated was used to validate the Knowledge-based Development Model. A list of the participating experts is available in the Appendix. Pilot tests conducted in Addis Ababa, Ethiopia and Bangkok, Thailand, described in Chapter 5, contributed to data collection, the further development of the model and its field validation.

The foregoing processes enabled UNESCO's Knowledge Societies Conceptual Framework to be operationalized in the Knowledge-based Development Model by:

i)   Establishing and demonstrating plausible conceptual linkages between UNESCO's Knowledge Societies Conceptual Framework and the paradigms of intellectual capital and knowledge management;

ii) Empirically demarcating or situating UNESCO's concept of "knowledge societies" within a defined spatial or geographical location – the city - thereby enabling the concept to become instantiated and observable;

iii) Developing indicators /criteria from the literature for the constructs contained in the UNESCO framework as well as methods for identifying the societal challenges to be addresses in the empirically instantiated knowledge societies;

iv) Developing a conceptual model which linked inputs, outputs or processes to desired strategic goals;

v) Developing data collection and measurement tools; and

vi) Validating this model through a Delphi study and field tests in two developing country primate cities, Addis Ababa, Ethiopia and Bangkok, Thailand which enabled the collection of experiences and the preparation of a case study.

RQ2: What insights does a Knowledge-based approach reveal when applied to cities?

From the structure of the validated model, eight propositions have been identified and are presented in Table 51. These propositions offer insights and suggestions – which at this stage have not been empirically explored – into how the various components of the knowledge maturity model influence each other. The propositions appear to support observed phenomena. For example, Proposition 1 provides an explanation for the inability of countries with high level of natural resources but low levels human capacity and institutional structures to adequately address societal challenges. It therefore provides rational support for investment in human capacity. The interdependencies highlighted in Proposition 8 between model

constructs also raises interesting questions and may serve as a departure point for empirical investigation and further theory building.

The field tests in Addis Ababa with the Knowledge-based Development Maturity Model served to signal the key role of context in determining meaning and sense-making. While bench-marking and "best practices" are useful, these must necessarily be adapted to the specificities of the locales in which interventions are to be made. This suggests that in order for each city to find its optimal position, it must seek to identify its particular strengths and risks and then seek to develop its unique responses rather than the wholesale replication of practices from other locales (Bresnahan & Gambardella, 2004; Käpylä et al., 2012; Yigitcanlar et al., 2012; Yigitcanlar & Lönnqvist, 2013). Cooperation and sharing ideas is however vital, as it may enable limiting assumptions and mental models to be challenged or to reveal contradictions and opportunities that are invisible to insiders (Bennet & Bennet, 2004; Snowden & Boone, 2007).

In the Addis Ababa field study, the roles of traditional structures such as the *Iqub* and *Edir* in supporting social cohesion and the manner in which urbanization was serving to threaten their survival was quite important and relevant. The apparent "gaming" of the international system for ODA by the city authorities to secure funding, pointed to the limitations of external interventions and the need for greater understanding of cultures in identifying "levers" to drive change. The unresolved ethnic and religious tensions which the model served to uncover appear to merit further and urgent study.

The field tests served to highlight that the language of the study and its tools as well as inherent assumptions made by the researcher in its design are indeed

barriers to inclusion and participation for the majority of citizens in both target cities. This suggests that while the Knowledge-based Development Model provides a useful theoretical and generalizable lens for explorations it must always be piloted in the locale where it is to be used and then adapted. The specificity of local places may result in local phenomena which it does not foresee and/or it may be understood differently. These adaptations must take into account cultural, linguistic and societal dimensions in order to be effective.

Based on the foregoing, the greatest value that this tool offers is the ability to support the development of baselines and ongoing self-assessment targeted to the city's needs rather than as an instrument for establishing city rankings.

RQ3: What contribution does the Knowledge-based approach provide to bench-learning and the possible orientation of action plans for policy-makers in the cities?

Almost 20 pages of policy-relevant finding and recommendations based on the application of the suite of tools based on the Knowledge-based Development Model have been captured in Chapter 5. These recommendations are drawn from the comparative analysis of Addis Ababa's current situation and Bangkok's response to urban pressures, as well as the responses of experts from government, private sector, civil society and academic participants in the simulated policy dialogue.

The results of the comparative analysis of Addis Ababa and Bangkok resulted from the application of the Knowledge Maturity Model. A limited field study was undertaken in Addis Ababa to establish the context around individual capacities and capabilities and social and structural frameworks and to identify the most urgent problems across four focus areas namely, environment, economy, social inclusion and

peace and security. This study revealed that managing urbanization and addressing water supply were amongst the most pressing challenges facing Addis Ababa. In line with Yin's (2014) concepts of literal and theoretical replication and with a view to focusing on experiences from the developing world, subsequent field tests were undertaken in Bangkok with a focus on the activities of the Central Planning Department in the Bangkok Metropolitan Authority (BMA) and the Bangkok Metropolitan Water Authority (WMA). This comparative approach enabled policy recommendations grounded and informed by the contextual realities to be elucidated.

The simulated policy dialogue drew on a wide range of stakeholders who based their responses on their deep understanding gained from their professional and lived experiences in seven primate cities located in developing countries of Africa and Asia. These cities were: Accra, Ghana; Addis Ababa, Ethiopia; Bangkok, Thailand; Jakarta, Indonesia; Manila, Philippines; Nairobi, Kenya and Yangon, Myanmar.

Tables 56 to 66 capture and synthesize areas where policy interventions are required by identifying specific challenges, stakeholders whose involvement are needed as well as a range of contextual factors that could hinder or foster progress. Importantly it also serves to point out to institutions, networks and projects with relevant competencies that could inform responses. Given the complex nature of the wicked problems cities must address, the understanding of the contextual landscape, the actors and their concerns provides an invaluable contribution to managing potential risks, particularly unknown unknowns (Bennet & Bennet, 2004; Snowden & Boone, 2007). The ability of the model to be used as a lens for supporting analysis across this diverse set of countries and its success in unearthing rich responses from

which recommendations could be advanced, points to the methods utility and relevance.

A focused application which utilizes all phases of the methodology in a given city and which is able to build on the findings of the application of the Knowledge Maturity Model is likely to provide even greater insight and utility to policy-makers. On this basis, a process that involves visits to cities to support the sharing and capturing of experiences that could shed light on the problems cities seek to address could be adopted.

Finally, participants in the simulated policy dialogue expressed support for the model, which they found useful and also called for its continued development and refinement particularly through empirical testing. The following comments are illustrative of the sentiments expressed by these experts:

- *This has been a challenging exercise and especially for me in Nairobi knowing that there are actual answers to these issues both from academia, research and industry, yet they remain largely unimplemented.*

- *An excellent effort to codify knowledge cities development model. As no perfect models exist, so attempts to create good models need to be complemented with good field testing. If this takes place, please share any findings with this Delphi-group. In Knowledge Cities, all citizens should ideally be 'smart,' both in the sense of digitally literate and able to think independently about the issues that impact their lives. More emphasis on thinking skills is essential in supporting smart citizens in smart cities. I hope this study will contribute to deeper thinking about that.*

- *I think that the resulting sets of indicators will be a significant contribution to the understanding and development of knowledge societies.*

- *I have seen significant refinement of the knowledge based development model. The model can help in formulating policies to foster development.*

6.2.1   Identifying the Theoretical Contributions of this Research

This section assesses the theoretical contributions provided by this work. In line with the focus on Design Science Research employed in the study, consideration is given to criteria grounded in this paradigm for assessing the significance of the scientific contributions of this study and its findings. Knowledge-based development in the context of primate cities of the developing world, spans numerous disciplinary fields including urban planning and knowledge management that are highly focused on theoretical guidance to support problem solving interventions. Accordingly, this section also provides some general reflections on perspectives and criteria for assessing theoretical contributions in application-oriented paradigms.

6.2.1.1   *Research Contributions from a Design Science Research Perspective*

Design Science Research is typified firstly, by its use of transparent and defined problem solution methods, secondly, by its drawing on prior research and existing theories to develop/determine approaches to practical problems and finally, by the evaluation of the solutions in the problem context in response to the identified challenges and opportunities (Brigg & Schwabe, 2011; Hevner et al., 2004; Iivari, 2007). Table 19 portrays the research products, standards of rigour, criteria for research contributions and their cross-fertilizations for Design Science Research.

Figure 29 indicates the relationships between the four modes of scientific inquiry –

exploratory research, theoretical research, applied research/engineering and

experimental research. Figure 30 shows how the inter-relations between the four

modes of enquiry are operationalized in a design science research process to ensure

rigor. Figure 31 illustrates how this conceptualization of design science research has

been utilized to shape the design of this study. Finally, Figure 63 presents Design

Science Research in the context of this study and explicitly presents the interactions

of the Environment, Design Science Research as well as the scientific contributions of

this research, which are primarily captured under the Meta-Artifacts component of the

Knowledge Base.

The Relevance Cycle interrogates the existing problems and opportunities,

captured in this study's research questions, in light of relevant theories and knowledge

- reflected in the knowledge base - and the demands/needs of the study environment,

which are the primate cities of developing countries, to produce design products,

processes and artifacts. The Design Cycle evaluates the adequacy of the design

products, processes and artifacts when deployed in the problem environment. On this

basis, design processes are developed as well as design products and design artifacts.

Design Processes here refer to research methods and practices used in addressing and

gaining insight into the problem, Design Products are the theories for modelling and

conceptualizing the problem, while Design Artifacts are the operational embodiments

or instantiations of the solutions developed (Brigg & Schwabe, 2011).

The design processes developed from the Relevance Cycle are the study

design and research protocol (See Figures 31 & 59). Corresponding design products

take the form of the conceptualized questionnaires (Please see the Appendix), initial

knowledge based-development model (Figure 36) and the initial knowledge-based development maturity model (Please see the Appendix) which have been operationalized in paper-based form and as an Android Application. Validation in the forms of pilot reviews by experts, semi-structured interviews, field testing of the artifacts, conducting of the Delphi study and the K-SWOT led to the capturing of new knowledge and insights around the problem situation. This process revealed the gaps between the researcher's conceptualization of the environment and the actual needs/context. This newly captured knowledge iteratively drove modification of the design processes, products and artifacts to reduce this gap.

By examining Table 19 and Figure 63, the contribution of this study to the four types of scientific enquiry may be assessed:

Exploratory research - In many ways this research contributes to exploratory enquiry. It provides a first empirical development and instantiation in the form of a Knowledge-based development model derived from UNESCO's Knowledge Societies Conceptual Framework. Furthermore, the study provides a means for examining the new context and phenomena of rapidly urbanizing and growing primate cities of the developing world through the lens of this knowledge-based development model. Findings from across two cities in two geographical regions, Addis Ababa and Bangkok are described and also compared. The indicators /criteria developed in this study, the knowledge-based development model and its propositions as well as the maturity model, all provide a rich basis for further exploration as well as enquiry through the other three research modes. The study offers a significant contribution in this field.

Theoretical research - The study presents the process, grounded in the literature by which the conceptual linkages between UNESCO's Knowledge Societies Conceptual Framework and Intellectual capital are made. Continuing this deductive process results in the development of a proposed Knowledge-based Development Model which identifies specific constructs and proposed relationships that are captured in the model (see Figure 36). The model was subsequently extended and validated through a multi-round expert panel using a rigorously conducted Delphi study. The propositions that flow from the model provide greater explanatory power than the parent UNESCO Conceptual Framework for understanding the inter-relationships and constructs that mediate the role of knowledge in the shaping of development outcomes. The model makes explicit the link between human rights, the mobilization of societal knowledge and development outcomes. Furthermore, the model serves to underscore the important role of existing tangible and intangible assets to development outcomes a key oversight of the parent framework. The eight propositions presented (See Table 51) provide new areas for exploration. On the basis of the criteria for design science research (Brigg & Schwabe, 2011) this work therefore represents a contribution to theory.

While knowledge-based processes are recognized as the most important sources of growth, this area of work represents an emerging disciplines and fields of academic inquiry that is still not well understood (Carrillo, 2004; Käpylä, 2012; Käpylä et al., 2012; Yigitcanlar, Ergazakis & Metaxiotis, 2011; Yigitcanlar, 2014). Carrillo, (2004), and Ergazakis and Metaxiotis (2011), have therefore pointed to the need for indicators and the of development assessment frameworks, methodologies, for understanding, applying and leveraging knowledge processes in societies. The

ability of this work to respond to such challenges within the discipline, according to a clearly articulated methodological framework further points to a significant contribution to theory.

Experimental research - Although the study produced a number of propositions, their investigation in detail was beyond the remit of the current study. The use of the maturity model enabled a limited investigation in Addis Ababa into the indicators / criteria (variables) that underpin the constructs in the model to be carried out using mixed methods. While this showed correlations between low scores on indicators / criteria and knowledge maturity to be seen (See Figures 47 to 57) the small sample size indicate that these findings lack statistical power. On the other hand, the design of the Delphi study did have some features of an experimental design and served to validate the proposed model and its inherent theories. Overall, the direct contribution in this mode of enquiry is rather limited.

Applied research/engineering - With respect to this mode the study contributes to solving practical problems and has generated a number of artifacts and meta-artifacts. For example, the Delphi panelists registration sheet (See Figure 61), the Knowledge-based Development Maturity Data Collection Application (See Figure 62), the paper-based version of the Knowledge-based Development Maturity Model (See Appendix). In the words of participants in the K-SWOT/ Policy dialogue, in speaking of the utility of the process and tools they used:

- *This has been a challenging exercise and especially for me in Nairobi knowing that there are actual answers to these issues both from academia; research and industry.*

- *I think that theoretically speaking, your model is valid and useful.*

- *I think that the resulting sets of indicators will be a significant contribution to the understanding and development of knowledge societies.*

- *The knowledge-based development model that is being developed is very good and comprehensive.*

The field validation of the research and its ability to shape thinking around the challenges facing cities and to support the development of policy recommendations further point to the utility of the model and the decision support tools that have been developed in this study. The study therefore offers a significant contribution.

6.2.1.2 Other Perspectives on Theoretical Contributions

This study is based within the discipline of knowledge management a young discipline with an emphasis on what Corley & Gioia (2011) might term a practice-oriented theoretical contribution. In this regard Whetten (1989) which refers to Dubin's (1978) approach provides useful guidance on theory building and what represents a theoretical contribution. According to Whetten all theories must contain at least three elements namely:

The "What" which identifies the set of factors (variables, concepts and constructs) that provide an explanation of the phenomena being investigated; The "How" that provides an explanation of the relationship between the set of factors; and the "Why", a set of underlying dynamic psychological, economic or social factors that justify the proposed factors and relationships.

Linkages between UNESCO's Knowledge Society's Conceptual Framework (See Figure 2), intellectual capital and knowledge management were established by drawing on theories such as the knowledge-based view of the firm (Alavi & Leidner

2001, Conner, 1991), knowledge economics (Carrillo, 2015; EU, 2000; COE, 2011; Sheehan and Tegart, 1998), wicked problems (Camillus, 2008; Darlsgaard, 2014; Farrell and Hooker, 2013; Rittel & Weber, 1973; Schön, 1987) and knowledge as an agent of social change (Bajracharya et al., 2009; Carrillo and Batra, 2012; Ergazakis & Metaxiotis, 2011). An initial model that took into account the academic and grey literature was developed (See Figures 35, 36 & 37) that captured these relations. The resulting model which represents the relations between variables, constructs and concepts, together provide a visualization of the theory (Corley & Gioia, 2011; Swanson & Chermack, 2013; Whetten, 1989).

Whetten (1989) offers three subjective criteria for assenting whether a proposed theory can be considered a significant contribution. These factor consider the extent of the improvement provided by the new theory over the current state of the art; the strength of arguments or evidence in favor of the new theory as well as proposed alternatives. In addition to the above factors, Corley & Gioia (2011) highlight the role of originality and utility as important assessment benchmarks in assessing the significance of a theoretical contribution. Ågerfalk (2014) relates the notion of contribution to theoretical implications, that is to say the extent to which proposed theories and findings serve to identify new phenomena that require exploration.

With respect to the aforementioned criteria the current study and its findings appear to be significant. This study has served to extend the utility of the underlying UNESCO Conceptual Framework by firstly spatially locating the abstract concept of "knowledge societies" within the primate cities of the developing world. The Knowledge-based Development Model has served to create a bridge between the

parallel disciplinary silos of human rights, knowledge management and economics allowing cross-fertilization of ideas. The model developed is, to the best of the researcher's knowledge the first such effort to operationalize this UNESCO framework and to provide a substantive response to Recommendation 10 of UNESCO's World Report: Towards Knowledge Societies published in 2015. The study has resulted in the development of some 46 indicators / criteria with corresponding weighting factors (See Table 52). These process and the Model have also been validated through Delphi panel. The eight propositions elucidated from the validated model structure (See Table 51) present new questions and point to new areas for investigation.

Based on the foregoing, the study has supported theory building activities. Furthermore, the findings that have emerged are opening up new vistas for research activity.
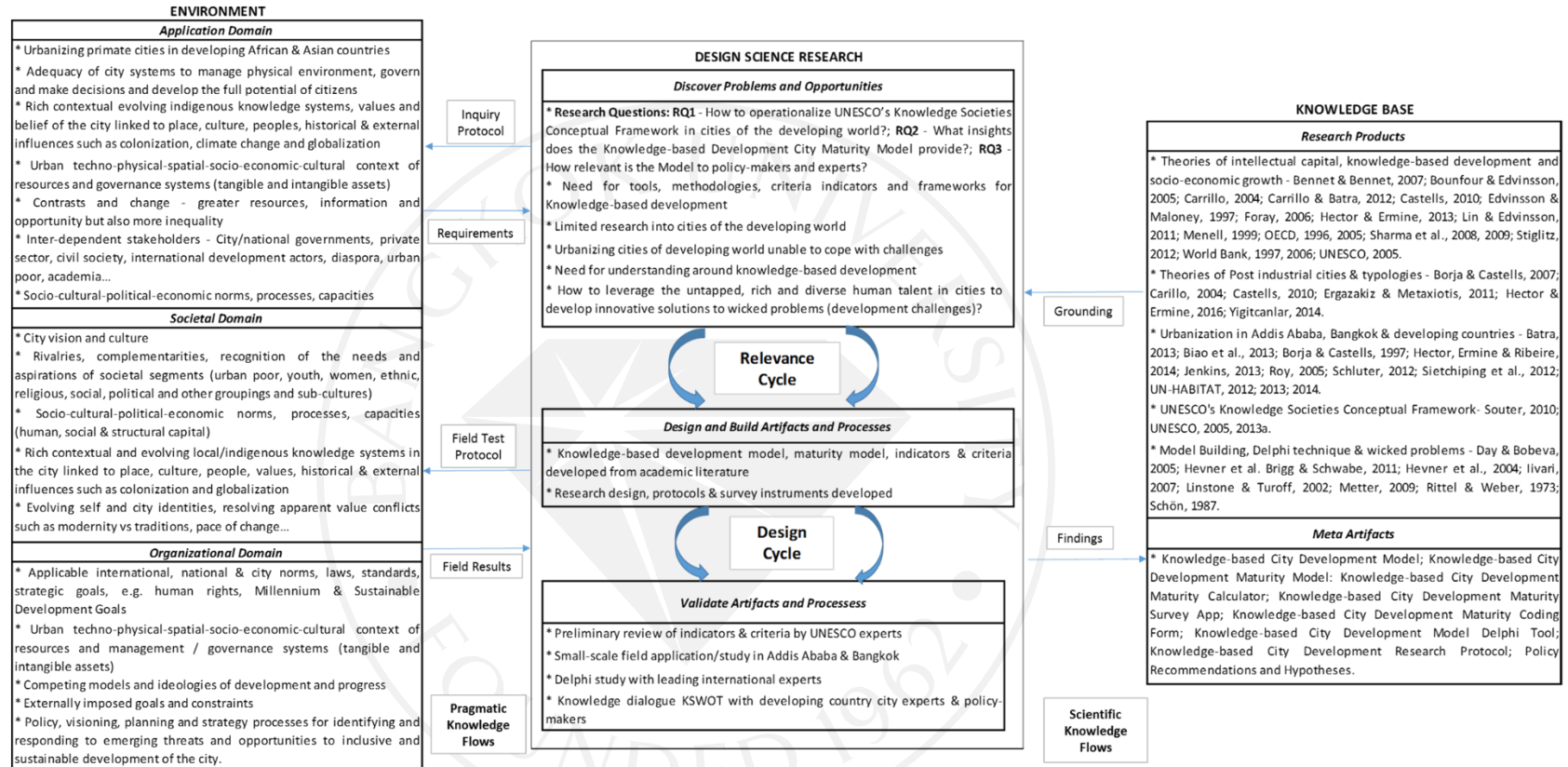
Figure 63:   Design Science Research Model applied to the Current Study incorporating the Research Modes and Activities, Relationships, Theories and Actions identified (Adapted from Brigg & Schwabe, 2011: 103)

6.2.2 Identifying the Practical Contributions of this Research

The overarching policy and practical contribution of this research lies in its ability to establish a clear link between the abstract concept of knowledge societies and the problems of contemporary societies, particularly cities of the developing world. This study has served to underline that development challenges fall into the category of wicked problems. Wicked problems due to their complex and interdependent nature cannot be solved, at best they may be contained or mitigated (Camillus, 2008; Darlsgaard, 2014; Farrell and Hooker, 2013; Rittel & Weber, 1973; Schön, 1987). Containment and mitigation processes require the collective action of a range of disparate stakeholder, and is dependent on the capabilities and competencies of the individuals, the societal structures for organizing them and the processes which the society collectively brings to bear on the identified problems. Common visions, shared goals, sustained engagement, the equitable sharing of benefits and risk, and harnessing of relevant knowledge and assets are therefore essential. To enhance their performance in addressing development challenges, cities must enhance their knowledge maturity. This involves on one hand dedicating resources and creating conditions and space for citizens to develop their full potential; and on the other, ensuring inclusive and just systems for societal management/governance/ decision-making systems in line with human rights principles to address resource allocation and strategic planning challenges.

The nature of wicked problems, which are intractable, means that it is never possible to solve societal problems. Our needs, concerns evolve over time giving rise to new problems. Therefore it should be clear that knowledge societies are not a destination or new utopia. Rather, they represent a new, dynamic, societal state

characterized by opportunities and challenges that require the participation and engagement of all citizens to support enhanced collective decision-making and problem-solving capabilities that enable innovation and greater resilience. This clearly signals that concepts such as pluralism, equity, inclusion, are not merely good to have but are rather essential cornerstones for society's progress.

The research also serves to develop recognition amongst policy-makers that knowledge-based production follows different rules to tangible-based production. While global benchmarks and best practices are relevant, in order for each city to find success it is essential that they seek to recognize, understand and leverage their specific advantages and also recognize their own constraints – including importantly, limiting beliefs and mindsets. Cities must therefore create conditions and foster processes that enable the creation of spaces for dialogue and collaboration which enable the challenges and opportunities to be recognized, developed and seized.

The recommendation, methods, tools and approaches proposed have been informed by the needs of the developing countries and seek to support these cities in responding to their challenges. They also seek to recognize, affirm and unlock the value inherent in their situated indigenous traditions, knowledge and memory as sources of shaping credible sustainable solutions to local challenges:

a) Tools and indicators

- A validated model that enables policy-makers to understand knowledge-based development processes

- A set of 46 indicators and criteria that may be further refined enabling the model to be applied drawing on the local knowledge of stakeholders;

- A suite of mobile-based data collection and analysis tools for the Android platform that enable policy-makers to undertake baselines assessments of knowledge maturity; the identification of stakeholders, K-SWOT analyses and benchmarking efforts; stakeholder group sense-making, consensus-building and the generation of problem solving actions.

b) Concrete responses to the recommendations in UNESCO's World Report (2005) and the needs of UNESCO Member States in particular:

- Developing links between knowledge and specific development challenges;

- Provides tools for measuring knowledge;

- Provides means for gathering data that considers non-economic factors and which are adapted to the conditions of developing countries;

- Providing systematic and holistic approaches to shaping policy that enable societies to identify their unique challenges and resources and to leverage their specific knowledge on a societal scale.

c) Accessible communication of this research to support its uptake by academics as well as by policy and practitioner oriented communities. This research has yielded research papers and posters that have been presented at research conferences/congresses and published in conference proceedings and practitioner journals. Articles and a book based on this research are also under preparation. Already available material include:

- Hector, P., Ermine, J-L., Ribiere, V. (2014). A tale of two cities: Building a knowledge analytical framework. *Proceedings of the 7th*

International Conference on Innovation and Knowledge Management in Asia Pacific (IKMAP 2014), 70 – 86.

- Hector, P & Ermine, J-L 2013, "Knowledge Societies: A KM-based model", paper presented at *6eme Colloque GeCSO: Gestion des Connaissances, Sociéte et Organisations*, Nancy, 5-6 June, 2013.

- Hector, P. (2015). Knowledge-based Urban Development: Providing cities with responses to their challenges and opportunities! *IKNOW, 5(1)*, 9-12.

d) Drawing on the findings of this study the project also proposes the following recommendations of particular relevance to Addis Ababa:

- The city should support a larger scale testing of the Knowledge-based Development Model to provide the necessary empirical data on a sufficient scale to establish a knowledge maturity baseline for the city. On this basis the city should support a pilot implementation of the method and policy recommendations with relevant longitudinal assessments.

- Continue to invest in critical city infrastructure systems such as water, electricity, transport, telecommunication and housing. These should be accompanied with close attention to ensuring investments in the human capital operating these systems. This is likely to improve management and performance of these infrastructure systems leading to greater effectiveness, innovation and longer useful life.

- Invest in their human capacity and capability by supporting, in particular, the expansion as well as the quality of formal and informal

education systems and the health care sector. This requires efforts to attract and train more qualified teachers, but also given the economic realities, provide more flexibility in the offering of educational opportunities to meet the needs but also the different life circumstances of child and adult learners. This focus should not be restricted to academic areas but include technical and vocational aspects as well as creative and traditional crafts and non-traditional areas such as sports and athletics. Given Addis Ababa's role as an important international center for trade, conferences and manufacture, acquiring soft skills such as competency in foreign languages and intercultural competencies needs to be emphasized to better leverage these opportunities and create new niche areas for growth.

- Develop and leverage strategic collaborative partnerships with other cities. Such partnerships should seek to support adaptation and knowledge transfer supported by a deep understanding amongst both the knowledge "donors" and "recipients" of the explicit, tacit and embodied knowledge as well as the broader socio-politico-cultural-economic context in which these solutions are expected to be operationalized.

- The challenges being addressed by cities are interdependent and interconnected and not under the control or purview of a single stakeholder. Greater dialogue and coordination both within the various levels of the municipal administration and with the Federal (national) government are necessary. Addis Ababa's location as an autonomous

region totally encapsulated by the Oromiya Federal State points to the need for greater cooperation and coordination between these two entities.

- Channels for two-way dialogue both formal and informal need to be developed with other stakeholders from civil society, private sector, diaspora and the expatriate community amongst others. Some possible stakeholder groups to be addressed are identified in Table 62. Specific attention to vulnerable groups and the urban poor and the development of additional mechanisms to solicit their views and liaise regularly with these groups need to be established.

- Changing the current top-down approach to governance to a more collaborative and participatory style represents a major shift from the *status quo.* This approach creates new opportunities but presents a shift from the current comfort zone and the prospect of potential political risks. Through regional and international bodies of mayors and cities, relevant experiences, case studies and support can be obtained for managing such a change.

- Maintaining existing cultural and historical landmarks and spaces as well as creating new public and green spaces is increasingly recognized as a distinguishing feature of livable and sustainable cities and a means of alleviating pollution. This should be pursued as an opportunity for citizen engagement.

6.3   Limitations

Section 3.13 highlights limitations that were noted in the development of this study. These aspects are not discussed here, rather attention is given to other limitations noted during the subsequent phases of the study.

The Delphi study, the field tests conducted in Addis Ababa and Bangkok as well as the modified policy forums represent the key means of data collection for developing responses to the research questions being investigated in this study. These activities have subjected the model and its application methodologies to a wide range of experts and disciplinary perspectives related to the theme of knowledge-based development. By approaching the model from different user perspectives they were able to triangulate results and provide face validity for the model and its constituent elements and relationships. Only four of the five stakeholder groups deemed as critical for the Addis Ababa field survey were interviewed. Despite efforts on a number of fronts it was not possible to obtain government participants. The success of the approach envisaged in the model is predicated on a willingness and an interest by stakeholders to engage.

Participation in the Delphi study was fully voluntary and this led to the composition of the panel varying throughout the study. The number of panelists ranged from 42 in the first round to 33 in the final one. Panelists were therefore probably not at the same level of engagement or understanding as the study process unfolded. A sub-group of 19 persons participated in all three rounds and greater emphasis was given to the opinions of this group in the quantitative assessment of consensus.

An empirical validation of the relationships presented in the model are beyond the scope of this study. To achieve predictive and convergent reliability of the model further testing with larger field samples, which includes the main five stakeholder groups as well as representative of vulnerable sectors is necessary. Data techniques like structural equation modelling could then be used to explore relationships between constructs in the model.

The cloud-based software platform Survey Monkey was used to manage the Delphi study. This tool supported quantitative and qualitative question types, analysis tools and enabled the researcher to customize some functionalities. However, for questions which involve the ranking of options, this tool was somewhat inflexible, preventing the designation of equally ranked options. This shortcoming was not noticed during the pilot tests and became evident only during the researcher's analysis of qualitative comments. This software feature may potentially have affected the weightings quoted for the various indicators/criteria in the model.

The literature (Day & Bobeva, 2004; Linstone & Turoff, 2002) points to the importance of ensuring ongoing engagement with Delphi panelists. In the first two rounds a high level of engagement was achieved with 40 and 42 participants involved respectively. In order to meet the completion date for the doctoral programme it was necessary to schedule the final Delphi round just prior to the start of the August holidays which resulted in a significant fall in the number of participants to 33 experts. While the number of responses exceeds the validity range of 10 – 18 complete responses (Day & Bobeva, 2004), the smaller sample necessarily led to a smaller pool of participants with developing country experience and a less diverse set of viewpoints during the concluding session.

While the city's administrative structures provide for and proclaim the devolution of authority to the city of Addis Ababa, in practice it appears that given the city's strategic importance and the political realities, power is largely centralized by the Federal Government. This situation therefore leads to a blurring of the boundaries and the delineation of roles and responsibilities between the city and national level. Consequently, the ability to distinguish the "city" from the "national" poses difficulties in the modeling process. This challenge was further amplified by the inability of the Researcher to access city officials authorized to inform the research, or willing to do so off the record.

While convenient in ensuring the participation of a geographically diverse group of experts, the use of primarily asynchronous on-line communication reduced the extent and depth of exchange between the researcher and the Delphi panelists. This resulted in some aspects not being as fully explored or being as developed as a synchronous face to face dialogue would allow for.

As indicated previously, the historical, cultural and other contextual similarities between Addis Ababa and Bangkok may limit generalizability of their findings to other primate cities in the developing countries of Africa and Asia. For example, as a country with limited colonial influences, Ethiopia is unique amongst African nations.

Pragmatism, with its contextually oriented epistemological and ontological outlook emphasizes the researcher's understanding of the socio-cultural-political-physical context in which the validation and field-testing of the model occurred. Consequently, meanings and information that is misunderstood, unexplored or

undetected in the researcher's interaction with respondents are potential source of error.

The choice of the UNESCO framework implicitly marginalizes other equally valid ways of modeling the concept of knowledge-based development. While there is growing interest in the more holistic approach to societal development, economic paradigms are still dominant.

Finally, the research study has been largely informed by the views of globally savvy elites and experts, with the Delphi panel and field interviews conducted in English. (One interview in Thailand was conducted with the assistance of an English –Thai interpreter). Attention was given by panelists and the researcher throughout the Delphi model validation process to ensuring that the perspectives and needs of vulnerable groups were considered by policy-makers. Respondents broadly identified women, youth, the urban poor, and persons with disabilities, migrants as well as the retired and aged living in the cities of developing countries in Africa and Asia as vulnerable persons. While women were present in the pilot field test these did not fit the profile of the marginalized and powerless women who respondents felt were unable to articulate their concerns. Consequently, interviews with vulnerable persons would be useful and important to bolster confidence in the research recommendations.

6.4   Recommendations for Future Work

On 26 October 2015, Ms. Irina Bokova, Director-General of UNESCO received the 2015 Knowledge Management Award on behalf of the Organization from Knowledge Management Austria (KM-A). The award was conferred in

recognition of UNESCO's 2005 publication "Towards Knowledge Societies" which KM-A designated as:

> *"An early milestone for a better understanding of the future challenges and opportunities of knowledge societies [and for UNESCO's] outstanding efforts and achievements to promote the idea of knowledge societies, to capture and preserve the world's knowledge resources and to strengthen inclusiveness and sustainability in knowledge societies. Furthermore, many of the Organization's other programs and projects demonstrate the continued emphasis on the development of knowledge societies and knowledge cities on the basis of freedom of expression, universal access to information and knowledge, respect for cultural and linguistic diversity, and quality education for all".*

> *(Knowledge Management Austria et al., 2015)*

This award by a leading Knowledge Management professional body, closely involved in work on Knowledge Cities, further attests to the importance and significance of UNESCO's Knowledge Societies Conceptual Framework. Ten years since its publication, this award underscores that UNESCO's Knowledge Societies Conceptual Framework is important, it therefore attest to the relevance of this research.

On 21 October, 2015 the UN General Assembly released Resolution A/70/L.1 which adopted the outcome document of the United Nations summit for adoption of the post-2015 development agenda "Transforming our world: The 2030 Agenda for Sustainable Development". This Agenda has received considerable interest and support from stakeholders across the public sector, private sector and civil society. This is a

clear indication of a growing sense of urgency of the need for more holistic approaches to global challenges.

Figure 64:   UNESCO's Director-General Ms Irina Bokova, receiving the 2015 Knowledge Management Award from Dr. Andreas Brandner, Managing Director and Dr Yanko Yanev, Chief Executive Officer, Knowledge Management Austria. UNESCO Paris, 26 October 2015. © UNESCO/P. Chiang-Joo

The extension of the current research to map and identify areas of alignment as well as gaps with the UN Framework could serve to identify how the model contributes to the UN Sustainable Development Agenda. The methodological tools and processes such as the Delphi panels and policy dialogues and maturity frameworks could be used to support the alignment process. In the coming years, countries and cities will use the targets of the UN Sustainable Development Agenda

as a means for data collection to assess progress. This data could support the rapid assessment of city and potentially country knowledge maturity.

Taking into account the theoretical and practical contributions of this research and its recognized limitations as well as ongoing developments such as the adoption of the 2030 Sustainable Development Agenda, future work could seek to:

- Through the publication of papers, participation in conferences and outreach to other researchers and municipalities in developing countries, raise awareness of the role of knowledge-based development and promote the use of the tools and methodologies developed in this study;

- Building on the insights gained from the Addis Ababa and Bangkok pilots seek to conduct larger-scale studies in these cities which could be replicated or extended to other cities. Also, in line with the recommendations of panelists, conduct broader empirical studies aimed at collecting adequate data to assess the extent of support that exists for the theories and relationships captured in the model. As part of this work, aspects such as the eight propositions (See Table 51) that have been identified and the role of weightings could be investigated;

- Continue to support refinement of the knowledge-based development model and associated resources such as the Android-based data collection tool and make these available on an on-line platform to cities and researchers. Also providing training in the methodology and establishing a repository that could facilitate the collection, dissemination, analysis and re-use of data based on this methodology. The availability of such data could support the establishment of baselines and longitudinal data collection. In addition, it

could also enable approaches such as structural equation modelling and other forms of analysis that could provide insights and an assessment of the predictive and convergent validity of the model.

- Seek to explore the use of the Knowledge-Based Development model with a subset of the 17 sustainable development goals and 169 targets that have been identified in the 2030 Sustainable Development Agenda. This could potentially involve incorporating these targets into the four-goal (environmental, social, economic, security) and also exploring where and how the 46 criteria/indicators identified in this study could contribute to supporting the new global targets.

- The concept of "Wisdom or a wise society" has emerged during the Delphi Study as an important area that knowledge maturity contributes to. According to Goede (2011) a wise society emerges when good governance exists at the personal, corporate and public level. The relationship between knowledge cities and wisdom represents an open but necessary field of exploration given current demographic trends and the need to make cities resilient.

6.5   Conclusion

This mixed methods research study has developed, validated and confirmed the policy-relevance of a Knowledge City Maturity Model based on UNESCO's Knowledge Societies Conceptual Framework. The model developed from the literature, validated through expert panels and field tested in selected primate cities of developing countries located in Africa and Asia is the first such empirical application

of the UNESCO framework. The indicators / criteria developed, the eight propositions and other findings open up new avenues for research based on a unique, people-centered, holistic approach grounded in the humanistic values promoted by the Unite Nations and inherent in the international normative instruments adopted by national Governments.

Globalization, the ease of mobility and demographic trends are resulting in more and more people living in cities. The increasing heterogeneity of cities, poses new challenges for social cohesion. More than 90% of global urbanization over the next 15 years will be in cities of the developing world where human, governance and infrastructural capacity is low and countries are not well prepared to cope with the challenges of rapid population growth and urbanization. This research which has focused on primate cities of the developing world, can contribute to enabling cities of the developing world to be more effective in leveraging their knowledge. By helping cities to unlock their capacity to effectively implement knowledge-based development significant improvements in quality sustainable living for their citizens can be achieved.

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APPENDIX

APPENDIX

Table of Contents of the Appendix

The Appendix is available on-line at: **https://tinyurl.com/thesis-appendix-hector**

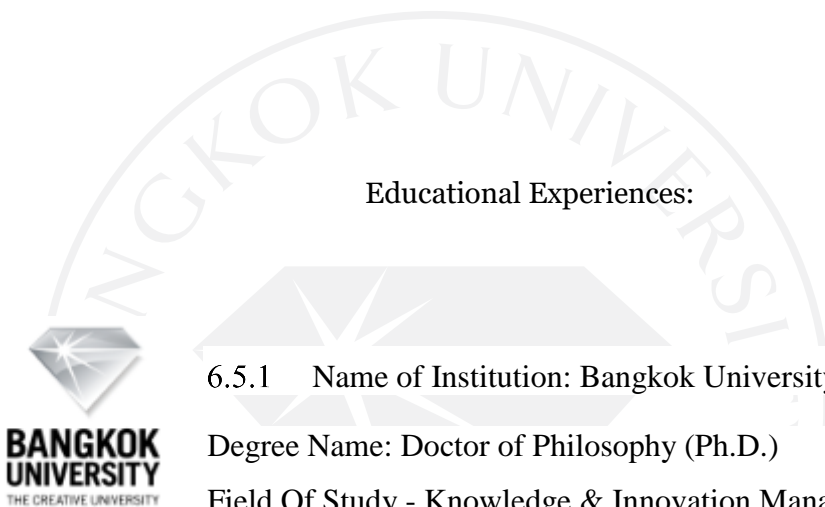**OR https://preview.tinyurl.com/thesis-appendix-hector**

BIODATA

Name & Surname: Paul Geoffrey Cuthbert HECTOR

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Educational Experiences:

6.5.1   Name of Institution: Bangkok University

Degree Name: Doctor of Philosophy (Ph.D.)

Field Of Study - Knowledge & Innovation Management

Dates attended or expected graduation: 2012 – 2017

Activities and Societies:

IKlub - http://iklub.org/

AGECSO - http://www.agecso.com/wp/

Creative Bangkok - http://www.creativebangkok.org/creative2014/creabkk2014/

Creative Mornings - http://www.bu.ac.th/bui/

Published article in Special Issue of IKNOW on Knowledge Cities - http://www.iki-sea.org/2015/02/12/iknow-volume-5-issue-1-knowledge-cities/

Presented peer-reviewed paper at the 7th International Conference on Innovation and Knowledge Management in Asia Pacific (IKMAP 2014) - http://ikmap2014.com/

Presented peer-reviewed paper at 6e conférence du GeCSO: Gestion des Connaissances dans la Société et les Organisations (Paris, France) - http://www.agecso.com/wp/conferences/gecso-2013/

6.5.2 Name of Institution: Télécom Ecole de Management / University of Paris-Saclay

Degree Name: Doctor of Philosophy (Ph.D.)

Field Of Study: Management Science

Dates attended or expected graduation: 2012 - 2016

Activities and Societies:

- LITEM - Laborator for Innovation, Technology, Economics and Management Member of LITEM research Group at Telecom École de Management focused on advancing theoretical knowledge and it's application to contemporary problems. http://www.telecom-em.eu/en/content/litem

- Business PhD in France Association an independent community run by PhD students of business education institutions in France, with the objective of promoting academic exchange, increasing scholarly cooperation and improving visibility within the scientific community https://www.business-phd.com/

Name of Institution: WIPO (World Intellectual Property Organization) Worldwide Academy

Degree Name: Certificate

Field Of Study: Intellectual Property Rights (IPR)

Dates attended or expected graduation: 2002 – 2012

Activities and Societies:

- Followed a series of courses on intellectual property rights (IPR) including selected international and national IPR regulatory regimes on copyright, patents, trademarks, industrial property, traditional knowledge and biotechnology.

6.5.3 Name of Institution: University of Strathclyde

Degree Name: MSc Operational Research

Field Of Study: Operational Research

Dates attended or expected graduation: 2006 – 2009

Activities and Societies:

- Operations Research Society of South Africa: www.orssa.org.za/
- Canadian Operations Research Society: https://www.cors.ca/
- The Institute of Management Consultants of Southern Africa: http://imcsa.org.za/
- The Institute for Operations Research and the Management Sciences: https://www.informs.org/

Completed MSc with distinction. Research project focused on managing organizational change processes in a multi-organization, multi-country context.

6.5.4 Name of Institution: University of Washington

Degree Name: MSc Engineering

Field Of Study: Civil Engineering (Structures and geotechnics)

Dates attended or expected graduation: 1996 – 1998

Activities and Societies:

- Fulbright Fellow - J William Fulbright Fellowship,
- UW Rowing club,
- Racquetball
- Foundation for International Understanding Through Students (FIUTS) http://www.fiuts.org/

Master of Science degree in Civil Engineering with specialization in structures and geotechnics. Involved in research projects on renewable energy technologies (wind turbine siting and design), use of advanced materials in earthquake resistant construction design and road improvement in developing countries.

6.5.5 Name of Institution: University of the West Indies, St. Augustine Campus

Degree Name: BSc Engineering (Honors)

Field Of Study: Civil Engineering

Dates attended or expected graduation: 1991 – 1994

Activities and Societies:

- BDD-WIST Scholar

- Biological Society

- University Karate Club (Tae Kwando)

- Part-time coach for the Green Acres Football team

Graduated with an Upper Second Honours Degree. My final year research project involved the design of the energy systems for an ecological resort on the pristine North Coast, this involved the development of a 3D topographical Model and siting of solar, wind and hydro energy units.

Work Experience:

Overview: Over the past 25 years I have been engaged in roles of increasing responsibility in public, private and international organizations across a range of countries and cultural settings in Africa, Asia and the Middle East. These experiences have served to further develop and augment my analytical, managerial, leadership and interpersonal skills. My familiarity with information and communication technologies (ICTs), willingness to acquire additional skills and use them to solve practical problems is an invaluable asset in today's knowledge-based and rapidly evolving work environment. My persistence, multi-disciplinary outlook, adaptability and initiative coupled with my ability to learn quickly and build on past experiences and training, allows me to function effectively across a range of demanding job positions.

Company Name: UNESCO

Positions held: Advisor for Communication and Information (East Africa, Middle East, South Pacific); Programme Specialist (Responsible for managing UNESCO's global Intergovernmental Informtion for All Programme (IFAP) and coordinating C10 Action Line: Ethical dimensions of the Information Society of the World Summit on the Information Society (WSIS). Assistant Programme Specialist

Dates Employed: November 2000 – Present 2016

Supported over $10 Million in fund raising for the implementation of development-related projects that focus on providing access to information and knowledge through the use of ICTs. These initiatives with global impact are focused on benefiting emerging and developing economies. As part of this effort have initiated various research studies, communities of practice and training programmes to support national strategic plans.

Company Name: Telecom Ecole de Management

Position: Adjunct Lecturer

Dates Employed: Mar 2014 – August 2016

Lecturer in the Business School for the course "MAN 7002 - Management of change and innovation in organizations", a 15 credit hours course for 2nd year students (cohort size ~35 students) in the MSc International Business/Management programme. My duties included; * Adapting and elaborating course content in line with curriculum/objectives; * Course delivery in a face to face classroom/seminar setting; * Conducting tutorials and providing ongoing support to students in understanding core concepts and preparing their end-of course project* Developing and conducting interim and end of course assessments/evaluations.

Company Name: National Piling / M A Kharafi & Sons WLL

Position: Site Engineer

Dates Employed: February 1998 – October 2000

Responsible for directing marine works with a value of US$10 Million and managing a team of a 40-person international team and heavy equipment fleet including barges, piling equipment, haulage trucks on an industrial jetty constructuion and dredging works project. Project was completed on time and within budget.

Position: Assistant Resident Engineer

Company: David Lashley & Partners Ltd.

Dates Employed: August 1995 - September 1996

Under the direction of the Resident Engineer I was responsible for monitoring and providing engineering quality control of works undertaken by the Contractor, conducting marine and onshore surveys, preparing site instructions, technical reports including work instructions and design changes and assisting in the preparation of payment and work valuation certificates. Project was an internationally financed tourism port rehabilitation and waterfront reclamation project.

Company: Public Works Department, Ministry of Communication & Works, Nevis, Island Government

Position: Civil Engineer

Dates Employed: August 1994 - August

Duties included the design and implementation of various public infrastructure projects, carrying out engineering studies and evaluations of projects, assisting in the development and updating of a computerized database management system for the national disaster management programme; inspections and upgrading of roads, minor bridges and culverts.

Company: Charlestown Secondary School, Ministry of Education, Charlestown, Nevis, W.I

Position: Substitute Science Teacher

Dates Employed: September 1989 - September 1991

Responsible for teaching students in the Grade 7 – Grade 12 levels Agricultural Science, Chemistry, Integrated Science, Mathematics and Physics in preparation for the Grade 12 Caribbean Examination Council (CXC) Examinations.

Awards Received

2007: United States Government *International Visitor Leadership Programme* Alumni

2000: Recruited to UNESCO under the Organization's *Young Professionals Programme*.

1996: *J. William Fulbright Fellow* Masters at the University of Washington, USA

1991: *British Development Division BDD-WIST Scholar* – Full Scholarship to pursue Bachelor of Science in Civil Engineering at the University of the West Indies

1991: *University of the West Indies Scholarship* (University Scholarship Examination Awardee)

1988: *Organization of American States (OAS)* Essay Competition Winner (Latin American and the Caribbean)

Bangkok University

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