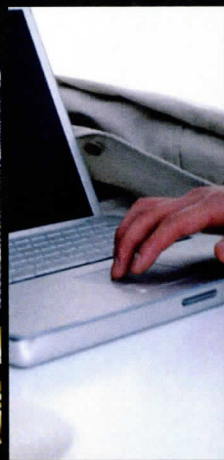
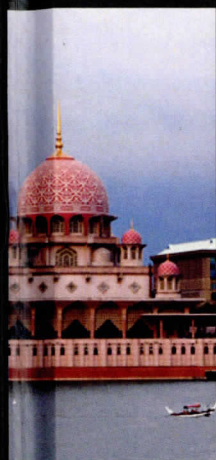


KNOWLEDGE CITIES

FUTURE OF CITIES
IN THE KNOWLEDGE ECONOMY





KNOWLEDGE CITIES

FUTURE OF CITIES IN THE KNOWLEDGE
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Knowledge Cities: Future of Cities in the Knowledge Economy

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PREFACE

Knowledge products have become the new export commodity to bring wealth to urban economies. Knowledge cities, both newly built and transformed ones, have travelled different routes to achieve one single goal — create wealth through the use of knowledge. This Conference, the second on Knowledge Cities, with the first having been held in Medinah (Saudi Arabia) in 2005, provides a platform to a better understanding of the different patterns of growth of urban regions and their ICT clusters across different countries especially in Europe, the Middle East and South East Asia. Through such understanding it is hoped that the learning curve will be shorter and faster and lead to a more dynamic development of the knowledge cities in the developing world.

Key to the development of a knowledge economy is the availability of a growing talent pool in these countries that is prepared to identify the need for new products, design and market them through global networks linked by world-wide web. In this scenario we see a symbiotic relationship between the universities as knowledge centres, the R&D centres using the talent output of the universities to focus on designing new products and services and the ICT industry that turns these ideas into marketable products and exportable commodities and services. Our observation is that the smaller countries in the Baltic and Western Europe have made the fastest transition to the knowledge economy using their experience and dynamism in a limited number of knowledge areas and taking it vertically to drive products and services such as in telecommunications, banking, finance and logistics. They have fully utilized the digital growth opportunities, adapting existing "old" economic activities to the new e-business environment.

The BRIC (Brazil, Russia, India & China) economies have exploited the outsourcing process with their vast talent pool to

service worldwide clients and this activity has brought substantial economic development to these countries and made the outlook of their workforce more global than local.

This book contains articles contributed by scholars, researchers and professionals from various fields and countries. There are twelve edited and refereed chapters. Chapter 1, written by Khaled Ali Youssef, starts a discussion on *Economics of Knowledge Cities: Opportunities and Challenges*. While Chapter 2 by Rabee M. Reffat presents the approach of *the information technology spine for the development of knowledge-based cities in transition*. In Chapter 3, Zaitun A. B and M. S. Termanini outline the approach to combat cyber attacks on Knowledge Cities through *an Early Warning Predictive System*. The system uses Grid computing and autonomic computing. Chapter 4 elaborates a research done by a group of researchers from International Islamic University Malaysia (IIUM), International Institute for Geo-Information Science and Earth Observation (ITC) of The Netherlands, and University of Trento, Italy on *institutionalising Spatial Planning and Decision Support System (SPDSS) for planning and decision making process in Malaysia*. Ali A. Alraouf, in Chapter 5, examines the status of the projects which were promoted, and initiated within those cities to facilitate their role as Knowledge Cities. Later, in Chapter 6, Tan Yigitcanlar discusses *global practices of the making of urban spaces for the knowledge economy*. Chapter 7 by Mohamed Thalha Alithamby also presents the global experiences but relevance to cities in developing countries. In turn, Nasser Abu-Anzeh and Tahar Ledraa in Chapter 8 explore the planning aspects of the knowledge-based city by looking at how the rising knowledge economy will change the urban setting and landscape of cities. The following chapters are some of the papers presented in the 1st Symposium on Knowledge Cities in Medinah, Saudi Arabia. These papers are still relevant to the title of the book and deserve consideration for publication. In Chapter 9, Ahmed Driouchi derives mechanisms to monitor and benchmark global measurements for knowledge cities and follows by Chapter 10 on

the explanation of Sudan Electronic City initiative by Nadir Mohamed Hassanein and Mudathir Suliman Mohamed. These two last chapters are related to legal aspects of knowledge cities. Chapter 11 by Abdul Raman Saad describes the needs for information privacy and data protection and finally, Chapter 12 by Abu Bakar Munir and Sonny Zuhuda provides a comprehensive overview of e-commerce with its various legal issues and problems which might pose a threat to the implementation of e-commerce.

The organizers welcome all participants to contribute their knowledge and experience in the conference and take back new knowledge and proven experience to enrich their national efforts to progress through the Knowledge Cities. We also hope that this book will be a resourceful reference for town planners, architects, engineers, landscape architects, mayors, municipality councilors, government officers, politicians, students, researchers and decision makers in planning and developing future Knowledge Cities.

Malaysian Institute of Planners (MIP)
Arab Urban Development Institute (AUDI)
Shah Alam City Council (MBSA)
Al-Madinah Municipality

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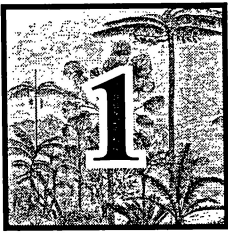
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Economics of Knowledge Cities: Opportunities and Challenges

Khaled Ali Youssef,
Assiut University, Egypt

Introduction

Motivation: Why the Economics of Knowledge Cities?

'Knowledge Cities' can be considered as a tangible result of the convergence of the city and the flow of knowledge. The 'city' is the location where most activities take place, the bulk population live and work, most job opportunities are created, and numerous profound social problems and highest incidence of poverty are located (Coats, 2005; and Jones et al, 2006). As cities of the past were built along railroads, waterways and interstate highways, '*cities of the 21st century will be built along information highways; broadband communications links, playing together with the digital age smart and sustainable communities a central role in the rebirth of civilization in the 21st century*' (Eger, 2001). These cities are promoted to work 'smarter; not 'harder', adopting the principles of dematerialization, demobilization, mass customization, intelligent operation and soft transformation (Mitchell, 2000). Flows of information, services, images, sounds and symbols in digital forms through networks managed to gradually replace physical spaces in timeless time (Van-Dijk), steadily defining the ground on which 'Knowledge Cities' can be built.

The rise of 'Knowledge Economy'; or the so-called 'knowledge-based economy', 'weightless economy', 'high skill economy', and 'dynamic knowledge economy' (Coats, 2005), arguably increase the awareness of

knowledge as a key factor for economic growth and performance (Rehfeld & Hamburg, 2001), providing the concept of 'Knowledge Cities' with influential motifs, despite the fact that there is a standard definition of neither 'Knowledge Economy' nor 'Knowledge Cities'. Further, the term 'Knowledge Cities' is seen to be associated with a wide range of terms, such as: Intelligent City, Educating City, Creative City, Science City, Region of The Future, Media Village, High Tech Knowledge Corridor, Knowledge Commons, Smart City and Knowledge Innovation Zones, acknowledging the flow of knowledge through networks (Amidon & Davis, 2006). As a result, the terms 'knowledge', 'cities' and 'economy' appeared easy to use but hard to precisely define.

What compounds the problem is the disparity between the interpretations of the terms 'Knowledge Economy' and 'Knowledge Cities', not only because of the varying vitality of a nation's economy and the advancement of society as a whole (Amidon, 1993), but also for the varying demands placed on the concept (Dvir, 2004). In investigating how UK cities can become drivers of the knowledge economy and what the implications of becoming a 'knowledge city' might be, Jones et al (2006) address three basic challenges; each starts with '*lack of clarity about*', showing the lack of clarity about the terms 'knowledge' and 'city' to become an obstacle for the city to navigate its path towards becoming an 'Ideopolis'.

On the other hand, over simplifying the concept of 'Knowledge Economy'; and therefore 'Knowledge Cities', in terms of concentrating on the association with the Internet (Coats, 2005), the shift into the informational mode, the production of technology and the unbalanced focus on it, neglecting the cultural aspects and the varying standards of nations (So et al, 2001), and the promotion of higher exploitation of ICT without understanding the implications of application (Kreiser, 2001), could lead to bad choices. In response to that, Coats (2005) promotes the concept to be the subject of 'serious analysis.

"Some of the media interest in the knowledge economy was a phenomenon associated with the dot.com bubble – the misconceived belief that we would all be Internet entrepreneurs in the future – but the knowledge economy story has more substance than that and needs to be the subject of serious

analysis..... Most commentary on the knowledge economy has focused on ICT production, the ICT using sectors and biotechnology, but this is to oversimplify the richness of the concept and could potentially lead to bad policy choices” (Coats, 2005).

As economy is considered a cornerstone, economics of ‘Knowledge Cities’; in terms of the economic opportunities and challenges associated with the concept, are considered central to its implications, especially when talking about the developing world. Detailed studies done by economists and sociologist; such as Manuel Castells (1996) and G. Smith (2003), show how massive and powerful the knowledge-based opportunities and challenges are. Castells argues that networks are not extremely wonderful; that they can be networks of destruction. Networks do not have hearts; they can *kill* or *kiss*. They can go both ways; as tools for creation and free communication, and as tools for concentrating wealth and power (Kreisler, 2001). Knowledge capital investments will increasingly be concentrated in places with competitive advantages in knowledge production, efficiently enabling its wide range of offered opportunities and rationally reacting to its imposed challenges (Smith, 2003).

In conclusion, the rapidly increasing awareness of knowledge as a key factor for economic growth and performance; the lack of clarity about what the term ‘Knowledge Cities’ implies, and over simplifying the concept of ‘Knowledge Economy’ and therefore ‘Knowledge Cities’; the massive and powerful economic opportunities and challenges offered by the concept appear in their totality to highlight the importance of studying their economic implications as an important step to define a coherent and appropriate vision of ‘Knowledge Cities’.

Aim and Objectives

In order not to misinterpret the concept or imitating without understanding the implications of application, the paper aims at sketching a coherent and concrete vision of ‘Knowledge Cities’, in terms of exploring the opportunities

they offer and the challenges they pose. For the aim to be attained the following objectives are to be accomplished:

- Investigating the complexity of 'Knowledge Cities',
- Deriving the key ingredients of the concept,
- Identifying the requirements of application, *and*
- Exploring the offered opportunities and imposed challenges.

Upon completion of deriving the key ingredients, identifying the key components and exploring the issued opportunities and challenges, a more coherent and concrete vision of economics of 'Knowledge Cities' will be sketched. The paper can therefore be considered a starting point towards defining a detailed and appropriate profile of 'Knowledge Cities'.

Scope and Limitations

In investigating the implications of adopting the concept of 'Knowledge Cities', dozens of opportunities and challenges appear to announce themselves; among which, the economic opportunities and challenges can be considered the most influential. In this paper, the investigation will be limited to exploring the wide range of economic opportunities and challenges of 'Knowledge Cities' as far as they would influence and be influenced by the city architecture and planning, as well as the environmental, functional, political and social opportunities and challenges that engage to, and can be translated into economic terms.

Methods

For the aim of the work to be attained, the scope of the paper is extended to encompass the literature that celebrates the concept of 'Knowledge Cities' in various contexts as far as it contributes to exploring the offered opportunities and challenges. First, a rich collection of definitions, proposals and viewpoints is introduced, and key ingredients of the concept are derived. Second, the requirements of application are identified and analyzed. Third, the economic opportunities and challenges are explored and classified. Lastly, and in the light of the explored opportunities and challenges, a discussion takes place highlighting the findings of the paper.

Knowledge Cities: Definitions and Key

Ingredients

In this part of the paper, a rich collection of definitions, proposals and viewpoints of 'Knowledge Cities' is introduced and key ingredients are derived, as a step to identify the requirements needed for application and explore the offered opportunities and imposed challenges.

Knowledge Cities: Definitions, Proposals and Viewpoints

Although the paper focuses on the concept of 'Knowledge Cities', the scope of deriving its key ingredients and exploring the offered opportunities and imposed challenges is extended to embrace other knowledge-based zones as they apply nearly the same principles but starting from different start points. As mentioned before, dozens of terms appear to be connected to and associated with the term 'Knowledge Cities', such as: Smart/Intelligent City (WTA, 2000), Educating City, Creative City, Science City, Knowledge Societies ('Towards Knowledge Societies', 2005), Smart/Intelligent Communities (Eger, 2001; and ICF, 2007), Region of the Future, Media Village, Knowledge Corridors, Knowledge Harbors, Knowledge Villages, Knowledge Regions and Knowledge Innovation Zones (Amidon & Davis, 2006).

According to Leif Edvinsson (2002), a 'Knowledge City' is *'a city that is purposefully designed to encourage the nurturing of knowledge'* (Dvir, 2004), whereas, it is *'an umbrella metaphor for geographical entities which focus on knowledge creation'* as B. Davis (2004) defines it. Ergazakis et al. (2004) argues it as *'a town that encourages ongoing creation, sharing, evaluation, renewal and update of knowledge through the continuous interaction between its citizens as well as interaction with citizens of other cities'*, highlighting the flow of knowledge in a broader sense (Goldberg, Pasher and Levin-Sagi, 2006). In the first UNESCO World Report on 'Towards Knowledge Societies', it is argued that 'Knowledge Societies' are not just the information society: unlike information, knowledge cannot be considered as mere merchandise. In terms of creating new chances and new kinds of development via: the availability of knowledge, better higher education strategies, research revolution, 'lifelong' education, knowledge economy and creating a culture of innovation, the report sketches a profile of what 'Knowledge Societies' should be ('Towards Knowledge Societies', 2005).

In other words, Eger (2001) defines the 'smart community' as the 'community which makes a conscious decision to aggressively deploy technology as a catalyst to solve its social and business needs, undoubtedly focusing on building its high speed broadband infrastructures'. For the Intelligent Community Forum (ICF), 'Intelligent Community' is a term associated with other terms like the 'Wired City', 'Smart community', or 'e-City', where the Internet bandwidth is addressed as an essential utility. In order to investigate how far the community can be termed 'intelligent', the ICF identifies five indicators, which define in their totality the conceptual framework of an 'Intelligent Community'. These indicators are: broadband infrastructure, knowledge force, innovation, digital inclusion and marketing. The ICF Indicators provide communities with a useful framework for assessment, planning and development, as they work to build prosperous local economies in the broadband era (ICF, 2007).

In this coming era, Mitchell (1996; and 2000) argues, activities are promoted to be done from homes, strongly affecting the need for physical buildings. Facades are to become digital interfaces. Bookstores, libraries, galleries and theaters are to morph into Bit-stores, servers, digital museums and digital displays. Tele-working, Tele-learning and Tele-medicine influence the need for office buildings, educational buildings and hospitals. We no longer have to extensively design department stores and banks; electronic malls and scattered ATMs will do the job. In whole, the industrial city of the past will be tele-served, and the task of architects and planners will no longer be to design physical buildings, it will be building the bit-sphere; the worldwide electronically mediated environment. It will include connecting the body net to the building net, the building net to the community net, and the community net to the globe net (Mitchell, 2000).

From the World Teleport Association (WTA)'s perspectives, telecommunications technologies are claimed as the backbone of intelligence, encouraging the broad bandwidth to attract leading-edge businesses, create job opportunities, generate economic growth and improve the delivery of governmental services. In terms of accomplishing these objectives, the intelligent city, building and visionary of the year are annually awarded by the WTA, emphasizing the importance of broadband networks in designing and building intelligent knowledge-based zones (WTA, 2000).

According to Coats (2005), Smith (2003), Amidon (1993), Amidon & Davis (2006), Chesbrough (2006) and others, knowledge-based zones; i.e. 'Knowledge Cities', are strongly connected to 'Knowledge Economy'; or the so-called 'weightless economy'. Parallel to this connection, Amidon (1993) while arguing that 'Knowledge' and 'Innovation' are strongly interrelated; formulated the so-called 'Knowledge Innovation'. This is defined as *'the creation, evolution, exchange and application of new ideas into marketable goods and services for the excellence of an enterprise, the vitality of a nation's economy and the advancement of society as a whole'*. Similar to the way any building has to have key components, knowledge-based businesses need what is termed 'the 15 C's: capital; customer; commerce; cost; competitiveness; community, culture and caring; content and cognition; communications and connections; coordination; core capabilities; computerization; change and complexity; collaboration; and continuity. In light of the connection between knowledge-based zones and 'Knowledge Economy', these 15 C's are argued the key components to build a 'Knowledge City' (Chesbrough, 2006).

For Amidon & Davis (2006), knowledge innovation zones are *'geographic regions, economic sectors or communities of practice where knowledge flows from origin to the point of highest need or opportunity'*. They argue that the concept is no longer a theoretical proposal; it became a global phenomenon being applied in scattered places all over the globe, such as in: Panama, Barcelona, Shanghai, Manchester, Sao Paulo, Rotterdam, Calgary, Monterrey, Vilnius, Mauritius, Kuala Lumpur, Johannesburg, and Dubai (Amidon & Davis, 2006).

Key Ingredients of Knowledge Cities

In analyzing the reviewed definitions, proposals and viewpoint, 'Knowledge Cities' appear to have their attributes and basic principles from the association with six key ingredients. These key ingredients are: knowledge, intelligence, economy, culture, citizens, and workforce. The integration of these six key ingredients is strongly affected by the scale of application, and the motivations and targets, the fact that promotes these two items to be added to the key ingredients of 'Knowledge Cities', Fig. 1.

Knowledge, the first key ingredient, is considered the cornerstone attribute of 'Knowledge Cities', pursuing the availability/open-flow of knowledge, the shift into the e-paradigm, the promotion of knowledge intensive' activities, and

"The 1st symposium on Knowledge Cities aimed to shed light on the role of the Arab city in facing the challenges of shortage in knowledge in their communities, review the available solutions and alternatives for the development of knowledge-production and dissemination process, suggest the applicable steps needed for the enhancement of knowledge in the Arab city, display some Arab and international experiences, review some of the latest developments in the field, and to define the challenges and difficulties that constrain transferring the Arab city into a knowledge community and how to deal with these challenges."

Arab Urban Development Institute, The World Bank, and Medinah Municipality,
Symposium on Knowledge Cities (2005), Medinah, Saudi Arabia

"Cities are engine of growth and centre of future human civilization. Knowledge City is "a city that encourages the nurturing of knowledge". It is also the creation of value in all its areas and develops high standards of life, cultural support and economic development. The technological and digital evolutions have changed the way cities work for their citizens. This book discusses matters pertaining to knowledge-based economy of cities; the role of technology in establishing Knowledge Cities; the institutional transition and building knowledge and human capitals; partnerships for development; and international and regional experiences."

Norliza Hashim, President of the Malaysian Institute of Planners and Chairperson of the 2nd International Symposium on Knowledge Cities: Future of Cities in the Knowledge Economy (2007), Shah Alam, Selangor, Malaysia

"With the changes of time, knowledge, particularly science, technology and engineering, has been developed. Knowledge is the prime cause of the progress and development of mankind. We keep seeing new ideas, products, technologies, and approaches developed and nurtured. And we can't deny that knowledge is the backbone of everything that makes changes in our way of life and action."

Dr. Alias Abdullah, Professor of Urban and Regional Planning, Kulliyah of Architecture and Environmental Design, International Islamic University Malaysia; and Co-editor of Islam and Urban Planning book.

"....a rapid evolution of the Knowledge City concept from early articulations of the 'technopolis' and 'ideapolis' into the 'digital and intelligent city'. This concept involves developing a path towards more viable, vibrant, and sustainable development. Knowledge Cities have embarked on a strategic mission to firmly encourage the nurturing of innovation, science and creativity, within the context of an expanding knowledge-based economy and society."

Dr. Tan Yigitcanlar, School of Environmental Planning, Griffith University, Brisbane, Australia

"In the global arena, the United Nations, the European Union, the OECD, and the World Bank have all stressed the critical importance of the Knowledge Economy as a global reality established over the turn of the century."

Francisco Javier Carrillo,
Editor of Knowledge Cities: Approaches, Experiences, and Perspective (2006)



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