

March 2017

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Baduza, Gugulethu Q. and Khene, Caroline P. (2017) "A Needs-ICTD Strategy Alignment Foundation for the Measurement of ICTD Impact: Three Case Studies in South Africa," *The African Journal of Information Systems*: Vol. 9 : Iss. 2 , Article 3.
Available at: <http://digitalcommons.kennesaw.edu/ajis/vol9/iss2/3>

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A Needs-ICTD Strategy Alignment Foundation for the Measurement of ICTD Impact: Three Case Studies in South Africa

Research Paper

Volume 9, Issue 2, April 2017, ISSN 1936-0282

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(Received August 2016, accepted September 2016)

ABSTRACT (REQUIRED)

Access to ICTD projects has increased over the years; however, they have not significantly changed the lives of the targeted communities. This discrepancy relates to the gap that exists between the reality of the community, its needs and the ICTD strategy of the project. This research paper presents a Needs-ICTD strategy alignment framework to support the alignment of ICTD strategy, and the development and promotion of contextual needs of marginalized areas. The framework also contributes to the identification of preliminary impact indicators, which can support impact assessment. Through a multi-case study investigation of the Siyakhula Living Lab and the SAP Living Labs, key findings indicate that a lack of involvement of local stakeholders in the development and alignment of ICTD strategy has negative implications. These include failing to understand the holistic needs of the community with available resources, and the inability to provide appropriate information on opportunities for the general development of the community.

Keywords

Community Needs, ICTD Strategy, Business-IT Alignment, Needs-ICTD Alignment, Community Development

1. INTRODUCTION

Rural areas in Sub-Saharan Africa are characterized by high levels of poverty, interlinked with challenges, such as, low agricultural productivity, poor rural infrastructure, lack of access to markets and market information, low levels of investment in people, and a lack of access to basic services and needs (Mwabu and Thorbecke, 2004; Poulton, Kydd, and Dorward, 2006; Hove, Ngwerume and Muchemwa, 2013). Challenges in marginalised areas are associated with a lack of basic information to support informed decisions and enhance

communication essential for social economic activities. Despite the potential of ICTs, there are still a number of challenges that are faced by rural communities when it comes to implementing, using or adopting ICTs (Pade *et al.*, 2010). These include, but are not limited to, problems associated with limited standards and telecommunications infrastructure in supporting ICT applications, limited formal education, financial, political, social and cultural constraints; providing good access to knowledge sources, lack of use by the targeted audience, resistance by policy developers; lack of a holistic view, and so forth (Pade *et al.*, 2010; Wakelin and Shadrach, 2001; Walsham and Sahay, 2010; Dodson, Sterling and Bennett, 2012, Ciaghi, Villafiorita and Dalvit, 2014). Some of these challenges contribute to what Heeks (2009) identifies as the “Design-Reality gap”. This refers to a large gap that exists between ICTD design expectations and the actual realities of the project and its context on the ground.

In the discipline of Information Systems, the design-reality gap model can be compared to the concept of Business-IT alignment, which is defined as the ‘cohesive and concurrent achievement of mutual goals between business (context) and IT’ (Gartlan and Shanks, 2007; Orozco, Tarhini, Masa’deh and Tarhini, 2015). The main purpose of Business-IT alignment is to provide the business with enabling tools and an environment for the business to achieve its goals. Adapting this to ICTD, such an approach implies that the alignment of ICTD strategies with the needs of the community is essential. Literature on the concept of Business-IT alignment indicates that the following factors promote alignment between business and IT: company/firm-wide active involvement, long-term focus, open communication, the meeting of the minds, and clarity of ideas and consistency (Luftman, 2003; Gartlan and Shanks, 2007; Henderson and Venkatraman, 1996; Orozco *et al.*, 2015). A case can then be made to learn from such alignment practice, in order to establish an alignment between what the community needs and what the ICT project intends to achieve within the chosen community. Many ICTD projects are established with the aim of supporting and engaging in the progressive development of a community; however, this is done without a rigorous investigation and understanding of the development needs of these communities, and aligning ICTD strategy with these needs. As a result, an adequate programme theory (strategy) and relevant impact indicators fail to be developed. This implies that when an impact assessment is conducted, often the effects are not directly linked to the needs of the community or what the community had hoped to gain from the ICTD supported initiative.

This paper presents the development of a needs-ICTD strategy alignment framework to support the alignment of community needs and ICTD strategy, hence providing a foundation that supports the identification and formulation of impact indicators. Firstly, the paper presents a discussion on the importance of aligning community needs and ICTD strategy. The case for business-IT alignment in ICTD and the identification of impact indicators is then discussed, followed by a presentation of the Needs-ICTD strategy alignment framework. Subsequently, the results from the empirical case studies are presented; highlighting key lessons learned. Finally, the paper concludes that a lack of involvement of local stakeholders in the development and alignment of ICTD strategy has negative consequences - particularly on linking the services, identification of appropriate impact indicators, meeting the needs of the community, allocation of available resources and general development of the community.

2. The Need for Alignment

According to Remenyi *et al.*, (2004), there are two primary principles for rural community development. The first principle indicates that rural development is about development of and for the community, while the second principle emphasises development through community

decision-making processes. Development is fundamental to building human capacity, and one of many approaches is to provide effective programmes informed by information and knowledge for decision making, supported by ICTs (World Bank, 2006; Tlabela *et al*, 2007; Albion, Tondeur, Forkosh-Baruch and Peeraer, 2015). However, ICT interventions face challenges that stem from misalignment with development plans or needs, and the assumption that it is a panacea for development (Heeks 2009; Toyama, 2011). A functional alignment should exist between rural development needs and how ICT can support these needs. According to Dhingra and Misra (2004) ICTD professionals tend to develop ICT solutions based on their own perception of the end-users' requirements, rather than developing ICT through an exploration of local information needs. Dhingra and Misra (2004) state that it is advisable to develop information categories representing the information needs of rural communities. A needs assessment frames the problems or opportunities of interest, and builds relationships among people and groups who have a stake in the issue (Gupta *et al.*, 2007; Dagenais, 2010, Pade-Khene and Sewry, 2012). There are three types of needs for engaging in community development, and these include information needs, community and target needs, and demand-driven needs. Bridges (2011) notes that in relation to ICT initiatives, a needs assessment should also fully investigate current technology use in the area to be served. Some of the factors that have to be taken into account include the local capacity to use the technology; the availability of technical support; the kind of services that people and organizations would be willing to pay for and what may need to be provided for free (Bridges, 2011). Furthermore, the training needed to integrate technology use into daily routines of the target groups, the availability and reliability of electricity and phone lines; secure storage for technology; and many other factors also have to be accounted for. The identification of the various needs, therefore, provides external and internal project stakeholders with vital information that should contribute to the development of an ICTD strategy that is tailored to suit the needs of the community and enhance development.

An ICTD strategy is used to effectively plan, over the long term, how the ICT will operate to support development, and how the ICT resource/s will be used to achieve this strategy (Pade-Khene and Sewry, 2012). The ICTD strategy objectives are tied to the community's overall development objectives, which can include education, health, government, business, and industry development (World Bank, 2006: 88; Geldof, 2005: 7). According to Harris (2004), an ICTD strategy should contain an information strategy, development strategy, and technology strategy. These different strategies are all interrelated in ICTD. The application of ICTs for development should always begin with a development strategy, which includes development decisions, objectives and directions, change orientation, and priorities of development (Harris, 2004). An information strategy can then emerge from this development strategy as it is informed of the existing gaps in information and communication that are related to development challenges. Subsequently, a technology strategy is developed that explores the various platforms that are available to access the information to support development of the community. The holistic consideration of a development, information, and technology strategy, contributes to a sound ICTD strategy. If the ICTD strategy is not sound and the strategy itself does not align sufficiently with actual human development needs or processes, therefore, gaps in strategy emerge, which if ignored can contribute to a breakdown in the sustainability of a project.

2.1 The Case for Business-IT Alignment

The field of ICTD can learn from the concept of Business-IT alignment when it comes to addressing the gaps that exist between local needs and ICTD strategy. Business-IT alignment is defined as the degree to which the Information Technology (IT) function of the business

supports and is supported by the business strategy through the alignment of the mission, objectives, structure, technology, personnel, processes and plans of both functions working towards the same goal (Chan, 2002; Gartlan and Shanks, 2007; Luftman, 2003; Reich and Benbasat, 2000). The alignment of IT strategy with the organisation's business strategy is a fundamental principle that has been advocated for over a decade (Luftman, 2003; Gartlan and Shanks, 2007; Turel and Bart, 2014). As alignment remains important, companies struggle to link technology and business, it is critical that alignment pays attention to both doing the right things (effectiveness) and doing things right (efficiency) (Luftman, 2003). Alignment enables organisations to work together towards a common goal that the organisation has. Tarafdar and Qrunfles (2004) reaffirm this view that it is important that IT plans and business plans are coordinated; an example would be the organisation adopting IT applications that support its strategic goals.

Addressing how business can be aligned to IT, and how IT can be aligned to business, is where the results of the alignment can be illustrated (Luftman, 2003). An evolved alignment connection between business and IT is when business and IT adapt their strategies in conjunction with each other. The overall objective is to guarantee that the organisational strategies adapt harmoniously, whether one considers business-IT alignment or IT-business alignment (Luftman, 2003). It is also evident that alignment clearly needs to exist between other spheres of the organisation for business-IT alignment to work properly (Henderson and Venkatraman, 1996: 8). Henderson and Venkatraman (1996: 34) emphasise that a cross-domain relationship has to occur among the business structures, IT strategy, business infrastructure and process, along with the IT infrastructure and process. A business will not be able to properly perform its tasks and operations to achieve its goals and strategies, if it does not have the proper infrastructure and process. The same can be said for the IT strategy and IT infrastructure and process.

As the Business-IT alignment process aims to be successful, there are a number of factors that promote the process and just like any other process there are also inhibitors to the process. Luftman, Papp and Brier (1999) describe these factors as the activities that management must go through in order to achieve cohesive goals across the organisation. These activities which favour the process are then termed enablers, while the inhibitors are the factors that hinder the business-IT alignment process, as indicated in Table 1. The ultimate goal is for managers to work toward eradicating activities that prevent alignment and take full advantage of activities that strengthen it.

Table 1: Enablers and Inhibitors of the Business-IT Relationship

Enablers	Inhibitors
Top Management Support for IT(Luftman et al., 1999; Teo and Ang, 1999)	The Lack of Close Relationships between IT and Business- (Luftman et al., 1999; Singh and Woo, 2009)
The Involvement of IT in Strategy Development-(Almajali and Dahalin, 2011; Luftman et al., 1999)	IT does Not Prioritize Well- (Luftman et al., 1999; Tan, 1999)
IT Understands the Needs and Requirements of Business- (Luftman et al., 1999; Teo and Ang, 1999, Gartlan and Shanks, 2007)	IT Fails to Meet its Commitments-(Luftman et al., 1999; Tan, 1999)
Effective and Reliable Services from IT to User Departments- (Luftman et al., 1999; Teo and Ang, 1999)	IT does not Understand Business- (Luftman et al., 1999; Tan, 1999)
Successful IT History- (Almajali and Dahalin, 2011; Reich and Benbasat, 2000)	

As much as there are enablers and inhibitors of the Business-IT alignment relationship, there are also enablers for the community needs-ICTD relationship. An example of a top enabler of the business-IT relationship is top management support of the endeavours of IT. In an ICTD, there needs to be support from the community leaders, whether it is the municipal leader, church leader, the chief or an elected community leader. The support of community leaders needs to be attained through the provision examples of how IT has helped other communities, what their ICTD vision entails for the community, and more (Pade-Khene and Sewry, 2012). If the community leaders support the ICTD vision for supporting development in the community, the community leaders can also in the future recommend that the ICTD external stakeholder be incorporated when decisions are to be taken about the state of the community (Pade-Khene and Sewry, 2012). There are various methodologies and approaches that are used to align business and IT. The various methodologies and approaches could also be adapted and applied in the process to align community needs and ICTD strategy.

The use of the lessons learned from the business-IT alignment process can contribute greatly to understanding how the alignment of community needs and ICTD strategy may occur. With business-IT alignment as the model that can be used to align community needs and ICTD strategy, it provides structures and processes of how this can be done. Understanding needs of the community can be related to understanding the needs of the business. The business, for instance, aims to achieve innovation and value for money from IT, but the community aims to achieve sustainability and development. The community aims to achieve this through, an improvement in the socio-economic status of the community, connectivity to the world, and to have their development needs supported. Furthermore, what IT provides to the business to achieve its goals could be related to how the ICTD strategy in the community should aim to provide avenues to achieve community development goals. The business-IT relationship cannot be possible without business and IT looking to each other on how they can improve the capability and standing of the business in the environment and the market they are faced with. Therefore, IT starts by knowing the what, how, why, and when of the business environment and market before they can align their strategy to business. Applying this to ICTD, means that the external and internal stakeholders of the ICTD project, therefore, need to collaborate in understanding the developmental, informational and technological needs, the strategies and the environment, and the context of the community. When alignment between the community and the ICTD strategy is achieved, relevant impact indicators become more explicit, which would provide an indication of the results of the outcome and impact assessment.

2.2 Identification of Impact Indicators based on the Needs-ICTD Alignment

An impact assessment aims to implement a monitoring and evaluation system to identify whether a project fulfils its development purpose for its clients and beneficiaries (Batchelor and Norrish, 2006). According to Heeks and Molla (2009), an impact assessment is driven by the following questions: “*what do we not know, that we need to know and how are we going to find that out?*”. Impact assessments also answer the question of “*how access to ICTs produces benefits to the individuals and communities they serve*” (Rothenberg-Aalami and Pal, 2005: 7). Impact assessments also reveal what has changed and why, they provide evidence of a change in the behaviour of economic, social, and political factors. These factors are then measured through impact indicators, which indicate what change has occurred or not within the ICTD project. The occurrence of a needs-ICTD alignment can provide a base from

which relevant impact indicators can be identified (specifically, intended impacts). The evaluation of an ICTD project should, therefore, be based on the needs of the community, of which the project goals are linked to (depending on the human development intervention focus).

The United Nations (2009) suggests that broader areas of impact need to be identified first, such as, economic, social, and political factors, before indicators are developed. Moreover, when indicators are identified based on their impact areas they need to possess the following characteristics (Licona, 2008; Prennushi et al., 2002):

- Indicators need to be clear, precise and an unambiguous measure of progress.
- They need to be relevant, meaning they need to be appropriate to the subject matter and reflect their shared objectives.
- They need to be monitor-able and hence amenable to independent validation.
- And lastly, it must not be easily distracted by unrelated developments and should not be easily influenced to show success where none exists.

Ashraf et al (2008) suggests that impact indicators should be identified by participants within a particular community who can themselves describe or decide what constitutes development. This is because the community members are the ones who are more likely to be conscious of their own well-being and can thus offer useful suggestions on the impact of changes resulting from the ICTD intervention. This allows for development information to come and be easily understood directly from the participants themselves. It is also imperative that the goal of the project is understood before any indicators can be constructed (United Nations, 2009: 10). According to Rothenberg-Aalami and Pal (2005: 8) impact indicators should be of a qualitative and quantitative nature as impact can occur across all scales.

3. THE NEEDS-ICTD STRATEGY ALIGNMENT FRAMEWORK

A review across the concepts of ICTD, business-IT alignment, and impact indicators contributed to the preliminary themes and development of a framework. The Needs-ICTD strategy alignment framework in Figure1, supports the process of linking ICTD strategy to community needs, and in providing a foundation for the identification of impact indicators. The framework is divided into eight components, which facilitates the alignment of needs and ICTD strategy to the measurement impact. Since each component affects the execution of a subsequent component, each component cannot be executed without the results of the previous component. The internal and external stakeholders on the sides of the framework illustrates how the stakeholders drive and are consulted about the processes of alignment. The central components illustrate the process flow moving from one component to the next, as indicated by the arrows. The development plan of the community illustrates the direction in which the development of the community will take and contributes to the Baseline Study foundation. The Baseline Study illustrates the status of the context and community, identifying key development aspects that need to be addressed. Therefore, the Baseline Study feeds into two different components, which are the needs assessment and the ICTD strategy. The needs assessment illustrates the needs of the community based on the development plan and baseline study. The ICTD strategy aims at developing tools to assist the development plan of the community. The needs-ICTD linkage illustrates the alignment of the needs identified and the ICTD strategy. Lastly, the impact indicators component illustrates how based on the preceding components a foundation is created from which impact indicators can be identified.

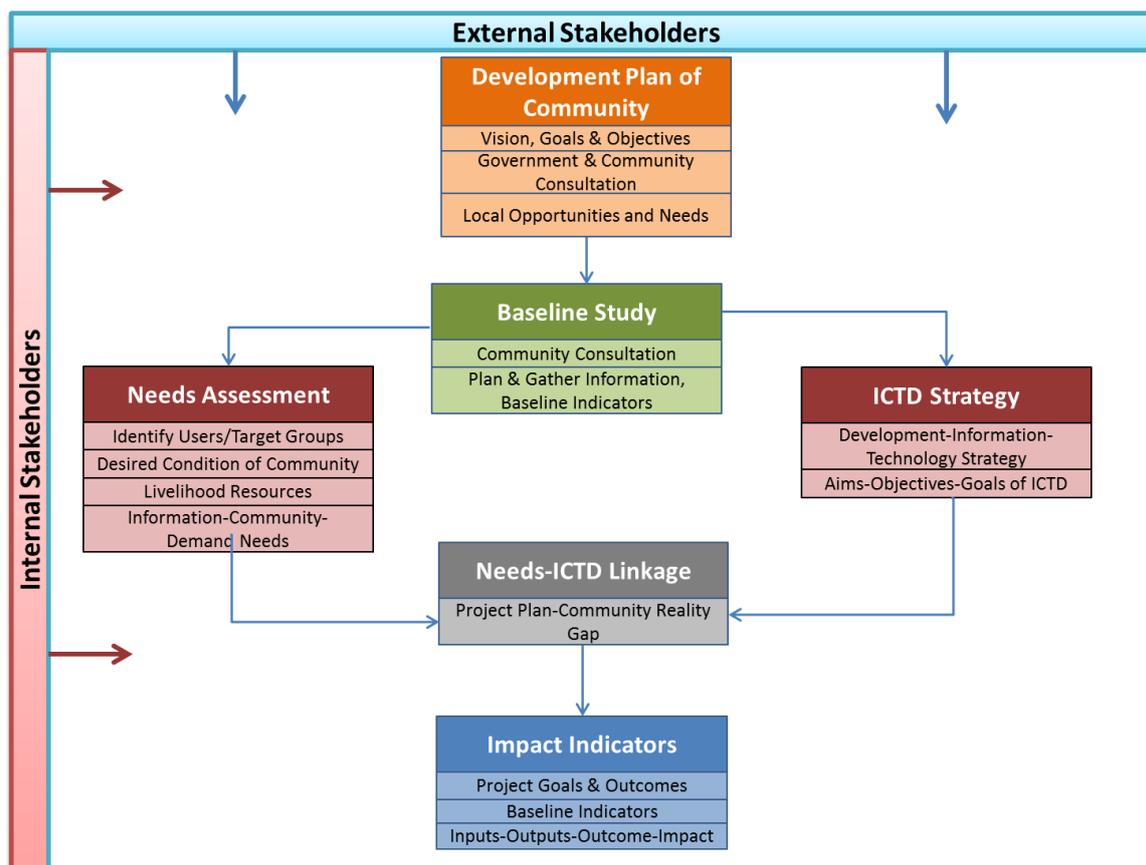


Figure 1: Needs-ICTD Strategy Alignment Framework

3.1 Internal and External Stakeholders

Internal stakeholders are the community at large and are made up of groups within the community; for example, the youth, elderly people, business groups, teachers, health officers, and school children (Pade *et al.*, 2010). Internal stakeholders at times know their development needs when asked in a manner in which they understand; however, at times, they need to be guided by the possibilities and also their challenges. External stakeholders are commonly the people that assist in initiating development in the various communities. Examples of external stakeholders include researchers, project partners and funders, project leads, trainers and technicians (Gumbo, Thinyane, Thinyane, Terizoli and Hansen, 2012) and they are placed at the top of the diagram for the purpose of driving development but in consultation with the internal stakeholders at all times. All stakeholders need to contribute to the development of the community, but the agenda must be driven by the community. A development plan of the community may focus on one particular aspect at a time in the community, for example, education or health.

3.2 The Development Plan of the Community

This component is divided into three parts, which encompass the vision, goals and objectives; government and community consultation; and local opportunities and needs. The vision, goals and objectives clearly state the direction in which the community will develop and the aim of development (Pade *et al.*, 2010). The local needs of the community should also drive the initiative of creating the selected goals and objectives of the community. The

interventionist should always be in contact with the community and its leaders to know the needs and development aspirations of the community through a Development Plan (DP) (McEwan, 2003).

3.3 Baseline Study

The baseline study is aimed at investigating and assessing the current status of the community and its readiness to uptake innovative development activities through the use of ICT (Pade *et al.*, 2010; Rossi, Lipsey and Freeman, 2004). The following are some examples of aspects that should be assessed: socio-economic conditions, demographics, cultural context, political context, existing ICT diffusion (both modern and traditional ICT), the way of life in the community, and traditional information and communication channels (Pade *et al.*, 2010). Encompassed in the baseline study are Community consultation and the process of planning and gathering information. Through community consultation, it can be discovered whether the community is actually ready to be involved in the project and be involved in the change that will occur. Planning and gathering information is a process of knowing what, how and which information must be gathered for the baseline study and, therefore, this requires rigorous interaction between the external and internal stakeholders. The baseline study will then contribute to the needs assessment of the community, by providing the current context of the community.

3.4 Needs Assessment

The needs assessment component can only proceed once the development plan and baseline study results of the community are evident. The first part of this component is identifying user/target groups within the community to understand their specific needs. This can be conducted through reviewing the baseline study and development plans of the community in order to get an indication of the groups that exist in the community. The second part of this component is exploring an in-depth desired condition of the community. The current condition of the community can be viewed through the baseline study, and the development plan of the community can identify the plans that the community would like to achieve in order to progress in human development. The third and fourth part of this component is identifying and exploring the needs of the community through a livelihood resources approach, as one approach to provide information vital for survival. The resources essential for rural development include economic or financial capital, natural capital, human capital, social capital, and informational capital (Gigler, 2004). This process provides an understanding of what the community needs to survive and, therefore, contributes to attaining these resources to fulfil the needs. Three different types of needs should be considered, that is, information needs, community and target group needs, and lastly demand-driven needs. The needs assessment process is a continuous process and therefore, cannot be conducted and completed all at once. Overtime the needs of the community change and, therefore, sustainability needs to be achieved through a continuous needs assessment of the community.

3.5 ICTD Strategy

The development-information-technology strategy holistically brings together the different types of strategies that are needed to provide a sound ICTD strategy (Harris, 2004). The second sub-component is the aims-objectives-goals of the ICTD initiative, which can be established when there is a clear indication of the development, information and technology plans. Formulating the aims, objectives and goals of the ICTD initiative should be a collective effort between external and internal stakeholders. External stakeholders clearly

indicate to the community what technology can do and achieve when used in the correct ways. The combination of the two parts of this component, which are the development-information-technology strategy and the aims-objectives-goals of the ICTD all contribute to the development of a sound ICTD strategy. A sound ICTD strategy contributes to developing the alignment between the needs and ICTD strategy more effectively than an ICTD strategy that is fully developed without community participation.

3.6 Needs-ICTD Linkage

The Needs-ICTD linkage component of the framework aims to align community needs with the ICTD strategy. The Needs-ICTD linkage component contains one section, which is the 'project plan - community reality gap'. The project plan-community reality gap is aimed at reducing the gap between the design of the ICTD strategy and the contextual reality of the community in which the ICTD operates in (Heeks, 2009). The project plan is the strategy in which external stakeholders aim to develop the community. The community plan emanates from the development plan of the community. The involvement of the internal stakeholders in the development of the ICTD strategy will provide a positive reflection of the external stakeholders to the internal stakeholders in order to show how much they value their input. Clear communication between the internal and external stakeholders can reduce the gap as there will be no implied and mixed messages between them. When the community members know how ICT (sharing successful IT history) has helped other communities they become more enthusiastic about how the technology can assist them in solving their own problems, developing the community and therefore, lessening the gap. The external stakeholders also need to show commitment to the project by meeting its promised deliverables and meet the deadlines set with the community and therefore, lessening the gap. When the gap is closed or reduced the community finds trust with the external stakeholders and their capabilities because their needs would have been given priority as to how they can be solved with the ICTD strategy in place. The implementation of the strategy should also be given thought and outlined in the process of linking the needs and ICTD strategy. The needs-ICTD linkage component is one of the critical elements of the framework. If the needs and ICTD strategy are not in alignment, then a wider gap develops, which could ultimately lead to the failure of the project, or a negative effect on sustainability. The impact indicators cannot be clearly articulated to reflect the needs of the community when this component is not applied.

3.7 Impact Indicators

The impact indicators component is dependent on the alignment of ICTD strategy with local needs. The component as seen in Figure 1 is divided into three parts, which are the project goals and outcomes, baseline indicators, and inputs-outputs-outcome-impact linkage. The project goals and outcomes should be reiterated throughout the lifecycle of the project and if they change, all stakeholders should be informed. The project goals should have a link to the overall community development goals and the needs of the community. The comparison between the baseline study and the community development plan can clearly bring out the impact which the development plan aims to achieve, and provides the current status of the community. Impact indicators can then emerge from the baseline indicators in order to assess and compare the changes.

Inputs, outputs, outcome, and impact should be the line of linking what was done (input) to what was achieved (impact). Therefore, indicators could be identified through linking the needs that existed, the inputs that were used to achieve a positive outcome of the need, and what the outcome was that is linked to impact. The goals of the project can provide a clear

connection through linking inputs to impacts. Unintended impacts may also arise as demand-driven needs of the community may give rise to unintended impact indicators.

4. RESEARCH METHODOLOGY

This research applied a post-positivist qualitative approach as it applies a deductive approach for identifying, exploring and explaining the application of a Needs-ICTD Strategy Alignment Framework (Wildemuth, 1993; Ochara, 2013). The research strategy used to answer the research question and provide a case for this research is the case study approach method through qualitative research. An investigation into the alignment approach in the living labs used is conducted through engaging the community with the designers of the ICTD strategy; hence, the empirical investigation questions are:

1. How are the needs of the community elicited and how is the ICTD strategy aligned to the needs of the community?
2. Why were the selected approaches chosen for aligning ICTD strategy and the needs of the community?

The case studies were used to inform and explore the Needs-ICTD strategy alignment framework in order to also provide a realistic understanding of how alignment did or did not happen. The results of this process enabled us to critique the cases, and learn lessons from their experiences, investigating the necessity of certain components in the Needs-ICTD strategy alignment framework to confirm, as well as address the lack of alignment in the case studies. The research instruments that were used included interviews of internal and external stakeholders to the projects; participant observation of trainings, meetings, and general occurrences in the communities; and document analysis of project plans, concept documents, baseline studies and so forth.

Three case studies were selected based on how they would inform the Needs-ICTD Strategy Alignment framework. This would be done through identify how practices were applied to align the ICTD Strategy to the needs of the community and why these specific practices were applied in the Living Lab, which will form a base for the measurement of impact. The first case study is the Siyakhula Living Lab (SLL), which is situated in the Dwesa area, within the Mbhashe municipality of the Eastern Cape Province in South Africa. In the Siyakhula LL, the focus was on the residents of the Dwesa (a town in rural community who were involved in the operations of the lab, the community at large, and the management unit of the Siyakhula living Lab. The second and third case studies were SAP Living Labs. The SAP Living Labs are situated in various provinces in South Africa, which are Limpopo and North West provinces. Two projects were selected from the SAP LL, that is, the Rustica Project (Limpopo) aimed at small business enterprises, and the Smart Energy Project (North West) aimed at households that use various energy sources. The reason why the SLL ICTD project has been chosen as a case study is because the lab was established in a rural community, and has been operating for five years, with lessons to learn from its approach. The Rustica and Smart Energy case studies have also been situated in rural communities which operate for specific projects which are intended for the communities.

The technique that is used for analysing the case study is the explanation building technique, which is relevant to explanatory case studies in order to “explain” a phenomenon (Yin, 2003). Through the application of the Needs-ICTD strategy alignment framework in the Siyakhula and SAP living labs, explanation building is developed and built through interactions, observations and experiences of the researcher. Data was also analysed through thematic analysis, as it enables patterns and common trends to be identified. Relationships can, therefore, be identified between these patterns and trends (Oates, 2006).

5. COMPARATIVE CASE STUDY RESULTS AND DISCUSSION

The following discussion provides a comparative review of results from the case studies in relation to the components of the Needs-ICTD Strategy Alignment Framework. Table 2, provides an overall view of the key differences and similarities.

Table 2: Key Differences and Similarities between the case studies

	Case Study 1-SAP Rustica	Case Study 2- SAP Smart Energy	Case Study 3- Siyakhula Living Lab
Internal and External Stakeholders	Partnership initiated by external stakeholders to collaborate with internal stakeholders.	Partnership initiated by external stakeholders to collaborate with internal stakeholders.	Partnership initiated by external stakeholders to collaborate with internal stakeholders.
Development	Based on Infopreneurs and ordering stock via application.	Based on monitoring all energy use based on application.	Based on bringing ICT to the community and schools.
Baseline Study	Socio-economic study was conducted	Baseline study was conducted.	Baseline study was conducted.
Needs Assessment	Conducted simultaneously with baseline study in socio-economic assessment.	Conducted by North West Living Lab, separate external stakeholder from projects team.	Target group specific needs assessment was conducted.
ICTD Strategy	Various strategies were developed such as the roadmap, communication and ICT intervention strategy.	The objectives of Smart Energy were developed based Department of Science and Technology project objectives.	Strategy expanded through funding applications which were submitted to external stakeholders. Difficulty in developing one strategy too many stakeholders.
Needs-ICTD Linkage	Project was too solution specific and not focused on other community challenges.	Project was too solution specific and not focused on other community challenges.	Attempts were made to align the strategy.
Impact Indicators	The goals and intended outcomes of the project were communicated to the community. There is no clear evidence of how the impact indicators were developed.	Assessment based on eight questions that directed the impact assessment.	The goals and intended outcomes of the project were communicated to the community. There is no clear evidence of how the impact indicators were developed.

5.1 Internal and External Stakeholders

In all the interactions between internal and external stakeholders, more could have been done to increase the level of interaction and consultation. Commonly, in all three projects the leaders or chiefs of the various communities were consulted specifically at the beginning of the project, where the external stakeholders intended to start initiatives in the community (Kingsbury *et al.* 2004: 44). After this initial process, they consulted the leaders or chiefs as and when needed by them (external stakeholders). This did not allow for much interaction between local leaders and external stakeholders. Interaction between internal and external stakeholders was essential to ensure viable mutually beneficial relationships.

5.2 Development of the Community

In all three of the case studies evaluated, the communities had begun their own community development initiatives, which were in response to some of the challenges the community was facing (Harris, 2004). In some cases development was also through the assistance of external stakeholders, such as the government, NGO's, educational institutions and other various organisations. Whether it was a pre-empted solution of general solutions, the overall aim was to improve the communities in the respective field. What was very common in the three cases is that the projects paid little attention to finding out what the previous projects had achieved in the community, and what the development goals and objectives of the communities were. Government support was also available at times in various initiatives started by the communities although more could have been achieved by government in these communities. This means that the framework needs to accommodate the knowledge of past

projects and the effect they have had in the community (Pade *et al.*, 2010). This will also be valuable to the external stakeholders as they will be able to know how to work with the community and the people who will positively affect the success of the project and the community expectation of the project.

5.3 Baseline Study

Local people understand their communities better than an external stakeholder (Pade *et al.*, 2010). In the Rustica and Smart Energy case studies, on a higher level, most of the planning in the baseline study involved external stakeholders with little or no involvement from internal stakeholders. In Smart energy, there was involvement from internal stakeholders, where they were asked on the most relevant people to interview, the kind of questions to ask and the local information. Internal stakeholders were only on the receiving end in most occasions and they would be asked to fill in questionnaires, agree to interviews, etc. For instance, in the SLL case study, a pilot study was conducted before the main baseline study to ascertain whether the questions posed would be relevant. If the solution of the project was not pre-empted, more value would have been derived from the various projects. This would allow the questions directed to the community to be re-evaluated and better questions derived (Pade-Khene and Sewry, 2012). Therefore, a baseline pilot study needs to be conducted to make sure that the state of the community is sufficiently addressed and documented by the main baseline study which will impact the various decisions which will be taken by external stakeholders. The content of a baseline study should be fully reviewed in order to view the community holistically in the condition it is in, and view how segments of the community operate.

5.4 Needs Assessment

Solution specific projects which were based on the funding focus determined by funders, such as, Rustica and Smart Energy were aimed at solving challenges for some people in the community and not for the greater good of the community (Toyama, 2011). This then meant that the needs of the other groups had been disregarded as they would not benefit from the project. When looking at Rustica, for example, it is evident that it targeted specific groups in the community which were the 'Spaza' shops and the sociopreneurs. The needs of the community were evaluated, which revealed that other groups in the community also had needs which needed to be fulfilled but were often ignored. If a common solution to the needs of the community was provided was the initiative going to bring change in the community? There might have been a change but it would have been at a larger scale than the effects provided only from the 'spaza' shops and the sociopreneurs. Therefore, projects should be viewed holistically in how they can benefit the community (Pade-Khene and Sewry, 2012).

Since most of the projects reviewed possessed pre-empted solutions from funders, it was difficult to link the solutions provided to how they would affect the living conditions of the communities. This was not to the benefit of the community in the long term. There are many lessons that can be learned from the Rustica case, such as, that, pre-empted solutions for specific groups are not the best when they do not benefit the community as a whole. Therefore, the socio-economic study may assist in knowing not only the landscape of the community but how the problems identified could also be linked to the pre-empted solution to be provided.

In all the case studies, none of the needs were re-evaluated to change what was being offered to the communities. The information or community needs change all the time, which gave

rise to demand-driven needs. These were not accommodated in the operations of the various labs and projects. The lack of re-evaluation of the needs neglected possible development linked to the emergent demand-driven needs in the community (Toyama, 2011). The target group needs must be evaluated on all the community members, from where the best possible case which will benefit the community is selected, and not only cases which will benefit certain specific groups. The results should also provide an indication of the type of solution that should be provided.

5.5 ICTD Strategy

In all three of the projects, community members had perceptions about how the project was going to work in the community. Community members knew the basic idea of what the project was going to do. For example, in one project a community member said: *“the plan of the lab was to teach us how to use energy”*. If the strategy or plan of the project is viewed, one will find that the project had aimed to do more than what the community members indicated they knew. If the community was not involved in the development of the strategy, and the strategy was developed by funders and external stakeholders, then it is important that the plan should be clearly articulated to the community members and that it should clearly show why the project is in the community and how it will benefit the community along with how this will be achieved (Harris, 2004).

When the external stakeholders and funders develop the strategy on their own they are not fully aware of the challenges the community is faced with and how the developed objectives and goals will affect the community. Communities need to know and fully understand how their needs are going to be addressed and how this will affect them. The ICTD strategies also need to be fully communicated to the communities so that they can understand how that particular strategy will assist them and also be involved in the development of the strategy in order for common goals to be achieved instead of the achievement of one-sided goals (Rossi *et al.*, 2004: 135). When the strategy is communicated in a simple manner, it is less intellectually intimidating to the community members and maybe they could contribute more to the strategy, therefore, the communication of the strategy is included as a component of the ICTD strategy. One way of doing this, for example, is through presenting in their own language and terms which they understand. This will then affect the linkage of the needs and the ICTD strategy.

5.6 Needs-ICTD Linkage

In the interviews of the SLL, it was expressed that the community was seen as a partner rather than a recipient of the products produced by the SLL. If that was the case, then a common strategy should have been developed that would see all the parties interests addressed in a common strategy. It was also evident that the strategies of the other external stakeholders were fully addressed as compared to the needs of the community (Heeks, 2009). They therefore, achieved more, as they understood what they needed to do to achieve their goals. As a partner, the community needed to contribute their own strategy on development,

Pre-empted solutions are not driven by the needs of the communities, but rather by identified opportunities from one angle, usually that from the external stakeholders. This means that the solution provided has not taken into account the developmental plan of the community or the target groups into consideration, and how the project aims to address the plans for the community with its strategy (Reich and Benbasat, 2000). The solution then partly addresses the needs of those groups and has no effect on the community as a whole. When the ICTD

strategy is linked to needs, more community appropriate solutions are developed and are linked to the needs of the community. With this link, appropriate ICTD strategies are, therefore, be developed, potentially providing appropriate technologies and context relevant solutions to the community.

In the cases studied, it was evident that no training on the advantages and uses of ICT was given to the communities. The training that was provided was in relation to the operation of the applications that were provided. However, the uses were shared in passing with the community members, such as, when in training sessions, community members would, for instance, ask questions of how they could use the technologies provided to do certain things. This would have also affected the level of involvement of community members in contributing to the alignment of the ICTD strategy of the project to the needs of the community.

5.7 Impact Indicators

SLL and Rustica conducted their impact assessments, they aimed to assess the before and after situation of the communities. Therefore, they identified what they had set out to achieve, which entailed the goals and objectives of the project; and then evaluated them against the baseline condition of the community. However, there were no impact indicators that were identified, therefore, the impact of the project was assessed based on comparing the local existing status with results from the baseline study or socio-economic study that was conducted before the project. Impact indicators were identified based on the goals and objectives that the project had set out to achieve. This impact assessment was inaccurate as it would have left out how the project fulfilled the needs of the community, as the needs of the community were unaccounted for (Batchelor and Norrish, 2006). Pre-empted solutions were the most vulnerable to this trap, since what needed to be achieved was already in place before the needs of the community were understood.

When the needs of the communities' change, new demand-driven needs emerge which would affect the needs-ICTD linkage and therefore, the balance is not achieved. As the needs of the case studies changed the projects did not change their operations to meet these new needs, because they were *not* evaluated in the first place. The intended and unintended impact indicators will not be sufficiently identified if they are only linked to the objectives and goals. Impact indicators then need to be developed from the needs-ICTD linkage which will allow for the needs to be linked to the projects goals and objectives. Unintended impact indicators need to be developed as to be able to link to the needs-ICTD linkage and link to changed demand-driven needs.

6. AN ENHANCED NEEDS-ICTD STRATEGY ALIGNMENT FRAMEWORK

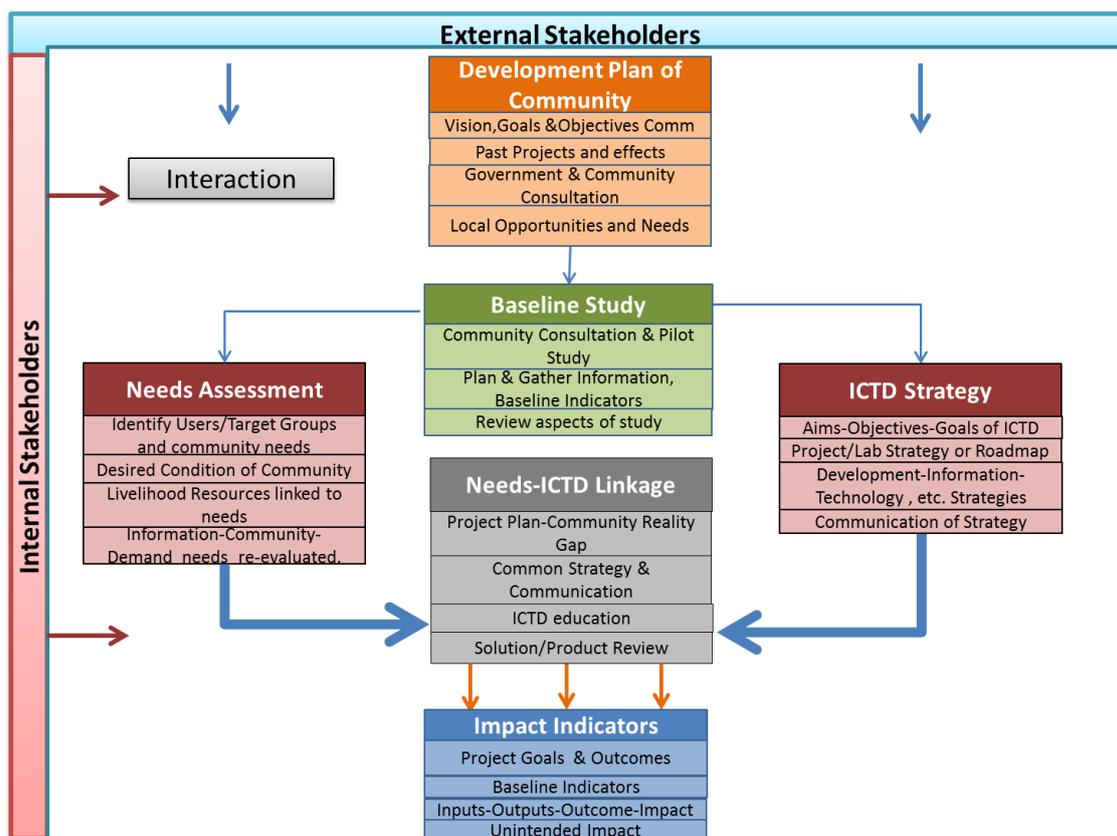


Figure 2: An Enhanced Needs-ICTD Strategy Alignment Framework

The framework has not changed dramatically from the original proposed version. Aspects of *external and internal stakeholder* involvement remain unchanged as it remains significant, as it was evident from the analysis that communities might be interpreted as partners in the projects, but rarely have input into the solution that is developed. Their input is seen as contributing to the baseline and needs assessment only and is not seen elsewhere. In some areas, sections have been added to components, which have expanded components of the framework. The other change in the framework is the emphasised arrows illustrated in the framework which indicate the importance of the components from which they emanate.

In the original framework, there was no area that would accommodate *interaction* between stakeholders. During the data analyses, it became clear that not many interactions were occurring between stakeholders. Community members would only be contacted at the start of the project as the various project external stakeholders would be seeking approval from internal stakeholders. Therefore, interaction between the internal and external stakeholders to ensure viable mutually beneficial relationships needs to be clearly emphasized, hence an 'Interaction' component was added to the framework.

The *Development Plan of the Community* component has changed to include communication of the vision, goals and objectives to internal stakeholders. Another section that has been added to the component is the 'Past Projects and Effects'. This section details the previous projects the community has been involved in and how they have impacted the community, as well as, how they have been received by the community. All the steps included in the

component should be viewed holistically in deriving a clear picture of the community and its capabilities.

There was only one change to the *Baseline Study* component, which is the ‘Review aspects of study’. The content of a baseline study should be fully reviewed in order to view the community holistically in the condition it is in, and view how segments of the community operate.

The *Needs Assessment* is usually conducted after the baseline study, which provides a high level and general view of what the needs of the community are. The first change that has occurred on the needs assessment component is not only identifying the ‘needs of the users and target group needs’, but also, the community needs. The second change is associated with linking the livelihood resources to the needs of the community. This allows the livelihood resources identified earlier to be linked to the needs of the community. The last effect of the component is the re-evaluation of the information, community and demand-driven needs, which indicate the changing environment of the community. This shows the significance of this component as it was in the framework and the importance of it has been reaffirmed.

Since *ICTD Strategy* deals with the strategy of external stakeholders it needs to be transparent and must be based on the aims, objectives and goals of the project, which was a section that was added. The first section that has been added to this component is the overall project strategy or roadmap. This stipulates the project’s overall strategy and roadmap that need to be followed. Another section that has been adjusted is the development, information and technology strategy to include all other strategies (for example a skills strategy), which might be developed by external stakeholders to support the overall strategy of the project. However, every plan developed here needs to be communicated to the community in clear, simple and understandable terms that are not intimidating. Therefore, the communication of the strategy is included as a component of the ICTD strategy. One way of doing this, for example, is through presenting in the own language and terms which they understand, or through a key gatekeeper in the community.

The *Needs-ICTD Linkage* component has mostly been informed by the results that emanated from the case studies analyses. The first change is associated with the common strategy needs to be developed which will address the needs of the community in a holistic manner and ensure the interests of the internal stakeholders involved in the project are addressed. The second section focuses on the accommodation of ICTD education, where the external stakeholders build the capacity of local stakeholder to understand the role of ICTD in supporting development and livelihood initiatives. The last section that has been added is the solution/product review section, which aims to address whether the solution provided is linked to community needs and how it fulfils these needs. This is the most crucial part of the framework where a balance is obtained between the community and external stakeholder goals. This can be conducted through actively reviewing with internal stakeholders how ICT supports their local activities.

The *Impact Indicator* component affects the monitoring and evaluation of the project. The only change that has been implemented in this component is the emphasis on the needs-ICTD linkage shown by arrows as in Figure 2, as it is vital in order to determine appropriate impact indicators. Another change has been the addition of the unintended impact indicators that emerge overtime, independent of the intended impacts. The table below summarises the changes of this component.

7. CONCLUSION

As much as communities have changed over time, they still value the process of development that can be supported by access to information and knowledge, in building capacity to address development challenges. There is a growing frustration in community members, which is caused by unachieved outcomes by ICTD projects and unmanaged project expectations. The provision of ICT services for development in communities is often not linked to community needs, and therefore, does not provide value to the community. ICTs have the potential to support development activities that change the lives of people in rural areas. However, without a thorough investigation of needs and suitable alignment of ICTD strategy, ICTD initiatives are not effective in communities. The Needs-ICTD framework was then developed in order to provide a framework which would assist in aligning the ICTD strategy with community needs and provide a foundation that would allow for impact indicators to be identified. The process of informing the framework was vital through real life case studies and key lessons learned. Lessons learned contributed to an enhanced Needs-ICTD Strategy Alignment framework, which took into account the experiences and review of the case studies. The revised framework encapsulated the lessons learned, the experiences of the projects, and the review of the related literature. The Needs-ICTD Strategy Alignment framework essentially provides guidelines in aligning the ICTD strategy to the community needs, as a foundation for assessing impact through the supportive identification of relevant impact indicators.

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