

Beyond the Digital Divide:

A Conceptual Framework for Analyzing Knowledge Societies.

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STRUCTURED ABSTRACT

Purpose – The research reported in this on-going study investigates the notion of knowledge assets developed within digital communities in the course of their economic or leisure activities. Ideally, the resulting knowledge is universal, affordable and relevant; this inclusiveness is a hallmark of any information or knowledge society.

Methodology / Approach – We first synthesize the related research literature covering the areas of knowledge based economies, knowledge societies and knowledge policies. We then develop a model using 13 dimensions that we claim are critical for creating a knowledge community in the digital economy. The model is validated against critique from a Delphi panel of researchers in the area.

Findings – While creating a knowledge society encompasses dimensions pertaining to infrastructure, governance, talent and culture, the *intangible assets* are key to sustaining such societies. Governance and culture are instances of such intangibles. Talent may seem to be tangible but the human capacity for learning and development which leads to an innovative culture is less so. In any case, time is the essential ingredient for a knowledge culture to come about.

Research Limitations – Knowledge societies are not measurable constructs which may be quantitatively described and benchmarked with weighted summations of scores along prescribed dimensions. It would be a fallacy to treat the notion of a knowledge index as a socio-economic measure of success.

Practical Implications – We conclude with a practical view of how the dimensions may be best exploited in the course of a policy discussion on sustainable knowledge societies.

Originality / Value of Paper – It is hoped that the research will provide a framework for policy-makers and analysts to conduct qualitative discussions on creating and sustaining knowledge societies.

Keywords – National Intellectual Capital, Sustainable Development, Knowledge Economy, Knowledge Policy.

Category – Conceptual Paper.

1. Introduction

Societies have for some time organized themselves in order to achieve a healthy environment of knowledge development, learning and sharing. The characteristics of a knowledge society are that they are part of a knowledge economy; possess high absorptive capacity; have structures and cultures that facilitate frictionless knowledge diffusion and sharing; undergo complex chains of creation, production and distribution including inter-functional collaboration; and are sustainable learning communities with an emphasis on innovation (cf. APEC 2000; Houghton & Sheehan 2000; Powell & Snellman 2004; UNESCO 2005). If these characteristics can be embraced by the community at large, then, conventional public policy holds that a competitive economy and a higher quality of life is the outcome.

From the academic arena, Powell and Snellman (2004) posit that although the causal factors of a KBE is subject to much discussion and debate, current studies may be classified into three major areas of research: (i) the rise of new science-based industries and their role in social and economic change (ii) sociology and labor economic investigations on whether new kinds of jobs and novel forms of work organizations have emerged in knowledge societies and (iii) managerial focus on the role of learning and continuous innovation inside firms. Alternately, Houghton & Sheehan (2000) suggest that as society progresses up the value chain of quality and productivity, the role of knowledge as a factor of production and its subsequent influence on skills, learning, organization and innovation are increasingly the determinants of success.

In order to create such a knowledge society or economy, the conditions for knowledge-sharing have to be favorable. The idea from Joseph Stiglitz (the 2001 Nobel Laureate for Economics) is that knowledge as a “global public good” is most effective when shared without distribution inequities. As Koichiro Matsuura (2006), UNESCO’s Director-General puts it: “An economy based on the sharing and diffusion of knowledge provides an opportunity for emerging nations to increase the well-being of their populations.” He goes on to cite the examples of several communities which have transformed themselves into network societies favorable to “knowledge seeking, innovation, training and research”. He concludes that knowledge sharing is indeed a powerful tool in both the fight against poverty as well as the key to wealth creation.

In a retrospective review of research in the area of the wealth of nations, Edvinsson (2003) showed that the well-known Skandia Navigator is easily transformed from the corporate to national environment to encompass the following foci: financial (eg. per capita GDP and national debt); market (e.g., balance of trade, net IP flows); human (e.g., quality of life, health and education levels); process (e.g., business leadership, service producing organisations); and renewal and development

(e.g., R&D expenses, business start-ups). He also cites the work of the pan-European body – Eurostat – as a leader in developing statistical indicators for the new economy which enable a fuller understanding of the knowledge economy and the relationship between intangible assets and socio-economic activity (cf. <http://europa.eu.int/en/comm/eurostat/research/retd/sine.pdf>).

Drawing on the synthesis of Edvinsson (2002 & 2003) of what constitutes the IC of nations and the framework of Nahapiet and Ghoshal (1998) which suggests how knowledge societies organise themselves, a review of the highly-cited literature on the social, structural and relational aspects of knowledge societies was conducted. This was followed by a critical analysis of the related literature from which the authors devised a set of dimensions that contribute towards the formation and evolution of a successful knowledge society. As will be elaborated in the next section which describes the research methodology, this process was and cumulative and iterative. For now, our conceptual model will derive a framework that draw from the work of Nahapiet and Ghoshal (*op. cit.*) and operationalises the 4 major philosophical constructs of a knowledge society with some 13 dimensions which may serve as measurable and actionable items for policy-makers.

In this article, we seek to understand the dimensions of knowledge societies beyond the obvious ICT and technology base. More specifically, we present the conceptual framework of ongoing research into creating and sustaining knowledge societies. Our empirical findings shall be presented in a forthcoming sequel to this paper. The remainder of this paper is organised thus. In this section, we have reviewed the background literature that comprises significant research in the area of knowledge societies, communities and economies. We develop this into a framework for articulating the more impactful factors and outcomes that make up a knowledge society. We also conducted a Delphi panel of ten thought leaders for qualitative and anecdotal validation of our model with action research in order to establish its validity. Finally, we conclude with some thoughts on whether the dimensions offer a means to replicate the development of knowledge societies.

2. Methodology and Conceptual Model

Our framework for knowledge societies was operationalised from the conceptual model of Edvinsson (2003) on what constitutes the IC of nations and that of Nahapiet and Ghoshal (1998) which helped formulate our pillars comprising interacting factors as well as outcomes that contribute to the creation of successful knowledge societies. These were mostly distilled from a review of the literature. Some of these dimensions were factors that contribute towards creating a knowledge society (ICT accessibility, expenditure on higher education, R&D) whereas outcomes are the results of becoming a knowledge society (e.g. economic wealth, quality of life, EVA etc.). As well, almost all the dimensions contribute to more than one of the pillars of a knowledge society. Hence, we note

that there is a predominant disposition in each of them and when listed in the order described in the previous section, there is an infrastructure, governance, talent and culture continuum to their membership.

Going forward, the research methodology was conducted over three stages. In the first stage, a Delphi Panel of 10 researchers in the area of KBEs was consulted via e-mail for their feedback on the model and the dimensions. They were asked for their judgements on whether the model was comprehensive and relevant. They were also specifically asked for the comments on each of the 13 dimensions – both the definitions as well as their applicability. The dimension “Role of Mass Media” was in fact not derived by the literature but suggested by one of the panellist to the concurrence of the others. Over three iterations, a distinct consensus emerged among the Delphi panellists that the model well articulated the contributory factors and outcomes of knowledge societies and that the 13 dimensions were sufficiently comprehensive and parsimonious. On the strength of the grounded theory model formulation, literature search of dimensions and the resulting consensus, we claim face, content and construct validity.

In the second stage, drawing on the infrastructure-governance-talent-culture framework and the operational definitions of the dimensions that were derived in the above-mentioned manner, the research team searched several reputable, published sources of socio-economic indicators (cf. ITU 2007, OECD 2007 and UNESCO 2005) for indicators of the information society; the World Bank Knowledge Assessment Methodology (2007); an annual survey of business competitiveness by the World Economic Forum 2006; and arguably the most complete characterization of a knowledge society by UNDP 2007) for the availability of reliably collected, accurate and authoritative secondary data that could serve as proxy indicators for each of the dimensions.. It was not the stated objective (or otherwise) of this research study to obtain a quantitative measure of knowledge societies since such attempts by the UNDP (2007) and the World Bank (2007) are both exhaustive and well-reported and no benefit can be derived from replicating smaller scale versions of these field investigations. However, the availability of such proxy indicators, in a sense, validated the dimensions in our framework. It allowed our abstract, composite dimensions to be operationalized into contributing measures of a knowledge society. In this manner, data for about 20 communities spanning various stages of knowledge development was then collected from the relevant secondary databases. The findings from this stage of the research will be presented in the sequel to this paper. For now, we claim field validity in the sense that these were dimensions that could be used and measured for the purpose of public policy.

During the third stage, in an attempt to derive relevance for policy-makers, a 2-hour focus group workshop with about 20 experienced policy analysts was conducted in order to ascertain the use of such a framework of dimensions in the field. First, the model and framework of dimensions was

presented as a short seminar. They were first briefed about the framework and then asked to participate in a discussion about the comparative knowledge policies of four well known societies (Nigeria, Singapore, the United Arab Emirates) - chosen because they were well-known to our focus group (being subjects of interest as well as familiarity). This made the test for comparative policy analysis credible as well as meaningful.

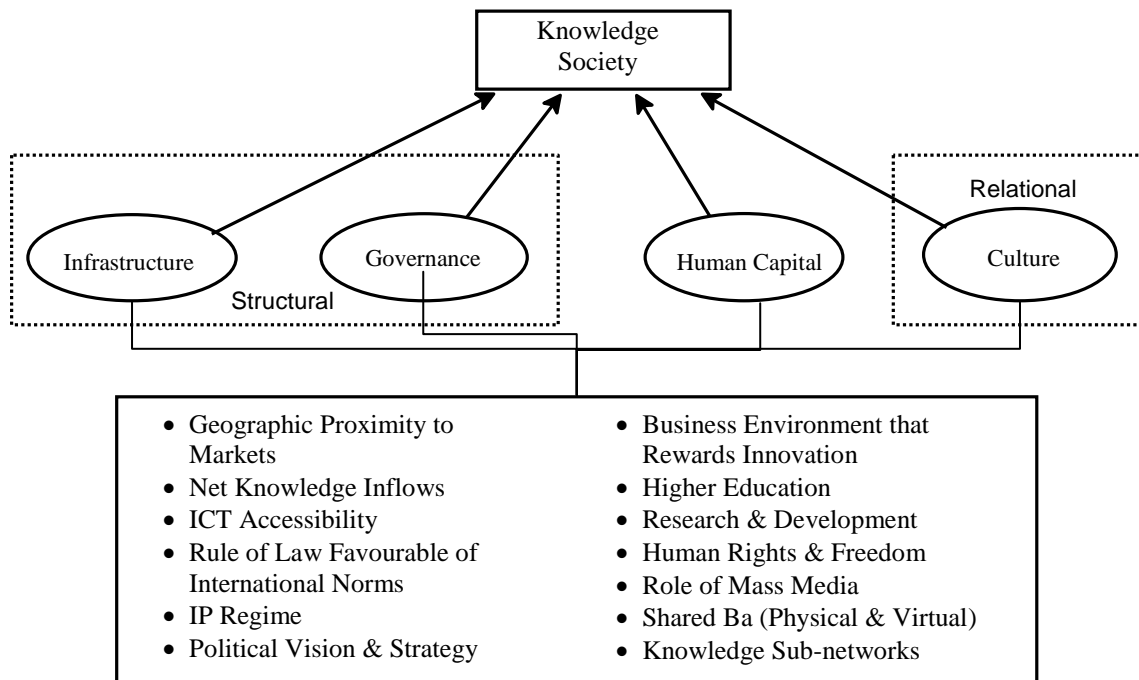


Figure 1: A Framework for Analysing Knowledge Societies.

In the above manner, we developed the conceptual framework for the analysis of knowledge societies. In the next section, we first provide an overview of the 4 pillars and follow this with detailed support from the literature for the 13 interacting dimensions. The model in Figure 1 aligns the three components of the IC of knowledge societies – structural, social and relational – with the adaptation of the structural, cognitive and relational aspects of social intellectual capital. This results in what is proposed as the four fundamental pillars on which a knowledge society may be created – 1). Infrastructure; 2). Governance (which together form Structural Capital); 3). Human Capital (by nature cognitive); and 4). Culture (which is a part of Relational Capital). Guided by this framework, a review of the related literature unearthed 13, operational dimensions necessary for creating and sustaining a knowledge society. It is immediately apparent that the 13 dimensions are not mutually exclusive to any one pillar. More specifically, their definitions indicate that they overlap as contributing factors and outcomes of the infrastructure, governance, human capital and culture facets

of a knowledge society much like the inter-dependency suggested in the framework of Nahapiet and Ghoshal (1998).

Pillar 1: Infrastructure

One of the first basic transformations that a society goes through in evolving into a KBE is the nature and scope of its investments in infrastructure. Gaps emanating from inefficiencies of knowledge creation, transfer and re-use amongst the citizenry form a great impediment to developing into a KBE (cf. Baquir and Kathawala, 2004; Conceicao et al. 2003; Dvir and Pasher, 2004; Ergazakis et al. 2006). Mansell (2002), for example, suggests that an effective means of eradicating such gaps is to provide an efficient infrastructure which includes more than basic amenities (water, electricity, sewage, transportation, security services, and a currency / stock exchange) to also encompass township planning, advanced systems of education and healthcare, and even networked communities. Structural inefficiencies attributable to power cuts, traffic jams, inadequate schooling, unavailable specialist healthcare, poor financial systems, and so on are not conducive to creating knowledge societies.

Pillar 2: Governance

Governance may be considered to be the effective macro-management of knowledge resources within a society. In order to effectively utilise the typically expensive infrastructure, there has to be appropriate policy measures in place; that is, governmental intervention (at the municipal, provincial or federal level) is necessary to put in place the elements that promote the effective usage of infrastructure and human capital resources – increasingly scarce commodities. This is why both Pillars 1 and 2 fall under the Structural Capital of a Knowledge Society. In fact, for societies to move beyond the digital divide and further evolve into a knowledge society, greater policy intervention is needed to harness the potential of infrastructure, ICT and new media developments to enable a greater number of citizens to acquire literacy in the use of knowledge. Whilst by no means unanimous, several studies have alluded to this nexus between governance and the organisation of knowledge economies (Castells 2000; Dolfma 2006; Edvinsson 2003; Harris 2001; Kaufmann and Mastruzzi, 2007; Samarajiva and Gamage, 2007; Sharma and Azura, 2006; Soete 2006; Snowden 1999; UNESCO 2005).

Pillar 3: Human Capital or Talent

Much of the literature and studies on the development of knowledge societies emphasise the significance of human capital as a key component that gives these societies an edge in competence over others (APEC 2000; Cheng et al. 2004; Conceicao et al. 2003; Cummings and Teng 2003; Hamdouch and Sheehan, 2000; Houghton & Sheehan, 2000; Kahin 2006; Olssen & Peters, 2005; UNESCO, 2005; UNDP 2007; World Bank 2006). In fact, many aspiring KBEs understand the importance of managing knowledge gaps and in particular, narrow such gaps between the information

rich and poor, because information enriches a society's human capital, which in turn boasts creativity that is essential for the knowledge economy (Olssen & Peters, 2005). In their research on the growth of technology, Florida and Gates (2001) posit that fundamental questions such as - Are the people in the city able to accept a highly diverse environment? Are they sufficiently tolerant to make the city an attractive place to the types of people above? - will determine the extent of diversity and tolerance influences the propensity of a society to evolve into high knowledge areas. This aspect also goes beyond human capital and capability and touches on the aspect of culture that permeates a society.

Pillar 4: Culture

Culture is indeed the most unique pillar of the four as most societies are already aware of the importance of infrastructural developments; governance and human capital are replicable and transferable, hence culture is the competitive factor that makes a knowledge society unique. According to Ergazakis et al. (2006), some cities have failed to be developed as knowledge cities even as much investment is made towards developing other areas such as transport infrastructures. This implies that greater attention has to be paid to the needs and expectations of the people in KBEs that help improve overall quality of life beyond economic issues (Baqir and Kathawala, 2004; Cohen and Prusak, 2005; Connelly and Kelloway, 2003; Ergazakis et al. 2006; Foray 2006; Koshland 2007; Masterman 1995; Rodrigues 2002; Sagasti 2004; Trussler 1999). Culture also includes attitudes and assumptions about learning, and the objectives of education on the whole. An important part of the culture of learning is the sense of adventure – manifested by encouraging experimentation, willingness to think out of the box, and risk taking – prevalent within the members of society. This will inevitably lead to knowledge creation (Levinson, 2006).

3. The Framework of 13 Dimensions

Spawning from the four-pillar framework, the 13 dimensions are defined with support from the literature in order to justify our conceptual postulate that they are essential building blocks of a knowledge society.

Dimension 1: Geographic Proximity to Markets

Geographic proximity suggests *closeness* to markets and hence a *critical mass of consumption* of goods and services. This is a concept also known as geographic agglomeration and clustering (Dolfsma, 2006; Foray, 2006; Houghton & Sheehan, 2000). Much of the research into knowledge economies stress the self-reinforcing advantages of having knowledge producers, suppliers and support services concentrate in a certain geographic area as structural, human and relational knowledge can be shared, integrated and transferred through relationships of proximity. In fact, there is a casual link between a high-tech firm's decision to situate itself in a particular location and the knowledge infrastructure already present in close geographic proximity (Dolfsma, 2006). Likewise,

there is a natural advantage that accrues to members of a geographic grouping (such as the European Union or ASEAN) which actively encourages cooperation and exchanges in scientific, economic and social areas. Invariably, benchmarking and learning takes place that both raises the bar as well as fixes disparities (APEC 2000; Conceicao et al. 2003; Edvinsson 2003; OECD 1996; Rodrigues 2002).

Dimension 2: Net Knowledge Inflows

Knowledge diffusion is a necessary condition for a knowledge society to progress. Knowledge diffusion is facilitated by telecommunications networks, a thriving content industry and a healthy media sector (Dolfsma, 2006; Rodrigues, 2003). There is also evidence that knowledge societies with higher absorptive capacities (or the ability to assimilate knowledge so that it may be exploited) are those that are open to diversity. For instance, specifically successful knowledge societies are those that have positive attitudes towards immigration – a major contributory to the net inflow of human capital and tacit knowledge (Ergazakis et al., 2006). This, in turn, results in a cosmopolitan outlook. The cross-pollination of human knowledge not only broadens the knowledge base but also promotes economic activity (Dolfsma, 2006). The role of foreign investments (particularly smart money which comes with professional management skills and experience) in creating net knowledge inflows has also received much scholarly attention (cf. Ergazakis et al. 2006; Foray, 2006; Gupta and Govindarajan, 2000; Hamdouch and Moulaert, 2006; Harris, 2001).

Dimension 3: ICT Accessibility

This refers to the availability as well as affordability of computers with multimedia performance capabilities with broadband connectivity to the Internet. In a time where so much content and contacts are on the Internet, anything less than broadband, multimedia can be considered a competitive disadvantage (Sharma and Azura, 2006). Samarajiva and Gamage (2007) reaffirm the strong correlation (though they concede this does not necessarily mean causation) between the ability to communicate over distances and time using technology and economic growth. The digital divide, while passé in its prognosis, remains a demarcation between haves and have less (UNESCO 2005). Mansell (2002), Castells (2000) among others, caution against the fallacies of present policy measures that tend to favour the economic or intellectual elite in the mistaken belief that it would be more impactful. The concept of ICT accessibility has to be broadened to ensure that there is greater deliberative democracy, which is essentially what is required in a knowledge society. In this sense, universal suffrage for ICT means that the availability and cost of access to broadband Internet allows a knowledge society to presume that participation is open to all who need them (Ergazakis, 2006; Paganetto 2004).

Dimension 4: Rule of Law Favourable of International Norms

The rule of law gives a transparent, impartial and accepted-by-popular-vote code of conduct that governs the relationship between individuals and organisations in any society. Such a common

understanding and acceptance of norms is imperative for the sanctioning of knowledge creation and transfer for the purpose of commerce and industry (Conceicao et al. 2003; Kahin 2006; Rodrigues 2003). Addressing the International Bar Association's 2007 Conference in Singapore on the topic of "Rule of Law", the Singaporean Minister for Law remarked in his invited address that an independent judiciary, the right not to be arbitrarily arrested, the conduct of a fair trial, free and fair elections, and the right to personal safety and security are the cornerstone of a society governed by the rule of law and other measures "very much depend on the balance between individual and societal rights". Increasingly there is much discussion among communities of nations (e.g., ASEAN and the European Union) of what this balance ought to be. Globalisation is characterised by rapid increases in the flows of foreign direct investment, capital transfers other than direct investment, trade flows of goods and services, and technology transfer" state Houghton & Sheehan (2000, p.5). It is essential to preserve a common understanding of values, practices and norms upon which these activities can take place.

Dimension 5: Intellectual Property (IP) Regime

In any KBE, knowledge assets are critical resources which must be preserved and protected in order that they may be exploited for gain. Hence, an Intellectual Property Rights (IPRs) regime which protects the exploitation of research so that those who invested in research may benefit commercially from their efforts to the exclusion of opportunistic free-riders, differentiates how society views innovation – is it an economic commodity to be owned or creative common good to be shared? While it is commonly known that having a good IP regime helps protect trade secrets, industrial designs, copyright material, patents and even tacit knowledge (through non-disclosure or no-compete agreements, for example) which in turn lead to a greater stimulation for innovation, Dolfsma (2006) also cautions against having an excessive regime: "It is possible that an excessively 'strong' intellectual property regime may actually inhibit the pace of innovation, and slow the pace of economic development. Such a conclusion hinges, of course, on the effects of developments in IPRs in terms of communication costs on innovative activity." (p.215). It is hence accepted that there is a balance between protecting creative works and inventors on one hand and the need to promote and disseminate useful knowledge for the advancement of society (Dolfsma, 2006; Kahin, 2006; Olssen & Peters, 2005; Powell & Snellman, 2004; UNESCO, 2005).

Dimension 6: Political Vision & Strategy

Much like a business vision and mission in any organisation, the political vision is a strategic impetus that enunciates how the leaders of a society wish to direct infrastructure, governance, human development and nation-building activities in order to achieve this shared vision. It is clear that the leadership that is derived from political vision and strategy are key factors that are necessary to ensure the success of a society's transition towards a knowledge economy (cf. Cheng et al. 2004; Conceicao et al., 2003; Dvir and Pasher, 2004; Ergazakis et al., 2004; Mansell, 2002; Olssen & Peters, 2005).

Political vision requires an acceptance that institutions such as a representative legislative body, an independent judicial system, a free and vibrant press are all constituents of a plural and inclusive knowledge society that thrives on knowledge creation and innovation (Cheng et al., 2004). Olssen and Peters (2005) have also suggested that an open and successful knowledge society requires institutions such as a free press, transparent government, pluralism, checks and balances, toleration, freedom of thought and open public debate as political openness is essential for the success of the transformation towards a knowledge economy. While this belief is not universally-held and in fact somewhat contentious, the same qualities (or lack of) also comprise the political DNA of a society.

Dimension 7: Business Environment that Rewards Innovation

A business-friendly environment includes open and fair policies and rules for business practices (public tenders), competition, regulatory regimes, taxation and the provisioning of public services from these revenues that allow knowledge work to thrive – for instance grants for education and research. The business environment and platform on which knowledge is created, shared and exploited is another crucial aspect of successful knowledge societies. A positive business environment eliminates hurdles and makes it easier to do business. This allows firms to focus on innovation rather than on overcoming the red tape of bureaucracy.

Dimension 8: Higher Education

Higher or post secondary education is defined as the human resource development offered in universities, colleges and other specialist institutes that goes beyond formal schooling (10 – 12 years of basic education) and typically leads to specialist degree or diploma qualifications. Historically, universities have been centers of knowledge, learning and change. Hence they form the key institutions that act as drivers of innovation and value creation. Consequently, these higher education institutions are often encouraged to create thought leadership that steps out of the shadows of “conventional wisdom” that is practiced by industry and business (Foray, 2006; Olssen & Peters, 2005). Research by UNESCO (2005) and UNDP (2007) suggests that education has been undervalued in terms of its contribution to knowledge capital, and due focus must be given to these higher education institutions to stimulate a greater knowledge-sharing culture in our societies (Ergazakis et al., 2004; Olssen & Peters, 2005). Universities and higher education are hence greater than the sum total of their explicit knowledge repositories.

Dimension 9: Research & Development

Research and development is defined as formal and funded programs for scientific, technical and rigorous investigations into the pressing problems of society. A successful knowledge society is one where there is a premium placed on extensive R&D to acquire knowledge through its research centres and learning institutions, which together enhances economic development (Edvinsson 2003; Ergazakis et al., 2006). The Cha-Cha-Cha framework of discoveries is useful to understand the types

of discoveries and inventions that are made in this context (Koshland, 2007). “Charge” inventions solve problems that are quite obvious, e.g., a cure for cancer. “Challenge” discoveries are a result of an accumulation of facts or concepts that are *unexplained by or incongruous with* scientific theories of the time, often resulting in “paradigm shifts”. “Chance” discoveries refer to those that are serendipitous. However, serendipity is not sheer luck and involves knowledge and intelligence for recognition and application (Shah, 2006). As such, R&D is considered necessary for society to progress and regenerate.

Dimension 10: Human Rights & Freedom

Human rights and freedoms refer to a set of fundamental rights recognized by most societies in human civilisation. These rights were originally described more than fifty years ago in the Universal Declaration of Human Rights and have since been detailed in a series of human rights agreements, similar to international treaties. Human rights at the most basic include the right to life, liberty, and personal security; the right not to be tortured or enslaved; the right to safe, decent work; and the right to an education. In a knowledge society, the assurance of the rights of citizens – the right to access data held by public authorities, civil society participation, universal suffrage (voting) and universal access to knowledge – is fundamental to the promotion of human development and leads to a greater citizen empowerment and the sharing of information and knowledge (Ergazakis et al., 2004; Ergazakis et al., 2006; Foray, 2006; Mansell, 2002; UNESCO, 2005). It is a perennial debate on whether human rights and freedom may co-exist with the rule of law. Whilst this may seem contradictory, there are many current examples of societies that possess one of the two dimensions but not the other, and yet other societies that jointly promote both after considering a careful trade-off.

Dimension 11: Role of Mass Media

The role of mass media is the dissemination of public interest information as well as the accompanying discussion and debate that comes with it in order to support an open and informed society that can participate in civic decisions such as elections and referenda (Ron Rice, personal communication, 2007). As Federov (2003, p 1) notes: *Media literacy, acquired in the result of this process, helps a person to actively use the resources of the information field.* The ubiquity of responsible mass media (e.g., newspapers, radio, television, telephones) is always central to any discussion of development, whether economic, political, or quality of life. Media access is often correlated with political maturity and economic development and literacy. Given the increasing commercialization of mass media, what Masterman (2004) later calls the media quality gap is particularly pertinent. It is clear that media literacy skills are essential to the democratic health of contemporary media-saturated societies. This is not to posit a passive notion of media consumption - the audience as vulnerable victims – but that increasingly sophisticated techniques of information management demand a commensurate expansion in the critical consciousness of audiences. A

knowledge society must address the gap between the relative sophistication and power of media producers and media audiences.

Dimension 12: Shared Ba (Physical & Virtual)

The Japanese word *ba* refers not just to a physical space, but a specific time and space – “it is a concept that unifies physical space such as an office space, virtual space such as email, and mental space such as shared ideals” (Nonaka et al., 2000). When people gather in a meeting room and share their knowledge to solve a problem, they are providing a shared context to create new knowledge.” (Baqir & Kathawala, 2004). However, several researchers also suggest that the quality of a virtual *ba* is not yet comparable to that of a *ba* in a physical environment. In the knowledge cities technology model, the selection of technologies is aimed at meeting the challenge of ensuring that the quality of a virtual *ba* is equivalent to the *ba* of a physical meeting. The notion of a *ba* in the creation of knowledge can hardly be over-emphasised. The group of French mathematicians that was known as the pseudonym Bourbaki, met frequently in cafés, tabacs, and brasseries of the Latin Quarter in Paris (such as the Capoulade’s Café) in the 1934–35 period, discussing mathematical problems and authoring mathematical treatises (Beaulieu, 1993) in an open, irreverent and cooperative mode. When the Bambergers founded the Institute for Advanced Study in Princeton, in 1930, they in fact, built an excellent *ba* which was later described as an “intellectual hotel” by the faculty members (Regis, 1987). Such spaces in cities often take the form of cafes, pubs, social events and cultural settings (including places of worship).

Dimension 13: Knowledge Sub-networks

A knowledge sub-network can be described as the forming of a group of people with shared interests and expertise in a given knowledge domain. The success of a knowledge society not only depends on the diffusion of knowledge through formal networks and links but also on such informal networks and relationships. These sub-networks can act as localized knowledge sharing and co-creation channels (Cheng et al., 2004). Such sub-networks provide certain advantages to its members that are not available outside in the wider network, such as helping entrepreneurs identify opportunities that may be exploited in future or scientists or engineers critique their progress in the path of discovery. In the transition from the industrial era to the information era, we have witnessed how the process of globalization has been a major catalyst. Hence, a myriad of international professional societies and standards bodies have emerged in the last 100 years in order to promote these necessary knowledge sub-networks. At the other end of sophistication is the age old tradition of story-telling as the glue that binds a segment of society with common beliefs and values and in so doing facilitates the transfer of learning and wisdom (Snowden, 1999).

4. Concluding Remarks

The analysis thus far suggests that the knowledge society is indeed a desirable outcome that could be designed to foster sustainable development. However, the key to successful knowledge creation and sharing is complex – knowledge that is codified and imported is rarely a sustainable advantage. Hence there is a need to consider the intricate inter-relationships between the structural, human and relational dimensions of knowledge. While we posit 13 dimensions that contribute to creating and sustaining knowledge societies, their interactive effects are commonly mediated through the pillar we have defined as culture. Indeed it is readily apparent that a sustainable knowledge society places assumptions of an all pervading culture of learning, innovation, knowledge sharing, diversity of thought and industry impetus. Such is the nature of culture that it is not easily replicated and hence serves as a sustainable competitive advantage (as compared to infrastructure which may be acquired or governance which may be imposed or talent that is relatively mobile). As Houghton and Sheehan (2000) state, this “complex chain of creation, production and distribution” that characterizes a KBE requires such sophistication in the culture of its talent and governance. We provisionally conclude that culture is the necessary condition that allows for a certain level of governance and attracts a certain quality of talent.

One such sophisticated aspect of culture is the acceptance of the notion that knowledge (particularly science more than technology) serves as a common public good – it is in society’s interest that higher education, ICT access and publicly funded basic research is universally available to its citizens. This formed the ideological basis for the notion of the creative commons. Another aspect of this culture is the recognition of diversity as a merit and the active participation of youth and women in knowledge creation as well as governance. It is widely held that youth is the single biggest agent of change (and this change is a constant in the KBE) and therefore a catalyst for continual learning and (re-) discovery. As well, women have been held as the purveyors of knowledge and wisdom in society since ancient times and hence their involvement (not only in child rearing) remains critical.

Numerous recent examples have pointed to societies which have emerged within a span of 2 or 3 decades to become economic powerhouses (eg. Korea, Turkey, Brazil) – migrating from less-developed to OECD. In several of these cases, the composite of governance, talent, and culture have augmented what we believe is most passé – infrastructure – to support such a transformation. Indeed the World Bank’s (2006) study on the wealth of nations found that a society’s visible assets – land, natural resources, manufacturing facilities, machinery – are only a fraction of its total wealth, most of which are intangible – skills and know-how, social capital such as trust among people and their ability to work together, governance dimensions such as rule of law, effective justice, property rights and functional government, and net financial assets including foreign reserves. The study showed that successful knowledge societies accumulated above 80% of their wealth in terms of intangible assets

and that “human capital (measured through years of schooling) and governance (measured through a rule-of-law index) together explain 90% of the variation in intangible capital”. In other words, the higher education and rule of law dimensions of a knowledge society could alone predict an overwhelming proportion (90% of 80%) of its success. It is therefore a reasonable conclusion that investing in continuing and higher education, promoting research and innovation, and preserving the cultural conditions that shore up relational capital are more potent policy instruments than the mere cultivation of natural capital and development of physical assets beyond a certain stage.

As well, it has also been suggested that a knowledge society which is truly self-actualised is by definition also a contented one which conducts inter-personal relationships in a sagacious manner (cf. Ezechieli 2003). So we have a Gross National Happiness (GNH) Index proposed in 2006 by the US-based International Institute of Management that considers the cultural trait of being happy and content as a socioeconomic development metric encompassing a society’s mental and emotional health. However, with some exceptions, many of these aspects of how a society lives with fulfilling knowledge, have yet to enter into the lexicon of most knowledge policy planners.

“For UNESCO, [on the other hand] the construction of knowledge societies opens the way to humanization of the process of globalization.” (UNESCO, 2005, p27). Hence its report (*op. cit.*) alludes to less developed societies having opportunities to evolve into sustainable KBEs through active education and literacy policies (citing the examples of Botswana, Kerala in India, and a Peruvian village), electronic administration for better governance, promotion of research and innovation (knowledge creation), and moving from consumption to participation in the knowledge economy. These are generally policies that encourage participatory access to knowledge and an integration of various knowledge policies (similar to what Michael Potter might have called the cluster approach to development). However, we caution that the “barriers to entry” and the “existence of competitive forces” make such a rapid ascension into a KBE a formidable proposition. The idea of leapfrogging or achieving hyper-growth in transforming from an agricultural to a knowledge society is indeed appealing in its theoretical ideal of creating a less disparate world as well as in its practical goal of poverty alleviation. However, our understanding of how such societies may emerge, based on the research reported in this paper, is that such a transformation is not possible without the necessary building blocks of infrastructure, governance, talent and culture. Alas, in the foreseeable future, much of this will be strongly associated with OECD member societies until and unless the operational dimensions of creating sustainable knowledge societies are systemically addressed in the public policy domain.

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