

Beyond ‘Technology for Development’ and ‘Sustainability’ towards Systemic and Holistic Rural Innovation: Success Factors from the Southern African Experience over 20 years

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Brief Biography of Presenting Author: Johann (Rensie) van Rensburg is Programme Manager for the Rural Enterprise and Economic Development Initiative of CSIR Meraka Institute and has been active in the ICT for Development arena (ICT4D) for 20 years. Van Rensburg has extensive practical knowledge and experience in working with rural communities and micro enterprises, government, science councils and industry in the implementation of sustainability models and technical solutions for the advancement of rural communities in South Africa and the SADC region.

Abstract:

This paper describes essential, real-world activities and processes needed to develop and deploy people-centred networks enabled with innovative technologies that in turn produce “essential knowledge economy functions in service of systemic and holistic rural innovation” based on some of the authors’ own and multiple other documented difficulties encountered in Information and Communication Technologies for Development (ICT4D) and broader “technology for development” implementations in the developing world - especially in the light of the challenge of directly linking ICT4D application (and adoption) to scalable socio-economic development in a number of Southern African initiatives. The authors subscribe to a view of development as a participatory process, improving the individual and communal asset-base and embedding it in bottom-up visioning. Their rural enterprise and economic development (REED) involves a shift away from an ICT4D-driven orientation to an approach now focusing on people-centred network development that consists of: identifying the key visions (and dreams) as well as innovative systemic dependencies in the targeted context and services delivery channel; developing a programmatic behavioural change process; utilising ICTs as enablers of human-centric community networks that render knowledge economy services into the local delivery channel – called Infopreneurs[®]; surfacing and understanding the individual and collective resource base in support of the engagement; surfacing existing mind-sets and managing behavioural change as well as relationship building. Infopreneur[®] networks engage directly with the community and deliver a range of knowledge economy services to enhance, build and grow the five main community assets /resource bases: human, physical, financial, natural and social. They act as the extended local delivery channel (“extending extension”) to support new scalable and sustainable micro-enterprises within the local contexts. The results of the emerging approach involve five key aspects including: local ownership, a systemic and holistic approach, knowledge economy services, ongoing monitoring, evaluation, reflection and learning as well as the application of systems thinking and network theories.

Introduction and purpose

The purpose of the document is to present the authors’ experience of 20 years of rural enterprise and economic development (REED) research and implementation in African countries. Our ICT4D journey has led us to state the following: “Pushing (or even transferring) technology (especially ICTs) into the development space at the ‘base-of-the-pyramid (BoP)’ is *easy*. Making development stick and scale here is *hard*. Employing technology to speed-up and enhance the reaching of development objectives here is *extremely hard* and requires a holistic approach aimed at achieving individual and collective (systemic) behavioural change”. This paper therefore reflects our need to describe essential, real-world (action research as well as a living lab approaches) activities and processes needed to develop and deploy people-centred networks enabled with innovative technologies that in turn produce essential knowledge economy functions in service of systemic and holistic rural innovation.

Our experience to date has specifically pointed out the critical need for research and guidelines into systemic and holistic innovation in rural contexts. This is due to the current challenge experienced in fulfilling the promise of development initiatives for scalability and larger scale impact for rural development such as job creation and improving quality of life in rural areas. It requires the innovation and development of products and services that has the ability to contribute to sustainable and enhanced local livelihoods and economies.

During this time there has been a fundamental philosophical shift from an ICT4D driven orientation to an approach now focusing on people-centred network development where (local) people are the starting point, partners in the journey as well as the final destination, and represent the constant factor in the development dialogue. It has become clear that it is critical to fundamentally consider, respect and work in tandem with the traditional African context and culture which adhere to African communal relationships of mutual responsibility that was once finely tuned to respond to the needs of the African community, climate and its environment (Sparks 1990), as part of rethinking African development.

This paradigm shift for our current and future ICT4D initiatives in the sub-continent involve: identifying the key visions (and dreams) as well as innovative systemic dependencies in the targeted context and services delivery channel; developing a programmatic behavioural change process; utilising ICTs (and other relevant technologies) as enablers of human-centric community networks that render knowledge economy services into the local delivery channel and establish new scalable and sustainable micro-enterprise networks and value-chains within this context.

The results of the emerging approach involve five key aspects. These are:

- Ensuring local ownership and empowerment;
- Designing and initialising a well-informed systemic and holistic approach;
- Deepening the knowledge economy services value proposition of the communal networks;
- Providing a framework for ongoing monitoring, evaluation, reflection and learning to influence behavioural change; and
- The application of systems thinking and network theories.

These aspects are described and discussed as the basis for the conclusions in terms of our acid test for an enhanced and validated paradigm for practitioners in the African rural ICT4D and broader technology for development field.

Prior research and implementation

The authors of this paper are both researchers and practitioners who wish to share their learning from theoretical and practical perspectives. The sharing is mainly a “view from practice”. Our continued experiences during recent years have identified further areas for improvement in this approach and have led us to ongoing innovation in Southern African rural contexts. Our expertise over the last 20 years has been shaped by the following broad groupings of activities (Van Rensburg et al. 2010):

Table 1: Research and development (R&D) activities and related outcomes

Activities	Dates	Outcomes
Obtain an understanding of SMME development practice and processes in a developing economy (SA)	1994-1998 (5 years)	Highlighting the importance of the <i>mediator /champion</i> in a developing community context.
Deploy a national network of public, self-help, touch-screen kiosks in a franchise model in high pedestrian traffic environments.	1995- 1996 (2 years)	Highlight the importance of <i>allocating resources</i> (tools, skills) to all <i>tasks</i> in the “information economy”.
Developing & deploying software systems in community level development facilities (SMME Development & Multi-purpose community centres).	1999- 2004 (5 years)	Highlighting <i>implementation challenges</i> in the technology <i>adoption and ownership</i> spheres.
Developing robust implementation models for sustained (development) service delivery in developing economies.	2004- 2008 (4 years)	Highlighting the importance of solid <i>business development</i> approaches in the ICT4D arena.
Validation of a small-scale network (Vhembe District) in a Living Lab fashion.	2008-2013 (5 years)	Challenged to deal with issues of <i>scalability and ‘sustainability’</i> of the intervention.
Designing, implementing and refining a “virtuous cycle” model of actions and processes to facilitate systemic and holistic community development	2011-2014 (2,5 years)	Growing understanding and appreciation of the need for a people-centred approach aimed at <i>realising the aspirations</i> of (local) people through nurturing and systemically enhancing local passion.

a. Design and Methods

How did we get here? We have used what could probably be termed as a cross-breed between action research (researchers actively observing and interacting with people in context) (Stillman and Stoecker 2008) and “living labbing” (allowing the users from the targeted space to participate in the research agenda setting as well as research execution and validation) (Eriksson et al, 2005; Wills et al, 2009). What we have highlighted again, is the importance of the “translators” (or two-way decoders and connectors): individuals living actively in the worlds of researchers and development practitioners. They are responsible (and capable) of “translating” real-world needs into technology specifications as well as for the transfer of those technologies into the real-world use.

To establish communal relationships of mutual respect, trust and responsibility in our programmes, we have invested in the concept of Infopreneurs[®] (van Rensburg et al. 2007) to create the first line of mentored and supported community knowledge workers /change agents that are able to build viable knowledge economy functions to support sustainable development both in their communities as well as their local economies. We have confirmed the importance of continuously ensuring that the Infopreneurs[®] are community oriented and thus willing to facilitate community investment as well as enabling community members to improve their own initiatives and projects. This process helps communities to build confidence in their ability to support successful projects with a co-operative spirit to build and restore communal life.

b. Research Challenges

Surfacing and understanding the individual and collective resource base in support of the engagement; surfacing existing mind-sets and managing behavioural change as well as relationship building have been found to be critically important. Infopreneurs[®] engage directly with the community and deliver a range of knowledge economy services to enhance, build and grow the five main community capitals: human, physical, financial, natural and social (Bebbington 1999). They act as the extended local delivery channel (“extending extension”) to establish new scalable and entrepreneurially sustainable micro-enterprises (mostly in value-chains) within their contexts. The exact mechanics of these functions of the Infopreneur[®] network as well as the nature of the supporting and enabling technologies (specifically, but not exclusively, ICTs) are still ongoing research, development and innovation (RDI) challenges that needs continuous grappling and renewal.

Action Research and Living Lab Results

We have explored and validated – in an action research and “living lab” fashion - the modality (“how”) of:

- a. **Ensuring Local ownership and Empowerment:** Creating the opportunity for community members to develop a shared vision of a desired future of “what our community looks like when it is the way we want it”
- b. **Designing and initialising a well-informed systemic and holistic approach** to community engagement based on the extensive collection of **spatialised “emerging economy” data** on a wide range of community assets - using an *extended* Sustainable Livelihoods approach (Clark and Carney 2008) to community assets /capitals mapping;
- c. **Deepening the knowledge economy services value proposition** of the change agent (Infopreneur[®]) network as well as broadening the client base to enhance sustainability of the services bundle over a shared cost infrastructure. Deploying the knowledge economy services in support of the operations of a full value chain;
- d. **Providing a framework for ongoing monitoring, evaluation, reflection and learning to influence behavioural change** with a focus on “boxes” (technology), “business” (sustainability) and “behaviour” (self-driven local ownership); and
- e. **The application of systems thinking and network theories** to deploy rural change agent networks in “living lab” settings.

The details of each of these elements are given below.

a. Ensuring local ownership and empowerment

The authors’ approach to rural enterprise and economic development is heavily imbued with trust relationships (people-centeredness /“Ubuntu”) and enabling people to subscribe to knowledge economy principles that empower them to borrow intelligently from outside their knowledge sphere (community) for the nature and extent of their own development. The authors believe that the individuals involved, the implementation situation, and the hopes and dreams of people offer a non-negotiable starting point for engagement, unencumbered by external bias. The key is to “shut up and listen” (Siroli 2012) to the vision of a desired future (or present) by the people affected and driven by the fundamental question of “What does our community look like when it is fixed (the way we want it)?” (parenthesis ours) (Holtmann 2011) In response to the defined vision, the choice of approach and methodologies need to be negotiated, tested, evaluated, adapted, changed and refined as a team effort between the

development practitioners and the local actors. This type of interpersonal interaction implies both an action research (members from the “system of innovation” leaving their safe “ivory towers”) and living lab (members from the “real world” entering the “ivory towers”) approach from the outset to be able to create an operational context of mutual influence leading to long term impact.

Ideally the process is a leadership change at three levels; improvement change, intelligent copying and borrowing and mind-set change (Mbigi 2005). Firstly, improvement change ensures the upgrading and developing of what communities already have in their local systems from which they design community projects that achieve high impact. Communities are also expected to learn from their own achievements. Secondly, intelligent copying and borrowing from elsewhere what is useful to their own contexts by communities as facilitated by the Infopreneur® network. The communities can copy and borrow from elsewhere what is useful to their own contexts. This includes benchmarking best practices to ensure intelligent borrowing from global systems. Finally, mind-set change where communities become masters of change and have the ability to scan their own environment, analyse it and have the courage to reconceive their strategies and plans and implement it. This is a paradigm shift where communities have the ability to see the world anew, so as to develop creative and innovative solutions; and the self-confidence and reflective ability to accelerate the development of their communities.

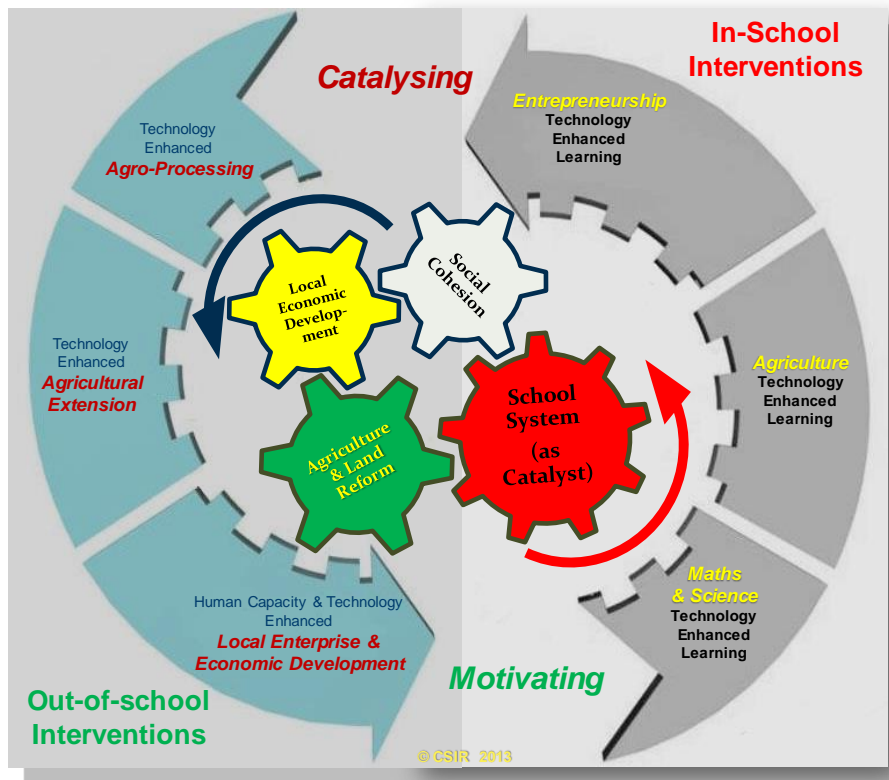
The dynamics of mutual influence relationship building creates opportunities for sharing the responsibility for formative (process) and summative (direction) decisions and in that way steer the overall initiative towards its ultimate destination: the vision proposed, agreed on and adopted by all. Transfer of process control can then be systematic, by empowering local actors to make strategic decisions from the outset and throughout the life cycle of the initiative to the point where there is sustainable local management and ownership. Transfer of ownership lays the foundation for systemic and holistic rural innovation.

b. Designing and initialising a well-informed systemic and holistic approach

The above involves an approach to community engagement based on the extensive collection of **spatialised “emerging economy” data** on a wide range of community assets - using an *extended* Sustainable Livelihoods approach to community assets /capitals mapping. We have (as in the case of the mentioned “extended” Sustainable Livelihoods approach) borrowed from a whole range of approaches that we have (in most cases) slightly adapted or modified or re-focussed to provide us with an effective and workable theoretical framework for our work and approach. This framework is being continuously tested against the real-world results and adjusted as necessary with a view of “the truth is what works now!” (Patton 2008)

A combination of the Sustainable Livelihoods Framework (SLF) (DFID 1999), asset-based community development (ABCD) (ABCDI 1993), extending to Choice and Capabilities (Sen 1999; Kleine 2010) and Betterness (Haque 2011) provides an approach that starts from the general SLF foundation, but extends into higher order capitals to provide a programme orientation that is focused on locating local assets and connecting them with one another in ways that multiply their power and effectiveness. We are referring to this development approach as the “creation of virtuous cycles” within the development context. These systemically linked activities /processes /institutions form the basis for a holistic approach to rural development which we have been refining in some deep rural contexts of South Africa since August 2011. The following diagram (Figure 1) provides an example of an approach that we have developed to link rural (agricultural) schools to the revitalisation of neglected irrigation schemes and small-holder agricultural activities. This is designed to positively influence the local economy with resultant increase in job and enterprise opportunities that are providing the basis for (currently absent) parents to return to the rural households. The returning parents should enhance social cohesion in the households which in turn should have a positive effect on the school and educational context which is the hub(s) /catalytical context /focus for our rural development initiative.

Figure 1: Example of the “virtuous cycle” systemic design



c. Deepening the knowledge economy services value proposition of the change agent network

Following are the details of deepening the knowledge economy services value proposition of the change agent (Infopreneur®) network as well as broadening the client base to enhance sustainability of the services bundle over a shared cost infrastructure and deploying the knowledge economy services in support of the operations of a full value chain. These are:

i. Which institutional vehicle /approach to use

In our case we do not employ people. We deal with the network of change agents as micro enterprises within their communal contexts. This “micro-franchise or micro-license” model allows everyone to pursue their own business interests side-by-side with the goals of the Infopreneur® network. The “development through enterprise” principle then operates at the individual Infopreneur® level and expands to sustain the enabling Infopreneur® network.

ii. Finding and attracting the right people

It is crucial to get this aspect right. The most important factor is to get people who are both entrepreneurial as well as passionate about developing themselves and their communities. They must also be prepared to stay in their communities. The general person-profile that emerged is a youngish person (23-33), with a good command of English and have good relationships with local authorities and who is willing to learn a lot.

iii. Enabling and supporting the people effectively

Capacity building (conventional training) is one thing, creating an effective mind-set is a totally different matter. Short courses on entrepreneurial skills, use of ICT’s, facilitator skills and English language skills are some of the capacity building interventions to help the Infopreneur® to fulfil his/her role. The Regional Infopreneur® has to be a mature business minded person with excellent networking skills as well as effective change management capabilities. He/she plays a vital role as bridge builder (and “decoder”) between the communities’ agenda, Infopreneurs® and researchers. Ongoing mentoring and support from the Regional Infopreneur® to the Infopreneurs® helps them to internalise the values of the network guided by a formal behavioural change methodology focusing on appropriate change management. The Regional Infopreneur® has a few change management tools available and these ensure that each Infopreneur® is tracked along a development path focusing on behavioural change as indicators of progress toward a destination.

iv. Managing local social dynamics

“Aligned but not owned” is one of the mantras of us testing an Infopreneur® network deployment for control and viability. An initiative can easily be hijacked by groups or individuals to further their own agendas. The needs to continuously be aware of who is doing what in a community as well as ensuring the collective vision is adhered to have been found to be non-negotiable. Sometimes an Infopreneur® can become part of a grouping in a community and this needs to be carefully managed to prevent damage to the “aligned but not owned” approach.

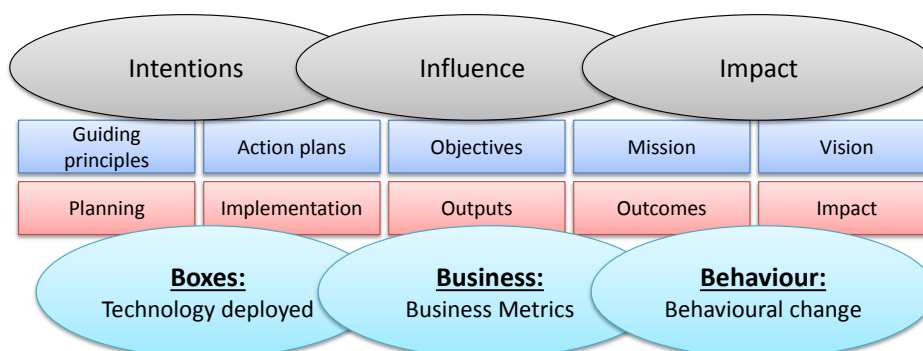
v. Building the network’s sustainability

It takes some time for a network to establish itself. It is important to build up a value proposition /attractive service offering for members of a community or grouping. In our case we have done small enterprise surveys for a local authority and later on participated in the development of processes and software to capture indigenous knowledge systems (IKS). We have found record /bookkeeping (formalising and tracking your business) and collective marketing /sales services as important value propositions for community enterprises. Once these services are established and there is a growing demand, the potential for expansion of the member network is possible through a subscription service to a “business club” which gives members automatic access to the basic services. As soon as an Infopreneur® is well established and trusted, the expanded services are introduced. Trust is essential. Our experience has confirmed that the Infopreneurs® who pro-actively team up to offer services and support to local initiatives are doing better than the ones going solo. It is therefore critical to continuously enhance the networks’ inter-dependency and collective effort as well as integrative technology platforms.

d. Providing a framework for ongoing monitoring, evaluation, reflection and learning

The basis for our implementation approach is provided by a modified monitoring and evaluation, review and learning (MERL) methodology based on the Canadian International Development Research Centre (IDRC) Outcomes Mapping approach (Earl et al. 2001) which not only sets the strategic direction, but also aligns the mission, objectives, strategies and organisational practices in support of the vision with the components of the evaluation chain. This MERL process devolves actions to the delivery level of influencing behavioural change as drivers of meaningful progress. An integrated development approach links a set of intentions to a systemic influence strategy to contribute to potential impact. Intentions frame actions and influences within a project produce a programme and impact that is aligned with the vision. The conceptualisation of the overall programme starts with the vision, underpinned by a set of mission statements, leading to verifiable objectives through specific action plans supported by a set of guiding principles.

Figure 2: Our MERL Framework



Previous research by the authors (du Buisson 2010) has shown that a combination of monitoring and evaluation methodologies is needed to effectively collect and substantiate evidence across all the levels of the strategic plan. A useful combination deals with “Boxes, Business and Behaviour”.

i. “Boxes” involve the technology deployed

In the ICT environment the boxes comprise the source connectivity, backbone, backhaul, local networks, terminal point equipment, premises and user devices. In a holistic development programme, the technology deployed may include additional infrastructure such as buildings, security, irrigation, equipment and material. The evaluation of what was installed and how it has been used is typically quantitative in nature where the Logframe methodology (AUSAID 2002) is appropriate. With a full expansion of the Logframe decision tree, some of the qualitative components can be dealt with effectively.

ii. “Business” looks at viability

Development projects traditionally strive for a “value for money” approach where there is financial justification for project actions. This is a typical income statement approach where a running record is kept of what was spent and the outcomes are measured in terms of adoption, scalability and sustainability. Within the context of long term viability, the income statement elements of income, cost of sales, expenses and profit are the key considerations, with a particular emphasis on the financial bottom line only. We have found that a “balance sheet” approach with a critical analysis of communal assets – before and after the development interventions – is also of very significant importance. Business evaluation follows a standard Business Process Analysis (BPA) framework, working through products, customers, capital requirements, income statement elements to viability and profitability, summarised on a balance sheet to determine whether wealth has been created or not.

iii. “Behavioural change” is a verifiable indicator of outcomes

Development is accomplished by, and for, people. A shared vision needs to be created as a consultative partnering process of the human, social, and environmental betterment to which the programme hopes to contribute. The program then needs to know not only about development results, but also about the processes by which they were attained, as well as about its own internal effectiveness. The program's contributions to development is planned and assessed based on its influence on the partners with whom it is working with to effect behavioural change. Outcome Mapping is an evaluation methodology that focuses on behavioural change as indicators of outcomes (Earl et al. 2001). Outcomes are defined as changes in the behaviour, relationships, activities, or actions of the people, groups, and organizations with whom a program works directly. The intentional design (evaluation plan) using OM defines an implementation process where it is possible to:

- Capture the achievement of Progress Markers over time and record the results
- Relate the use of Strategies directly to the Outcomes Challenges (behavioural objectives), comment on the process, document the lessons learnt and capture the unexpected results
- Gather evidence for comparison with mission statements
- Use the status of mission statements to reflect on organisational practices and performance
- Speculate on the progress towards the vision and its relationship to the impact

e. The application of systems thinking and network theories

Systems perspectives and a focus on human-centric community networks have been applied in both the Infopreneurs® and the Broadband for All (BB4ALL) initiatives of the CSIR (South African Council for Scientific and Industrial Research). A systems perspective on development asks what are the components and the interactions between them in a developmental context. The concept of capitals has been influential in development and has featured prominently in the research on livelihoods (Chambers and Conway, 1991 and Bebbington, 1999) and the systemization of the capitals concept in the Sustainable Livelihood Framework (SLF) as well the application thereof in the Sustainable Livelihoods approach (Clark and Carney, 2008) by the UK Department for International Development (DFID, 1999 and Solesbury, 2003). The Infopreneur and BB4ALL/Village Operator initiatives grow networks of relationships in communities and a focus on social capital brings this aspect to the fore. We have been adopting the approach used by Farr (2004, p.9), who follows Putnam (2000) and combines the concepts of networks, norms and trust to define social capital as “the network of associations, activities, or relations that bind people together as a community via certain norms and psychological capacities, notably trust, which are essential for civil society and productive of future collective action or goods, in the manner of other forms of capital”.

This focus on networks of relationships is in line with work done by the World Bank. Woolcock (1998) argues that the unit of analysis in post modernization development theories, such as neo-classical growth theories, has become either the nation-state or the “rational” individual, therefore neglecting the valuable mediation role played by civil society in the interaction between nation-states and markets. The concept of a focus on social capital has promise since it may offer a way of highlighting this role of civil society in development initiatives.

The model that we have developed from our BB4All work aims to leverage the social capital that exists in and between the local community and local school leavers, local schools and other government facilities (Roux and Marais, 2011; Marais, 2012). By approaching the service as a community-based enterprise development effort, the local infrastructures and local 'gatekeepers' are more easily accessed by the community based service enterprises. Trust is built between local players, without the need to create additional dependencies on external supply of resources or skills.

Conclusion and way forward

On the basis of the above learning, this paper has endeavoured to share an enhanced and validated paradigm for practitioners in the African rural ICT4D and broader technology for development field. It demonstrates the value of a “living lab” approach and provides a framework for scalable and sustainable (technology enabled) community level micro enterprise networks focussed on the delivery of knowledge economy services as enablers of systemic and holistic rural innovation and behavioural changes in Southern African – and other similar “dual-track economy” contexts. The “ACID” test that we have developed to guide, evaluate and shape our current and future rural enterprise and economic development (REED) work is shown below:

Table 2: “ACID” Test for current and future work

“ACID” Test	REED Challenge	REED Response	REED “Tools”
<i>Alignment?</i>	Surfacing local context, vision and realities	Spatial Development Frameworks, Local integrated & economic plans Analysed and Visualised	Adapted Outcomes Mapping (OM) and Geo-Reporting and Analysis
<i>Change Agent Enabled?</i>	Targeting Mind-set and Behaviour Pattern Changes (HCD)	Transfer Passion and Drive from External to Internal Change Agents for Sensing & Serving	Catalogues & “Rural Pages”, “Health Checking” & SWOT Analysis; Intervention Planning and “Treasure Mapping (TM)”;
<i>Information Society Orientation?</i>	Localised 21 st Century Innovation	Indigenous Knowledge Economy Products, Services and Tools	BoP Design for “Indigenous ICTs” using mobile processing and low-bandwidth platforms for collaborative local content creation
<i>Driver?</i>	Development through Enterprise	Enterprise and Value-chain Development	Ongoing business modelling and support

We are currently making the final adjustments to the implementation of the holistic, systemic model described in Figure 1. This is happening in the Eastern Cape province of South Africa near a small town with the name of Cofimvaba and an under-utilised irrigation scheme called Qamata. The fine tuning of the model and approach will happen during 2014. During the same time we are also planning to replicate (and validate) this approach in the Limpopo province of South Africa in the Levubu sub-tropical valley. We are open to (and eager for) co-operation with African and European counterparts who share some of our concerns and interests in an appropriate and viable African response and approach to technology enhanced and accelerated rural development.

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