Learning networks for bridging knowledge divides in international development: aligning approaches and initiatives

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About IKM Emergent

In April 2007, a five-year research programme was approved for funding by the Directorate General for International Cooperation (DGIS), part of the Dutch Ministry of Foreign Affairs. The programme, Emergent Issues in Information and Knowledge Management (IKM) and International Development, will be known as the IKM Emergent Research Programme.

The objective of the programme is to improve development practice by promoting change in the way the development sector approaches the selection, management and use of knowledge in the formation and implementation of its policies and programmes. It aims to achieve this by:

- raising awareness of the importance of knowledge to development work and its contested nature;
- promoting investment in and use of Southern knowledge production of all types and origins;
- creating an environment for innovation, supported by research on existing and emergent practice, for people working in the development sector to raise and discuss means of addressing these issues; and
- finding, creating, testing and documenting ideas for processes and tools which will illustrate the range of issues that affect how knowledge is used in development work and stimulate thought around possible solutions.

Colophon

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Abbreviations

AKIS	Agricultural Knowledge and Information Systems
CGIAR	Consultative Group of International Agricultural Research
CSOs	Civil Society Organizations
CoI	Communities of interest
CoP	Communities of practice
DFID	UK Department for International Development
Dgroups	Development through dialogue
EADI	European Association of Development Research and Training Institutes
FAO	United Nations Food and Agriculture Organization
GANM	Global Alliance for Nursing and Midwifery Communities of Practice
GDN	Global Development Network
ICTs	Information and Communication Technologies
IDS	Institute of Development Studies, UK
IICD	International Institute for Communication and Development
ILAC	Institutional Learning and Change Initiative
KM4Dev	Knowledge management for development
KIT	Royal Tropical Institute, Netherlands
IDRC	International Development Research Centre of Canada
IKM	Information and Knowledge Management
LINK	Learning Innovation and Knowledge
MIS	Management Information Systems
NGOs	Non-Governmental Organizations
NRNA	Non-Resident Nepalese Association
PROLINNOVA	Promoting Local Innovation
RKIS	Rural Knowledge and Information Systems
RPV	Resources, Processes and Values
SDC	Swiss Agency for Development Cooperation
SI&E	Social Innovation and Entrepreneurship
SNV	Netherlands Development Organisation
S&T	Science and Technology
UNDP	United Nations Development Programme
UNU-MERIT	United Nations University – Maastricht Economic and Social Research and Training Centre on Innovation and Technology
WOTE	Working on the edge

Executive Summary

This study is commissioned by the IKM (Information and Knowledge Management) Emergent Research Programme of the European Association of Development Research and Training Institutes (EADI) upon recommendation of a scoping study entitled *Management of knowledge for development: meta-review and scoping study* (Ferguson, Mchombu and Cummings 2008). The source of motivation also lies in the findings of a collection of papers published in the December, 2006 issue of the *Knowledge Management for Development Journal* 2 (3) on 'Bridging knowledge divides: the role of partnerships and cross-cutting initiatives.' This study aims to identify and characterize approaches and initiatives to bridging a complex array of knowledge divides in international development, specifically the differences in learning and innovation arising from multiple realities and multiple knowledge of a myriad of stakeholders, from multi-lateral and bi-lateral organizations to diaspora communities, civil society organizations (CSOs), and destitute local communities.

This study identifies systems approaches, specifically innovation systems thinking, as a potential candidate among a basket of choices to address the complexity of knowledge divides. Based on a review of the relevant literature, a convergence model of social innovation and entrepreneurship (SI&E) has been developed and provisionally tested using the evidence from the contemporary blossoming (or in some cases mushrooming) of the practices of forming epistemic communities, communities of practice, communities of interest, learning communities, learning alliances and learning networks, both globally as well as locally. These are various terminologies for seemingly similar processes of learning across conventional boundaries, although finer differences are possible between these communities. Recognizing semantic ambiguity of the use of the terms, this paper posits the concept of *learning networks,* as a corollary to the concept of *learning organizations,* is inclusive of all kinds of learning communities in international development.

There is a need for further research on stakeholder engagement in learning networks as a potential initiative to bridge knowledge divides, specifically using the convergence model of SI&E as a conceptual framework. This framework would be useful to understand processes of social innovation and entrepreneurship, from local to global levels. An effective learning network should entail a holistic perspective on the convergence of actor structures, resources, processes and values, not just integrating the ways of knowing and addressing the nature of being. In other words, this study argues that a higher order goal of value convergence is necessary to bridge divides arising from multiple realities and multiple knowledge systems. Subsequently, this study develops principles of managing learning networks, with a focus on individual actors, and outlines a few research questions by way of illustration. The questions, however, are not exhaustive and need to emerge through researchers' interactions with the members of the learning network in question.

About the Author

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Acknowledgements

Introduction

Knowledge divides are persistent challenges for international development. The underlying causes of knowledge divides in the contemporary knowledge economy are the disparity in stakeholder capacity to access knowledge assets, both public and private, as well as differences in capacity to participate in learning and innovation processes (UNESCO 2005). In the contemporary knowledge economy, the asset of knowledge is crucial in addition to the conventional factors of production – land, labour and capital. Universal access to information and knowledge, and freedom of expression, are the two pillars of the knowledge economy. The problems arising from knowledge divides will remain unresolved unless these two pillars of the knowledge society are strengthened by revisiting public and private, as well as formal and informal, modes of knowledge production, exchange, regulation and application. The epistemological divides which this paper refers to as divergences in ways of knowing, such as the divides between expert knowledge and local practices, are rooted in the multiple realities of stakeholder groups, such as profit and non-profit, as well as informal stakeholder groups. The crux of the problem of strengthening the two pillars of the contemporary knowledge economy lies in the way in which the various stakeholders work: the established habits and practices, and our readiness to change them in response to changes in the knowledge economy. As Thomas Kuhn (1962) asserts in his notion of normal science or paradigm-based science, part of the problem is due to a tendency to work under a paradigm-based research, policy and practice – the practice of normal science, normal policy and normal practice.

While local contexts are rapidly changing in response to changes in technological, biophysical, social and cultural systems in the knowledge economy, changes in a given paradigm of science, policy and practice often lag far behind. These lags are becoming evident over space and time. For example, since the existing conceptual approaches and tools available to development practitioners are often not enough to address the existing, let alone emergent, knowledge divides, an extraordinary science, policy and practice is urgently needed. This would come from a practice of thinking beyond what is obvious within a given paradigm or regime, and working on the edge (WOTE): new ways of thinking equals creativity and new ways of doing equals innovation. However, scientists, policymakers and practitioners are often preoccupied with predictable behaviours, social orders, routine tasks and daily errands, and have less time for novelty, creativity, reflection, contemplation and meditation (Wieldenhof and Molenaar 2006). Most unfortunately, relevant stakeholders often agree in principle to cross traditional boundaries, but in practice they have a tendency to work with like-minded people, to stick together, to reconfirm one another's preconceived ideas, and to remain within their respective silos. Spanning one's comfort zone is very challenging.

This working paper first presents the inherent complexity of knowledge divides by grouping them into analytical categories along four dimensions: technological divides, social/cultural divides, ontological (nature of being) divides, and epistemological (ways of knowing) divides. The paper then goes on to review various systems thinking, the latest being innovation systems thinking. Based on a review of

the literature, a convergence model of social innovation and entrepreneurship (SI&E) has been developed, recognizing a need to move from bridge building - the hardware metaphor - to the convergence of actor structures, resources, processes and values along a three-dimensional innovation platform – *the nature of being*, *ways of knowing*, and *long-term strategy* - as an effective strategy to address knowledge divides. The term *convergence* in this model refers to the coming together of public and private actors, developing a synergy of resources available in both sectors, and achieving overarching goals, but at the same time maintaining their inherent public and private values. The second section of the paper presents the strengths and limitations of contemporary initiatives to bridge knowledge divides in international development. Finally, the study recognizes the gap between conceptual approaches and prevailing practices, provides a set of recommendations, suggests further research in this field of knowledge and innovation management for development, specifically using the convergence model of SI&E, and presents its conclusions.

Part 1:   Approaches to Bridging Knowledge Divides

This section presents conceptual approaches to bridging knowledge divides in international development, and includes specific discussions on the inherent complexity of the knowledge divides; paradigm shifts towards systems thinking in response to the complexity and uncertainty; and finally develops a conceptual model of SI&E.

Complexity of the knowledge divides

Although the consequences of knowledge divides are already apparent in terms of ongoing problems such as poverty, hunger and resource degradation, the causes are complex, contextual and socially constructed, and the solutions are even more ambiguous. Technological and social forces interact with multiple realities and the multiple knowledge of a myriad of stakeholders, thereby creating a complex dynamic of knowledge divides in practice. To understand this complexity, an analytical typology of knowledge divides is presented below (Table 1).

	Ontological (multiple reality)	**Epistemological (multiple knowledge)**
Technological	Digital divide, broadband Internet divide Information divide Technological divide, physical divide	Technology literacy divide Computer literacy divide
Social/cultural	Divides between reductionist and holistic ontology North-South divide, developed-developing country divide, donor-recipient divide Political divide, ideological divide, citizen-state divide, public-private divide Social divide (class, caste, gender, religion) Racial divide, cultural divide Language divide Ethical divide, divides on human rights	Divides between positivist-constructivist epistemology, subject-object divide Disciplinary/interdisciplinary divide Professional divide Academic-practitioner divide Academic-vocational divide Research-practice divide Science-management divide Scientific-indigenous knowledge divide Theory-practice divide Knowledge-action divide Secular and sacred knowledge/practice

Table 1. A typology of knowledge divides with examples

Note: *The typology is for analytical purposes only and the various types of divides overlap in practice, e.g. digital divides can intersect the North-South divide, rural-urban divide, and divides in social structures (caste, class, gender, generation, etc.)*
Source: Author

1. Multiple realities

Technological divides interplay with the reality of stakeholders in various social domains, such as class, gender, caste, religion, and the roles in a development enterprise. For example, digital divides are often considered to be a technological problem limiting access to information, but ontologically there is a North-South digital divide, a rural-urban digital divide, and a gender digital divide. The underlying causes of digital divides are multiple. In this way, digital divides can come about as a result of socio-economic factors, geographical factors, educational, attitudinal and generational factors, or even through physical disabilities (Cullen 2001). Such interplay of digital technology divides and social divides is termed the *digital vicious cycle,* meaning that social exclusion reinforces digital exclusion, and vice versa (Warren 2007). Therefore, technological divides cannot be addressed through technological solutions *per se.*

Knowledge divides are also apparent between public and private, formal and informal, non-profit and for-profit sectors within a country or region, including civil society organizations, business organizations and rural communities. This problem is reflected in the following quote: "[in] principle, many people accept the trend of dissolving sector boundaries; in practice, however, they continue to toil in silos. Even within sectors, communities are fragmented by roles." (Phills, Deiglmeier and Miller 2008: 42).

2. Multiple knowledges

Technological divides also relate to the way in which various stakeholders learn technological skills, and it appears that technological knowledge divides are due to illiteracy, or inaccessibility, or a reluctance to use cutting-edge technological innovations. However, this is not the complete story; there are knowledge divides as a result of differences in terms of the way people with different backgrounds and capabilities learn a technological application. In addition to the diverse way in which people perceive their own reality, there are also epistemological divisions, such as the divergences between modern scientific research, policy and practice, which are often referred to as divides in policy and practice, research and practice, theory and practice, science and management, and knowledge and action (Ferguson 2005; Pavitt 1999).

The epistemological divisions undermine the interdependency of technological and social innovations leading to problems such as the practice of context-stripping in modern scientific research. For example, researchers who work under Western knowledge-based scientific paradigms are considered to be so-called innovators, the normal science practitioners as Thomas Kuhn posits it. During the process of knowledge production, they de-contextualize knowledge in their laboratory in the same way as biologists extract an organism from nature or a gene from an organism (Shiva 1997). When a piece of codified knowledge is put back into a society, it would not be properly re-contextualized. The practice of context-stripping is a flaw in using science and technology for international development.

The challenge of re-contextualizing codified knowledge is also related to the epistemological distinction between sacred and secular science and practice. For example, spiritual thinking views the rational action of human beings as being influenced by spirituality, *adhy-atma* in Sanskrit meaning the soul (*atma*), and emphasizes the metaphysical basis of its ontology. For deep learning and innovation, language-mediated stakeholder interactions need to be complemented by consciousness-mediated interactions, leading to spiritual enlightenment (van Eijk 2000). Here it is important to distinguish 'consciousness' from 'awareness': consciousness recollects past experience, confronts present opportunities and challenges, and anticipates future uncertainty, but awareness is inherently a phenomenon about what is happening in the 'here and now'.

Conscious development through practices such as meditation and contemplation would help to combine science and spirituality as has been practiced in various alternative ways of using renewable natural resources in international development, for example: organic farming and low external input agriculture over input-intensive agriculture; ethical production practices, and fair trade movements over exploiting the labour force; no or minimum tillage of mother Earth over concurring her with masculinity; and biodynamic agriculture that advocates maintaining the natural rhythms of agricultural production practices as opposed to farming under controlled environment facilities. Examples in the health sector include Yoga, traditional healing practices, and Ayurvedic and homeopathic medicine. All of these practices, in one way or another, transcend beyond the economic rationality *per se*, and involve an integration of various epistemologies or ways of knowing including innovations in the increasingly

specialized fields of mainstream health and agriculture (World Bank 2007). Unfortunately, the Western paradigm-based science has so far not had enough space for spiritual thinking and sacred learning, thereby creating a chasm between sacred and secular science, policy and practice (Berkes 2008).

In a nutshell, under the Western paradigm-based science, patented innovations, as far as these provide private property rights to inventors, are dominated by economic interests while freely shared innovations are relatively more relevant to solve seemingly intractable social problems. This leads to a proposition that practitioners are likely to be more effective innovators than paradigm-based scientists, though customarily unacknowledged, since their knowledge is mostly tacit, contextual, untold and acquired through situated learning, learning that happens in a context (Lave and Wenger 1991). Context-stripping invites negative consequences because knowledge from practice is dynamic, interactive and person-based, developed through age-old adaptation to changes in technological, biophysical, social and cultural systems.

Towards systems approaches in knowledge and innovation management for development

The transfer of technology paradigm considers learning and innovation as linear processes of scientific discovery, technological development and commercialization through mechanisms, such as patenting and licensing. This linear paradigm considers science and technology (S&T) systems as the central source of innovations, and public policies are aligned towards transfer of technology. The practice domain is rarely considered as a source of innovation. The major source of innovation and growth is the development of cutting-edge technology, the protection of intellectual property rights through measures like patents, and commercialization by providing a license to use a patented technology. Therefore, the linear paradigm of learning and innovation considers innovation to be a linear process from basic research via applied research and technology development to market introduction of the resulting products or technologies (OECD 2005). Specifically in agriculture, the innovation processes have long been perceived as linear, research as knowledge producers, extension as knowledge disseminators, and farmers as the passive recipients of the information being disseminated – the process is referred to as the diffusion of innovation (Rogers 2003). Similarly in the field of information management, the linear thinking focuses on the use of Information and Communication Technologies (ICTs) in knowledge storage and transfer, such as electronic databases, portals and clearinghouses (Ferguson and Cummings 2007).

As a significant departure from the linear mode of thinking in agricultural development, Niels Röling (1990; 1994) proposes the Agricultural Knowledge and Information Systems (AKIS) which conceptualizes the diffusion of innovation from a systems perspective. This approach to knowledge management for development recognizes that data is a set of discrete, objective facts about events; information consists of a pattern imposed on data which simultaneously affects the interpretation of those data and enables them to be transmitted; and knowledge consists of a meaningful experience (Davenport and Prusak 1998; Röling 1990). Subsequent versions of the AKIS address overarching

issues of knowledge and information management in renewable natural resources and agriculture, including a discussion on ecological knowledge and emergent ICTs (FAO 2000; Röling and Jiggins 1998). The legacy of the AKIS lies in the concept of the Management Information System (MIS) which dates from as early as the mid-twentieth century; the MIS entails the accumulation, processing, storage and transmission of information to the right people, at the right time, to facilitate the right strategic management decisions (O'Brien 1970).

Along with the AKIS, the contemporary emphasis on innovation systems thinking in renewable natural resources and agriculture challenges the linear processes of innovation. While a broader concept of innovation systems includes all parts and aspects of the economic structures and institutional set-ups affecting learning and innovation, a specific definition includes a network of public and private stakeholders engaged in the generation, exchange, regulation and application of knowledge (Lundvall 1992a; Lundvall 1985; Lundvall et al. 2002).

Lundvall and others (2002) comment that as long as nation states exist as political entities with their own agendas to innovate, it is useful to work with national innovation systems. This notion is analogous to what List (1841) argued about national systems of production. Lundvall (1992b) further argues that regionalization and globalization of the economy definitely weakens national capacity to innovate, especially when the knowledge exchanges are tacit and difficult to codify. Stakeholders who originate from different cultures may have a hard time crossing the cultural divides and engaging in interactive learning and innovation. To give it a twist that is relevant to international development; the globalization of knowledge and innovation management, such as scientific research of global significance, not only makes such research less embedded in the societal context, but also drains energy away from the national innovation systems (Molenaar 2008). Hence, there can be a tension between pan-regional and global integration, and the appreciation of diversity at the national and sub-regional levels (Sumberg 2005). The North-South knowledge divide is one such example. Nevertheless, the arguments for qualifying the innovation systems turn out to be pragmatic in the realm of policy. Although nation states are responsible for national policies, this does not preclude the importance of pan-regional and global policies. Indeed, the process of regionalization and globalization of innovation make it even more pertinent to understand the role of nation states (Lundvall 1992b).

An application of the innovation system thinking in international development implies a transition of this concept from one sector to another; for example, a current transition today is from manufacturing to renewable natural resources, agriculture and health. Four major limitations become apparent when trying to apply the innovation system framework in international development (Lundvall et al. 2002). *Firstly*, the focus should be on systems building in addition to its application on systems diagnosis because most low-income countries do not have an innovation system (Lundvall et al. 2002). *Secondly*, it should systemically recognize the capacity to innovative, the ontological reality, and the epistemological backgrounds of all the relevant stakeholders including the agency of more socially

excluded groups such as women, youths, small-scale producers and resource-poor farmers (Shiva 1997; Stamp 1989).

Thirdly, an equally important issue is to work with public, non-profit private, for-profit private and informal sectors in a systems framework since this concept has evolved from manufacturing where the actors are predominantly corporate sector stakeholders (Edquist 1997; Lundvall 1992a; Nelson 1993). Engaging civil society organizations, whose members are often critical towards the corporate sector, is a challenging task. *Finally*, specifically in the areas of renewable natural resources and agriculture, the production cycle is relatively longer than in manufacturing and influenced by the interplay of technological, biophysical and socio-economic factors. There is an apparent challenge in addressing the generic differences between firms and farms, specifically when agriculture is primarily practiced for subsistence in resource-constrained contexts (Clark et al. 2003). Since the advent of the twenty-first century, innovation systems ideas have been employed in the areas of renewable natural resources and agriculture with due consideration of the above issues (Clark, Yoganand and Hall 2002; Hall et al. 2001a; Hall et al. 2001b).

All in all, the conceptual shift from linear thinking to systems thinking in knowledge and innovation management is considered to be an inherently social process where stakeholder groups learn and innovate through negotiation over actor structures, resources, processes and values (Engel 1997). This necessitates moving from the hardware metaphor - bridge building- towards shared learning spaces and innovation platforms.

Innovation through the convergence and divergence of dialectical divides

Since a particular type of knowledge divide interplays with the multiple realities of a myriad of stakeholder groups, it is now imperative to move beyond bridging knowledge divides and address the dynamics of the divergence and convergence of knowledge divides. Divergence is a broader term that not only includes knowledge divides, such as divides between science, policy and practice, but also all the other kinds of divides that deepen the knowledge divide. Although it sounds rather semantic to prefer the word *divergence* over 'divides' or 'asymmetries', the term *divergence* is more appropriate to address the dynamic nature of knowledge divides because the divides are relational and contextual. Divides can diverge or converge over time and space, with or without external interventions. As time passes, existing knowledge becomes obsolete more rapidly than before in the face of twenty-first century challenges such as the food crisis, the financial crisis and the economic crisis, each one unfolding after the other. Recognizing this challenge, Lundvall and Nielson (2007) posits that the concept of the 'learning economy' is more relevant than the 'knowledge economy'. Their rationale to emphasize learning is that knowledge can become obsolete but learning is not. Using the same rationale, the term *learning networks* is more appropriate than *knowledge networks* for addressing the uncertainty associated with the rapidly evolving learning economy of the twenty-first century.

Metaphorically, the task of bridging knowledge divides is like trying to hit a moving target as the divides evolve over time and space through a complex interplay of technological and socio-cultural factors. Addressing the dynamics of knowledge convergence and divergence would be a step towards knocking down the silos of socially and culturally constructed divides in international development. Thus the contemporary emphasis shifts away from bridging knowledge divides to learning and innovation through sharing knowledge (UNESCO 2005). The effective knowledge bridging works not only require universal access to information and knowledge but also need to enhance stakeholder capacity to participate in the very processes of learning and innovation.

Before we embark on any further discussion about the convergence of knowledge divides as a way of enhancing stakeholder capacity to learn and innovate, the conventional notion of convergence theory is briefly reviewed here. During the mid-twentieth century, a Dutch economist Jan Tinbergen, the first Nobel laureate in economics with Ragnar Frisch, developed a *convergence theory*, a corollary to the theory of optimal economic order. The optimal economic order, he argues, cannot come from extremism, but lies somewhere between capitalism and socialism, and therefore economic actors need to move towards the centre, without necessarily leaving their original stance (Tinbergen 1998). The convergence theory gained widespread acceptance during the second-half of the twentieth century as capitalist economies were becoming more structured towards using non-market mechanisms to correct inherent market failures, and socialist economies were becoming more open to market mechanisms (deWolff and Kol 1993; Galbraith 1967).

Recent literature about the convergence theory, specifically as it relates to international trade and regional economic cooperation, includes phenomena as diverse as the convergence of government spending on social welfare (Winkler 1998), the convergence of per capita income and living standards (Jones 2002; Scully and Bass 1998), and the convergence of capital market interest rates (Fase and Vlaar 1998). Such convergence is desirable in both national as well as international development policy coordination (Haas 1992). One way to achieve various types of convergence is to work towards a convergence of national innovation capacities by providing enabling environments such as policy development, institutional change and infrastructure development. However, an absolute convergence of national innovation capacities is almost impossible because such capacities are socially embedded and culturally evolved through generations, and these contextual factors vary across regions and nations (Jungmittag 2006). The lack of convergence of national innovation capacities has been coined the North-South *innovation divide*, and involves the processes of technological as well as institutional innovations (Holroyd 2007).

Thus bridging knowledge divides in international development collaboration necessitates addressing the relative convergence of actor structures, resources, processes and values in specific national and regional interventions; the very processes of innovation capacity development (Hall 2005). In the field of knowledge management for development a convergence of policy, research and practice is

emphasized, specifically within a given country, region or local context (Ferguson 2005). Therefore, it is desirable to converge public and private actor structures, public and private resources, and public and private modes of learning and innovation processes to achieve overarching goals, such as economic growth, poverty reduction and environmental protection, but at the same maintaining public and private value systems. Such a convergence can happen within a country or context and between various countries as a process of bridging persistent knowledge divides.

This study has developed a convergence model of SI&E (see Figure 1 on the next page). There are three dimensions and four spheres of convergence (or divergence). The three dimensions of convergence are ontological (X-axis, nature of being, such as individual and collective action), epistemological (Y-axis, ways of knowing, such as tacit and codified learning) and chronological (Z–axis, short-term and long-term strategy), and the four spheres of convergence are actor convergence, resource convergence, process convergence and value convergence. Conceptually, the convergence model of SI&E integrates the three dimensions of knowledge management – ontological, epistemological and chronological (Nonaka 1991; Nonaka and Takeuchi 1995) - with the resources, processes and values (RPV) theory of disruptive innovation (Christensen et al. 2006). The RPV theory entails that resources (what a firm has), processes (how a firm does its work), and values (what a firm wants to do) collectively define an organization's strengths as well as its weaknesses and blind spots. This theory explains why existing companies grapple with disruptive innovations that challenge industry incumbents by offering simpler, good-enough alternatives to an underserved group of customers, such as child's laptop XO, mobile health clinics, and micro-finance. However, the RPV theory takes actor structures as granted because this theory discusses innovation within the context of corporate organizations.

In the context of knowledge and innovation management for development, actor structures are so important because unlike an organization, actors in the international development arena are more diverse coming from a myriad of organizations ranging from donors to tribal communities, involving complex and contested relationships, and "…innovation blossoms where the [public and private] sectors converge." (Phills, Deiglmeier and Miller 2008: 43). The process of convergence involves negotiation over actor structures, resources, processes and values (Engel 1997). The resources include five major forms of capital, commonly referred to as the *asset pentagon* in sustainable livelihood literature – natural, physical, social, financial and human resources (Brock 1999; Chambers and Conway 1992; Scoones 1998). Human resources and social capital are embedded with actor structures and value systems that are prerequisites in the processes of knowledge and innovation management. In this process, individuals exercise their human agency within the constitution of their organizations or social groups or networks (Giddens 1984).
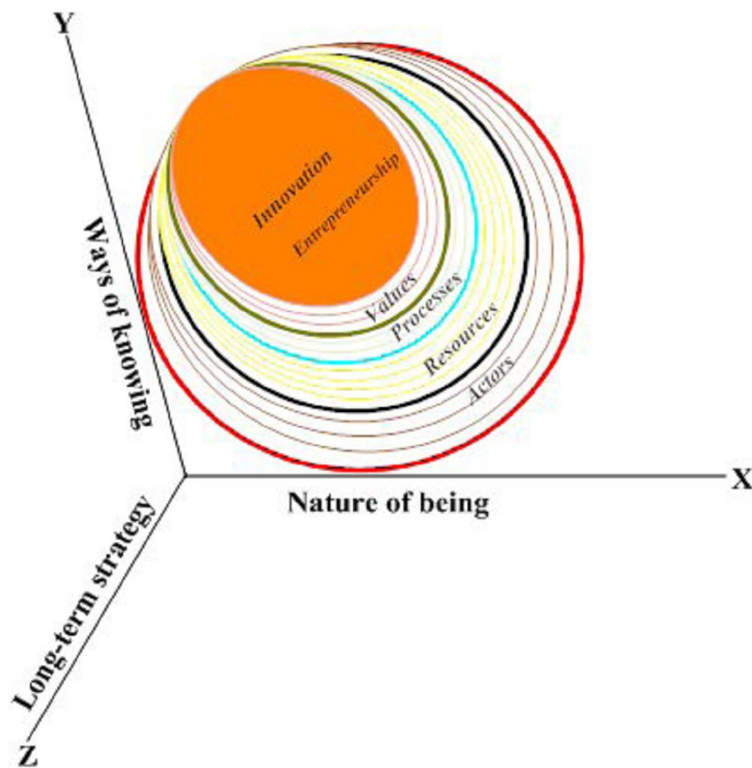
Figure 1. Convergence model of social innovation and entrepreneurship
Source: Author

Since the knowledge divides are dialectical, for example Global South is meaningless without Global North while private is meaningless without public, the negotiation process should involve a deep deliberation on the divides (Pant and Hambly Odame 2006). It is important to manage the divides and differences rather than simply bridging or ignoring them. The third dimension of knowledge management intersects both the ontological and epistemological dimensions. We have to differentiate between interventions for short-term efficiency and those for long-term strategic capacity development. Knowledge management for development should have a strategic focus on addressing the rapidly changing nature of local contexts and the global knowledge economy, such as increasing globalization and the subsequent deepening of knowledge divides.

To conclude this section, the approach towards bridging knowledge divides in international development is going through three major stages or generations, taking stock of the previous generations, and looking ahead at the twenty-first century challenges (Ferguson and Cummings 2007; OECD 2005). The *first generation* of innovation thinking is based on the idea of linear processes of innovation and growth – beginning with laboratory science and ending with commercial applications such as a one-way conduit or *pipeline model*. Specifically in knowledge management, the emphasis is on the use of ICTs to facilitate the storage and exchange of knowledge that is codified into information. The *second generation* of innovation thinking, which is currently most visible in various innovation

platforms, recognizes innovation as an emergent property of complex adaptive systems. The most common policy principle under this paradigm is to facilitate interactive learning processes among multiple stakeholders – facilitating various patterns of interaction and creating enabling environments for learning and innovation (specific initiatives as discussed in Part 2). The *third generation* of innovation thinking is still emerging and emphasizes the benefits of coordinated actions through the exercise of individual human agency within a social structure, and places the innovation systems idea at the heart of all research, policy and practices.

Part 2: Current Initiatives to Bridge Knowledge Divides

In the contemporary knowledge economy, human interactions are characterized by networked forms of governance and, certainly, networking is the predominant *modus operandi* of choice of the organizational frontiers. The actors who facilitate the advancement of these frontiers are indeed network managers (Wenger and Snyder 2000; Williams 2002) with a network consisting of a reservoir of people active at a strategic level, representing different agencies and organizations who are referred to as 'the usual suspects' because of their appearance in many different relationships.

This section first builds on the argument that learning networks are inclusive of the diversity of contemporary initiatives to bridging knowledge divides and discusses how the theory of learning organizations applies to learning networks. Then various typologies of contemporary learning communities for bridging knowledge divides are presented based on the four major parameters – the involvement of principal actors, sector representation on the learning agenda, the principal mode of interaction, and the processes of learning and innovation. The limitations of the current initiatives are also discussed.

Learning networks as an extension of the theory of learning organizations

One way to address the limitations of the contemporary learning communities discussed above is to extend the idea of *learning organizations* into the network of individuals and organizations involved in various learning communities. While a CoP exists entirely within a division or stretches across divisional boundaries within an organization or even across organizational boundaries, learning networks can be formal or informal, usually stretching organizational boundaries (Wenger and Snyder 2000).

Although *learning networks* and *learning organizations* differ in their scale of operation, the former theoretical approach is more relevant in international development where both actors from the formal and informal sectors require their engagement in knowledge management (Pant et al. 2008). In his theory of learning organizations, Peter Senge (2006) identified five components or disciplines of learning organizations – systems thinking, personal mastery, mental models, shared vision and team

learning. If a learning object were an engineering innovation, such as the airplane, the blueberry and the computer, the components are called *technologies*, but if learning involves innovation in human behaviour, often referred to as social or institutional innovation, the components are called *disciplines* – not the rules of law but a body of theory, policy and practice.

The five disciplines of learning organizations also apply to learning networks. *Firstly*, as discussed in Part 1 of this paper, systems thinking has been well recognized among international development communities and the latest systems approach which is the innovation system, is extraordinarily emerging in international development, specifically in health and agriculture.

Secondly, the discipline of personal mastery recognizes that the full participation of individual actors in the knowledge economy has emerged as a new source of competence. Personal mastery is becoming even more important in networked societies because individuals are increasingly required to think beyond what is obvious under the prevailing paradigm and to work on the edge, and are subsequently engaging in non-traditional roles. For example, the traditional boundaries between researchers and practitioners are becoming blurred, particularly when stakeholders engage in research for development (Molenaar 2008). Although many conventional organizations that are accustomed to working within their 'silos' may not expect employees to become involved in non-traditional roles, the seemingly intractable problems, such as poverty, hunger and food insecurity, provide intrinsic motivation for responsible global citizens to think beyond what is obvious under a given paradigm and regime. In others words, such individuals are positive deviants who depart from the norms of the reference group or the mainstream actors, often breaking established rules and regulations to achieve culturally defined social goals (Merton 1957). One prominent role of such deviants is to work beyond the conventional sectoral and organizational boundaries. For example, CoPs that operate essentially within an organization can initiate interaction with the help of positive deviants in spite of the absence of favourable organizational environments to do so.

Thirdly, the reification of abstract mental models into concrete forms, such as documents, symbols, agreements and common metaphors, serves as boundary objects for promoting stakeholder participation and subsequent negotiation over actor structures, resources, processes and values (Wenger 1998). The identification of context-relevant boundary objects and engagement in boundary processes enables sectoral and organizational boundaries to be crossed (Hoe 2006; Williams 2002).

Fourthly, individual members can share their vision through their engagement in a learning network. Foresight and shared vision is important to translate human ingenuity into collective imagination, collective intelligence and collective innovation (Hall 2007). This is not possible by adhering to a blueprint but by following a set of organizing principles. Positive deviants are again crucial to such a visioning exercise, particularly when it is not required by the management of one's own organization. *Finally*, human groups or teams are the fundamental learning units in modern organizations, but in learning networks organizations are also learning units in addition to teams. As discussed in Part 1,

innovation systems entail networks of public and private stakeholders engaged in the production, exchange, regulation and application of knowledge pertaining to a particular economic activity. The emphasis on learning networks is not only relevant to the innovation systems framework but also eliminates some of the conceptual limitations of learning communities, such as CoPs and CoIs. Thus, in the process of learning and innovation, dyads form basic units of human interaction, teams are units of an organization, organizations are units of networks, and networks are units of systems.

Learning networks in international development

1. Actor based typology of networks

Many learning networks for development are initiated either by donors including multi-lateral and bi-lateral agencies, or diaspora communities, or civil society organizations (Table 2). *Firstly*, multi-lateral and bilateral organizations have been at the forefront of initiating and funding global learning networks (Box 1). One of the first initiatives is the Global Development Network (GDN) founded in 1997 under the aegis of the World Bank's Knowledge for Development Programme (Stiglitz 1998; World Bank 1998). Although this initiative has been welcomed in the development studies community, there are concerns about a rationalist tendency within the GDN that portrays (scientific) research as independent from its social context, and knowledge is utilized as an intellectual tool that allows rational policy actors to reduce and control uncertainty in decision-making and advance social progress (Stone 2003). It is important to move beyond rationalism because the ways of knowing and nature of being differ from one context to another (Powell 2006).

Basis	Typology
Actors	Communities initiated by multilateral and bilateral organizations Diaspora communities Communities initiated by civil society organizations Communities initiated by donors and civil society organizations
Sectors	Sector-specific communities Sector overarching communities
Modes of interaction	Online communities that interact primarily in virtual space Place-based communities that primarily interact in a physical space Communities that interact through a hybrid mode
Platform of interaction	Epistemic communities: authoritative, unique values Communities of practice: distributed networks of two or more epistemic communities Communities of interest: distributed network of two or more CoPs Learning alliances: cooperative networks of seemingly competing actors

Table 2. Typology of learning communities in international development

Source: Author

Secondly, diaspora communities have appeared as an alternative force in international development collaboration. Arguments are being made to promote ways of developing diaspora networks and facilitating learning and innovation (Kuznetsov and Sabel 2006). While some success has been demonstrated by some of the larger mature diaspora networks, such as those of the Indian, Chinese and South African diaspora, in triggering learning and innovation in their home countries, small young diaspora networks, such as the Nepalese diaspora, struggle to engage themselves in such activities. However, Armenia and Chile are exceptions. Despite being a large mature diaspora, the political divisions between the Armenian diaspora and the post-Soviet political class in Armenia, which severely hampered their success, illustrates that political context requires as much attention as the economic setting. Contrary to this, the case of Chile suggests that even sparsely populated, informal diaspora networks that link small home countries with their talent abroad are capable of triggering development in the home countries.

A cautionary note with regard to involving diaspora for development is that the current preoccupation of the diaspora role as mere generators of remittances needs to be seriously reconsidered; diaspora can contribute towards building up their home countries in five major ways - remittances, charitable donations, investments, networking for learning and innovation, and institutional reforms through their participation in social and political processes (Kuznetsov 2008). The higher order diaspora impacts are often overlooked in the contemporary studies of international development in general and ways of bridging knowledge divides in particular. After the destitute local communities back home, diaspora are the ones who know the social, cultural and political realities of their home countries the best, and can be phenomenal in bridging North-South knowledge divides. However, elite groups in the home countries often complain that the diaspora communities often speak on their behalf in the international development platforms without necessarily knowing the local context.

Thirdly, learning networks initiated by civil society organizations (CSOs) are usually intended to challenge the *status quo* of the public sector, and generate alternatives to conventional, relatively inefficient, approaches towards learning and innovation. This category of learning networks cautiously involves public sector partners and usually excludes large private sector members, as illustrated by the Promoting Local Innovation (PROLINNOVA) network (Ekboir and Hambly 2007). Whenever government partners are involved, positive deviants within the public sector, who challenge the *status quo* of their own institution, are instrumental in driving the learning network towards positive social change (Pant and Hambly Odame 2008).

Finally, most effective learning networks that have appeared in contemporary international development initiatives are those involving partners from bilateral and multi-lateral organizations, donor agencies and civil society organizations, specifically to sustain such initiatives through long-term financial support. One such example is the Dgroups Partnership involving international NGOs, such as Bellanet, the International Institute for Communication and Development (IICD), One World, Helvetas, Hivos, the Royal Tropical Institute (KIT) and the European Association of Development Research and

Training (EADI); multilateral organizations, such as the United Nations Food and Agriculture Organization (FAO), the United Nations Development Programme (UNDP), the Consultative Group of International Agricultural Research (CGIAR) and the World Bank; and bilateral organizations, such as the UK Department for International Development (DFID), the Swiss Agency for Development Cooperation (SDC), the Netherlands Development Organisation (SNV) and the International Development Research Centre (IDRC) of Canada. Bellanet, IICD and One World are founder members of the Dgroups Partnership (Cummings 2008). Cummings (2008) reveals that Dgroups initiatives facilitate bridging the knowledge divides between North and South, between public and civil society organizations, and between different professional groups, as well as to some extent crossing the digital divide. As in the case of PROLINNOVA, the Dgroups Partnership which was founded by leading international NGOs, has not yet been joined by the corporate sector.

Box 1. **Selected examples of learning communities in international development**

1. Global Development Network (GDN, http://www.gdnet.org), a network initiated by the World Bank to allow greater scope for home-grown policy, information sharing, and enhanced research capacity in and between developing countries (Stone 2003).
2. Global Alliance for Nursing and Midwifery Communities of Practice (GANM) (http://www.my.ibpinitiative.org/public), a global network initiated by the World Health Organization, and subdivided into several CoPs involving health care providers, policymakers and researchers working in nursing and midwifery (Compernolle 2006).
3. Global Alliance for Livestock Veterinary Medicines (http://www.galvmed.org), a partnership between large pharmaceutical companies and donors (the UK Department for International Development (DFID) and the Bill & Melinda Gates Foundation) (Thomas and Slater 2006).
4. Learning Innovation Knowledge (LINK), an initiative of the United Nations University (UNU-MERIT) and the United National Food and Agriculture Organization (FAO) (http://www.innovationstudies.org), a global network to stimulate debate and share lessons on rural innovation policy and practice (Ekboir and Hambly 2007).
5. Promoting Local Innovation (PROLINOVA) (http://www.prolinnova.net), an NGO-initiated programme to build a global learning network to promote local innovation in ecologically-oriented agriculture and natural resources management (Ekboir and Hambly 2007).
6. Institutional Learning and Change (ILAC) Initiative (http://www.cgiar-ilac.org), a network to promote pro-poor agricultural innovation and to ensure that research and development activities are managed more effectively to contribute to poverty reduction.
7. Development through Dialogue (Dgroup, http://www.dgroups.org) an online network for groups and communities interested in international development (Cummings 2008; Ferguson and Cummings 2007).
8. Knowledge Management for Development (KM4Dev) Community of Practice (http://www.km4dev.org, http://www.dgroups.org/groups/km4dev), a knowledge sharing community in international development (Ferguson and Cummings 2007).
9. Development Gateway Foundation (http://www.developmentgateway.org), an online portal and host of the online dgcommunities.
10. Science and Development Network Science and Development Network (http://www.scidev.net), a virtual network about news, views and information on science, technology and the developing world.
11. Eldis (http://www.eldis.org), the development information gateway hosted by the Institute of Development Studies (IDS), UK (Brown, Daniel and Fischer 2006).
12. Malaria Competence Network, popularly known as the Mombasa Group, to develop malaria-competent societies where vulnerable people stop seeing malaria as a fact of life and take the lead in fighting the disease. (Kamara and Sedoh 2006).
13. Non-Resident Nepalese Association (NRNA, http://www.nrn.org.np) , a community of interest involving national coordination councils in over 45 countries of the world including Africa and the Middle East.

Note: *This list includes the networks that are either widely discussed in knowledge management for development literature or with which the author is personally familiar.*

2. Sector-based typology of networks

The emerging learning networks in international development are either formed with sector-specific or cross-cutting mandates. *Firstly*, sector-specific networks consider a particular sector, such as agriculture and health, as a reference, and address other relevant sectors as appropriate. Learning networks that are confined to one particular sector alone are less relevant to address development problems, specifically in rural communities, where people derive their livelihoods through on-farm, off-farm and non-farm economic opportunities (Norman 2002).

Secondly, networks with cross-cutting mandates do not necessarily have a reference discipline but consider a particular problem area, such as knowledge mismanagement, that often relates to more than one sector. Bridging knowledge divides in development collaboration are equally relevant for issues as diverse as addressing fodder scarcity (de Haan et al. 2006), developing vaccines for livestock diseases (Thomas and Slater 2006), developing malaria-competent communities (Kamara and Sedoh 2006), and enhancing the professional competence of nurses and midwives (Compernolle 2006). However, in some cases participants suggest being involved in more than just an exchange of information (Compernolle 2006).

3. Typology of networks based on the principal medium of interaction

The medium of interaction in learning networks is either in the virtual space, in a physical space or in a combination of both. *Firstly*, with the emergence of ICTs, the establishment of virtual learning communities has become promising in the field of knowledge management for development. However, even though the Internet holds such a promise as a virtual medium for knowledge sharing, there is a rationalist tendency that knowledge is codified into information and that the decodification process may lose the context under which the knowledge was initially created.

Margreet van Doodewaard (2006) brings empirical evidence from Africa and argues that in many instances in low-income countries no infrastructure, means, capacity or facilities exist to exploit the benefits of the Internet, leaving the stakeholders with traditional options such as face-to-face meetings, radio programmes and paper publications. She further comments that for the CSOs that do have access to this technology, the Internet has become a marketing tool to create upward visibility such as communicating with their international partners and influencing donors to continue supporting their work. Although online learning networks lack the richness of face-to-face dialogue, a single request can generate many pertinent responses, while the conversation becomes accessible to the whole of the community that has access to the technology and can be archived and accessed at any time later (Sharratt and Usoro 2003).

Secondly, with the limitation of virtual learning communities, not only because of the technological divides but also as a result of the limitation of ICTs to move beyond a rationalist perspective on knowledge management, a renewed interest in face-to-face interactions has now appeared, specifically at the local level. For example, the Knowledge Management for Development (KM4Dev)

community subscribes to the services provided by the Dgroups Partnership and uses the Internet as its principal mode of interaction, yet this community has recently begun *Happy Hours* (close interpersonal interactions) in specific locations where members have enough interest and enthusiasm to meet fact-to-face. The above evidence illustrates that a hybrid mode of interaction engaging community members in virtual as well as physical spaces, as appropriate in a given context, is promising for learning and innovation. Specifically, the Mombasa Group in Africa have been facilitating knowledge sharing among stakeholders involved in developing local competence to fight malaria through interaction over the Internet, emails and face-to-face meetings (Kamara and Sedoh 2006). The local communities no longer consider malaria to be a fact of life, but rather a problem that can be solved by human ingenuity.

4. Process-based typology of networks

The most common types of learning communities reported in knowledge management literature are epistemic communities, communities of practice, communities of interest, and learning alliances (see Box 2 below).

Box 2. Definitions of various learning communities

Epistemic communities: "An epistemic community is a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area." (Haas 1992: 3)

Communities of practice: "A group of people who have a particular activity in common, and as a consequence have some common knowledge, a sense of community identity, and some elements of overlapping values."(Hislop 2005: 59)

Communities of interest: *"Communities of interest* (defined by their collective concern with the resolution of a problem) bring together several *communities of practice* that represent groups of practitioners from different domains." (Fischer 2001: 1)

Learning alliances: Learning alliances are cooperative networks of otherwise competing partners, and facilitate "...access to all forms of knowledge, from knowledge about people, facilities, management systems and practices, to critical information about differences in values and beliefs." (Morrison and Mezentseff 1997: 354)

Firstly, an *epistemic community* shares an epistemic culture, which is neither straightforward to create nor easy to change once it is established because the cognitive learning of individuals in an epistemic community develops over a relatively long period of time. Cognitive learning involves individual thinking processes, innate abilities and personality characteristics that develop over a long period of time (Amabile 1996). In other words, closer cognitive distance or convergence on the ways of learning among the members of a community members help form epistemic communities, but at the same time it provides a challenge to collaboration outside their community (Antonelli 2006). For example, it is challenging to change the epistemic culture of paradigm-based scientists towards one which is more receptive to different types of knowledge systems, as well as creating a greater openness towards

sharing knowledge (Wall 2006). To put it differently, an epistemic community of scientists in a particular disciplinary field is close-knit, and often works on a single knowledge system. Members of a community with such a close cognitive distance are well aware that their work will be judged against the established standards of their epistemic community and deviation from that standard would jeopardize their professional success. For example, rigorous peer review is a quality management practice of an epistemic community of scientists which often undermines novelty coming through critical thinkers within the community and novelty outside the community (Braben 2002).

Secondly, unlike epistemic communities, *communities of practice* (CoP) involve the integration of multiple knowledge systems. In other words, while maintaining their disciplinary identity, members of a CoP interact across multiple knowledge systems, such as research, policy and practice. As a consequence of involvement in a common activity, the members of a CoP have some common knowledge, a sense of identity and some overlapping values (Hislop 2005). A community of practice entails three major dimensions (Wenger 1998): its *nature* as a joint enterprise as understood and continually negotiated by its members; its *functions* as mutual engagement that bind members together as a social entity; and its *capabilities* as the shared repertoire of communal resources (routines, artifacts, sensibilities, vocabulary, language, jargons and style) that members have developed over time.

Since it requires some common knowledge to work for, a CoP is built around a single knowledge system in which new members are expected to learn over time while maintaining their epistemic recognition (Ekboir and Hambly 2007). Recognizing the limits of the CoP approach to knowledge management, recommendations are made for greater conceptual clarity. The site for the development of identities and practices is not solely located within a community but in the spaces between multiple communities (Handley et al. 2006). Individuals are increasingly becoming members of multiple communities and arguments are made whether communities of communities are desirable to address this reality. Moreover, the ambiguity with the CoP approach relates to the size and spatial reach of a community against the demise of the wider social notion of communities in the Global North (Roberts 2006). However, proponents of the CoP approach argue that the notion of community in this approach is metaphorical, not determined by locality or specific size and form of association (Johnson 2007). If the notion of community is just metaphorical, there are benefits of not using the term.

Thirdly, a *community of interest* (CoI) brings together several communities of practice, metaphorically *communities of communities* or *networks of networks* (Fischer 2001). Although it is a challenge to engage in learning in such heterogeneous networks, this is a fact of life because most learning networks involve several communities of practice often spatially and temporally, and most individuals are involved in more than one network (Fischer 2005). Addressing differences and diversity in the realities and knowledge of stakeholders through networking is one of the ways of generating and sustaining social creativity (Amabile 1996; Fischer and Giaccardi 2007). In this context, a key factor

influencing the successes of a CoI is the development of a common language among members with different knowledge systems, identities and values (Ekboir and Hambly 2007)

Finally, a *learning alliance* comprises cooperative networks of otherwise competing partners, and a subset of the notion of strategic alliances (Morrison and Mezentseff 1997; Sparling and Cook 2000). For example, a recent scoping study to establish CoPs in innovation systems in agriculture revealed that none of the existing learning communities in this field has so far achieved the inclusiveness one might expect for a global CoP (Ekboir and Hambly 2007). Hence, the study argues that it is desirable to set aside the notion of an all-encompassing CoP in favour of a learning alliance among the existing and emerging learning communities.

The challenges of facilitating learning networks are becoming more apparent with the contemporary blossoming (or even mushrooming) of learning communities. *Firstly*, learning communities differ not only in terms of a concept or idea, but also in their action for overcoming the inherent knowledge gaps and impoverishment in the Global South (Ekboir and Hambly 2007). For example, the GDN under of the aegis of the World Bank, although principally all-inclusive, is in practice dominated by rationalist tendency (Stone 2003).

Secondly, although the PROLINNOVA, a non-profit initiative, moves well beyond the rationalist tradition and engages in civil society movements for promoting local innovation, in some cases also involving government agencies and academic institutions, it is reluctant to form strategic learning alliances with large for-profit private organizations. However, the Global Alliance for Livestock Veterinary Medicines successfully fosters a partnership between large pharmaceutical companies and donors (specifically the UK Department for International Development and the Bill & Melinda Gates Foundation) for the benefit of smallholder farmers in Africa (Thomas and Slater 2006). Successful modalities to bridge boundaries between public and non-profit private stakeholders on the one hand, and for-profit private stakeholders on the other, are yet to emerge.

Thirdly, the Dgroups Partnership has very limited penetration in academia, and the dgroups' impact is also very limited in bridging South-South knowledge divides and forging links between different language-speaking stakeholder groups (Cummings 2008). Recognizing its further limitation to bridge tacit and codified ways of knowing, members of some of the dgroups, such as the Knowledge Management for Development dgroup, have begun to meet face-to-face in places where there is enough interest to do so.

Finally, the literature on CoPs discusses a concept of situated learning (situated in physical and social space, and time), and local context determines the identities, values and composition of a learning community (Lave and Wenger 1991). Communities of Practice (CoPs) can work for individuals from organizations as well as people primarily working on their own, such as tribal communities with shared spiritual values, and communities of freelance consultants (Wenger and Snyder 2000). Roberts (2006)

in her critical analysis of the CoP approach to knowledge management brings an example from the film industry to illustrate how distributed networks function independently of organizations. In the film industry, individuals come together to create a film and once this is achieved they disperse, yet they remain members of the film-making community even when they are no longer employed by a film-producing business organization. Although individuals engaged in international development interventions seldom work independently from their organization, nevertheless the project-based nature of their work allows them to come together and disperse after a project is completed yet still remain within the enterprise of international development. Consultants are the other group of actors who bear a close resemblance to the actors from the film industry: they assemble, say for a project evaluation, and disperse after the work is completed. Specifically, the choice of network partners also varies depending on the context. An ideal learning network in an innovation system requires traditional organizational boundaries to be crossed and engages its public and private members throughout the whole system in learning and innovation processes (Pant et al. 2008).

The role of individual actors in maintaining a delicate balance of convergence and divergence

The review in Part 1 of this paper provides enough evidence that the innovation systems approach entails networks of individuals and organizations engaged in public and private as well as formal and informal modes of knowledge production, exchange, regulation and application in the contemporary knowledge society. However, the review of current initiatives of forming and mobilizing various learning communities, such as epistemic communities, CoPs, CoIs and learning alliances, shows that interaction between public and private stakeholders is a far cry from the international development arena, particularly when it is desirable to engage the for-profit private sector in development work. Although a broader definition of the private sector also includes civil society organizations and the informal sector, such as rural and tribal communities, the mode of knowledge management strategies in these sectors is often aligned with the public sector, particularly in terms of knowledge as a global public good.

The discussion on the disciplines of learning organizations to engage stakeholders in distributed networks shows that individual actors are crucial to initiate and facilitate various learning communities. In order to bridge knowledge divides between research, policy and practice, it is important to move out of the black box of paradigmatic thinking. It is vital to engage the public and private stakeholders in extraordinary science, policy and practice; and to empower individuals to facilitate this engagement process. In other words, knowledge management for development should move beyond the production, exchange, regulation and application of knowledge within an organization, and involve layers of public and private stakeholders – individuals, groups and organizations as well as networks and systems (Pant et al. 2008). Whether individuals engage in learning communities that exist within their own organization or across their organizational boundary, the value of such engagements would be enhanced if learning networks complement organizational structures and institutional set-ups (Court et

al. 2006). Any divergences between the mission and vision of learning networks and the organizations where the network members work would invite tensions.

Tensions can potentially arise in all human interactions but here the particular interest is in how human relationships are managed when learning networks involve individuals from two or more organizations, with divergences in reality and knowledge. Individual actors can easily get caught up in the cross fire. On the one hand, the individual identity and belief that one establishes through one's upbringing do not necessarily have to be in alignment with the values of one's organization. Any divergences in individual values and organizational values can limit an individual actor's performance and job satisfaction. Moreover, the management of an organization can be skeptical about an individual's engagement in extra-organizational affairs, such as learning networks. Such change makers often confront dominance by groups committed to maintaining the *status quo* (Kristjanson et al. 2008). On the other hand, a learning community itself involves actors with diverse realities and knowledge. When those in authority do not take account of staff participation in learning networks to evaluate their performance, individuals who engage in learning networks may not have the motivation, except when the intention of such an engagement is to challenge the *status quo* (Fox 1974; Wenger and Snyder 2000).

The major sources of tension in inter-organizational learning networks, as is increasingly common in international development, are *power, value, predisposition and trust* (Fox 1974; Roberts 2006). Michel Foucault (1982) asserts that in order to understand what power relations are about, one needs to investigate the forms of resistance and attempts to dissociate power relations, such as opposition to the power of managers over employees, of men over women, of parents over children, of psychiatry over the mentally ill, and of a state over its citizens. In a CoP, such power dynamics can arise from the dominance to centre over periphery and founder members of a community over its new members (Wenger 1998). Indeed, early CoP theory was formulated as part of situated learning theory (Lave and Wenger 1991), and promised to work on issues of social context and unequal power relations (Fox 2000).

Various forms of resistance, either over the management of one's organization or over those in the centre of a learning network is particularly important when there is incongruence between individual and collective values. Value incongruence limits shared understanding in human interactions, such as differences in perspective making and perspective taking, the differences in the way the sender codes a message and a receiver decodes it (Hislop 2005). Perspective making is the process through which a community develops, strengthens, and sustains its knowledge and values, while perspective taking is the process through which people develop an understanding of the knowledge, values, and world-view of others.

A perception of value incongruence between individuals and their organization can generate distrust, not only among individuals but also between an individual and his/her team or organization or network.

Although there are various ways of looking at trust, one typology relevant to knowledge management for development involves *competence trust, intentional trust, business trust and emotional trust* (Nooteboom 1996; Nooteboom 2000). Competence trust involves confidence in the capacity of other actors to perform a task; intentional trust entails confidence in the intentions of other actors to perform a task, business trust is related to confidence in reliability in business transactions; and emotional trust involves personal confidence based on human relationships.

Bridging knowledge divides in international development often involves power struggles, value incongruence, differential predisposition, and mistrust between scientific community members, policy people and practitioners. In order to maintain a power balance, achieve value convergence, enhance the level of trust and subsequently facilitate learning and innovation, boundary work is important. Boundary work involves two or more groups that work to different standards and objectives, such as basic scientists versus practitioners (Kristjanson et al. 2008). Boundary objects are joint creations at the interface of communities, such as models, maps, assessments, contracts, a memorandum of understanding (MoU), and posters. Boundary actors can be an organization or an individual within an organization, and most effective boundary organizations are jointly accountable to both the science and user communities. Boundary actors are also called boundary spanners, and represent a group of employees whose potential often remains relatively untapped in managing learning communities. They often show deviant behaviour. Recognizing the untapped potential of boundary spanners offers tremendous opportunity for knowledge and innovation management (Hoe 2006). They are the ones who do something different, and are often seen to be trying to change the power balance, although this can be unpopular (Kristjanson et al. 2008). Boundary spanners are radicalists, rule breakers, positive deviants, entrepreneurs, innovators, leaders, and network managers (Williams 2002).

To conclude this section, the current initiatives to bridge knowledge divides, such as forming communities of practice, communities of interest and learning alliances, recognize two elements of stakeholder collaboration – learning and networking - and the notion of community is metaphorical, not determined by locality or a specific form of association (Johnson 2007). This indicates that the term 'network' would suffice and can vary in its modality – data-sharing networks, information-sharing networks, knowledge-sharing networks or learning networks. Moreover, most learning networks, including communities of practice, communities of interest and learning alliances in decreasing order of commonness, share at least some of the organizing principles, such as a shared domain of interest, some common knowledge, a sense of community identity and some elements of overlapping values (Cummings and van Zee 2005). When stakeholders in a learning network diverge in terms of these principles, the role of boundary spanners is very critical to facilitate negotiation over actor structures, available and anticipated resources, knowledge management processes, and stakeholder values. Such a negotiation should recognize that the seemingly contradictory knowledge and reality (either or) are just contraries.

Part 3: Alignment of Approaches and Initiatives

The review in Part 1 shows that there is a basket of approaches to bridge knowledge divides that one can choose from, ranging from linear thinking to various systems approaches. None of these approaches are wrong or right but their relevance and effectiveness depends on the context. For example, the transfer of technology approach is persistently used despite the criticism it has received over several decades. In spite of the availability of various systems approaches, the international development community is currently experimenting with the innovation systems approach, particularly in bridging knowledge divides between scientific research, policy and practice. One of the seemingly intractable challenges of the contemporary knowledge economy is to integrate public and private as well as formal and informal modes of knowledge production, exchange, regulation and application. However, when it comes to contemporary initiatives to bridge knowledge divides, specifically through broad-based stakeholder engagement in various learning communities, fostering cooperative learning alliances of seemingly competing actors with welfare and profit motives is still a far cry away. This section outlines some of the basic principles of managing learning networks and suggests further research areas to advance this field of inquiry.

Organizing principles of learning networks

Initiating and managing a learning network to bridge knowledge divides is a challenge. There is a diversity of approaches that theoretically inform networking initiatives but the nature of learning networks itself is very diverse in terms of the actors involved, sectors discussed, and the mode and platform of interaction. Although there are gaps between the approaches that are available and the contemporary practices of facilitating learning networks, the review of conceptual approaches and contemporary initiatives to bridge knowledge divides has made it evident that there are generic principles that can be followed to manage learning networks.

Focus on individual actors rather than their organizations. Since networks are distributed structures, focusing on individuals helps generate novelty outside their organization even if the work environments within their primary work environment is not favourable for learning and innovation.

Observe deviant behaviour among the network members. Individuals who deviate from what is normal under the given paradigm or regime can serve as innovators and entrepreneurs during times of crises and uncertainty. However, those people who are committed to maintaining the *status quo* would think that such individuals are a nuisance to the organization, and investing in ideas that do not fit under the normal paradigm can compete with operational resources and infrastructure.

Identify individuals who are unpopular. Unpopular individuals are not necessarily inefficient. They may not be resistant either. Unpopularity can be a sign of dominance by people who are committed to maintaining the *status quo.*

Foster interaction outside the group of like-minded people. A congregation of like-minded people does not necessarily facilitate learning and innovation. They may be trapped into confirming and reconfirming their ideas rather than challenging each other.

Look for individuals in academia and research organizations who are members (potential members) of learning networks. Existing learning networks in international development have very limited participation from people in academia. This is not unusual because many learning networks are initiated by practitioners and academics may not know them. Engaging people from academia and research can be an effective way to bridge the divide between research and practice, and theory and practice.

Involve for-profit private sector individuals in learning networks. While the field of knowledge and innovation management for development is largely influenced by the literature in management studies, the participation of individuals from the private sector is a rare practice. Some of the learning networks initiated by civil society organizations are often critical towards corporate organizations. This is fine but managing such divides is more beneficial than ignoring them. If we are going to implement the innovation systems framework, deliberation on dialectical divides, such as the public and private good nature of knowledge, is very important.

Involve donors cautiously. While involving donors in learning networks can be instrumental in securing financial sustainability for such networks particularly where justification for funding is hard, it is nevertheless important to avoid learning agendas being driven too much by donor interests. This critique, however, is not new in the international development community, but here the logic behind this recommendation is to keep learning networks distributed and informal.

Involve elite groups cautiously. Although this recommendation is equally relevant for virtual learning networks involving national, pan-regional and international elite groups as well elite groups in place-based communities, the elite capture of learning networks which excludes less influential actors such as women, tribal people and poor people can generate negative social capital. Again, it is important to keep learning networks distributed and informal.

Engage policymakers and government officers in learning networks. The contemporary learning networks involve government people only in a few limited cases. However, if network members are going to influence policy through engagement in learning networks, it would be extremely important to facilitate continuous processes of interaction with policymakers and regulatory agencies.

Further research on social innovation and entrepreneurship through learning networks

One way to proceed with further research on bridging knowledge divides in international development collaboration would be to employ the convergence model of SI&E that has been developed in this

paper. An effective learning network should provide a holistic perspective on the convergence of actor structures, resources, processes and values. This model emphasizes the role of individual actors in innovation systems, as a conceptual approach to inform various initiatives to bridge knowledge divides in international development. Since the innovation systems framework involves networks of public and private stakeholders engaged in the production, exchange, regulation and application of knowledge pertaining to a particular economic and social activity, the purposive use of the concept of the learning network to define various kinds of learning communities is timely and relevant.

Employing the conceptual framework presented in this paper, multiple case studies can be designed to understand how actor structures, resources, processes and stakeholder values converge or diverge in various learning networks, from place-based communities of remote and isolated areas engaged in renewable natural resource management to virtual networks engaged in knowledge management at national and international levels (a) networks initiated by donors, diaspora communities, and civil society organizations and government agencies; (b) networks involving a specific sector, such as agriculture and health, or cross-cutting issues, such as learning and innovation in a particular context; (c) networks with a principal mode of interaction through either an online environment, face-to-face dialogue, or a smart combination of both; and (d) networks that engage those in authority and that challenge them. Some of the research questions that emerge from the review are as follows: What are the organizing principles of learning networks in a given context? How do learning network members facilitate creativity and innovation within their organization and in societal systems at large? What are the roles of boundary spanners to initiate, facilitate and sustain learning networks? How do network members know whether their network is learning and innovating enough to prevent learning network failure, and thus contributing to a prosperous knowledge economy? These questions, however, are not exhaustive and can evolve further through researchers' interaction with the members of a learning network under study.

Conclusion

The review revealed that the existing body of literature on knowledge management for development is very small, and specifically focuses on integrating multiple knowledge systems without enough treatment of multiple realities; but in practice the latter often complicates the former. Most actors in knowledge networking initiatives, however, seem to agree at least in principle that knowledge is not an entity or commodity, but in practice such networks often fail to appreciate that knowledge is socially constructed, as influenced by the multiple knowledge systems and multiple realities of a diverse group of stakeholders. In other words, human agency fails to exercise what we agree in principle because we work under a relatively rigid social and organizational structure and institutional set-ups. To this end, the innovation systems approach recognizes that stakeholder interaction occurs in a context, analogous to the theory of situated learning, and emphasizes the creation of enabling environments, specifically in the areas of policy and infrastructure, for learning and innovation.

One pragmatic way to address the above paradox is by engaging in negotiation, not just about multiple knowledge and multiple realities but holistically about the convergence of actor structures, institutional set-ups, available resources and infrastructure, knowledge management processes, and stakeholder values. However, this provisional conclusion needs to be validated through further research as suggested in this paper. The current preoccupation with paradigm-based science, policy and practice should be reconsidered because a paradigm is not a blueprint, but an organizing principle and a conceptual framework. To this end, the role of a learning network should be to engage its members in continuous processes of learning and innovation, often thinking beyond what is obvious and working on the edge, often through continuously spanning the traditional boundaries. Although in principle the importance of integrating Western paradigm-based science, policy and practice with the knowledge and realities of Southern scientists, practitioners and local communities is increasingly being realized, unfortunately in practice there is still a long way to go before we see meaningful impacts in the field of international development.

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