

---

## 10

### Borderland tele-centres: learning & connectivity at the edge

---

Blanca C. Garcia

Department of Public Policy | North East Region | Monterrey Unit.  
El Colegio de la Frontera Norte. COLEF. (Northern Borderlands  
Research College). <http://www.colef.mx/english/english.asp>  
277, Tecnicos St. Tecnologico. Monterrey, Nuevo Leon. Mexico. C.P.  
64700  
E-mail: [blancagnava@gmail.com](mailto:blancagnava@gmail.com) ; [bgarcia@colef.mx](mailto:bgarcia@colef.mx)

#### Structured Abstract

**Purpose** – This research paper explores a regional Latin American telecentre development strategy initiative from a knowledge-based development (KBD), perspective.

**Design/methodology/approach** – From such approach, the paper takes the discussion away from information and communication technology (ICT) applications, connectivity access or digital divide perspectives. It will rather focus on relational capital concepts, linked to that of knowledge for community development, in order to map out the nature, development and impact of collective knowledge on sustainability. It would therefore explore how conventional telecentres could be transformed into knowledge hubs in a fast-paced route into becoming knowledge networks, built on key strengths of the city-region's *Systems of Learning*.

**Originality/value** – It is sought to highlight how regional systems of Learning, as modern Agora, continue building knowledge-based communities and social networks. It is expected that a network outlook will better highlight such networks, strengthening the region's relational capital.

**Practical implications** – Hence, this piece of research work advances that the aspirational transformations of telecentres into knowledge hubs and knowledge networks is possible in a context of knowledge-based development initiatives. As the Mexican North-East region and other Latin American regions seek to re-invent themselves as knowledge epicentres, the possibilities for sustainable development through k-networks are greatly increased. Therefore, the paper will seek to emphasize the importance of telecentres for information and knowledge sharing. Most importantly, it will attempt to highlight the trade-off between top-down connectivity and computer literacy programs vs the community-prone and development-led efforts that telecentres represent in some Latin American regions. In such contexts, telecentres could become knowledge hubs and knowledge networks for more extended cases of sustainable development.

**Keywords** – tele-centres, ICTs for development, Knowledge-Based Development (KDB), Knowledge Cities (KCs), digital policy.

**Paper type** – Academic Research Paper / Practical Paper

## **1 Introduction**

Connectivity and the use of information and communication technologies (ICTs) for development is unavoidably linked to that of knowledge management and social knowledge sharing practices. However, sharing knowledge remains the biggest challenge in our knowledge-based development (KBD) dimension (Halal, 2005:7). In such context, this paper aims to explore the case of Tele-centres, a practical case of connectivity that provides a social knowledge-generating space for communities, cities and societies. Some Tele-centres around the world are seemingly undergoing a process of transformation from information kiosks into knowledge hubs. The impact on the social *Systems of Learning* they are part of is yet unexplored, and necessary to map out as key knowledge-based social dynamics if telecentres are eventually to assume a knowledge network role in their communities and city-regions.

In such context, the first part of the paper attempts a literature review and discussion away from technological applications that support knowledge sharing communities, connectivity access or digital divides. It will rather focus on how social capital concepts, linked to that of knowledge for community development, in order to map out the nature, development and impact of collective knowledge. The paper will advance that the key to improve knowledge-based development practices in telecentres is learning facilitation, particularly social learning facilitation in informal and formal networks. They could become spaces for conversations where knowledge is transformed into a value system that benefits the city (Carrillo, 2004). This review will be followed by a deeper inquiry on the role of social learning networks and social knowledge networks, on how they add value to the social capital of members through access negotiation, autonomy and participation.

The third part of the paper will explore a case for Telecentres in the Latin American (Mexico's) context, where their impact and effectiveness has been intensely questioned at the connectivity level. The project initiated in February of 2001, with the first CCA operating in the Mexican North East (near the Monterrey city-region). A few evaluations on real impact have already taken place, not all of them have been positive. In any case, the Monterrey city-region and the North East of Mexico are territories that have been both at the leading and bleeding edge of Mexico's socio-economical history. Shaped by their unique geo-historical conditions, they are once more developing new forms of social capital, defined and characterized by their condition of 'borderland'. Even if the Monterrey city-region is yet to prove that Telecentres in these borderland territories can indeed act as the first knowledge networks given its singular knowledge-generating environment, the city-region seemingly presents alternatives for national public policy, knowledge transformation and sustainable development that are worth exploring.

## **2 Telecentres and knowledge sharing**

Access to information has the potential to bring about the necessary social and economic change in a society. In that sense, telecentres seem to bridge the connectivity promise with shared facilities for people who cannot individually afford them because they are too expensive and/or too complicated to use (Ariyabandu, 2009:2). The fact that the users share the cost of telecom infrastructure and local facilities within their community at an affordable cost, brings a strategy for telecentres to operate: they could effortlessly encourage knowledge sharing. Nevertheless, sharing knowledge remain one of the key challenges of our time (Halal, 2005:7).

### **2.1 *The impact of collective knowledge on-line***

Indeed, as collective knowledge continues to grow in volume and complexity, we are progressively challenged to make sense of the co-evolutionary processes between learning (as knowledge creation) and its relationships and interdependencies with the new information and communication media available (Tuomi, 2005). Moreover, with telecentre activities and a number of other on-line, self-paced development processes, we seem to keep building multi-cultural, multi-ideological information highways. Indeed, our globe is seemingly turning into a world of parallel *systems of meaning* (Tuomi, 2004a:1). In this multi-meaning universe, the emerging societies in different parts of our world are increasingly depending on international links and networks to live on: their communication activities become critically important in the social construction of *communities that learn* (Tuomi, 2004a:1). In these emerging societies, our culture-led communication artefacts and culturally-based arrangements such as technologies, information systems and connection infrastructures such as telecentres are seemingly making our communication activities more intense and more relevant to others and their communities. At the same time, access to meaningful communication (or the lack of it) is shaping our self-perceptions as individuals; and our perceptions about other humans, cultures, and value systems in many ways. Hence, our unconventional exchanges of information, knowledge and experiences over the Internet are becoming permanent and personal processes of *meaning negotiation*. Message significance depends on who and where are the users at the moment of interaction. This meaning negotiation is the new reality of on-line environments and Internet-based interactions happening world-wide on a 24/7 basis: an increasing flow of continuous and creative interaction. At the core of this complex makeover of the social, economic and technical sub-systems, sits the *System of Learning* on which each of our societies rely on. Our systems of learning are historical societal structures now seemingly developing into *Systems of Meaning-Creation* (Tuomi, 2004a:2). Indeed, the learning systems in our societies appear to be challenged by the power of networked communication with varying levels of intensity. More than an information revolution, the new millennium has openly confronted us with a learning revolution (Sloman, 2001). Intranets, virtual communities and on-line learning are seemingly only the tip of a gigantic iceberg in this emerging revolution. Predictably, given the emphasis of communication in meaning-creation processes, information and communication technologies (ICTs) are indeed playing a major role in the *System of Learning* of emerging knowledge-based cities, regions and societies.

### **2.2 *Collective knowledge in networks***

On the other hand, the notion of *knowledge networks* is attracting an immense amount of interest within the international community. Networks by nature assume a globally distributed international audience, working 24/7 from the most diverse points of the planet. They are compared to, but distinguished from concepts such as Communities of Practice or CoPs. In CoPs, learning is generally situated and therefore the local context is essential to construct the meaning of such interactions. While an on-line environment might not be able to support situated learning (Lave and Wenger, 1991), the kind of exchange reached within a knowledge network (k-network) is seemingly overcoming typical on-line barriers of *meaning construction* by generating a common theoretical base and language of exchange. Indeed, user-friendly, internet-based networking technologies have accelerated the development of new forms of exchange: open and public

technologies have enabled the creation of strong networked communities, and "virtual" networks by underlining the role of shared community repositories (documents, databases, research outputs) that enable the network to generate a common language or practice. Networks can seemingly overcome the constraints posed by situational learning by establishing ground for common understanding (Brown and Duguid, 2000). Wenger (1998) has also proposed a network model within social communities as a *constellation* of interrelated CoPs, while Brown and Duguid (1991) have introduced notions of surrounding *knowledge ecology systems*. In any case, networks are seemingly developing a stronger ability that allows the transfer of knowledge and the facilitation of learning through social links. However, networks come in different shapes and forms. Indeed, in recent years a number of scholars have attempted to define the elements and characteristics of networks, especially those who add value to the social capital of organisations. For instance, Monge & Contractor (2003), suggest three kinds of value-adding, on-line networks:

*Social Networks*. Its not what you know, its who you know. These networks are created mainly to exchange *social* information amongst their members, such as their personal preferences, hobbies and leisure time activities etc.

*Cognitive Social Networks*. Its not who you know, its who they think you know. These networks are created to strengthen the relationships of its members within their network and beyond, bridging professionals' participation in a variety of interconnected memberships and groups.

*Knowledge Networks*. Its not who you know, its what they think you know. These networks are created by relationships between people who discover each other through their own knowledge (content, projects, comments, questions, answers): not just *social* information (*who knows what?* instead of the *who knows who* of the typical online social network services).

For the purposes of this paper, the third classification, that of knowledge networks (also known as social knowledge networks) is the more relevant to retain and explore in combination with telecentres, as presented in section three.

However, as well as for communities when working within networks, implementing ICT systems does not guarantee that people will stay connected. "It is important to remember that although it might be the technology that helps to connect people, it is the social capital that helps them stay connected" (Huysman and Wulf, 2005:86). Therefore, by linking the social capital concept to that of the concept of communities, this paper adheres to Marleen Huysman and Volker Wulf's proposal to focus on shared practice and social networks of technology-supported communities (Huysman and Wulf, 2005). It is affirmed that only with increased understanding of development in all its various dimensions, can knowledge-based development practices be improved. Key to this process is learning, particularly social learning in informal and formal networks (Cummings, et.al., 2003). This is how it is becoming progressively apparent for knowledge-based development (KBD) scholars that "there is a convergence between the 'sciences of development' and the 'sciences of knowledge' as together, they refer to the whole domain of human experience and potential". (Carrillo, 2002:384). Such insights into the evolution of social capital in communities can bring clarity to the state of the art of emerging knowledge-based models as the next paragraphs will elucidate.

### 2.3 Social capital, knowledge networks & development

As a counterpoint for rational neoclassical economic views of market transactions, social capital finds its conceptual roots in political science and sociology. In their comprehensive literature review on the evolution of social capital conceptualisations, Marleen Huysman and Volker Wulf (2005) propose a working definition for social capital, adopted here for the purposes of this paper:

*It refers to networked ties of goodwill, mutual support, shared language, shared norms, social trust and a sense of mutual obligation that people can derive from. Social capital is about value gained from being a member of a network. Social capital is often seen as the glue that brings and holds communities together (Huysman and Wulf, 2005:2).*

Such definition is the result of years of collective action. The first systematic contemporary analysis of social capital was produced by Pierre Bourdieu, who saw it as a durable network of relationships (1980, in Portes, 1998:3). But it was Granovetter in 1985, (in Huysman and Wulf, 2005) the one who introduced the concept of embeddedness of social action, bringing the element of trust into the scene. Also, on a theoretical level, Coleman (1988), Burt (1992) and Portes (1998) have provided key contributions to the discussions on human capital and its relation to social capital. Later, it was Putnam (1993, in Huysman and Wulf, 2005) the one who brings social capital to the level of civic engagement, and applies it to cities, regions and whole nations. Social entities, especially city-regions, are more pre-eminent in the analysis of learning, and we witness the emergence of learning city and knowledge city (KC) knowledge-based models, with integrative and global aspirations. Social capital becomes the prevalence of the network, through which information and knowledge are transmitted more efficiently (Halal, 2005:13). Networks have become synonyms of virtual working groups, and are “basically organizational forms of connecting people based on infrastructures offered by internet” (Huysman and Wulf, 2005:81). Now that technology affordances allow it, a conceptual and practical convergence between telecentres and knowledge networks is emerging as part of the development dynamics in different parts of the world.

### 3 Telecentres as knowledge hubs & networks

The origin of the *community access points*, or telecentres dates back to 1980s, when the first *telecottages* were established in Scandinavia and *community technology centers* (CTC) were established in the US (Ariyabandu, 2009). According to Molnár and Karvalics (2001), the first community technical centre was opened in Harlem, USA, in 1983, with the primary aim of bridging the growing digital divide between the upper and lower levels of society. CTCs offered free access to technologies and placed great emphasis on training at low cost. This same idea of creating places where the members of a community could access Information and Communication Technologies (ICT) was also followed in 1985 in the villages of Vemdalen and Harjedalen in Sweden (Molnár and Karvalics 2001). From these beginnings, two basic telecentre models can be identified: a) the Scandinavian model with the social aim of connecting the rural and village societies thus supporting their development, and b) the more profit-oriented Anglo-Saxon model, providing long-term access to the ICT devices primarily aiming at profit production (Rega, 2010).

However, since *telecentre* is a generic term which has acquired variety of names depending on the type of use (they could range from *Multipurpose Community*

*Telecentres, Community Tele- Services Centres, Community Information Centres, Community Learning Centres Telekiosk, Telecottages, etc.*), for the purposes of this paper, a working definition of **telecentre** is proposed as follows:

A telecentre is a public ICT access point with value-adding knowledge, training, and services to support its community's economic, social and educational development, reducing isolation, promoting education, employment, health and like services, empowering women and bridging the digital, economic, social and gender divides that polarize our societies (adapted from Ariyabandu, 2009:10).

As the new century progresses, the role of such conventional telecentres is transforming to more development-oriented knowledge networks. Knowledge hubs are the key intermediate step between common telecentres and knowledge networks, as emerging actors in the regional scenario. A conventional **knowledge hub** can be described as:

A vibrant public ICT access point which is accessible to communities to gain, share and organize knowledge depending on their needs and environment. (adapted from ESCAP 2006, in Ariyabandu, 2009:10).

Knowledge hubs can localize knowledge gained from peer ICT-based access points in other regions and serve their community. They will also contribute to creating knowledge by providing experience gained from the local communities to the benefit of the global networks at large. Indeed, knowledge networks, as knowledge hubs, are thought to trigger many other knowledge functions such as education, employment, agriculture and health besides providing conventional ICT facilities to bridge the digital divide. It is thus thought that rural/marginal community empowerment can be attained if the community is provided with access to information and knowledge to improve its livelihood and seek for sustainable development. However, such process involves the emergence of new partnerships, governance structures, participation and business plans. Such partnership dynamics could capture and manage relevant information, and eventually generate more knowledge from the fragmented and otherwise lost collective knowledge of communities. Hence, a working definition for a social or community-based *knowledge network* is proposed as:

A group of expert institutions working together on a common concern, to strengthen each other's research and communication capacity, to share knowledge bases and develop solutions that meet the needs of target decision-makers at the national and international levels. (Creech and Willard 2001).

Moreover, it is thought that the development of knowledge networks could facilitate bridging not only the digital divide but also the economic, social and gender divides now polarizing our societies (Ariyabandu, 2009:10). Knowledge networks seem thus to be working out beyond the connectivity promises of last century.

Hence, the process of transformation from telecentres to knowledge hubs and the eventual role they could play as knowledge networks it's worth exploring. Only recently a lot of emphasis has been put in transforming telecentres into knowledge networks, underscoring the role of knowledge hubs as they could empower rural and marginal communities to face their connectivity and development challenges. As the role of knowledge networks in development is acknowledged, a clearer view could be drawn to facilitate the process leading to sustainability in development. However, *knowledge sharing* as mentioned before, is a collective process: "telecentres are expected to generate and share new knowledge through global and local networks, and they are also expected

to harness local and traditional knowledge to add value to knowledge networks” (Ariyabandu, 2009:3). Unfortunately, more often than needed, fragmentation and underutilization of knowledge have been observed in telecentres of the Latin American region, resulting in low capability of communities in accessing, adapting and utilizing knowledge, isolation of disadvantaged communities and general decrease in socio-economic development. In such context, knowledge sharing in a networked environment is yet a connectivity promise to be fulfilled.

In that sense, some urban communities in Latin America have seemingly taken a leading role in developing connectivity, playing as new epicentres for their regions. By being re-defined by their history, their experience and their level of development, they are bringing new elements to the knowledge-based development scene. For instance, a city-region’s identity, the way its citizenship use knowledge to build their infrastructure, their institutions and their future strategies are playing a role in how they trigger knowledge-hubs and knowledge networks within and beyond their areas of influence. In the process, most of them are also building knowledge repositories or *depots* of information and *know-how* schemes from which they can withdraw elements of creativity to thrive in challenging times. Seemingly, in these city-regions generically known as knowledge-cities (KCs), “people link to form knowledge-based extended networks to achieve strategic goals, cultivate innovation and successfully respond to rapidly changing conditions”. (Chatzkel, 2004:62). Such networks are part of the city’s capital, and it can take different forms. With time, as the city’s population grows and diversifies, so does its knowledge, and the channels and networks through which it is distributed. Portes indicates: “whereas economic capital is in people’s bank accounts, and human capital is inside their heads, social capital inheres in the structure of their relationships... To possess social capital, a person must be related to others, and it is those others, not himself, who are the actual source of citizens’ advantage” (Portes,1998:7). Social capital is therefore perceived as the contextual complement of human capital (Burt, 2000:3) and potentially a close complement of social capital. (Healy, 2002:78). These are on-going processes in different parts of the planet, but for the purposes of this paper, we would like to have a glance into the Latin American window, and the Northern border of Mexico in particular. Such outlook is recorded in the following paragraphs.

#### **4 Telecentres in Latin America**

Even though several countries in Latin American have been world leaders in implementing universal access/service programs aimed at increasing access to telephones and the Internet in rural and isolated areas (i.e.: Argentina, Brazil, Chile, Colombia, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Paraguay, Peru, and the Dominican Republic), Latin America joins the telecentre connectivity race much later than other regions in the globe. It has been till the early 1990’s that central government policies attempted to favour remote rural or low-income urban communities by installing a telecentre within their reach. Today, Latin American telecentres vary widely (in concept and practice) throughout the region, but in general these are at “venues open to the public offering access to telephone, computer, Internet, and other communications and information resources, sometimes run on a purely commercial basis and sometimes linked to broader economic and social development policy goals and supported distinctively by one or more of these entities: public governmental institutions , NGOs and funding (private) organizations” (see Table 1 from Menou, et.al., 2004). In the beginning, most

telecentres in the region, were established in the aim to provide communities with access to computers and telecommunications facilities for purposes of socio-economic and community development (Menou, et.al. 2004). Their scope intended to address long-term social issues such as social exclusion and capacity building in marginalized communities. However, funding for such long-term social projects was seldom secured. Often, telecentres concentrated in bringing relevant solutions to technological access issues, forgetting the issues that telecentre users actually face (Huerta, 2007, Dewan & Riggins, 2005). In Latin America, telecentre users' efficiency such as gathering information, managing relevant information, and generating knowledge they can actually apply, are highly intangible issues yet to be explored (Huerta, 2007).

**Table 1.** Telecentres in Latin America by supporting entity.

<b>Initiatives Supporting the Telecentre</b>	<b>2002</b>	<b>Projected 2005</b>	<b>Projected 2010</b>
<b>Central &amp; Local Government based in Communities</b>	4 560	6 410	7 110
<b>Central and Local Governments based in Educational Institutions</b>	1 780	3 280	4 890
<b>NGO's and Private Sector</b>	106	940	5 870

Source: Adapted from Menou, et.al. 2004 and [www.telecentre.org](http://www.telecentre.org)

Nevertheless, the presence of telecentres since the mid to late nineties left a rich heritage for networking and a form of knowledge-based networks. Some of them have since disappeared; new ones emerge and others continue to work and have become part of an active community fostered and supported by telecentre.org (Caicedo, 2009). In Colombia, for instance, the Colombian National Telecentre Network led by *Colnodo* is "on its way to becoming a sustainable initiative that will offer continuous support to telecentres in Colombia and the region" (Caicedo, 2009). Of a special note amongst such success stories of Colombian telecentres is CINARA's knowledge network dealing with *Water Supply, Environmental Sanitation and Water Resources Conservation* in hydric stressed areas such as the Alta Guajira near the Atlantic coastal border (Latorre, 2010). This particular group is benefiting from telecentres' networked technologies to build permanent focus groups that include local government institutions, private sector and hydric-stressed communities. Also a skills development process was triggered by participatory research within the community, in which the indigenous knowledge was re-valued: partnerships were built, horizontal relationships were created and participation was the articulating principle of the whole project. As they work in consultation teams, solutions to the communities' acute lack of water emerge as they follow principles of knowledge-based development initiatives that are environment-friendly and people-centered. Researchers report above all, a clear shift in paradigms of policy implementation, research approach and community participation: a net impact on regional development (Latorre, 2009).

#### **4.1 Telecentres in Mexico**

Since the 1960's, a rich tradition for Distance Education moved Mexico ahead in the use of networked technology for development purposes. Successive federal and regional government initiatives have since implemented telecentre initiatives, amongst which are the following (see Table 2):



a) As part of the *School Network*, a federal government initiative in the early 1990's set up *Educational Technology Centres* in primary schools all over the country. They are spaces within schools that foster children's computing skills. They are shared computing rooms that combine different connectivity elements such as Internet, videoteque, and satellite television. Similar strategies started up as *Knowledge Centres* in Guanajuato or as *Tyldes* in Puebla (central Mexico), also operated at school level.

b) *Internet in my Library* initiative is part of a Digital Library strategy launched nationwide by the Libraries Directorate within the National Council for Culture & Arts ([www.cnca.gob.mx](http://www.cnca.gob.mx) or [www.cnca.edu.mx](http://www.cnca.edu.mx)).

c) *Communitarian Plazas* is another telecentre initiative launched by the National Institute of Education For Adults ([www.sep.gob.mx](http://www.sep.gob.mx)) which is piloting experiences for adult learners under the *Education for Life and the Workplace* scheme.

d) From a more systemic telecentre initiatives, the first *Information and Communication Systems Regional Centre* (SICOM, in Spanish) was inaugurated on 12th December 1996 in Puebla (central Mexico) and other five systems followed in 1997 within the region. SICOMs offer access to information of diverse nature: regional computer science, information and skills development, educational programme broadcastings on radio and television, with centre facilitator guidance, and like services.

e) Amongst the private sector initiatives, in 2002 the northern state of Nuevo Leon launched a telecentre initiative with 34 new Learning Community Centres (CCAs, in Spanish). By 2005 the *e-Mexico* initiative (see below) had 622 CCAs in operation, administered by Monterrey Tec (ITESM). Telecentres were located first in target marginalized counties in the south of the state, and deprived areas within city of Monterrey. Today they have expanded operations to the rest of the country and five other foreign countries in Latin America (Guatemala Colombia, Ecuador, Panama and the Dominican Republic), and the United States under a partnership scheme led by the Social Development Secretariat.

**Table 2.** Telecentres in Mexico by supporting entity.

<b>Initiatives Supporting the Telecentre</b>	<b>Projected 2010</b>
<b>Central &amp; Local Government based in Communities and/or Educational Institutions. CCDs</b>	6 550
<b>NGO's and Private Sector. CCAs</b>	1 918

Source: Adapted from [http://www.cca.org.mx/portalcca/donde\\_estamos/homedoc.htm](http://www.cca.org.mx/portalcca/donde_estamos/homedoc.htm) and <http://www.emexico.gob.mx/work/resources/LocalContent/24650/1/redes.pdf>

#### **4.2 The e-Mexico National System initiative**

The CCA initiative is apart of a more integrative, systemic view of telecentres, under the scheme known as *e-Mexico*. The *e-Mexico National System* initiative attempted to produce coherency in the interests of the Federal, State and Local public administrations, public offices, telecommunication operators, chambers and associations regarding information and communication technologies, academic and economic agents, and diverse institutions to develop digital services ([e-Mexico.gob.mx](http://e-Mexico.gob.mx), 2010). Launched in 2001 by the executive federal government, *e-Mexico* was thought as an integrative set of strategies to foster, maintain and enhance the use of computers and access to the Internet.

It aims to allow citizens to benefit from information and Communication Technologies through a Digital Sharing Process, and recognizes that education and knowledge should be regarded as basic public services for all citizens. It seeks to converge the efforts of different public and private actors who are joining this Digital Sharing integral process. The initiative follows three main action lines: a) Connectivity, b) Contents and c) Systems. The three action lines focused mainly in services of e-Learning, e-Health, e-Economy and e-Government, with paramount emphasis on communities and people, especially the marginalized ones (e-Mexico.gob.mx, 2010).

The issue of connectivity is vital in the initiative, aiming to bring citizens all around the country to the effective use of ICTs. In such aim, *e-Mexico* encourages investments from the private sector to increase the telecentre infrastructure, in which CCAs play a significant role. However, from a public investment point of view, *e-Mexico* fosters and sponsors the establishment of a nationwide network of Digital Community Centers (DCCs) in every single one of the municipalities of the country. DCCs are physical spaces where the members of a community access digital services and contents, as well as the use of internet using computing equipment. These centers are installed in public places such as schools, health centers, libraries and government service offices. DCCs attempt to provide connectivity to isolated communities –through their municipalities, with access to learning, health, economy and government services. In brief, *e-Mexico* aims to connect every Mexican citizen with all his/her countrymen, and with the rest of the world (e-Mexico.gob.mx, 2010).

Some resulting figures from the first stages of the initiative include the following: on June 5, 2003 the First *e-Mexico* Satellite Network was launched; since then, connectivity is provided to 3,200 DCCs covering all the municipal heads in Mexico (2,445, although more than 75% of the DCCs are located in schools and academic centres in the nation). Two more satellites launched later added 4,300 additional DCCs to the *e-Mexico* national network to date. In brief, the *e-Mexico National System* has already deployed 7,500 Digital Community Centres (DCCs), and 1918 Learning Community Centres (CCAs), run by private initiatives. Today, it is estimated that 5 million monthly visitors access the DCCs and 250+ million web pages are displayed in their facilities. Potentially, DCCs could serve more than the 60% of Mexican population in need of connectivity. It is in this dynamic and effervescent context that CCAs emerged in the Monterrey city-region.



## 5 A social/relational capital for Monterrey

### 5.1 A research methodology for borderland telecentres

Monterrey has been the context in which a form of telecentre network is taking shape as Mexico progresses in providing digital services to all sectors of its citizenship. CCAs, along with DCCs, are complementary partners in the nation-wide efforts to stay connected, and act as the private sector arm to strengthen Mexico's connectivity. CCAs

are prone to be sustainable and likely to become knowledge hubs gathered around Monterrey as its epicentre for a simple reason: the high capacity for relational/social capital already existing in the city-region (Garcia, 2009). Indeed, Monterrey's business culture has managed to establish a tacit agreement between labour and entrepreneurship (now embedded in the city-region) that has attracted specific industry clusters as today's backbone of Monterrey industry. With such prominent position, Monterrey has nevertheless been both at the leading and bleeding edge of Mexico's socio-economical history. Shaped by its unique geo-historical conditions, Monterrey has developed original forms of human collective capital, defined and characterized by its condition of 'borderland'. By becoming a city 'purposefully designed to nurture knowledge' (Dvir and Pasher, 2004:17), Indeed, Monterrey is focused in becoming a knowledge epicentre and it has been in this context that CCAs are framed. In this context, Moreno (2003), has identified the core types of public policy evaluation earlier used by other researchers (Carter & Wharf, 1973:26 - 28; Patton, 1987:346 - 347 and Rossi & Freeman, 1987:14 - 15), that could be classified as quantitative, qualitative or a combination of both, according to the approaches and specific evaluation aims (Moreno, 2003). Amongst the qualitative methodologies (impact obtained, formative, conclusive evaluation), for the purposes of this research, a qualitative, external and formative evaluation format has been chosen, which asks questions such as the following: How can the programme in course be improved? Which are the weakest and most consistent aspects amongst the daily activities of the programme? Can such activities be improved?

## **5.2 CCAs: Monterrey's systems of learning & systems of knowing**

Recently, Monterrey's local government purposefully undertook Knowledge-City initiatives that intensified its knowledge-based industries. However, prior to that, ICTs were already playing a significant role in supporting social capital within existing and newly emerging communities in Monterrey: i.e. the city has traditionally been the home base for national and multinational corporations with a culture for networks. Moreover, the city-region is home to over 20 chief universities, with several of them located in Monterrey and actively seeking for ICT infrastructure deployment. Relevant to the CCAs initiative, and with a strong tradition at local and national level is the city's technological institute (ITESM) also known as Monterrey Tech.

Monterrey Tech or ITESM was founded in the city of Monterrey in 1943, to grow into one of the largest private university systems in the Americas, with 30 campus in Mexico and 1,240 field offices of its Virtual university programmes in Mexico and Latin America (Shapiro, et.al., 2000:45). At the beginning of the century, ITESM growth strategy was driven by two major trends: globalization and network capability, emphasizing the extensive internal use of ICTs (Shapiro, et.al., 2000:48). An example of this is the infrastructure investment approved in 1997. Deployed in about 2 months, central servers for information management were set up, new campus software for course redesign was bought, 3,000 network gates for laptop connectivity were installed and 18,000 laptops were (credit) distributed amongst students (Shapiro, et.al., 2000:49). Although an integral culture based on teamwork, collaboration and time management is still on course, ITESM has a lead in the region, taking part in the effort to develop telecommunications in Mexico and Latin America. ITESM has already a technology-based educational model, which matched the requirements of CCAs under the *e-Mexico* scheme.

It was in such context that back in February of 2001, Monterrey Tech (ITESM) joined the distance education private initiatives around Mexico to reach isolated or marginalized communities with quality (technology-based) educational services. The first Community Learning Centre (CCA) was established in the southern Nuevo Leon locality of Doctor Arroyo (a three hour drive from Monterrey) considered one of the most deprived and marginalized areas of the state. This centre became immediately the access door to a formal education for many children, young people and adults who would not have such possibility otherwise. Later in April of that same year, in partnership with the Education Secretariat and Telmex (the main Mexican telecom supplier) ITESM began to operate another 30 CCAs in different locations. By May 2001 Monterrey Tech signed an agreement with the Mexican Social Development Secretariat (SEDESOL) to establish a CCA in each one of the micro regions of greater marginalization in the country, which started to operate by 2002. ITESM serves today around 2,100 telecentres 90% of which are within Mexico's territory. But its linking social capital has also expanded the CCAs network into North Carolina, Florida, Georgia and Texas, where they serve Mexican and other Latino immigrants in about 90 telecentres helping them access their community opportunities. CCAs operate on an ITESM technological platform and ITESM (undergraduate) students play the role of tutors for CCA users in this computer-based educational initiative (Cronica Intercampus, 2003:1/4). They aim to advance emerging educational models based on innovation, ICT use, learner-centred methodologies and partnership building. And their ultimate goal is to create learning opportunities for marginalized communities and generate alternatives to social exclusion and inequity by fostering the development of ICT abilities (computer literacy) for people in such communities. Indeed, any private or public institution can apply to open a CCA. Data for this study were collected from CCAs that are sponsored by ITESM, with purpose-built facilities and an average of 6 to 10 desktop computers and (mostly) with Internet connection. Computers have a Pentium processor and a hard disk of 40 to 60 gigabytes. Depending on the demand, computers are leased an average of 45 minutes (Huerta, 2007). It is believed that such use of technology by a university system is having considerable impact in its surrounding community and beyond. Initiatives such as the CCAs are also a platform for innovative ways of using ICTs. For instance, it is believed that an inclusive initiative of "telecommunications for the poor" is to intensify radio broadcast as a means to raise their awareness and familiarity to information interaction and feedback. This proposal sees radio programmes as clear development opportunities for the marginalized, as they prepare them for the mainstream information flow of the internet. (Kenny, 2002:154). This logic has been followed by CCAs supported by ITESM, and have included a new technological communication tool for community support: the Radio Chat. It combines audio broadcasting on Internet with the simultaneous ability to send written messages to radio broadcasters and the general public listeners. The Radio Chat is thus another tool for guaranteed interaction and social learning in networks, and possibly knowledge creation.

Indeed, as we first approached the exploration of the *Systems of Learning* and the *Systems of Knowing* underneath the CCA emerging culture, a case study was identified focusing on skill development for knowledge facilitators (namely CCA operators or promoters) of five CCAs in Nuevo Leon (Flores, 2005). This study sets out to measure the level of efficiency of the promoters/operators as knowledge facilitators of CCA users' learning processes based on their qualifications and/or profile at the time of being contracted for the role. The study tries to determine if the work of the promoters

(operators) reaches the main target for the CCAs to reach all the members of its community. The context of the study concentrated in the municipalities of Villa de Santiago, Allende, Villa Juárez Cadereyta, Gral. Terán, Montemorelos, Hualauises, Linares and Rayones. Back in 2005, these communities hosted most of the CCAs in Nuevo Leon, (known as the *citrus* region of the state), some considered marginalized areas of slow development. The study considered visits to six (6) CCAs to observe promoters' behaviour towards the users, realising these visits with a frequency of 2 daily ones to different centres to obtain 3 visits by CCA altogether. The visits faced streets without paving, that in rainy weather they made the access to the CCAs rather difficult (as it is the case of Allende), or localities with poor, scarce resources, like Cadereyta, Montemorelos and General Terán. CCAs in such context struggled to create cognitive learning spaces within their Nuevo Leon community. For instance, Flores (2005) observed that 35% of the Centres operate in their communities without Internet. Even without connectivity, cases of CCAs with proactive initiatives were observed. A CCA promoter for example, looked for encyclopaedia software to feed CCA computers with it so that users had the opportunity to find what they looked for their job or homework. Nevertheless, the study also detected that an important percentage of promoters (operators) do not know the emergent theories of learning (i.e. Andragogy, Knowles, 1970 in Flores, 2005:87). And this researcher found that 85% of the interviewed people have not designed any activity of directed support to solve problems within their community: only one user has offered a solution proposal to unemployment issues in her community in the 12 previous months to the visit, and a 30% of the promoters had never taken at least one course on line. In such case, the promoters' role as a learning facilitator dropped 50% according to the case study criteria (Flores, 2005:42). Hence, the study determined that the CCAs in Nuevo Leon were not fulfilling the mission for which they were created, that is to promote the learning and "to offer to the inhabitants of a community new opportunities at educative matter with a view to fortifying its knowledge and to develop its abilities to sum up in such a way that they can apply them to consolidate an improvement in his quality of life, contributing to the development of its community" (ITESM, 2004, in Flores, 2005:25). From this perspective, it is of extreme importance that the promoter dominates theoretical aspects of the cognitive learning process (Learning as knowledge creation). Evoking constructivist theories of learning, the study considers that "each subject (for example, the promoter) constructs *systems of knowing* from its cultural surroundings". Hence, the promoter finds him/herself constructing, manipulating, exploring, discovering, listening to and setting out his/her ideas to others. According to these models, if the promoter is not familiarized with learning processes, he would be unable to support or guide his/her users correctly or will not be able to offer learning options to trigger significant learning amongst the CCA users" (Flores, 2005:47). The study thus detected that the CCAs are not yet clearly contributing to the improvement of their communities. It concludes that CCAs are an optimal context for well trained promoters, suitably enabled to guide the users in how to take advantage of the digital technology and the learning how to learn frameworks (Flores, 2005:75). Flores then advances a model and a manual to train CCA promoters that is yet to be tested. Under this framework, it is hoped that knowledge facilitators within the CCA scheme can be empowered (through training) to become self-taught and independent learners, who become multiple facilitators to advise on activities and active courses addressed to the young adults and adults that CCAs serve. Such kind of facilitator

could become a companion who helps others to become aware and sensitive to on-line learning, guiding others to learn on a self-taught and independent basis.

## **6 First conclusions on research**

In this opportunity, we were able to explore the converging forces behind telecentres as networked knowledge-based engines for development. Leaving behind the focus on technology and digital divides, this paper attempted a systemic understanding of telecentres as knowledge hubs whose potential to become knowledge networks in the Latin American context that could be worth exploring. By presenting a knowledge-network conceptualization and literature review, it is hoped that this paper advances research on telecentres under a new approach that deepens the knowledge and research interests of the knowledge-based development (KBD) community has of telecentres.

Furthermore, the case study introduced aims to start an account for telecentre performance assessment that can be content-based and KBD-oriented. In fact, such outlook allowed us to grasp how the founding organization's conceptualization of a telecentre is perceived by people working in the telecentres, by people using it, by non-users (members of the local community who do not use the telecentre yet) and at the different locations (in the case of networked telecentres) which could bring further understanding on how a telecentre fosters community development and social capital. As we observe how CCAs reach out to contribute for the development-related needs of their communities, our trained eye is also allowed to examine the existing patterns of culture, relationship and trust, in order to trace back the kind of social capital and systems of learning that the CCA network is building in the northern areas of Mexico. Moreover, our empirical findings on the interrelation between community development and the appropriation of technologies has led us to discuss whether and how CCAs could play a significant role in supporting social capital within existing and newly emerging communities in a city-region in the Mexican North East. The example of Monterrey as a city and of ITESM as a university system involved in development initiatives, have led us to confirm that the use of ICTs and the existing social capital through the networks in the region could multiply the positive effects the recent knowledge-based initiatives have started.

Even though first results are far from encouraging, we must consider that Telecentres are both a commercial venture and a metaphor linked to ongoing changes and issues in public policy—each local project must meet demand, cover its operational costs and sustain itself, whereas the information generated and distributed should converge with a growing citizen demand for transparency in government as well as educational and cultural resources. If this citizen-driven demand not forthcoming, Telecentres may not prosper (Huerta, 2007). Hence, the CCAs already set up and thriving in the Mexican context may indeed constitute the ICT vanguard in rural towns and regions that is very much sought after under KBD schemes. With CCAs and DCCs, the Mexican scenario might be at the brink of dramatically lowering costs for local connectivity, if they could only manage to also integrate relevant, rich content to our community programmes. In that sense, the Monterrey city-region and relevant telecentres have already engaged in a development journey with new vision and new partnerships. Its universities, CCAs, DCCs and general networked capacity would play a strategic role for the city-region, in which the voices of learning systems' stakeholders would be simultaneously present in the diverse capital repositories of the city-region. Such variety of voices and the opportunity to hear and contrast them will be one of its key strengths in becoming a knowledge-based

hub, along with the complex and rich social capital repositories of this multilayered borderland.

## References

- Ariyabandu, R. (2009). "Role of Telecentres as Knowledge Networks: Successes and Challenges", for Information and Communication Technology and Disaster Risk Reduction Division, United Nations ESCAP, United Nations Building, Rajdamnern Nok Avenue, Bangkok 10200, Thailand. Available from: [http://www.unescap.org/idd/working%20papers/IDD\\_TP\\_09\\_06\\_of\\_WP\\_7\\_2\\_905.pdf](http://www.unescap.org/idd/working%20papers/IDD_TP_09_06_of_WP_7_2_905.pdf) Last Accessed on 8th February 2010.
- Brown J. S. and Duguid P. (2000) *The Social Life of Information*, Boston, MA: Harvard Business School Press.
- Brown, J. S. and Duguid, P. (1991). "Organizational learning and communities of practice: toward a unified view of working, learning and innovation", *Organizational Science*, Vol. 2 No. 1, pp. 40-57.
- Burt, R. (2000). "The network structure of social capital" in Sutton, I and Staw, B.M., *Research in Organisational Behaviour*. Vol. 22. Greenwich, Connecticut: JAI Press.
- Cothrel, J. and Williams, R. (1999). "On-line communities: helping them form and grow" in *Journal of Knowledge Management*,. Vol. 3, no.3 pp.54-60.
- Caicedo, S. (2009). "Networking the Latin American Telecentre Movement", in *Telecentre Magazine*. On line publication available at: (Last Accessed on 18th July 2010). <http://www.telecentremagazine.net/articles/article-details.asp?Title=Networking-the-Latin-American-Telecentre-Movement&articleid=230&typ=Features>
- Cardenas, L. (2008). "Monterrey, International City of Knowledge", Key Note Presentation at the Knowledge International Week, Ibero-American Community for Knowledge Systems, 29-31 Oct. 2008, Manizales, Colombia (pp. 99-118).
- Carrillo, F. J. (Ed.) (2006) *Knowledge Cities. Concepts, Approaches and Practices*, Bradford: Butterwood-Heinemann (Elsevier).
- Chatzkel, J. (2004). "Greater Phoenix as a knowledge capital". in *Journal of Knowledge Management*, Special issue on Knowledge-based development II: knowledge cities Vol. 8, no.5, pp. 28-46.
- Creech, H and T. Willard. (2001). *Strategic Intensions- Managing Knowledge Networks for Sustainable Development*. Manitoba, Canada: Institute for Sustainable Development.
- Cummings, S.; Heeks, R. and Huysman, M. (2003). "Knowledge and Learning in online communities in development: A social capital perspective", in *Development Informatics Working Papers Series*. Paper No. 16. IDPM. University of Manchester. Available at: <http://idpm.man.ac.uk/publications/wp/di/index.shtml> (Accessed on 3th August 2005).
- Dewan, S., & Riggins, F. J. (2005). The digital divide: Current and future research directions. *Journal of the Association for Information Systems*, 6(12), 298–337.
- Dvir, R. and Pasher, E (2004). "Innovation engines for knowledge cities: an innovation ecology perspective" in *Journal of Knowledge Management*, Special issue on Knowledge-Based Development II: Knowledge Cities. Vol. 8, no.5, pp.16-27.
- ESCAP (2006). "Knowledge Networks though ICT Access Points for Disadvantaged Communities" (United Nations Development Account Project).
- Flores, A.D. (2005). "Promotores of CCAs as Users' knowledge-facilitators", Educational Technology MSc dissertation. Monterrey: ITESM (2005).
- Flores, K; López, M.A. y De la Torre, E. (2009). "Digital Community Telecentres in e-México: Gómez Fariás, Jalisco Case". Presentation at Educational Research National Conference, Area 7: Visual Learning Environments. COMIE (<http://www.comie.org.mx/swgc/v2/sitio/sitio.php>), Sept 2009 Veracruz México. Paper Available from:

[http://www.comie.org.mx/congreso/memoria/v10/pdf/area\\_tematica\\_07/ponencias/0241-F.pdf](http://www.comie.org.mx/congreso/memoria/v10/pdf/area_tematica_07/ponencias/0241-F.pdf)  
Last accessed 08 March 2010.

- Garcia, B. (2009a). "Iron & Mountains: Shaping a Capitals System for Monterrey", in Batra, S. and Carrillo, F.J. (2009), *Knowledge Management and Intellectual Capital: Emerging Perspectives*. Section VI: Knowledge based Development and Knowledge Cities. Ghaziabad, India: Huntington Press.
- Granovetter, M.S. (1973), "The strength of weak ties", *American Journal of Sociology*, Vol. 78 No. 6, pp. 1360-80.
- Halal, W. E. (2005). *Making sense of knowledge*. Bradford (UK): Emerald publishing.
- Healy, T. (2002). "From Human Capital to Social Capital" in Instance, D.; Schuetze, H.G. and Schuller T. (2002). *International Perspectives on Lifelong Learning*. From Recurrent Education to the Knowledge Society. Milton Keynes: SRHE and Open University Press.
- Hildreth P. and Kimble C. (2003) *Knowledge Networks: Innovation through CoPs*. Idea Group Publishing. Available at: [<http://www.cs.york.ac.uk/mis/KNICOP/Chapters/Introduction.html> ]
- Huerta E. and Sandoval, R. (2007). "Digital Literacy: Problems Faced by Telecenter Users in Mexico" in *Information Technology for Development*. Volume 13, No.3, April 2007 p. 217–232 (2007). Abstract available from: [http://www.ritla.org.br/index2.php?option=com\\_content&do\\_pdf=1&id=928](http://www.ritla.org.br/index2.php?option=com_content&do_pdf=1&id=928) (Last accessed 08 March 2010).
- Huysman, M.H. (2003). "Communities of Practice: Towards a second generation of Knowledge Management" in *Human Resource Development*. Vol 4. No 4.
- Huysman, M.H. and de Wit, D. (2004). "Practices in Knowledge sharing: Towards a second generation of Knowledge Management", in *Knowledge and Process Management*. Vol 11 No. 2 pp 81-92.
- Huysman, M.H., y Wulf, V. (2005). "The role of Information Technology in building and sustaining the relational base of communities", en *The Information Society*, Special Issue. No. 21, pp 81-89.
- Kenny, Charles (2002). 'ICTs for direct poverty alleviation: costs and benefits', in *Development Policy Review* Vol. 20 (2) 141–157.
- Latorre, J. (2010). "Water Supply, Environmental Sanitation and Water Resources Conservation in Hydric Stressed areas: Colombia Alta Guajira's case.". Key Note Presentation in 2<sup>nd</sup> International Symposium, CAALCA 2010. ITESM, Monterrey, México. 7th May 2010. CINARA Research Centre: <http://cinara.univalle.edu.co/english/>; in partnership with <http://www.fundacionescerrejon.org>
- Lave, J. (1991). "Situating learning in communities of practice", in L. Resnick, J. Levine, & S. Teasley (Eds.), *Perspectives on Socially Shared Cognition*. APA, Washington, DC, pp. 63-83.
- Lave J. and Wenger E. (1991) *Situated Learning. Legitimate Peripheral Participation* Cambridge University Press.
- Malhotra, Y. (2003). "Measuring Knowledge Assets of a Nation: Knowledge Systems for Development" Research paper prepared for the Invited Keynote presentation delivered at the United Nations Advisory Meeting. of the Department of Economic and Social Affairs. New York City, New York, 4-5 September 2003.
- Menou, M.; Delgadillo, K. And Stoll, K. (2004) "Latin American Community Telecenters: It's a long way to TICperary", in *Journal of Community Informatics*, (2004), Vol. 1, Issue 1, pp. 39-57. Available from <http://www.ci-journal.net/index.php/ciej/article/viewFile/191/146> (Last Accessed 08 March 2010).
- Molnar, S and Karvalics, L. (2001). "Two models and six types of telecentres: a typological experiment", in *Papers of Information Society and Trend Research Institute*, Technical University. Budapest, Hungary. Available from [www.itk.hu/english/docs/two\\_models\\_six\\_type.pdf](http://www.itk.hu/english/docs/two_models_six_type.pdf) Last download 8 April 2010.
- Monge, P. R. & Contractor, N. S. (2003). *Theories of Communication Networks*. New York: Oxford University Press. See summary at: [www.uiuc.edu/ph/www/nosh](http://www.uiuc.edu/ph/www/nosh)



- Moreno, Luis. (2003) Evaluation and Optimization of Public Policy: Skill Development for Higher Education Teachers. Madrid: CSIC, Working Document #91.
- Portes, A. (1998). "Social Capital: its origins and applications in modern sociology" in Annual Review of Sociology. Palo Alto: 1998. Vol. 24, pp. 1-12.
- Rega, I (2010). "What do local people think about telecentres? A key issue for sustainability". A dissertation Submitted to the Faculty of Communication Sciences University of Lugano for the degree of Ph.D. in Communication Sciences. February 2010. Available from <http://doc.rero.ch/lm.php?url=1000.40.6.20100413103342-GI/2010COM001.pdf>. (Last Accessed 26 July 2010).
- Shapiro, L.; Carrillo, J. and Velásquez, C. (2000). "Evolution of collaborative distance work at ITESM: structure and process", in Journal of Knowledge Management, Vol. 4, no.1, pp. 44-55.
- Slooman, M. (2001). The e-learning revolution. London: Chartered Institute of Personnel and Development (CIPD).
- Tang, S. (2005). "Knowledge as a production factor: Toward a unified theory of economic growth". IAPSCASS Publications on-line (13th July 2005). Available at: <http://www.iapscass.cn/UploadFile/2005102203439560.pdf>. (Accessed 14th April 2007).
- Tuomi, I. (2004a). 'Future Challenges of the European Knowledge Society' discussion paper presented at Institute for Prospective Technological Studies. IPTS, 11th August 2004. Available at: <http://www.meaningprocessing.com/personalPages/tuomi/articles/TheFutureOfTheEuropeanKnowledgeSociety.pdf> (Last accessed 3rd March 2006).
- Tuomi, I. (2004b). "Knowledge sharing and the idea of Public Domain" Paper presented at the Unesco 21st Century Dialogue on Building Knowledge Societies. Seoul, 28 July 2004. A conference organized in the occasion of the 50th anniversary of the Korean National Commission for UNESCO. Available at: <http://www.meaningprocessing.com/personalPages/tuomi/articles/KnowledgeSharingAndTheIdeaOfPublicDomain.pdf>. (Last accessed 3rd March 2006).
- Tuomi, I. (2005). "The Future of Learning in the Knowledge Society: Disruptive Changes for Europe by 2020" Background paper prepared for the European Commission Directorate General Joint Research Centre (DG JRC)/Institute for Prospective Technological Studies. (IPTS) and DG EAC. To be published by IPTS, by March 2006. October 2005. Available at: <http://www.meaningprocessing.com/personalPages/tuomi/articles/TheFutureOfLearningInTheKnowledgeSociety.pdf>. (Last accessed 13th July 2006).
- Wenger E. (1998) Communities of Practice: Learning, Meaning and Identity. CUP.
- Vaast, E. (2004), Brother, Where are Thou? From Communities to Networks of Practice through intranet use, in Management Communication Quarterly, Vol. 18, No. 1, August 2004 pp. 5-44.
- Wasko, M. & Faraj, S. (2008). The Web of Knowledge: An Investigation of Knowledge Exchange in Networks of Practice, in Academy of Management Journal 2008.