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Prioritising University-Community Engagement in North-South Research partnerships

For session theme: Tomorrow's common research priorities for Nordic and Southern African universities

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Abstract

This paper will respond to the theme of multidisciplinary areas of research that are considered of high importance for SANORD's member universities and countries. It will explore the facilitation of existing networks and initiatives, with a specific focus on innovation, in forging partnerships that are useful and appropriate to communities. The ambition here is to address the knowledge discrepancies between universities and communities by establishing collaborative networks that actively involve members of both institutions. The strength of this endeavour is its reciprocal nature where local stakeholders are fruitfully and continuously engaged as network contributors and facilitators. Ultimately, the paper will present existing cases of North-South actions involving researchers, educators, and local role players that assist citizens of local (Southern) communities, aligned around mutual objectives in a single network.

Introduction

South Africa is a country affected by a multitude of social issues. Numerous communities here are exposed to problems that threaten the wellbeing of their citizens. These are complex social challenges often associated with poverty, crime, and health issues (especially HIV/AIDS and tuberculosis) (Van Zyl & De la Harpe, 2011). These ills impede or outright prevent the development and enablement of communities and their citizens. Factors that historically contribute to tension levels in under-resourced communities include the lack of economic agency (unemployment, inflation); social inequality (insufficient social services); remote health and educational facilities; lack of infrastructure; lack of access to technology; and the like (ibid.).

In light of the above, universities, and specifically university networks, are ideally placed to help address immediate societal concerns. One of the foremost objectives in universities' changing roles in the knowledge economy can be to facilitate collaboration (or collaborative) community networks in terms of communal enablement (or, for lack of a better term, empowerment). This, as we shall come to understand, can be achieved with open and active participation from both the university and the respective community, marked by mutual accountability and trust. Practical university-community engagement is not, universally, formalised in transparent and readily available policies – this is in line with recent literature (Hall, 2010). Both Hall and Kruss (see HSRC, 2010:1) assert that universities are grappling to define what 'community engagement' or 'social responsiveness' means, and what strategic and systemic changes are taking place – or should take place – to realize new visions of engagement.

Scholars such as Bender (2008) have indicated that research on curricular community engagement was historically lacking, despite being imperative. Recent claims, however, point to the emergence of a lively debate on the relationship between the university and society in a developing country like South Africa (see HSRC, 2010; Cloete, Bailey, & Maassen, 2011). This debate has further prompted calls for common discourse policy frameworks for social responsiveness (Favish, 2010). Community engagement in this sense, especially in terms of a socially responsive policy, can be regarded as a method, process, programme and practice in higher education. In light of these assertions, this paper will attempt to ground such engagement as an academic and civil research priority in terms of the collaboration between Southern African and Nordic universities, with a specific focus on information and

communication technologies (ICTs) and user-driven innovation. This certainly has special merits in a global context, supporting an aligned interest for multi-disciplinary and multi-levelled partnerships. Existing cases of North-South actions, where stakeholders are aligned around mutual objectives in a single network, will be presented in brief.

Objectives

In a knowledge or information economy, the role of universities is changing from the sole provision of education and specialised skills training to one of transferring knowledge and technology to industries and communities. Moreover, universities are increasingly involved in the commercialisation of knowledge, also becoming active players in national innovation programmes. Universities remain the primary source of highly skilled graduates. And through the development of multiple scientific disciplines, graduates are better equipped to perform in innovative environments. In order to develop more capacity in stimulating innovation, universities draw heavily on fundamental knowledge that arises from research and development at these institutions. Global drivers for competitiveness include knowledge-based societal foundations, and an investment in human beings to enhance productive capacities and technological innovations. It is important to harness human and social capital produced by knowledge workers for growth and prosperity.

In light of this context, it will be the objective of this paper to illustrate universities' evolutionary roles in the knowledge economy. This will be done in the framework of current North-South(-South) initiatives involving the Cape Peninsula University of Technology (CPUT) in Cape Town, South Africa. These initiatives describe universities (both Southern and Nordic) as active players in national and local innovation programmes. These cases will be practical examples of dynamic and collaborative networks around mutual interests and communal objectives. Part and parcel of such approaches are underlying methodologies, notably those of participatory design and ethnography. These facilitate the broader intentions of collaborative, user-driven partnerships, and align central actors with local actions. Essentially, this paper lays the early foundations for prioritising community engagement in terms of the research mandates of higher education institutions. In what follows, a contextual overview will be provided – one that broadly situates the priority for engagement. This is followed by a case study, if you will, of CPUT initiatives that constitute primary engagement vehicles through its active participation in a number of North-South actions.

Context

National System of Innovation: the need for systemic collaboration

Since August 2002, South Africa's National System of Innovation (NSI) has been developed, from a government perspective, on a basis established in the National Research and Development Strategy (NRDS). This system is represented visually, below:

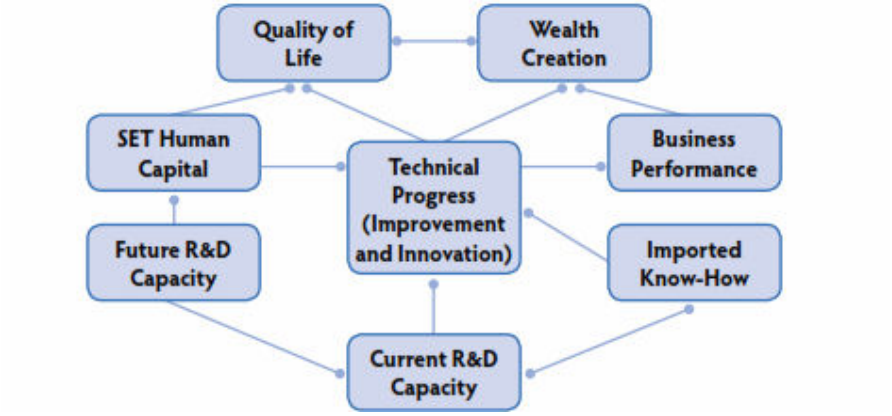

Figure 1. Key components of the National Research and Development Strategy (NACI, 2010).

As indicated by the diagram, the South African government promotes future research and development capacity through, for example, the public education system that produces human capital in secondary education and training. Moreover, technical progress – marked by improvement and innovation – is stimulated through public and private expenditures (business performance and wealth creation). The key process of innovation – surmised as the introduction of new products, services, and institutional forms both in society and the economy – is underpinned by respective knowledge resources in the economy. These resources encompass people and research development capacity.

In 2010, tasked by Science and Technology Minister Naledi Pandor, the South African National Advisory Council on Innovation (NACI) reported on the various strengths, weaknesses, and critical issues in terms of the country's innovation policy. Firstly, the national innovation strategy operates on the back of major strengths:

- Established institutional frameworks;
- A diversity of population;
- Private sector commitment to research and development;

- Existing national research facilities and a range of flagship development initiatives.

Conversely, nationwide innovation is hampered through the inability to leave a footprint at community level. According to the NACI 2010 report, the science sector has not adequately responded to social challenges, and South Africa has not yet converted the benefits of economic growth into tangible improvements in the quality of life for the majority of its population. In this vein, research and development investment has not been aligned to major social needs. Contributory factors here include excessive regulation and bureaucracy, and lacking funding in research infrastructure and human capacity development. Ultimately, countrywide innovation output is still in its infancy, despite a number of government initiatives and incentives.

The state of innovation in South Africa certainly underpins the need for international coordination efforts in implementing optimal innovation steering mechanisms. As indicated in the OECD's Country Report on South Africa's innovation system (2007), resources are stretched too thinly over too many priorities, often preventing the achievement of critical growth. Moreover, South Africa is ranked 54th in the 2009-2010 Global Competitiveness Index (previously ranked 45th) versus Nordic counterpart, Finland, ranked seventh. This speaks to a need for horizontal (local, regional and national) and vertical (international, North to South) interaction and collaboration. Through facilitating such networks, not least at university and community level, a national innovation framework may be strengthened. By tapping into the growing stock of global knowledge, assimilating and adapting it to local needs and creating new technology, it may be possible to contribute to Southern innovation.

Finland and South Africa: helping to stimulate engagement

Before presenting a case study of university-community engagement, within the context of innovation, it is worth mentioning that Finland has thus far been a significant Nordic collaborator. The country has a strong basis for research and education in the area of innovation, and community-centred initiatives in the South. The Finnish user-driven innovation policy – coordinated by the Ministry of Employment and the Economy – promotes the systematic engagement of users in the innovation process. It states that efficient user-driven innovation requires highly developed practical capabilities and tools that enable user-driven innovation, including development platforms like strategic- and service design. The Finnish universities participating in university-community engagement (as shall be described in the CPUT case study) are regarded as leading universities in the field of user-

centred and user-driven innovations and service design, both through research and education. CPUT's Finnish partners are specialized in the key areas and have study programmes in, inter alia, Service Design and Engineering (SDE) and Service Innovation and Design (SID).

The Cape Peninsula University of Technology has more than 4 000 full-time staff and more than 28 000 students. The university has a local and international student body emanating from all the provinces of South Africa, the continent, and across the world. The Faculty of Informatics and Design (FiD) is one of six faculties that offer courses relating to community engagement, design, and ICT disciplines. CPUT collaborates with communities, research institutions, industries, government departments, and educational stakeholders in local, provincial, national, regional and international contexts on all levels. CPUT is by official mandate committed to stimulate innovation contributing towards a knowledge economy for South Africa.

Prioritising university-community engagement

Overview

CPUT, in particular the Department of Information Technology, Faculty of Informatics and Design, has had extensive experience from international research and development projects (e.g. EU) and networks (e.g. LLiSA, ENoLL). In the North-South context, the department and its partners have been involved in activities supported by e.g. COFISA (2006-2009), SAFIPA (2008-2011), and INDEHELA (1989-2012). Results from these have been very encouraging. Research clusters are generally attributed to research by department members in areas such as indigenous knowledge, localization of IT, usability, design and evaluation methods (service and interaction design), collaborative community enablement, and development priorities like e-health and informal learning.

Focus

The Informatics Development for Health in Africa (INDEHELA) network, of which CPUT is central collaborator in the South, has analysed the role of information management and ICT in socio-economic and human development in several research and capacity development projects. Millennium Development Goal (MDG) 8, develop a global partnership for development, specifically identifies the sub-goal to make available the benefits of new technologies – especially information and communications technologies. The importance of adjusting technology to local contexts is also strongly supported by the Finnish government

development policy which suggests that "development cooperation should help developing countries to gain access to … technology applied to their conditions".

The principal objective of the ICT and the Information Society policy of the Ministry for Foreign Affairs of Finland (Toivanen, 2011) is to make ICT available in developing countries, but not as information technology development as an end itself. The policy highlights that the development of electronic services is not realistic, and often not even possible, if the information systems, work processes and expertise at the core levels of the sector are not in order. This is mainly a socio-technical (Information Systems / Information Management) issue instead of a purely technical one. There is a need in Africa for Information Systems education and IS development methods that promote societal development, particularly focusing on community needs.

For two decades, the Finnish-African university collaboration that is now the INDEHELA initiative has addressed the issue of "ICTs for Development" in practical terms by focusing on one of the highest development priorities – health. Recently maternal and child health (Millennium Development Goals 4 and 5) has often been identified as the core application domain for joint research and development activities. According to UNICEF (2008), "the divide between the industrialized countries and developing regions, particularly the least developed countries, is perhaps greater on maternal mortality than on almost any other issue". The very concrete experience from studying the needs and prerequisites for providing better healthcare services for communities through better information and better information management by means of appropriate technologies does, in turn, make it very tangible that there is a great need to develop current IT/IS education in Africa to better equip IT/IS professionals in addressing such socio-economic and human development needs in their professional practice.

Beneficiaries

The ultimate beneficiaries of CPUT-Finnish collaboration networks are the citizens and communities that benefit from the useful (based on analysed real needs) and usable (fit for users' existing skills and knowledge) services and solutions that are created with the students, teachers, researchers, and practitioners involved in the network. In South Africa, citizens have so far not been seen as playing a particularly active or important role in the innovation system. Often, they are seen as passive and adaptive, merely utilising technology developed

elsewhere or prescribed to them by experts external to their situations. Education in user-centred service design and engineering is capable of addressing this issue.

The challenge of developing sustainable solutions that involve the disadvantaged sections of the population highlights the need to understand these user groups thoroughly. User-driven approaches could thus provide real value for developing and validating new concepts, services or products, allowing more rapid insights into how different users think, adopt, use and influence technology. As a systemic and approach, this could lead to enabling users to become active partners in RDI processes for the future. It could also greatly benefit the current ICT4D community and help in creating more sustainable outcomes in the area of utilising technology in social and economic development.

The participating universities benefit from North-South engagement through the development of sustainable international education. Part of this collaboration foresees the development and facilitation of an 'incubation space', consisting of several young research practitioners and students. The incubation space will become the central driving force of the network research agenda, and will encourage collaborative engagement between communities under study. The collaborative efforts between the surrounding communities and the university culminate in an 'interaction space', where researchers, developers and community representatives engage openly in the research process.

The third and fourth beneficiary partners are local service providers and micro-enterprises respectively. These actors are necessary and indispensable elements to the functioning of the research process. Service providers may consult on a variety of services and products, for example in the field of mobile healthcare, informal learning, and community development issues. Micro-enterprises may then advise on the best means in distributing and promoting those innovations the lab delivers. In addition, network collaboration addresses the industrial possibilities that are required for upscaling the developed services. Bigger commercial partners may have large-scale business networks, thus a more penetrating reach in the regional economy.

As a summary, the beneficiaries of collaboration activities are both in South and North:

- Community members who will benefit as end users of innovations (long term)
- Relevant industries who will employ graduates who are able to use design approaches for innovation in their work (medium to long term)

- Undergraduate students who will be better equipped to use design methods for innovation for real needs (immediate)
- Post graduate students who will be able to utilise the design body of knowledge in the research (immediate)
- Academics at participating universities who will be able to incorporate design approaches in their teaching (immediate)
- Universities who will be in a better position to respond to the need for innovation as part of a knowledge economy (medium to long term)
- Universities who will benefit from their community engagement activities in a living lab/incubation space setup (medium to long term)
- Cape Town as the Design Capital for 2014 with tangible design outputs (immediate)
- The Southern region that will gain from the involvement with the Northern partners to become more innovative (long term)

Methodologies for engagement

Ethnography

It is important to consider the micro contexts of communities in understanding and exploring their socio-cultural engagements, especially concerning how information is gained, maintained, and shared in local settings. An ethnographic methodology brings about an insider's perspective – a narrative account of the many social and cultural dynamics at play in terms of the subject matter (Wolcott, 1975 cited in Van Zyl, 2011). To understand the complexities associated with socio-cultural and contextual lifeways, ethnographic methods could allow for deep, meaningful engagement with communities.

The ethnographer must be able to understand the outcomes of her accounts within the larger social circumstances and cultural norms (Savage, 2006). According to Blomberg, Burrell & Guest (2003), ethnography provides a point of view on associations between humans and the artefacts they design and use. Ethnography promotes observation of subjects in their natural settings. Because the subject is in her natural setting, all the artefacts and activities of interest are present for examination. Everything that happens in the subjects' environment must be seen holistically and understood in the larger context. Achieving this holism implies that an

activity or artefact studied in context will generate a deeper and more meaningful understanding.

Participatory Design

To design and develop innovations that will be useful and adopted by individual communities it is important to involve the users in the design, development and testing of these interfaces. A collaborative approach is required to provide for an iterative process of co-design, co-development and co-deployment of new technology artefacts. A participatory design approach is proposed for this purpose. Participatory design (PD) represents the design of computer systems whereby the user intended to use the proposed system would play a critical role in designing it.

The participatory development ideology is justifiable for its consideration toward empowerment, sustainability and relevance as it seeks to actively involve previously marginalized people in decisions that affect their lives (Cooke & Kothari, 2002). Participatory methods have been adopted by organizations like the World Bank and UNICEF in community development projects. Out of such projects, some useful research tools and methods have been developed, such as the use of appropriate technology, using existing indigenous technical knowledge, and "Participatory Rural Appraisal", a method used for assessing rural conditions (DeBenedittis, 2010).

Participation as a process is still an important aspect of design outcomes. Since this process determines which people and what information is included, it is a process that needs constant attention. Development is not just about an end product but about the process. Both the product and process are redefined over time toward the goal of a more socially acceptable and sustainable solution (Byrne & Sahay, 2007). A participatory design approach is proposed as fundamental constituent to community engagement, to ensure that the needs of local communities are sufficiently addressed. Particular cultural and other contextual aspects of user communities are to be considered.

Collaboration and engagement actions

INDEHELA

INDEHELA (Informatics Development for Health in Africa) is a long-term initiative to strengthen the capacity of the participating African higher education institutions to contribute to the socio-economic and human development in their countries, particularly in the scientific field of Health Informatics (HI) and the practice of e-health. The nucleus of the initiative is the collaboration since 1989 between the Department of Computer Science and Engineering of the Obafemi Awolowo University (OAU), Nigeria, and the Computing Centre of the University of Kuopio; currently the Healthcare Information Systems Research and Development (HIS R&D) Unit, School of Computing, University of Eastern Finland (UEF). The collaboration resulted in the partner HEIs organising the first Health Informatics in Africa (HELINA) conference in 1993 and being awarded funding by the Academy of Finland, Development Research, for the INDEHELA-Methods research project in 1998-2001.

The research collaboration in Information Systems (IS) in Healthcare was expanded to Universidade Eduardo Mondlane (UEM), Mozambique, and Cape Peninsula University of Technology, South Africa, during the INDEHELA-Context research project, funded by the Academy of Finland in 2004-2007. A broader network of universities and individual researchers or doctoral students, particularly from South Africa (Nelson Mandela Metropolitan University, University of Pretoria, University of Cape Town, University of Western Cape, Medical Research Council) but also from other countries (Botswana, Namibia, Norway), grew up spontaneously around the core universities.

The third phase of the INDEHELA network, INDEHELA-South and -ICI between 2008 and 2013, continues around annual multi-country meetings and workshops as well as spin-off projects by all or a subset of the partner HEIs, depending on the financing opportunities. CPUT has taken the responsibility of the coordinating university – thus the driving centre has moved from Finland to the South. Through the INDEHELA-Education NSS project 2009-2011 the network was extended in Finland to the Savonia University of Applied Sciences (SUAS). This was based on the long time close collaboration between the Health Informatics groups in UEF and SUAS in Finnish national research and development projects on the one hand, and on the parallel long collaboration that SUAS had in Africa, particularly in Mozambique with the Institute Superior de Ciências de Saúde (Higher Institution for Health Sciences, ISCISA).

Currently the OAU, UEM, CPUT as well as UEF and SUAS have a strategic collaboration under which funding has been secured / has been applied for / is being applied for in mutually complementary areas. The current INDEHELA-ICI programme focuses on developing the capacities of the three African Higher Education Institutions in Health Informatics (HI) and e-health education. An African Health Informatics Masters and/or certificate programme will be established in each African partner HEI, either integrated in generic Information Systems / Information Management and Software Engineering programmes or stand-alone. .

ISD4D

Adjusting technology to local context is a major challenge in the field of ICT for development, recognised equally by academics, practitioners and policy-makers. The aim of this collaboration is to respond to that challenge by developing a comprehensive approach (methodology) for the analysis and design of sustainable and scalable socio-technical information systems that promote societal development of local communities in varying developing-country contexts. Besides its research objective, the project has a capacity building objective of forming a sustained tripartite international research group capable of disseminating, evaluating and improving the approach further. The resulting holistic information systems development approach for societal development (ISD4D) is to comprise methodological guidelines in five sub-areas integrated into a holistic one: (1) Context mapping, (2) Community needs analysis, (3) Workflow analysis, (4) Architecture design, and (5) Interaction design.

The project is based on previous research of the INDEHELA network as well as a number of related national and international actions. The project will integrate the currently separate methodological sub-areas into one, and adjust them to the specific contextual settings of developing countries. The research approach takes a participatory action foundation in which Finnish, Mozambican and South African researchers collaborate with local actors to jointly develop the IS development approach. The empirical cases will be real-life IS development projects in maternity health. The research process alternates between theoretical reflection and empirical action in the real-life cases. The project is divided into four phases: setting-up phase, two action-reflection phases, and scaling-up phase.

The tripartite research team is strongly networked with a number of partners and projects nationally and internationally. Dissemination of results will take place through these networks. The outcomes will include the ISD4D approach documented in a report and several

refereed scientific papers, as well as 5-8 PhD degrees in Finland and Africa. Bridging the gap from ICT policies to the real-life development of socio-technical information management for societal development in Africa by African stakeholders will have a very high potential for societal impact. A documented, empirically tried IS development approach that is contextually sensitive will be a major scientific breakthrough in Information Systems.

UFISA NSS

This project "UFISA" (User-centred design for Innovative Services and Applications) facilitates the development of joint education between universities in Southern Africa (South Africa, Botswana, Namibia) and Finland. Altogether, there are 7 core partner universities (Africa: 4, Finland: 3) that join their activities around an important multi-disciplinary area of education and development (both technical and societal): user-centred design of information and communication services for communities. The education provides benefits for the communities in Southern Africa through innovative ICT-based prototype services. The universities benefit from the communities by being able to provide international teaching in real-life settings tied to the well-functioning living labs in Southern Africa. During the "UFISA" project, the consortium systematically develops a joint mode of operation. The joint activities will continue after the project in a North-South-South manner with a working incentive model.

To facilitate improvements in this, this project addresses innovation education in a timely topic: service design, innovation, and consumption. ICT-supported services are always consumed locally, but they need to be designed from international and global viewpoint. Therefore, global access to local settings is crucial for the development of services. The "UFISA" project facilitates this by educating the future designers of citizen-centric services. The students in the participating education institutes of this application are the designers of future services. The designers of the new innovative services for global markets need skills in international service design and production. The business networks that facilitate the delivery of international services consist of local actors that collaborate globally.

This local-global setting is a challenging situation; future designers need training for this already during their studies. This project establishes practical surroundings for them to study in international real-life settings. The project provides students with real international service design cases that deliver practical benefits for the surrounding local communities. The students learn to do design, communicate and interact in international designer groups. These

skills are of fundamental importance in addition to technical development skills that are the essence of the technical curriculum.

South Africa-Finland Partnership

CPUT and the Nelson Mandela Metropolitan University (NMMU) were funded from 2009-2011 by the South Africa-Finland Partnership (SAFIPA) in which the aims were to develop innovative solutions to home and community based healthcare; capacity development of student interns, novice researchers and community citizens; and knowledge exchange visits where persons were able to travel between Finland and South Africa. This project is an extension of the research activities started with the INDEHELA-Methods (1998-2001) and INDEHELA-Context (2004-2007). The research supported by INDEHELA was based on the proposed research framework with the following main components: the University as education provider; organisation to develop information systems, organisations to use information systems; and finally the community that should benefit from the information system. This project continues to focus on the role of the university in creating knowledge and ICT solutions that should directly benefit communities. This project is therefore an extension of a strong relationship between Finland and countries in Africa.

The development of information systems and how such systems are used in practice when transferred to another context, requires an understanding of contextual issues and how this impacts the sustainable use of the system. Finland partners have done extensive research in understanding specifically the context of Africa. This knowledge will be vital when developing information systems that need to be useful to the citizens of a community. An improved understanding of the different contexts of Finland and South Africa will help to address the divides, both social and technical, between a developed country and a country with many communities that still do not have sufficient access to information and educational opportunities.

Final thoughts: A community network discussion

This paper has thus far described practical collaborations, consisting of different layers of networks where each respective node can be exploded into another network. All these networks are important components in a university-community collaboration endeavour. The first network includes all major stakeholders as illustrated by Figure 2. The following network (Figure 3) is comprised of primary nodes: the community, South African universities and a Finnish partner. The strong existing relationship with Finland enables the network to

tap into the experiences, ideas, cases, results, and existing ICT solutions from similar projects already implemented or tested in Finland. In addition, the Finland partner can provide facilitators, through exchanges and/or volunteering. The South African universities can provide new or adapted ICT solutions, researchers, facilitators, educators, student teams or volunteers. The emphasis on the research approach and methods will be on immersive and participatory design and development. The proposed networks will support this approach and allow for collaboration.

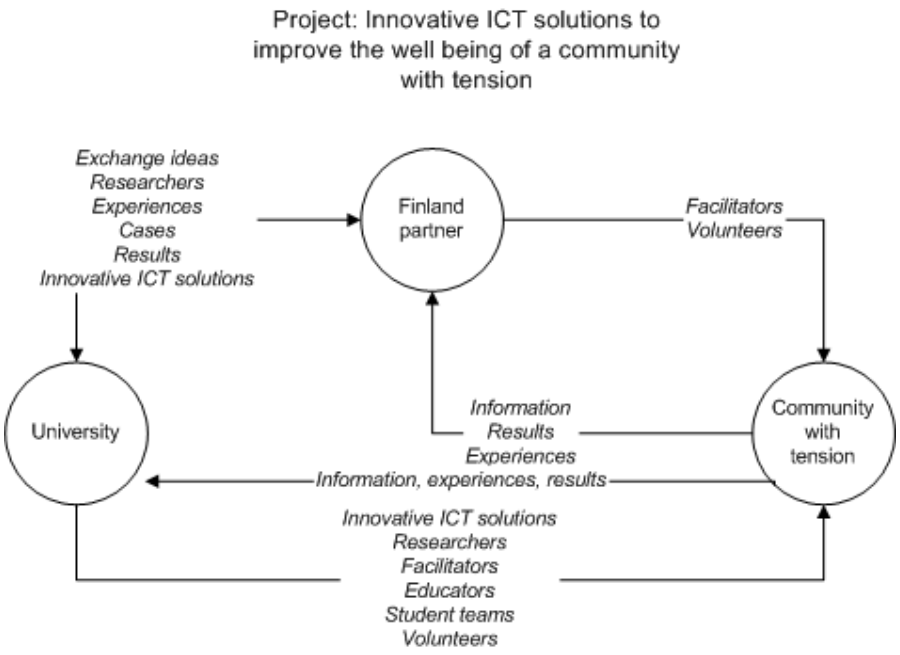

Figure 2. Main components for the network of university-community engagement

Within a university, different networks exist where a person can participate in one or more of the following roles: an educator, researcher, and/or project member. A network of researchers, for example, is a community of practice where experiences, observations, ideas and results are exchanged and shared. A network of educators, for example, will share an interest in designing curriculum for courses; develop content, teaching methods, and the like. Students can operate within an incubator where they will get the opportunity to acquire the necessary skills and know-how to develop as ICT developers. They can be divided into project teams where each team will have a project team leader and/or manager. These networks can be physically located at the same space or be virtual teams located at different geographical locations.

The citizens in a community also form a network of citizens physically located at the same geographical location, for example a township, rural community, or a virtual community where citizens are geographically separated but share a common interest or need (for example a support group for mental health sufferers). This is illustrated by Figure 3. A university with an intention to do community engagement activities can do this best if it does not offer a *solution* to a community as an outsider but rather immerse within the community to become part of the community. The suggested new network aligned around the proposed project then has members from both the community and university all participating in the same network. This way any solution becomes a collaborative action thus enabling citizens/members to eventually continue in a network even when the university network withdraws. The solution is successful when the network is stable: when all the members of the network acknowledge that the solution is necessary and that they can all benefit from participating, thereby improving their wellbeing. In such a case the solution is sustainable – that is, it no longer requires the intervention or involvement of outsiders.

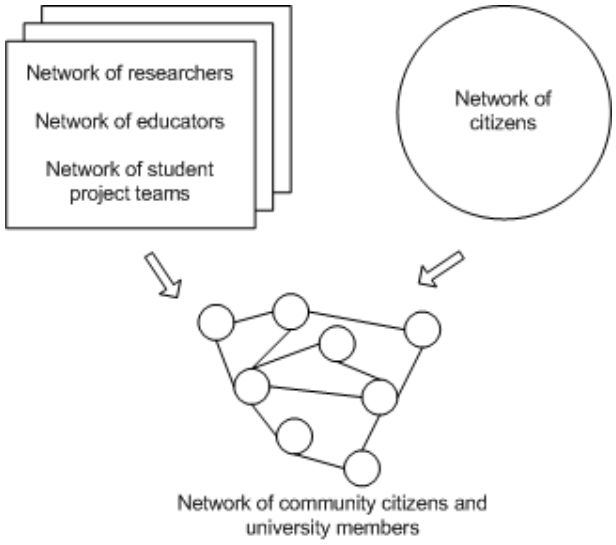

Figure 3. Collaborative networks with members from universities and communities

It is important to consider how these networks are formed and how different participants from universities, Northern (Finnish, in this case) partners and communities *enrol* in the network. It is envisaged that these networks, although with different goals, will collaborate closely. For this purpose, a taxonomy of 'citizens' is provided. A citizen is an individual that belongs to a

community. A citizen may be part of a family. At this stage the following citizen states have been identified (needs to be validated and researched). A citizen can be:

- neutral (is neither affected by immediate socio-economic problems or is contributing to the problems);
- antagonist – the citizen causing or directly contributing to the problem, e.g., gangster, drug-addict, abuser, and the like;
- victim – the citizen that is caused harm as a result of the problems contributing to the issue, e.g., victim of gangster violence;
- "sufferer" – the citizen that suffers as a result of the issue, e.g., a family member of the victim or the antagonist;
- reconstructed/reformed citizen – the citizen who used to be an antagonist, i.e., who has caused harm to others and has reformed;
- facilitator – the citizen or "thing" (ICT can also be regarded as a facilitator) that acts as a change agent to bring about change;
- community leader – a citizen formally or informally accepted as a leader who acts as a spokesperson for a group of citizens within the community, e.g., pastor;
- volunteer / community developer – a citizen (within or outside the community) who offers time and expertise to assist with the care, education, and dissemination of information, whose involvement contributes towards addressing the problems contributing to the immediate socio-economic problems.

Ideally, reconstructed citizens are to become active and continuous collaborators in addressing immediate communal problems for the purpose of general community wellbeing. This does not imply that the dynamics of the relationships between citizens, structures and other factors also contribute to an increase or decrease in the wellbeing of the community. Community leaders and reformed citizens often have direct linkages to non-profit organisations that formally represent citizens who may have formal links to the government on different levels. These relationships may, in turn, affect the roles and activities of reformed citizens, and provide communal platforms through which to support future enablement.

Conclusion

The many advantages that can arise out of open innovation are variably enormous (Kusiak, 2007). It would seem that many positive research actions may be generated within a collaborative university-community framework, as outlined above. Of these, the notable benefits include: strategic vision in bottom-up community engagement; real-life social research; tightened interpersonal connections via collaboration, incubation, and interaction spaces; the possibility of promoting strong community leaders; promoting products and services to a broader audience through industry; contributing to the development of local economies through the involvement of micro-enterprises and service providers; and, a symbolic socio-cultural engagement around key issues in South Africa's history in the form of ICT-for-development (and –innovation).

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