"Marrying the 'System of Innovation' and micro enterprises in real world rural SADC": An overview of collaborative SMME incubation in the Rural Living Lab of Sekhukhune

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Abstract: This paper is part of a series dealing with the **"Expansion of European Network of Living Labs (ENoLL) to Africa - Opportunities, Synergies, Benefits and Limitations".** It provides an overview of the Sekhukhune Rural Living Lab and explores specifically the collaborative business incubation aspects of this Living Lab. It highlights some of the business incubation challenges with regards to the "marriage" between 'Systems of Innovation' and the (SMME) inhabitants of "natural daily life /work environments". It is also an effort at raising the interest of other actors in this arena to collaborate in this endeavour and to collectively find ways of ensuring a more inclusive, real world (and real people) approach to rural development.

Keywords: Rural Living Lab (RLL); Collaboration@Rural (C@R); ICT4Dev; rural development in emerging economies; rural business incubation.

1. Background

A year ago, at IST 2006, we gave an overview of the changing emphasis that had been experienced within the 'system of innovation' (SOI) as some Southern African Development Community (SADC) Information and Communication Technology (ICT) researchers had realized the pressing need to focus more extensively on understanding and addressing business development aspects in the transferring of (ICT) technology to (specifically) rural areas. [5] This paper is intended to provide a further insight into this evolution as it gives an introduction to the live of the initiative discussed at IST 2006 within the context of one of the EU Framework Program 6 (FP6) "Living Labs", i.e. the Rural Living Lab (RLL) of Sekhukhune – one of the initiatives of the "Collaboration @ Rural (C@R)" integrated project (IP).

1.1 Defining the context

The following definitions would prove useful for a better understanding of the subsequent discussions:

1. Within the EU FP6 Framework a "Living Lab" is defined (loosely) as an "embedded set of actors & support systems in natural daily life /work environments for open co-creation & innovation together with engaged citizens /users". A "Living Lab" is therefore an effort at closing the gap between needs /ideas and business /user valid solutions. The RLL of Sekhukhune (and the associated "marriage to be discussed in this paper) is therefore the first contextualisation of the European Living Lab concept in an all African rural setting. [1]
2. For the purpose of the following discussion, we would like to define the "System of Innovation"(SOI) as follows: Those "actors" and (specifically) "support systems /institutions" (from the above definition) that are primarily involved in research and technology development activities (RTD) within a specific ("Living Lab") context. Within the context of the RLL of Sekhukhune, the 'observers' (SOI) intend to get extensively involved and embedded in the 'observed' ("natural daily life") environment, i.e. "marry" a specific selection of SMMEs (Small, Medium and Micro enterprises) within that "natural daily life /work environment" – as will be shown in later discussions.
3. A brief description of the Infopreneurs™ network would also prove useful at this point in time. This is a "community of practitioners" (see Figure 1 later) consisting of service sector SMMEs operating in a franchise-like manner at community level to render a range of services as "social" entrepreneurs, i.e doing it in a entrepreneurial, sustainable manner but with a clear commitment to the development of the community in which they operate.

2. Objectives

This paper has the following objectives:

1. It is an effort to provide an overview of the Sekhukhune Rural Living Lab addressing specific challenges, interventions, potential outcomes as well as a physical area description. This section includes an overview of the planned collaboration services for the area.
2. It aims to give an overview of the planned technology as well as business incubation interventions of the SOI in the C@R Sekhukhune RLL. It will, through this sharing, endeavour to provide some guidelines to promote the committed involvement ("marriage") of other SOIs in similar collaborative working /development environments within SADC. This is done in the believe that these kind of "marriages" could act as key enablers of sustainable development in rural areas; and
3. It further hopes to explore some of the (often under emphasised) business incubation aspects of the (specifically Sekhukhune) Rural Living Lab(s) of C@R.

Some longer term objectives of the research project in general are discussed in the conclusion.

3. Overview of C@R Sekhukhune RLL

3.1 Rural Challenges and Planned Overall Interventions

As in Europe, there are many barriers in South Africa inhibiting rural entrepreneurship and access to mainstream or global supply chains and markets. Many of these – such as long distances, high transport /transaction costs and low economies of scale – are the normal, expected consequences of typical rural conditions such as physical remoteness and low economic activity densities. The problems associated with these barriers however tend to worsen dramatically if roads are poor, telecommunications bandwidth is limited or very expensive, and a high proportion of small, micro and emerging rural entrepreneurs have

limited computer literacy and do not own a truck, motorcar or computer. These are the typical added complexities faced by rural entrepreneurs in most developing countries and in South Africa's "deep rural areas" (of which the Sekhukhune area is a prime example). The table below provides:

1. A summary of the "generic" (as well as SA specific – grey cells in table) rural barriers /challenges to rural enterprise development and competitiveness;
2. An outline of the specific type of collaboration-based SMME interventions (including both technological and entrepreneurial measures) that could be applied in this type of context; and
3. Potential outcomes. [2]

Table 1: Challenges, Interventions and Potential Outcomes.

<table>
<tr><th colspan="2">Rural enterprise & economic development challenges (SA – specific aspects are greyed /shaded)</th><th>Proposed focus of Collaboration @ Rural Interventions</th><th colspan="2">Potential outcomes (of directly and indirectly enabled enterprises /services)</th></tr>
<tr><td>Small enterprise sizes</td><td rowspan="2">Low economies of scale</td><td rowspan="7">Increased, sustainable, and accessible supply of virtual/ remote, mobile & local agency services, via:
A) Development of accessible portals (incl. geo-portals);
B) Harnessing of increasing mobile connectivity and spatial /location awareness; and
C) Enablement of rural service agents (like Infopreneurs™)</td><td rowspan="2">Sharing of infrastructure/ services, providing economies of scope</td><td>Clustered enterprises</td></tr>
<tr><td>Low supply chain volumes</td><td rowspan="2">Consolidation of volumes/ streamlined rural logistics</td></tr>
<tr><td>Long distances</td><td rowspan="3">High transport & transaction costs</td><td rowspan="3">Consolidated & cheaper transport shipments & reduced transaction costs</td></tr>
<tr><td>Low /costly bandwidth</td><td>Bandwidth-efficient systems</td></tr>
<tr><td>Limited connectivity /computer literacy</td><td>Accessible human/ digital information interfaces</td></tr>
<tr><td colspan="2">High proportion of unrecorded/ informal and uninformed SMMEs</td><td colspan="2">Enhanced local business & geo-economic intelligence</td></tr>
<tr><td colspan="2">High proportion of failed / unsustainable ICT4Dev projects (white elephants)</td><td colspan="2">Effectively localised, inter-operable and sustainable networks of ICT and allied services</td></tr>
</table>

3.2 Physical Area Description

The geographic focus for the proposed South African deployment of the Rural Living Lab is the **Sekhukhune District Municipality** and the wider or sub-regional focus area, in the Northern Drakensberg. This is one of 13 Rural Development Nodes, prioritised by South Africa's president and has a population of more than 1.4 million people (2002 statisticts). It consists of a traditional /former "ethnic homeland" area with high population pressures and unemployment levels and a low density commercial farming and mining area. There are extensive forestry and tourism activities in the Northern Drakensberg region. The wider area is also characterised by expanding new mining activities – in particular around Burgersfort. Our RLL also includes the town of Lydenburg (Thaba Cweu Municipality) that acts (to a large extend) as the commercial hub of the area. Infopreneurs™ will be deployed at Burgersfort (a nodal) point as well as the deep rural communities of Kgautswane and Leroro (satellite service delivery points).

To form a proper understanding of the 'ruralness' of parts of the Sekhukhune District, it needs to be mentioned that the community of Kgautswane (above) forms part of a 'chain' of 19 villages (with a total of about 120 000 inhabitants) in a remote valley that was only

connected to the national electricity grid in 2003. Fixed line communications are only available at a few community focus points (like the Kgautswane Multi-purpose Community Centre – MPCC) and wireless connectivity is hampered by the mountainous nature of the area. (Communal) payment for services (like electricity) often proves very problematic and frequent interruptions are experienced due to the discontinuation of services by the service providers based on large outstanding (electricity and telecommunication) bills.

3.3 Focus Services Areas and Scenario's for Planned Interventions

The following discussion will provide a brief overview on the different categories of collaboration services (following a Service Orientated Architecture – SOA - development approach) planned for SMMEs and other participants in the Sekhukhune Rural Living Lab area.

3.3.1 Collaborative Procurement & Logistics

One of the main problems in rural areas is the typical small volumes associated with business transactions. Vendors purchase small quantities from their suppliers on a very frequent basis. This adds a huge overhead cost to the price of the items and also to the cost of doing business, transporting and distributing goods in these areas. A bundle of services will therefore be developed to address these issues. This service bundle will include the following:

1. Provide online ordering facilities (including the ability to use mobile phones for ordering) to purchase from preferred suppliers, which will enable small vendors to order goods without leaving their premises.
2. An order aggregation facility whereby many small orders can be aggregated into one large order per single supplier, in the process enabling bulk discounts from the supplier.
3. Consolidated transport and delivery services to deliver ordered goods to the small vendors. This would include route planning functionality (via GIS, see below), load sharing, order tracking, and warehousing capabilities.
4. Mobile banking services (including pure mobile phone banking) to handle all financial transactions associated with the above services.
5. Different Business Intelligence information available to all stakeholders (small vendors, Infopreneurs™, transporters, suppliers)

Providing medical related transport in rural areas is also a huge challenge today. Different entities requiring transport include patients, home-based caregivers and sometimes even medical personnel. The services mentioned above should also be able to accommodate this need for consolidated medical transport. Complicating factors include payment for this service via government grants and allocations (i.e. not directly via the normal banking services) and additional legal liability issues when transporting patients.

Another issue currently being experienced in the rural areas, is the lack of efficient procurement between 1st economy organisations, operating in rural areas, and 2nd economy vendors (SMMEs) in these areas. This is typically the scenario in the Sekhukhune area where many large mining organisations are currently expanding their operations on a large scale (new mines). These organisations often publish large tenders, but the SMMEs in the area find it difficult to respond due to their small capacity. This issue can be addressed through the following services:

1. A centralised tender facility to collate, categorise and publicise all tenders in the area. This could typically be operated and maintained by the Infopreneur network.
2. The ability to automatically inform relevant potential SMMEs of new tenders.

3. Cataloguing of all potential 2nd economy service providers with corresponding areas of expertise.
4. Collaboration tools to assist several independent SMMEs to respond in a consortium fashion to selected tenders.
5. A facility where tender implementation and execution can be supported and monitored (with reduced risk for 1st economy 'buyers') until completion of the tender.

3.3.2 Collaborative Stock Management & e-Commerce

A large variety of small service providers normally exist in most economies. Sekhukhune area is no exception. For example, being on the main tourist route in South Africa, there are many small tourist orientated SMMEs: e.g. bed & breakfast establishments and curio vendors. Many of them have a need to be able to market and sell their goods electronically to 1st world buyers, but they do not have access to; do not have the necessary skills or do not want to be burdened with the overheads of e-Commerce. The following services will address these types of requirements:

1. An e-Commerce portal where registered SMMEs can market and sell their goods online.
2. A service that provides for stock management of the inventory of SMMEs. This service should be able to integrate and reflect "manual sales" (e.g. walk-in's and telephone bookings/sales) as well as "online sales".
3. Electronic banking facility to handle payments.
4. Order tracking and confirmation of deliveries.
5. Trends and tendencies information analysis services available to all stakeholders.
6. Support services to allow network coordinators (i.e. franchisors) to guide, assist and support Infopreneurs™.
7. Trading support engine to manage the calculation, separation and distribution of different types of costs, commissions and related financial transactions associated with all the different transactions.

3.3.3 Collaborative Knowledge Sharing, Mentoring and Support

The processes and technology services described above can only function properly if it is supported and driven by people. As mentioned before, Infopreneurs™ on the ground will be the main interface ("warm ware") for all "community users of the services". However, it is vital to provide the necessary backup and support to them and also to other stakeholders in all the services already described. The Network Co-ordinator ("Franchise Head office") fulfils a mentoring and support role. After establishing an Infopreneur™ outlet, the head office takes on the mentoring role. Support to the Infopreneurs™ consists of 5 major tasks:

1. gathering support requirements,
2. analyzing the support needs and providing /developing a solution,
3. applying the solution,
4. packaging it, and
5. re-using the solution when applicable (with appropriate compensation).

Some examples of typical mentoring & support services are as follows:

- Share "tips and tricks" with the other Infopreneurs™ in the network (e.g. for successful filming of video material, or for selling the financial products).
- Compensate originators for contributions to "tips and tricks".
- Provide technical support (e.g. how to configure a fire wire card to use with a video camera).
- E-Learning mechanisms that provide e-training on various relevant subjects.

- Build an expert knowledge system which is able to store, organise, search frequently asked questions.
- Web 2.0 kinds of informal collaborative, indigenous knowledge sharing making use of Wikis, Blogs etc.
- Community tools to exchange business ideas and innovations.

3.3.4 Spatial Analysis Support Services

Rural areas, in especially the developing world, often suffer from bad road directions and signs. (Travellers in Africa might have heard the phrase: "Turn right at the 3rd large tree after the river…"). This is a major stumbling block preventing the increased collaboration between 1st and 2nd economies.

Geographic Information Services (GIS) can greatly enhance the usefulness and efficiency of the general services described in the previous sections through the provision of a greater degree of spatial intelligence. Typical GIS services will be as follows:

1. GIS information for efficient route planning (as described under Collaborative Procurement & Logistics above), i.e. providing GPS coordinates for places of interest to the users of such services (e.g. hospitals, SMMEs, shops, road intersections, mines).
2. Location Based Services /location intelligence service, including the provision of mobile phone tracking, listing and communication services for 'geo-communities' (customers in the same geographic area that are formed for the purpose of internal communication and/or joint service procurement).
3. Any GIS is virtually useless without up-to-date information. The GIS system will therefore make provision for information gathering agents, such as the Infopreneurs™, to provide updated and new information to the GIS database (e.g. enterprise locations, crop conditions, road "bad spots").

4. Planned "Marriage" Approach for Incubation Purposes

Linking the System of Innovation with SMME Incubation will entail, in the Sekhukhune RLL, the participation of the SOI in various aspects of technology as well as business incubation. The SOI will take on – mostly in a non-residential manner - various roles normally associated with a start-up business incubator. The following diagram (Figure 1) provides a schematic representation of the 'marriage' between the SOI and the 'Community of Practitioners' in the Sekhukhune RLL.

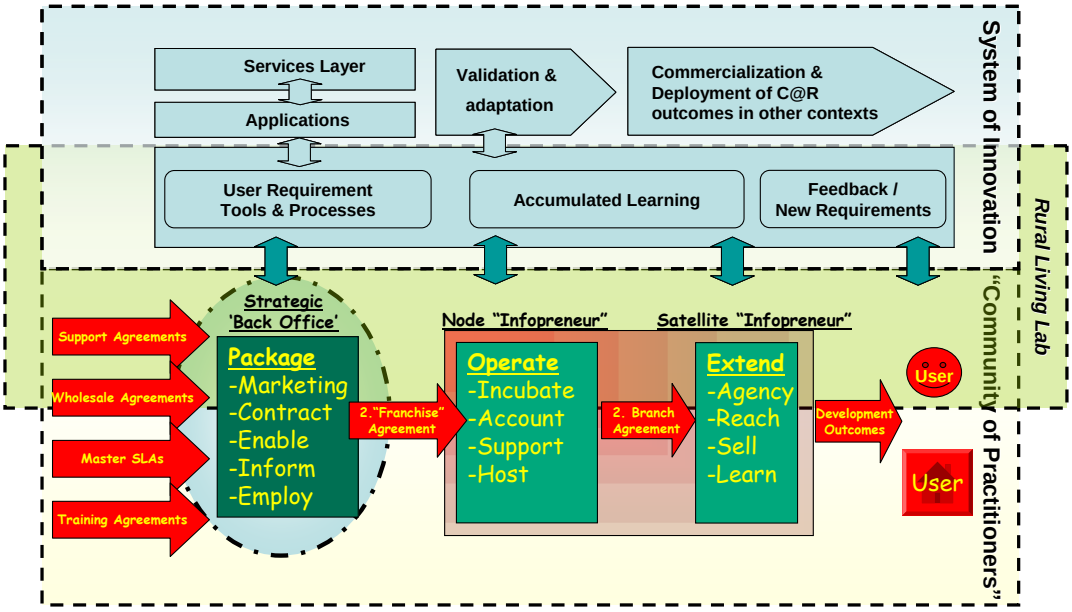

Figure 1: "Marrying" the SOI and "Community of Practitioners" for Sekhukhune RLL

In the case of the Sekhukhune RLL, the 'community of practitioners' consist of a franchise-like network of so-called Infopreneurs™. These rural "social" entrepreneurs will run start-up service enterprises at different levels of complexity and size (nodes and satellites) within the local communities of Sekhukhune. These (node and satellite) Infopreneurs™ will be supported by a "strategic back office" and co-ordinated by "Cluster Co-ordinators" (see Figure 1).

The SOI will consist of a number of institutional actors that will fulfil different, mainly RTD, functions at different 'distances' from the "community of practitioners". The major challenge that the SOI is facing, is finding ways of embedding (at least parts of) itself into the "community of practitioners" in ways that will ensure a working, tight "marriage" between the SOI and "community of practitioners". Some of the specific challenges to be addressed are:

1. How does the SOI go beyond traditional "piloting" and "concept /technology demonstration"?
2. What are the (lasting) value propositions both for the SOI (the "observers") as well as for the "natural daily life occupants /participants" (the "observed")?
3. Does this embedding happen in a phased manner and what would the roles and responsibilities for the "marriage partners" be during the different phases?

In the case of the Sekhukhune RLL, it is planned for the role of the "Strategic Back Office" ("Franchise Co-ordinator /Packager") to be taken up, at least initially, by institutional actors that form part of the SOI "family". It needs to be stated that it is already clear at this point in time that this proposed "marriage" forces the SOI "family" to seriously re-think and re-plan its own mindset, capacities and internal (RTD) processes. There are further challenges around questions like the duration and longer-term nature of the "marriage" that are specifically challenging when it gets to issues of business incubation – as we hope to demonstrate in later discussions.

4.1 Technology Incubation

The SOI in the above diagram will undertake technology development and incubation of the developed technology within the RLL. It can again already be seen that this "technology incubation" will require new mindsets as well as RTD practices within the whole SOI. This technology incubation is the focus of other papers published related to the C@R project [6].

4.2 Business Incubation

This paper would like to briefly focus on a few aspects of business incubation that the SOI plans to undertake (with full participation by the Infopreneurs™) within the Sekhukhune RLL. The first aspect that is deemed critical, is that of *business modelling* (the "package" function of the "Strategic Back Office" in Fig. 1).

4.2.1 Business Modelling /Packaging

Prof. Leo Van Audenhove and Simon Delaere of the "Interdisciplinair Instituut voor Breedbandtechnologie" (IBBT) highlight this aspect very well in the presentation of their work concerning the development of "Business scenarios for digital newspapers on e-Paper devices". They indicate the importance of exploring a range of business scenario's within a networked economy where uncertainty is high and the rate of change is tremendous. See the following diagram for an illustration of the 'place' of business modelling within the RTD activities of the networked economy. [3]

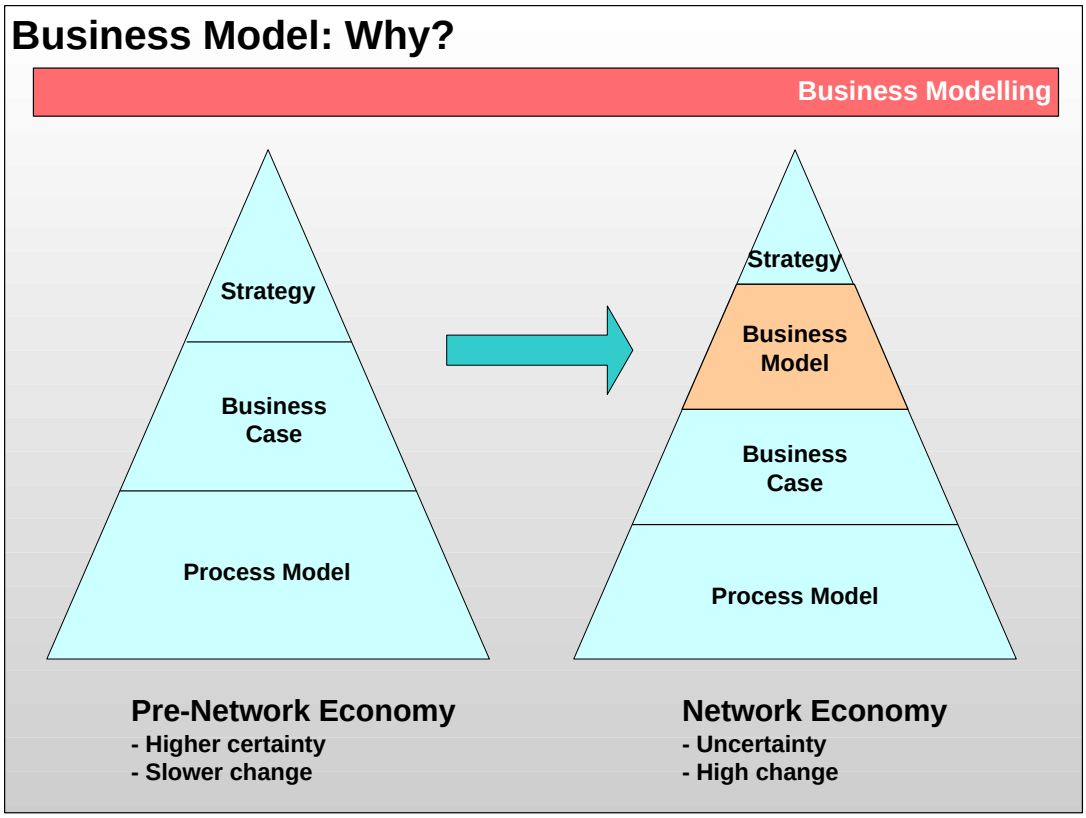

Figure 2: The place of "Business Modelling" within the Networked Economy. [3]

Within the predominantly rural context of Sekhukhune, very specific challenges have been identified to date that need to be addressed through extensive, real world business modelling. These are:

1. ***Replacing economies of scale with economies of scope***

This would entail finding an *appropriate, wide 'bundle of products /services'* that can jointly provide *a sustainable revenue stream* for the Infopreneurs™ in a deep rural context. Our experience to date has also indicated the need to *extensively explore a range of revenue streams that are associated with "agency" income* (acting on behalf of "wholesale" entities – commercial as well as public sector) rather than looking for more (or bigger) revenue streams from the inhabitants of the rural community.

2. ***Ensuring ownership, adoption and innovation***

The *workable business models* also have to *ensure ownership and adoption of technological means /tools* provided to the service entrepreneurs in these communities to *ensure the innovative use* of these technologies.

4.2.2 Enterprise Start-Up and Establishment

While fulfilling the role of "strategic back office", the SOI has to furthermore develop and test a range of processes and knowledge tools /templates to assist with (at least) the following aspects of SMME incubation (specifically during the start-up phase):

1. **Entrepreneur Selection.**

A brief comment concerning this aspect would be sufficient for now. It has been a tendency for rural development projects and initiatives (especially ICT for Development initiatives) to focus extensively on the technical skills of the participants. Within the Sekhukhune RLL, an extensive effort has been invested to measure and ensure entrepreneurial interest and aptitude from the prospective participants.

2. **Entrepreneur Skilling.**

Infopreneurs™ receive training - and continued mentoring - in (predominantly) business skills and (to a much lesser extend) also in technical skills. They are also trained to act as "agents" for various institutions and render (wholesale) services like banking and financial products.

As they tend to act as "generalists" at the "front desk", they also need problem identification and analysis skills and support mechanisms /tools that would enable them to become ad hoc "light weight experts" for the identification of "root problems" and the sourcing of required resources /services /information to solve those "root problems" facing SMMEs and citizens at community level.

One of the unique services that will be offered by the Infopreneurs™, and for which they need to be skilled specifically, is the creation and maintenance of comprehensive, spatially referenced (linked to GIS) datasets of formal and emerging businesses in their communities and municipal areas. These databases are used by both District and Local Municipalities for Local Economic Development (LED) planning as well as supply chain management (including procurement) activities.

3. Profiling the targeted community for (marketable) service needs.

It is necessary to appreciate the fact that some of the Infopreneurs™, to a large extend, has had very little exposure to entrepreneurship prior to their participation in this network. They therefore need assistance (from the "Strategic Back Office" as well as the "Hub Co-ordinators") with the analysis and profiling of the local community in which they will operate their Infopreneur™ outlet. This profiling exercise (and the tools used for it) must give the Infopreneurs™ a first indication of the service bundle that would be sellable within their community as well as assist them with prioritisation and a product /market development path.

4.2.3 Enterprise Maintenance and Support

One of the biggest challenges faced by the SOIs within (Rural) Living Labs would be to ensure that they move beyond just the traditional "piloting" and (technological) "concept demonstration" approaches. This can be done through the establishment of extensive enterprise support processes and mechanisms. In the case of Sekhukhune RLL, the SOI is planning to do this through its commitment to the "Collaborative Knowledge Sharing, Mentoring and Support" scenario previously mentioned and briefly sketched.

This would entail the implementation of a range of processes and tools that would support the Infopreneurs™.

The need (and imperative!) to provide ongoing, effective mentoring and support to the community of real world /"natural life" practitioners (network of Infopreneurs™), provides the biggest single opportunity to the SOI for a long-term "marriage" with the "natural life engaged citizens /users" (emerging SMME service enterprises in the case of Sekhukhune RLL). (It is probably also necessary to find ways of maintaining and extending the "embedded-ness" of the SOI beyond just "customer participation in improvement programmes"!)

The authors of the GTZ edited "Guide to Rural Economic and Enterprise Development (REED)" (Junior Davies et al) have the following to say about the need for "Access to effective and efficient support services and resources" as one of the "cornerstones" of rural economic and enterprise development:

"Why is this cornerstone important?

There is room for much improvement in support services and resources and in access to them. For one thing, production activities are characterised by time lags; i.e., production of goods only generates returns when the goods are marketed at a later point in time, depending on the respective transformation process. Generally, insufficient self financing

capacity makes access to additional financing resources a precondition for growing enterprises.

Furthermore, the smaller an enterprise, the more it is forced to concentrate on its basic production activities. It does not have the (financial) capacity to employ accountants, designers, marketing managers, lawyers, etc. Small, medium and micro enterprises thus need access to external financial resources, assets and inputs in order to exploit economically viable opportunities (emphasis ours). They need access to high-quality business development services (BDSs) to overcome human capital and information constraints and develop profitable activities (emphasis ours). They also need 'bundles' of services provided in a timely and efficient manner." [4]

A considerate amount of our effort in C@R will therefore be spent on the participatory design, specification, development and enhancement of the processes and tools for this collaborative knowledge sharing, mentoring and support scenario. We will also need to develop extensive understanding as to the longer term nature and form of:

- gathering support (and mentoring) requirements,
- analyzing the needs
- providing /developing solutions (in a collaborative fashion),
- applying (and verifying) the solutions,
- packaging it, and
- 're-using' the solutions (when applicable).

5. Conclusions

The C@R project illustrates the benefits of joint European/African research, specifically in the space of living labs where Sekhukhune is one of four living labs participating in the "SMME Incubation" component of the project.

This paper is an effort to indicate the importance of "marrying" the System of Innovation with the real world rural micro enterprises in order to establish and sustain collaborative SMME incubation in the Rural Living Lab of Sekhukhune. Without this close association, there would be no sustainability in the long term.

The different collaboration scenarios gave an indication of the types of collaboration activities that are currently being developed for the Sekhukhune RLL following the service-orientated architecture approach [6].

It should be evident at this stage that we do not regard ourselves as already having the answers. To a large extend, we are still busy with the formulation of the (unanswered) questions related to a more "real world", people oriented approach to rural development in emerging economies. This paper therefore serves mainly as an invitation to others within this same space (of rural economic and enterprise development) to "come to the party" and participate with us in a collaborative effort to address some of the pressing issues in this context within the geographical space of SADC (and other, similar emerging economies).

Outstanding questions that still need to be addressed by this study, as well as with the co-operation of others in this field, are:

- What are some of the options for such a "marriage"?;
- For how long and with what kind of 'bond'?;
- With what objectives?; and
- With what consequences to the "*natural daily life occupants*" as well as the "*System of Innovation*"?
- How to practically address the real-life issues such as bandwidth and access to equipment.

The general concepts discussed in this paper have been developed mainly over the last 2 years. Infopreneurs have been established in Sekhukhune at the end of 2006. Aspects

pertaining to the *Sekhukhune Rural Living Lab* are currently being developed and implemented as part of the EU FP6 project, *Collaboration@Rural*. It is planned to start implementing the collaboration services in the area before the end of 2007, followed by evaluation, revision and modification in 2008-2009.

In the space of the next 30 months, we would also like to:

1. Formulate the most pressing needs in terms of technology development as well as in terms of business development;
2. Embark on an ongoing participatory design, specification and validation process with the "natural daily life" inhabitants – predominantly SMMEs but also including (economic) citizens - of the rural economy of a specific deep rural area in Southern Africa;
3. Determine the nature (and benefits) of the long term "marriage" between SOIs and these "natural daily life" inhabitants; and
4. Identify (and adopt) the changed mindsets, especially within the SOIs, that would be required to "open up" these systems of innovation for free participation by all inhabitants of a specific economy.

We would like to extend an open invitation to all interested parties to explore ways with us to participate and collaborate in this exciting venture.

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