Ungana Afrika

COFISA
Cooperation Framework on Innovation Systems between
Finland & South Africa

Dwesa Village Connection Business Modelling

Feasibility Analysis

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October, 2008

Executive Summary

As a part of it's strategy, COFISA (Cooperation Framework on Innovation Systems between Finland and South Africa), is promoting and supporting the internationally designed Living Lab concept. One of the focus areas for the Dwesa Living Lab, which is located in the Amathole district in the Eastern Cape, is to pilot the Nokia Siemens Networks Village Connection concept for affordable mobile connectivity in rural and under-served markets. The Village Connection uses an innovative technology and business model to reduce the capital expenditure as well as the operating expenditure for providing mobile services.

To ensure the long-term sustainability of the planned Village Connection trial within Dwesa, COFISA with the project partners decided to implement a short community-centric business modelling study before the planned installation and roll-out of the technology components. This report presents the findings of the study. The proposed business model applies to the unique conditions of the trial, and would need to be modified for a scaled implementation approach.

The partnership between the project stakeholders (COFISA, the Universities of Fort Hare and Rhodes, Nokia Siemens Networks and the Meraka Institute) adds great value, but there are some concerns. Many of the stakeholders would need to invest more time and resources into the trial than what they are likely to gain, unless the scalability of the Village Connection in the region is viable. It is also clear that because of the frequent changes in the project plan, there is uncertainty between partners over some areas of responsibility. These responsibilities should be formalised prior to implementation.

Community development projects in Dwesa align with national development agendas. This can make implementation much easier, and enable access to local, provincial and national development budgets. However, the socio-economic conditions in Dwesa are daunting and it will be a struggle for any initiative to become sustainable. The high number of failed initiatives serves as a warning not to underestimate the challenges.

Currently the staff and students from Fort Hare and Rhodes University are the primary source of technology support in the Dwesa villages. However, the ad-hoc support they can provide may not be sufficient if community members are paying for mobile services. There are individuals operating informally in Idutywa and Willowvale who might have the necessary skills to support the Village Connection installation. The technology specified by NSN for the Village Connection is very simple, and the support requirements should be minimal. The more the implementation deviates from this model, the more necessary and expensive technology support is likely to be.

For the Village Connection to operate formally, the local operator will need professional assistance to fulfil the statutory requirements. Some of these services are available from Willowvale and Idutywa, while others will need to be sourced more broadly.

It may be necessary to conduct an Environmental Impact Assessment (EIA) at each site where a GSM Access Point (GAP) is installed. This would add significantly to the implementation costs and scalability potential. Further investigation is recommended to determine whether an EIA is required.

The market size is affected by several factors, including the extent of coverage afforded by the GAP, the location and population of the villages in the area, the number of mobile phone owners, the effect of existing competition, consumer perceptions of the services offered, and income levels of the community. Based on the scenario of co-locating the

GAP with the current Vodacom tower in Mpume, and taking into consideration affordability and coverage considerations, we estimate that there would be a minimum of 935 potential subscribers. There are also at least 346 current cellphone owners in the projected coverage area. With Vodacom's withdrawal, this scenario should be reviewed.

The extent of coverage that can be obtained is an important consideration for the Dwesa Village Connection trial. If the range is too small, it will be difficult to obtain enough subscribers to be sustainable. If necessary, the range should be increased by amplifying transmission power or increasing the height of the antenna. It is also recommended to place the trial implementation in a village with higher population, such as Nqabara.

Conclusions from focus groups and general discussions with community members are that the local calling afforded by the Village Connection is a desirable service which has value for the community. A monthly fee of around R30 is seen as reasonable.

Several possible governance structures were considered for the unique conditions of the trial, and a non-profit structure would seem to be the most appropriate. It ensures that the interests of the communities involved and also the external partners are considered, and leverages the local cultural knowledge as well as the external expert knowledge. Other models should be considered for scaled implementation. Investigation of the operating model showed that the skills necessary to operate the Village Connection are available but scarce, with business skills being of particular concern. Initial salary levels between R1,000 and R3,000 would seem appropriate for the operator.

The business model developed for the Dwesa Village Connection estimates a monthly revenue potential of R9,900. Set-up costs are expected to total R43,970. Cash-flow is estimated to be R-20,226.67 in the 12th month, necessitating an additional R25,000 in seed funding. Break-even point should be reached after 30 months of operation. Local sustainable operation should thus be feasible subject to some provisions:

- community members are able to afford the estimated R35 monthly subscription
- coverage is sufficient to incorporate a number of surrounding villages to reach 240 monthly subscribers
- seed finance is available with very friendly terms
- project stakeholders are willing to absorb their costs
- no franchise fee is paid to the GSM operator (at least until break-even is reached)
- the governance body will have to donate their time
- the need for external professional services is minimal

Because of the small margins involved and the importance of low-cost service delivery, small differences in revenue and expense projections can have a significant impact on profitability and whether break even can be reached. It will be important to monitor costs and revenues closely in order to stay on track.

If an operator can be found, proceeding with implementation is worthwhile. Even if operation does not continue beyond the pilot, it would provide sufficient value to the community through the services on offer and as a source of scarce employment and revenue. Piloting the Village Connection will also be the only way to fully evaluate the potential of the solution on a larger scale in rural South Africa.

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Chapter 1. Introduction

1. Background of the Project

The value proposition for Base of the Pyramid (BOP) markets making use of mobile phones has been clearly shown in a number of studies[1]. Patterns of spending between rural BOP markets and their urban counterparts are consistent with a lack of access to phone services in rural areas, and spending trends as income levels improve indicate cost barriers for accessing telephony[2]. Both these factors point to a potentially significant untapped market for low cost mobile phone services in rural areas of South Africa.

As a part of it's strategy, COFISA (Cooperation Framework on Innovation Systems between Finland and South Africa), is aiming at promoting and supporting the internationally designed Living Lab concept. According to COFISA, these "Living Lab platforms [are seen] as key mechanisms for creating sustainable, user and community-centric ICT innovation environments in South Africa. Living Labs are typically based on highly open innovation practices and involving users, developers and different support organizations in joint R&D activities in real-life contexts."

The Dwesa area, which is located in the Amathole district in the Eastern Cape, has one of the rural Living Labs that COFISA has been involved in during the last two years. Based on the COFISA documentation, this Living Lab "is built as an extension of university-led rural ICT development work and is focusing on open innovation in rural ICT applications and services."

A focus area of the Dwesa Living Lab is to pilot the Nokia Siemens Networks Village Connection concept, and investigate how it could provide access to the BOP market through its low-cost technology that removes financial barriers, and innovative business model that localises value through a village operator.

2. Nokia Siemens Networks Village Connection Solution

The Village Connection is a product developed by Nokia Siemens Networks (NSN) as a solution to the problem of mobile services affordability for customers in rural emerging markets.

In order to reach this market, NSN has taken an innovative approach to both the technology and the business model typically used to reach traditional markets. The Village Connection aims to reduce the capital expenditure (CAPEX) as well as the operating expenditure (OPEX) for providing mobile services to rural emerging markets so that a total cost of mobile ownership of no more than USD 3 per month can be attained.

The Village Connection technology is designed to be cheaper to implement than conventional GSM network infrastructure. It also outsources many of the operating expenses to local village operators, making the running of the network much cheaper for the GSM operator. The Village Connection solution achieves this through a network of many low cost village-level GSM Access Points (GAPs), connected to a regional Access

1 See for example "Impact of Mobile Phones in the Developing World", 2005, Vodafone. http://www.vodafone.com/start/responsibility/our_social___economic/access_to_communications/sim_research/impact_of_mobile_phones.html (Retrieved 3 July 2008)

2 Hammond et. al., 2007, "The Next 4 Billion: Market Size and Business Strategy at the Base of the Pyramid." World Resources Institute & International Finance Corporation, Washington DC. http://www.wri.org/publication/the-next-4-billion (Retrieved 2 July 2008)

Centre (AC). Subscribers receive signal from the GAP using traditional GSM on commodity handsets, while the link between the GAP and the AC is via Internet Protocol (IP).

The village-level GAP is comprised of a GSM transmitter and omni antenna, providing coverage to an area of approximately 1-4km; a traditional PC with the necessary software for subscriber management and call control; and a power supply for the installation. The technology is designed to be simple to use so that an operator in a rural village can run it without a great deal of training or support being needed. With provisioning, billing and customer support handled at a village level, the operating expenses of the GSM operator are greatly reduced. The current version of the Village Connection allows only basic voice and SMS services.

Call completion is also handled by the GAP, and all the GAPs in an area would aggregate to an AC. This enables local subscriber management and reduces backhaul requirements for the network.

The Access Centre aggregates traffic from up to 200 GAPs, and handles call switching between them. It also interfaces with the main GSM network through a Mobile Switching Centre (MSC). The IP link between the GAP and the AC enables a range of technologies to be used, making the network more flexible and adaptable.

The business model works around a flat-fee subscription by the subscriber at village level. This enables free calling within the village, and reduced rate calling within the domain (the collection of all the GAPs aggregating to the same AC). Normal duration-based charges and prepaid tariffs apply when calling outside of the domain. Post paid billing is also possible.

The village operator is required to operate the GAP, and there are various potential models for this. The village operator could own and operate the local "franchise", or could alternatively be employed by the GSM operator.

The GSM network operator is still a fundamental partner in the business model. They would manage the AC, and provide interconnection with the outside world and other networks.

The Village Connection solution has been trialled in India and a few other countries, but the results are still confidential. Until these become available, there are only theoretical models to work from.

3. Business Modelling Study for the Dwesa Village Connection

To ensure the long-term sustainability of the planned Village Connection trial within Dwesa, COFISA with the project partners decided to implement a short community-centric business modelling study before the planned installation and roll-out of the technology components.

This study proposed to work with project stakeholders to investigate the feasibility of this business model in the context of the Dwesa Living Lab field trial, identify challenges and suggest alternative strategies where necessary.

The objectives of this study were set to:

- map out stakeholder strategic objectives and requirements for the project.

- investigate the technical, socio-economic, logistical and regulatory environment of the project to identify requirements and potential constraints in which a business model needs to operate.
- investigate the capital, operating and skills requirements, operating costs and local income potential for a village operator, and the financing arrangements necessary to make it work.
- identify possible local entrepreneurs or operators who meet the skills requirements and could run the Village Connection in the trial villages[1], as well as the capacity building and support necessary for successful operation.
- develop a business model and governance structure for the Village Connection, in consultation with the local community, that works within the constraints of the environment and maximises benefits for all stakeholders.

Additional requirements for this study were to:

- converge the interests of the various partners in the project in developing the entrepreneurial and business models, and
- give a special focus on open utilisation of the network for the ongoing or planned Living Lab service/application projects by the Universities and their partners, which the model has to allow.

This report is the deliverable of the project. It includes an environmental analysis, stakeholder analysis, business model and governance structure, and recommendations for the project, including preliminary thoughts on scalability.

4. Ungana-Afrika - Implementing Organisation

Ungana-Afrika, registered as a non-profit organisation under the Department of Social Development in South Africa, has been active in the ICT for Development sector since 2002. The main focus of Ungana-Afrika is to empower under-served communities by deploying innovative technologies, business models and services that promote equality and sustainability. Ungana-Afrika has been involved with a great number of development and technology projects, with clients and partners from several sectors, within the African continent and abroad. A number of these projects have included direct work with rural communities and community partners. This experience has given Ungana-Afrika the necessary background to implement this study as well as the understanding of the complex environment that the Public-Private Partnership of the Dwesa trial entails.

5. Methodologies

Several research methodologies were used in undertaking this study. These include the following.

1 There were initially intended to be three trial villages: Nqabara, Mpume and Ngwane, but hurdles were encountered because of the need to undergo a lengthy Environmental Impact Assessment (EIA) at each site. This was circumvented by deciding to co-locate the equipment at the current site of the Vodacom tower at Mpume, which has already undergone the EIA process. This then became the focus village of the study.

5.1. Desktop research

A literature survey was conducted for most of the report sections. Online references, documents contributed by project stakeholders (especially by NSN, and both of the universities of Rhodes and Fort Hare) and publicly available information was used in order to gain an extensive understanding of the Village Connection concept, Dwesa trial project, other previous and existing research activities within the Dwesa community, and potential external factors affecting the implementation of the Village Connection in the pilot area.

Substantial use was made of the baseline study conducted by the universities of Rhodes and Fort Hare, which assessed various socio-economic and ICT indicators in Mpume village through household surveys.

5.2. Stakeholder engagement

During the project, the Ungana-Afrika team met with all project stakeholders. In addition, further technical and operational requirements were discussed with particular parties during telephonic, email, and additional face-to-face interviews.

The stakeholder engagement aimed at finding out the strategic objectives and requirements for the trial from each stakeholder, and probed several issues, including:

- what tangible or intangible value the Dwesa Trial adds to the work of the stakeholder (i.e. financial incentives, increased capacity, meeting targets for social responsibility programs, etc..)
- what roles and responsibilities each partner is going to carry during and after the trial
- level of each partner's commitment during and after the planned trial period of two years
- what type of a relationship the partner wants to develop with the village operator and how this is planned to be formalised
- what is the level of costs that each partner is willing to absorb during and after the trial
- what are the expectations that initial or operational investment would be covered eventually
- how the identified technical or regulatory issues are planned to be resolved

5.3. Community engagement and observation

Two separate community visits were made to Dwesa. The purpose of the first visit was not only to understand the operational, socio-economic, and cultural contexts, but also introduce the concept to different community contacts and to establish mutual respect and trust. The visit provided the necessary background to understand how the villages relate to each other, what facilities and services are available, how the university technology projects work as well as valuable answers to some initial questions about the community itself.

Feedback related to potential financial and capacity barriers, risk tolerance, and options for coordination and governance models were also gathered. The activities during this trip involved mostly observation and selected individual interviews, which started with community leaders and small business owners, in order to identify issues around governance and the operational elements.

Interviews were conducted with selected community members who were identified to have the potential capacity and entrepreneurial drive to operate the Village Connection and additional services. A few members of the public were consulted about their service needs and interest in subscribing to the local Village Connection network, to give an indication of the feasibility and perceived value of the proposed business model. Mr Mitchell Kavhai from the Fort Hare University joined the project team during the visit, and his assistance was valuable to identify the appropriate people to participate and help to communicate with some of the community members.

Initially, the second visit was going to have an emphasis on the governance aspects. However, because of the overall uncertainty of the project future after Vodacom withdrew from the project, it was decided to reduce the emphasis on governance aspects. Additional discussions about the governance would have created more expectations within the community and these should only take place once more concrete promises can be made.

The focus of the second visit was modified to concentrate on verifying report content (such as customer assumptions, and local expense levels) and additional fact-finding for the business model and operational issues. The community visit consisted of a few different focus group discussions and individual interviews. The basic IT skills of two potential village operators were also briefly tested. Ms. Pinky Mcinga was very helpful in facilitating the local arrangements in Mpume.

Interviews were also conducted in Idutywa with a local LED (Local Economic Development) office manager and a number of service providers whose skills would be essential to achieve an efficient administration of a formal community organisation (including legal, banking, accounting, and IT support services).

5.4. Business customer engagement

Owners and managers of furniture, grocery, wholesale and retail shops in Idutywa and Willowvale were interviewed to gain better understanding how they advertise their services in the rural areas. These discussions provided information on the potential for using a community knowledge portal as an alternative advertising channel.

Chapter 2. Stakeholder Analysis

The Dwesa Village Connection project is a Public-Private Partnership (PPP) between a number of different stakeholders ranging from academia to private industry to government, with an interest in rural development and innovation. This relationship brings together complementary skills and resources from the various partners and applies them locally to meet the needs of rural communities – in particular, the Dwesa community. This project offers the partners the opportunity to develop and test their own ideas for rural development and accessing rural markets, which can then be applied more broadly. The partnership is possible because of their shared objectives, but as with any partnership, there can be challenges where there are divergent agendas.

One of the objectives of this study was to understand the roles, interests and expectations of the partners, and identify possible challenges to the partnership. Each partner is assessed individually below, with some concluding findings.

1. COFISA

Cooperation Framework on Innovation Systems between Finland and South Africa (COFISA) has the objective of promoting economic growth and poverty alleviation by enhancing the effectiveness of the South African National System of Innovation. One of the program components has a theme to pilot innovation mechanisms in rural areas, and the Dwesa Village Connection trial project is linked to a rural Living Lab[1] program in the Eastern Cape that COFISA is assisting to develop.

Thus far, COFISA has had the overall responsibility for the project, and has had a coordinating role in the correspondence between the stakeholders. Due to its close links to many Finnish organisations, COFISA has also been able to introduce valuable expertise to the trial. In addition, COFISA has been funding the activities of various stakeholders, and has implemented research projects providing important information that is useful for not only Dwesa-related activities, but for rural innovation activities in general.

COFISA's expectations for the project are related to the long term sustainability of the initiative, under an operating model that allows other future Living Lab activities to potentially be added to the service or product set, or at least be allowed to leverage the Village Connection network.

The value of the trial is linked to the mandate of COFISA, since a sustainable rural technology-based initiative would contribute towards economic growth and poverty alleviation, and would be seen as a successful example encouraging similar initiatives to be developed in the future. The project is also seen to increase the quality of life of the Dwesa community, enhancing the access to communication technology and knowledge as well as increasing collaboration in ICT-based rural development in the Eastern Cape, both mentioned as the targeted outcomes of the rural component of COFISA.

When the project was started, the trial was supposed to be implemented within the program timeline for COFISA, initially planned to end at the end of 2008. Although the COFISA program has been extended it is not clear what resources and capacity COFISA is able to commit to the trial, to ensure a smooth project implementation.

1 Living Labs are innovation environments where users of the services and products are involved during the early phases of the innovation process. More information about Living Labs can be found at http://en.wikipedia.org/wiki/Living_lab

2. Meraka Institute

The Meraka Institute, Africa's advanced institute for information and communication technology, located at the Council for Scientific and Industrial Research in South Africa (CSIR), addresses critical ICT areas including innovative solutions that are helping to solve development challenges. Meraka has been involved with a number of wireless initiatives as a part of their Wireless Africa program, and the staff has a great deal of expertise with issues related to both technology and rural communities.

As with COFISA, Meraka's value for the project is gained through achieving results that are aligned with the mandate of the organisation. The trial activities are linked to a bigger program that Meraka is involved with called The Collaboration@Rural (a Collaborative Platform for Working and Living in Rural Areas). Rural living labs are an important part of the The Collaboration@Rural program. In addition, Meraka has interests in linking the trial site into some of the other projects, such as the MobiLed, which is a mobile learning platform.

Meraka's planned role for the Dwesa Village Connection trial is to look after the technical implementation of the local site with several related activities, from additional research and development, monitoring, to providing training and support. With links to government and academic institutions, Meraka has been creating necessary links with relevant partners.

There have been attempts to set-up a test environment of the Village Connection within Meraka, to allow project stakeholders to simulate the service in a controlled setting, but due to delays and some technology issues, the environment is not functional.

The future involvement of Meraka is a question mark. We assume that due to the project issues combined with the heavy workload from other projects, the Village Connection trial is currently not one of the highest priority projects for the Meraka team. This is, we believe, the reason why we were not given feedback from Meraka to our questions related to project expectations and future project involvement.

However, if these challenges can be overcome, then they would be the most appropriate partner to take over the coordination role that COFISA plays.

3. GSM Operator

For the Village Connection to access GSM frequencies and link to the South African GSM network, the project requires that one of the GSM operators is interested in getting involved.

Vodacom, the biggest national GSM operator in South Africa was approached, and the company was interested in assisting with the Dwesa trial, with the main interest in analysing the Village Connection concept and how it could be used to reach some of the remote areas in South Africa at a reasonably low cost.

Because Vodacom already had an existing network within the Dwesa area, it became clear that the trial was not an ideal test case for the scalability of the Village Connection, outside of the technical components of the concept. Because of the technical issues, and that the Dwesa trial offered limited commercial potential for Vodacom (the required investment to set-up the Village Connection sites is much higher than Vodacom initially expected, so even in a more favourable area, the return on investment period would be very long), the company withdrew from the trial during the course of this project study.

If the Dwesa trial is not seen as a social responsibility project, or an opportunity to test the technology, the only value for a GSM operator comes from the scalability potential that the Village Connection concept can offer. The most ideal business scenario for the operator is to expand into an area without any existing GSM network coverage, where the customer uptake would be the easiest. However, since the major GSM operators have already reached the majority of the South African population (Vodacom for example has claimed that it's network covers more than 98% of the population), it is more likely that the participating operator will need to develop a business case in a highly competitive environment (the baseline study results indicate that in Mpume the community is mostly using MTN and Vodacom, with only one Cell-C customer during mid-2008).

It should be understood that although during the trial the GSM operator's most important role is to provide access to the GSM connectivity including frequencies and the national network, in a longer term (to reach a sustainable Village Connection initiative), the GSM operator will need to carry several other responsibilities from equipment support and maintenance to marketing assistance. For the local village entrepreneur, the GSM operator is the most important stakeholder, who eventually is the owner of the GSM equipment. The GSM operator does need to commit to the site, by signing a service level agreement.

When analysing what went wrong with Vodacom, it seems that due the conceptual stage of the trial, Vodacom had not defined models or processes for the relationship between the company and the Village Connection entrepreneurs. Even for the Dwesa area, the roles and responsibilities between the parties were unclear. Therefore, our suggestion is that when negotiating with potential new GSM operator to join the trial, it should be emphasised that the operator would first need to analyse the project and the scalability potential from not only financial but also from the operational perspective.

4. Nokia Siemens Networks

The vision of Nokia Siemens Networks (NSN) is that by 2015 five billion people are connected. Based on the marketing materials, NSN estimates that 80% of new users will come from emerging markets, including the African continent. The Village Connection solution is one of NSN's service offerings for these growing markets, where income levels of end users are very low compared to the developed world. NSN interests with the success of the Village Connection are eventually linked with the financial growth prospects of the solution.

The NSN strategy for the Village Connection is to focus on areas where there is no coverage. Although other countries within the Southern African region have a less developed GSM network, NSN has well established operations around South Africa, making the country a good place to test and further develop the Village Connection solution. The Dwesa area however, is not seen as an ideal test case, mostly because of the existing competition from major national GSM operators, and the value for NSN would be mostly research related. In addition, if successful, the Dwesa Village Connection implementation would be used as a reference for other NSN focus countries in Africa. An existing Village Connection pilot site in Tanzania for example is not based on an entrepreneurship model.

NSN is a key partner in terms of finding a GSM operator to join the Dwesa trial. Even though most of the South African population is already covered by at least one of the main mobile networks, the Village Connection might be considered by an operator that

has not build it's own infrastructure within Dwesa and the surrounding areas. According to NSN, even if the operator's business case is not as clear in South Africa compared to countries such as India (with very high population density), an additional reason for a GSM operator to join the trial are to be better aligned with universal service obligations as well as to potentially gain a higher BEE (Black Economic Empowerment) rating through enterprise development and support activities, that the Village Connection would help to achieve.

Village Connection equipment will be provided on loan during the Dwesa trial period, but NSN does not see a direct role in the community and between itself and the village operator. The plan is to train other project partners (such as the GSM operator, Meraka and potentially the university staff) and to assist them to set-up the trial environment. NSN has also been helping to set-up a test environment within Meraka, but a working set-up is still to be established.

NSN stresses the importance of entrepreneur skills above the technical skills, since a basic PC literacy should be enough to operate the system. The capacity to learn how to implement first level maintenance tasks is also a requirement. Other important considerations that are important to NSN are that the regulatory processes (such as the Environmental Impact Assessment that is described in Chapter 3) and operator policies should be respected. They have no specific requirements for the governance model for the Dwesa set-up, and since the GSM operator will be responsible for a potential scaling-up of the solution, NSN believes that the GSM operator will set the requirements for the area.

5. Universities

Rhodes University in Grahamstown and Fort Hare University in Alice have been working for a number of years with the Dwesa community through their Telkom Centre of Excellence located in the Computer Science departments of both universities. This joint project has focused on the potential of e-commerce in Dwesa, local ICT training and innovative ways of making information and media available to rural communities through ICT. The projects that they have in Dwesa benefit not only from the strong partnership between the two universities and positive relationships among the students and staff, but also from the involvement of faculties other than computer science – notably the anthropology department. This multi-disciplinary approach is a great advantage in their efforts to introduce ICT in a remote rural context.

The universities have invested significant time and resources into their relationship with the people of Dwesa, particularly through the computer centres that have been established in several schools in the area. They have also committed to a long-term relationship with the community and frequent trips are made to Dwesa for maintenance, training, research or implementation purposes. This commitment has ensured that they are held in high regard by the Dwesa community and they have established trust, which is necessary for any community projects to be successful.

Because of this trust relationship, the universities are the vital connection between the other stakeholders and the community. Their frequent visits to Dwesa also make them ideal partners for monitoring implementation and operation of the Village Connection, as well as possible ad-hoc technical troubleshooting. They also have several students who will be doing research based on the implementation of the Village Connection, which will provide valuable insight into its impact and effectiveness.

It should be noted that the Village Connection is only one of a number of projects that the universities are implementing in Dwesa, although it could act as a valuable platform for other services that they may develop. This is the basis for their interest in the Village Connection – it complements their other efforts in the community, and is a logical extension of the projects they have undertaken thus far. Sustainable operation is seen as an extremely important objective, but their position is that it would still be worth pursuing implementation even if immediate sustainability is not apparent. Once the Village Connection has been established, the service set can be developed further in the context of the community so that sustainability can be found at a later stage.

The universities' commitment to the project is clear, should it go ahead. There are also students who are planning on doing degree-related research on the implementation, which is an additional motivating factor. Their role in local coordination of the Village Connection is vital, particularly in the governance of the project. However, the Village Connection needs to be seen in the context of their overall involvement with the community. It is a component of their project, not the totality of it. A partner such as Meraka is thus in a better position to coordinate the project in the absence of COFISA. They are better placed to be able to consider the broader potential of the technology in South Africa.

6. Dwesa Community

The Dwesa community is a key stakeholder in the project, and their role should not be underestimated. They will ultimately be the determining factor in whether the Village Connection is successful or not. They can also provide valuable insights into appropriate implementation strategies and viable services. Community engagement should be an aspect of every decision making process that affects implementation. Their role is investigated more deeply in Chapter 3.

7. Stakeholder Findings

Our major concerns are that the key project stakeholders (including NSN, and the GSM operator) would need to invest in more time and resources into the trial than what they are likely to gain, unless the scalability of the Village Connection in the region is viable. The Vodacom withdrawal was a result of the risk, and a larger scale financial feasibility will eventually be the most important factor to gain the commitment of all the stakeholders involved. The role of the operator is vital when determining the larger scale business case, but the opportunity in the Dwesa area and surrounding region for the operator is vague at best at this point.

It is also clear that the project currently suffers from a lack of formalised commitments. The partners have made verbal agreements, but with the uncertainty surrounding the overall project strategy, the specifics and extent of the partners' responsibilities are not clear. This can create an atmosphere of uncertainty, with one partner assuming that a part of the implementation would be the responsibility of another partner, while the other partner assumes that it's the responsibility of the first.

While verbal agreements are acceptable at this stage, they will need to be formalised and clearly stated once implementation is more certain so that there will be no uncertainty, and commitments are clear.

Chapter 3. Site Analysis: Dwesa

1. Community

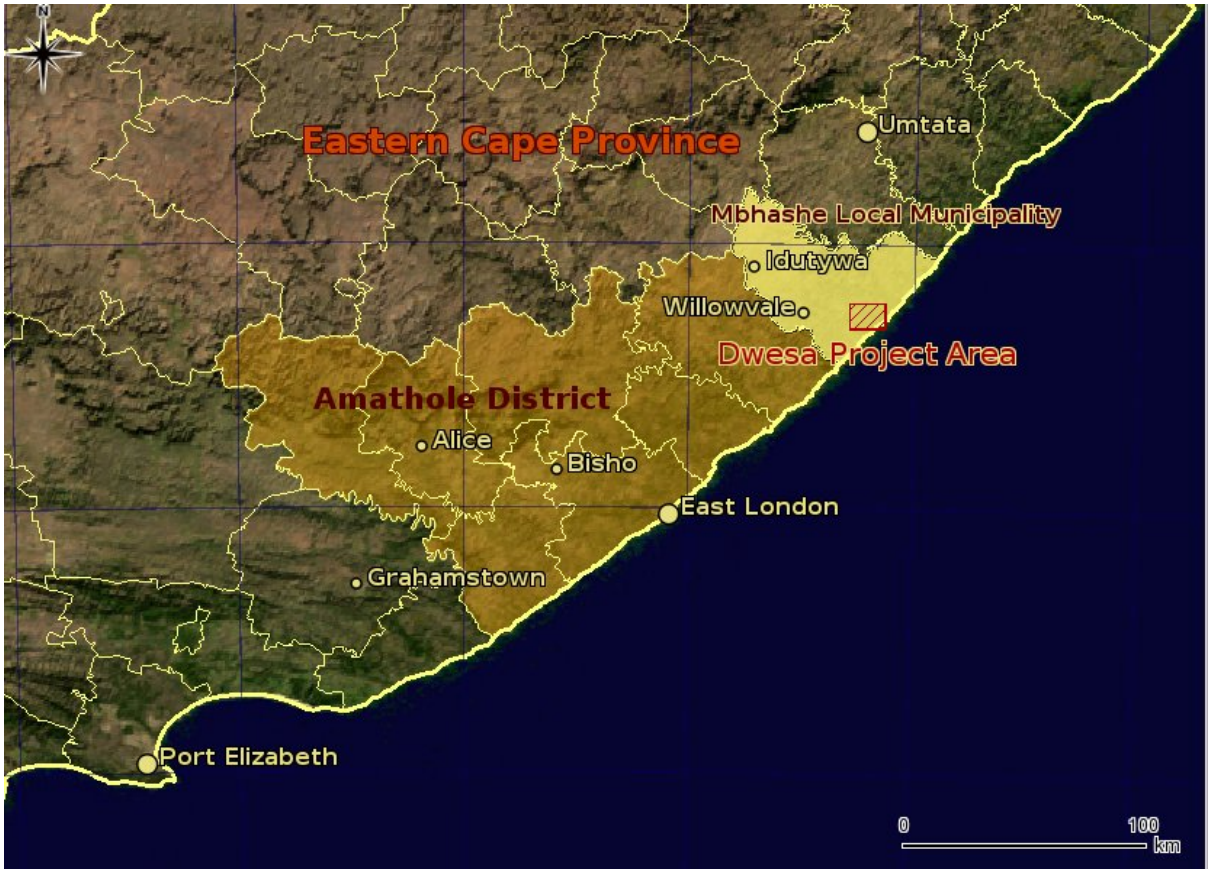


Illustration 1: Location of Dwesa Project Area

1.1. Introduction

The focus of the business modelling process was on Mpume, and several surrounding villages (notably Mtokwane, Ngwane and Ntobeni). These villages are part of the Dwesa / Cwebe region, located in the former homeland of Transkei, in the Eastern Cape Province. The region is composed of two areas, Dwesa and Cwebe, which are separated by the Mbhashe river. This study considered only the southern section, Dwesa, and its location is shown in Illustration 1. Access to the Dwesa villages is via Willowvale, which is the nearest town with a post office, magistrates court, police station and other such services. Willowvale is approximately 40km away along dirt roads, and it takes about an hour to drive there.

The site analysis included here considers various environmental factors that would influence the viability of a Village Connection in the area.

1.2. Socio-economic and cultural context

Dwesa falls within the Amathole District, and is administered by the Mbhashe Local Municipality. The landscape is made up predominantly of hilly grassland with some patches of coastal forest in the valleys. The area receives good rainfall and the rich soils are conducive to intensive agriculture (Pade 2007), but mostly the land is used on a subsistence basis.

The study area is entirely rural, and suffers from very poor development. The Human Development Index[1] (HDI) for Mbhashe Local Municipality is 0.41 (McCann 2006), which is well below the national average of 0.61 (UNDP 2007). Within the Amathole District, Mbhashe also has the lowest functional literacy[2] at 44.24 % (McCann 2006), compared with 68.5 % nationally (Stats SA 2006).

There is an entrenched culture of migrant labour, with a large proportion of the working age population moving to urban areas in search of work(Mijere 1997). The result is that only 47% of the population is of a working age (according to the baseline study), which creates a very high dependency ratio[3]. This is further exacerbated by 78% unemployment (McCann 2006). Most households are thus dependent on subsistence agriculture, government grants and remittances for survival. Approximately 49% of households in Mbhashe survive on less than R1000 a month (McCann 2006).

The Dwesa Nature Reserve is a very important resource in the area, and the ownership of the reserve has been restored to the community (represented by the Dwesa-Cwebe Land Trust), together with a substantial restoration package of approximately R14 million. In addition to this, each household received a R16,000 grant, which the community decided to pool together for investing in tourism infrastructure (an amount of about R9 million) (Palmer et al. 2002). During this study, several community members raised concerns about the management of the trust, and it is not immediately clear how it is materially benefiting the people of Dwesa.

Another factor influencing development in Dwesa is the Wild Coast Spatial Development Initiative (SDI), which aims to generate sustainable economic growth and development in the Wild Coast through a number of strategic interventions focusing mostly on the agriculture and tourism potential of the area. The SDI has suffered a number of setbacks, and implementation has been slow as a result. It is unclear what the status of the SDI is at the moment. The SDI has served to highlight the area as a development priority at a national level, and the communities have definitely benefited from a number of development projects, but not perhaps as much as they had been led to expect.

There is general dissatisfaction with the pace of development (communicated by several community members), and a perception that they are passive receivers in the process. This could be as a result of the high expectations set by the SDI and other such large-scale initiatives, as well as political promises over the years.

1 The Human Development Index (HDI) is an index combining normalized measures of life expectancy, literacy, educational attainment, and GDP per capita (Wikipedia)
2 A person is functionally literate who can engage in all those activities in which literacy is required for effective function of his or her group and community and also for enabling him or her to continue to use reading, writing and calculation for his or her own and the community's development. (UNESCO)
3 The ratio between the economically productive (aged 0-15) and dependent parts of the community (aged less than 15 and greater than 65).

The Dwesa Nature Reserve and schools are among the more significant and reliable sources of employment in the area. Development and poverty-alleviation projects also provide some employment although usually on a short-term basis. There is evidence of a few projects aimed at creating employment and stimulating local economic production. Examples include the Nqabara crafts centre (leveraging the tourism potential of the area) and a poultry production facility (an agricultural project). The success of these projects is questionable thus far. The crafts centre has a strong governance structure with a number of external advisors and community buy-in, but it is not yet profitable after a number of years of operation. The poultry facility failed, and the premises are now being used by local women as a bakery.

The dependence on external development projects for employment, and the knowledge that they usually come with some form of start-up investment, means that any externally initiated project is seen as a positive opportunity, whether it is viable or not. This makes it difficult to get objective feedback on the potential challenges and appropriateness of such projects.

There is very little evidence of entrepreneurial activity in the area, with one or two spaza shops[1] per village being the most visible form of economic activity. A few more villagers operate small-scale businesses from their homes, usually selling airtime or food products such as meat and amagwinya (fried balls of dough). There are also one or two people selling building materials and renting out tractors for ploughing.

Crime is apparently also an unfortunate aspect of life in Dwesa. It was alluded to on a number of occasions during this study, and was a prominent aspect of respondents' perceptions about the community in the baseline study.

Community development projects in Dwesa clearly align well with national development agendas. This can make implementation much easier, and enable access to local, provincial and national development budgets. However, the socio-economic conditions in Dwesa are daunting and it will be a struggle for any initiative to be sustainable in the long run. The high number of failed initiatives should serve as a warning not to underestimate the challenges.

1.3. Leadership

Leadership in Dwesa is through the village headmen. Most issues affecting the community are referred to them, and very often they will arrange community meetings in order to make decisions. Not much can be done in these communities without first getting the go-ahead of the headman. There is a hierarchy among villages, with some headmen having authority over several surrounding sub-headmen. These headmen and sub-headmen will meet periodically.

There are also ward councillors and ward committees whose role is more administrative. They are politically appointed and it is their responsibility to ensure that there is adequate provision of essential services. According to McCann (2006), Mbhashe Local Municipality has a total of 47 ward councillors, but it is unclear how many of these are to be found in Dwesa.

School headmasters and teachers also command some respect in the community, and in the absence of community halls, school buildings are often used for meetings. Within Dwesa alone there are seven churches, which are also important leadership structures.

1 Small, informal shops selling basic commodities

1.4. Technology setup and support

Currently the Telkom Centre of Excellence staff and students from Fort Hare and Rhodes University are the primary source of technology support in the Dwesa villages. They have already established computer centres at several schools in the area, and make periodic visits for training, maintenance and research purposes. The skills that they bring to the community are vital, and will continue to be an important stimulus of ICT uptake in the area, especially through their Living Labs programmes.

However, the ad-hoc support they can provide may not be sufficient if community members are paying for mobile services. It will be unacceptable for service to be unavailable for periods of a week or longer. The solution to this challenge is twofold: first, it will be necessary to have paid support options that can be called on at short notice. Second, the technology implementation should be as robust as possible to ensure that support is required only infrequently.

As the teachers (or students) from the schools with computer labs in Dwesa become more skilled, they can become a useful source of local support for basic problems. For more complicated support requirements, support will need to be sourced from further away. Most of the businesses in Willowvale and Idutywa use support from East London. This option is likely to be prohibitively expensive for a small business in Dwesa. Some investigation revealed that there are individuals operating informally in Idutywa and Willowvale who might have the necessary skills to support the Village Connection installation. An employee at a stationery store and internet café, for example, has been involved in school networking implementations in the area, and would probably be able to support a basic installation.

The technology specified by NSN for the Village Connection is very simple, and the support requirements should be minimal[1]. Ideally, the village operator should have direct access to the Village Connection PC. This would enable the operator to restart the machine, which can solve many software glitches.

The more the implementation deviates from this model, the more necessary and expensive technology support is likely to be. In the setup proposed by Vodacom, the operator would not have direct access to the machine (which would be co-located with the Vodacom tower), and there would need to be a virtual link to the operator's location. Each component that is added to the basic setup introduces an additional potential point of failure and increases the support requirement. Furthermore, if unusual technologies are employed (such as wireless links, or even remote desktops), then it becomes harder to find local support providers who are familiar with the technology.

If the Village Connection is implemented on a larger scale, then it becomes more feasible to build in support for the village operators.

A further crucial consideration for the Village Connection is the extent of coverage that can be obtained with a standard installation. If the range is too small (and only covers one village), then it will be very difficult to obtain enough subscribers to be sustainable. This question is discussed further in section 2.1 below.

1 It should be noted that it was not possible to evaluate a working installation during this study, and analysis of the Village Connection installation is thus necessarily theoretical.

1.5. Professional services

For the Village Connection to operate formally, the local operator will need professional assistance in order to fulfil the statutory requirements. Legal support will be necessary for establishing a formal entity. Financial administrative support will be necessary in order to fulfil the accounting, payroll and tax reporting requirements. An annual audit is also a likely requirement.

These services are definitely not available in Dwesa. Willowvale has a magistrates court, and it might be possible to find the necessary legal support there (and definitely in Idutywa). There is at least one accountant in Idutywa, who should also be able to manage tax submissions and some audit preparations. A recognised auditing company from one of the cities will probably be needed to conduct the audit, however. Payroll support does not need to be local, and it should be possible to find a payroll administrator for a reasonable cost.

The nearest banking services are available from the Post Office in Willowvale. However, it may be preferable to do banking in Idutywa, which has outlets for the four major South African banks, plus a few others who focus on servicing the Eastern Cape.

1.6. Logistics and infrastructure

Electricity is available in Dwesa, but there are only a few localities that have been able to pay the R3,000 initial connection fee. The schools, shops, and a few private dwellings have electricity. The service is mostly reliable, but there are occasionally outages of a few days.

Transport is more of a challenge. The road to Willowvale is unsurfaced, as are most of the roads in Mbhashe (which has only 0.37% road surfacing (McCann 2006) – the lowest in the province). Very few people have their own cars. Public transport is therefore a major factor in the lives of the people of Dwesa, and everyone knows the going rate for transport to Willowvale (R25) and Idutywa (R30).Transport routes generally follow a tree structure, with the branches extending to the outer villages, and the trunk rooted in Willowvale and Idutywa. For this reason, finding transport between villages that are on separate branches of the route can be difficult and expensive. Most people will walk within the village, and to surrounding villages, although the distances can be quite large and the terrain includes steep hills and river crossings.

There are very few landline telephones available. Mpume used to have a public telephone, but that had been removed by the time this study was conducted. Mobile phones are ubiquitous, however, and young people especially carry phones very visibly, and use them fairly frequently. During focus group discussions, several participants got up to answer calls. MTN and Vodacom are the most popular providers. According to the baseline study, 58% of respondents use MTN and 40% use Vodacom. Only one household reported using Cell-C. There is an average of 0.78 mobile phones per household in Mpume, and 60% of households have at least one mobile phone.

The baseline study suggests that Mpume mobile phone users typically don't use their phones for calling within the village. This was supported by the focus group participants, with the cost of calls being the primary deterrent.

Considering the high prevalence of crime reported during the baseline study, security measures should be put in place for any Village Connection installation, and insurance should also be considered. There is a high demand for solar panels in Dwesa, and they would be at a particularly high risk of theft if used in the installation.

1.7. Regulatory environment

There are two regulatory factors which affect the Village Connection implementation in Dwesa. The first is the requirement to conduct an Environmental Impact Assessment (EIA) prior to implementation of certain activities. The relevant regulation is given in Government Notices 385, 386 and 387 of 2006. According to the *National Environmental Management Act: Regulations: Submission, processing, consideration and decision of applications for environmental authorisation of activities* (Notice 385), activities listed in Notice 386 are subject to a basic environmental impact assessment. In this listing, activity 14 would seem to apply:

> The construction of masts of any height, including those used for telecommunication broadcasting and radio transmission, but excluding-
>
> (a) masts of 15 metres and lower exclusively used
>
> (i) by radio amateurs; or
>
> (ii) for lighting purposes
>
> (b) flag poles; and
>
> (c) lightning conductor poles.

There may be some debate about whether an EIA is required for erecting a radio antenna attached to a house, and the difference between a mast and an antenna ("mast" is not specifically defined in the document). Furthermore, there is a process for requesting exemption from the EIA requirement.

Ungana-Afrika does not have the legal background necessary to comment on the applicability of the legislation, but this study would recommend seeking legal advice about whether an EIA would be necessary (NSN seems to think it is not necessary for an antenna below a certain height attached to a house). If it is required, the process could add significantly to the implementation costs. The financial and time implications would likely be prohibitive for implementing the Village Connection at scale. An exemption should therefore be sought.

The other regulatory hurdle faced by the project is imposed by the use of Global Systems for Mobile communication (GSM) equipment which is regulated in terms of the Electronic Communications Act (ECA) and through the protection of the Intellectual Property Rights (IPR) of the GSM Association (GSMA). The implications have not been fully explored, but they essentially make it very difficult, if not impossible, to implement the Village Connection without a licensed GSM operator. This could preclude the use of alternative, potentially more affordable technologies. It also makes it harder to partner with a smaller company which is willing to be more flexible and adaptable to the rural, under-developed conditions in which the Village Connection needs to operate. Requiring that one of the established operators sub-licenses their rights to such a company could create a situation where there is not enough value in the business model to sustain the venture.

2. Market

One of the important questions affecting the viability of the Village Connection is the size of the market in the Dwesa area. This is affected by several factors, including the extent of coverage afforded by the Village Connection GSM Access Point (GAP); the location and

population of the villages in the area; the number of mobile phone owners; the effect of existing competition; consumer perceptions of the services offered; and income levels of the community. These factors are discussed in the following sections.

2.1. Market size

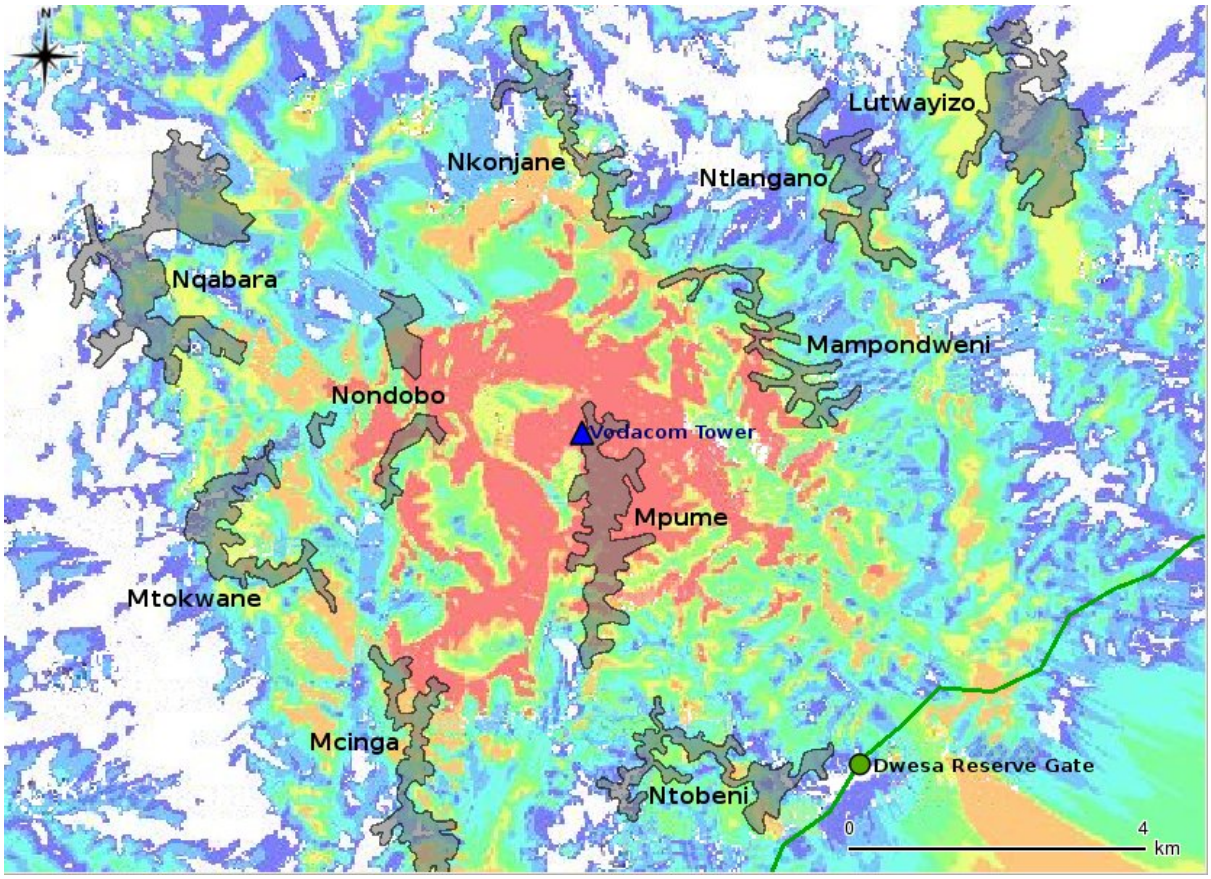


Illustration 2: Location and projected coverage of Dwesa villages

Illustration 2 gives an indication of the projected coverage of the Village Connection with the antenna located at the site of the current Vodacom tower, and with a height of approximately 9m. In the base coverage map (provided by Vodacom), red areas indicate good coverage, decreasing through orange, green and blue, to white areas where there is no coverage. On top of the coverage map, the locations of the surrounding villages have been mapped by pinpointing all the households in the villages with Google Earth, and creating an outline from these points.

A household generally consists of a group of loosely associated huts, and the arrangement of huts with each other, with fields and with visible fencing was used to estimate what constitutes a household. For each village, the estimated number of households based on these aerial counts was then used in further estimations of the market size, as discussed later.

With reference to Illustration 2, the projected coverage is clearly a best-case scenario. However, it represented the most likely implementation until Vodacom's withdrawal from the project and has been used for market size estimations in this study. This has led to at least one major assumption which may not be valid: that a single Village Connection

GAP can provide coverage to more than one village. This should be checked against further proposed implementations as it might be a requirement for a sustainable business model, given the low population density in the area. The alternative would be to have multiple GAPs administered by a single operator, but the technical feasibility of this approach is unknown.

Using the given scenario, however, there are ten villages that will receive at least some signal from the Village Connection. The next question then is how many people (and potential customers) there are in each village. This was estimated in two ways, and verified by a third.

The data from the baseline study was used as a starting point for estimating the size of the market in Mpume. The baseline study gave a count of 80 households. This was then compared with the aerial count, which estimated 199 households. Because of the lack of certainty about which numbers were more accurate, the baseline study estimate was used as a lower estimate, and the aerial count was used as an upper estimate.

Because the aerial counts were the only consistent data available for all villages, these numbers were used together with the baseline data to estimate the size of the market in each village. The aerial count was again used as an upper estimate, and the ratio of over-counting evident in Mpume (from comparing the aerial household count to the baseline study count for the village – a ratio of approximately 1:2.5), was used to derive a lower estimate of the number of households for each of the other villages. It was assumed that the household averages derived from the baseline study were correct, and that it was only the household count that was in question. It was further assumed that there were no material differences between the villages, and that the averages from Mpume were generally applicable to all villages.

Population data from Statistics South Africa was difficult to match to the village names used in this study, however, household counts from the 2001 survey could be matched for three of the villages. They fall within the lower and upper estimates used here (with the exception of Lutwayizo, which has a very different spatial arrangement of households when viewed from the air, when compared with other villages, making comparison difficult for this village). Table 1 shows the lower and upper household estimates used in this study, together with the census counts where they are available.

	Households		
	2001 census	Lower	Upper
Mpume		80	199
Nondobo		31	78
Nqabara		150	374
Mtokwane		95	237
Mcinga		55	137
Nkonjane		62	154
Mampondweni		41	103
Ntobeni	95	54	134
Ntlangano	55	39	98
Lutwayizo	130	135	337
Total:		742	1851

Table 1: Household estimates for Dwesa villages

With lower and upper estimates of the number of households in each village, the data from the baseline study could then be applied to get an idea of the market. From the baseline study, there are an average of 0.78 mobile phones per household. Assuming that each mobile phone is already a potential customer, we can get an idea of the current market for mobile services in Dwesa. This is given in Table 2.

	Mobile Phones	
	Lower	Upper
Mpume	62	154
Nondobo	24	60
Nqabara	117	290
Mtokwane	74	184
Mcinga	43	106
Nkonjane	48	119
Mampondweni	32	80
Ntobeni	42	104
Ntlangano	31	76
Lutwayizo	105	261
Total:	578	1434

Table 2: Estimated number of mobile phones in Dwesa villages

Numbers used in the business model (see Chapter 5) suggest that a sustainable, formal operation will require approximately 240 monthly subscribers in order to break even. Even if the upper estimate of mobile phones is taken as correct, it will be difficult to achieve this. Nqabara is the only village which could have enough mobile phones in total. Even so, with existing competition from other mobile providers, it is unlikely that it would be possible to attract that many subscribers.

This would suggest that it will be necessary to attract subscribers from other villages as well (to attract enough subscribers in a reasonable amount of time), and this would require that the signal is strong enough to provide adequate reception at a range of more than 4km. It also suggests that perhaps Nqabara would be a better place to launch the Village Connection than Mpume, since it has a higher population estimate and larger market.

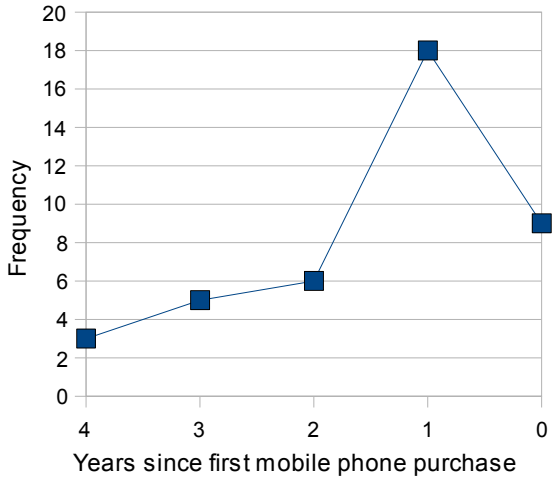


Illustration 3: Rate of mobile adoption in Mpume village

The number of mobile phones in a village provides a good indication of the current market, but as new villagers purchase mobile phones, they too become potential customers. Illustration 3 shows the rate at which villagers in Mpume are purchasing mobile phones for the first time (from the baseline study). This seems to have peaked, which indicates that the rate of growth of the customer base is slowing down, but it is increasing nevertheless. It is also not known whether the Village Connection will provide sufficient value to accelerate the rate of adoption once again.

	Population over 15	
	Lower	Upper
Mpume	168	418
Nondobo	66	164
Nqabara	316	785
Mtokwane	200	498
Mcinga	116	288
Nkonjane	130	323
Mampondweni	87	216
Ntobeni	113	281
Ntlangano	83	206
Lutwayizo	285	708
Total:	1564	3887

Table 3: Total estimated market size for Dwesa villages

Using the assumption that children younger than 15 will not be able to afford a mobile phone, we can estimate the total number of potential users. This is based on the baseline study results, which estimates that on average, 2.1 people per household are over the age of 15. This, together with the high and low household count for all the villages, was used to estimate the total potential market size in Dwesa, given in Table 3.

While these numbers are theoretically a far more promising indicator of the market size, there are many more unknowns. Key among these is affordability. The Village Connection does not bring down the cost of communication, it creates value where there was none before (since customers currently spend very little on local calling). In this sense it actually increases the cost of communication, since users will now have to spend money on local calling as well as on remote calling.

Illustration 4 (based on data from Statistics South Africa's 2005/2006 Income and Expenditure Survey) shows the breakdown of expenses of black households in the rural Eastern Cape. Approximately 3% of household spending is on communication (chiefly mobile telephony). For households with incomes less than R1000 (nearly half of households in Mbhashe according to McCann (2006)), this amounts to a current spending limit of approximately R30 per month for communication. If the monthly subscription cost for the Village Connection is R35 (see Chapter 5), this effectively requires that customers double their current communications spend without reducing costs in other areas, which will be difficult to attain, even for relatively more affluent households. It is therefore likely that only households with monthly income over R1000 will use the Village Connection – effectively half the population. Table 4 gives an estimate of the adjusted market size, based on population over 15, with monthly income more than R1000 per household.

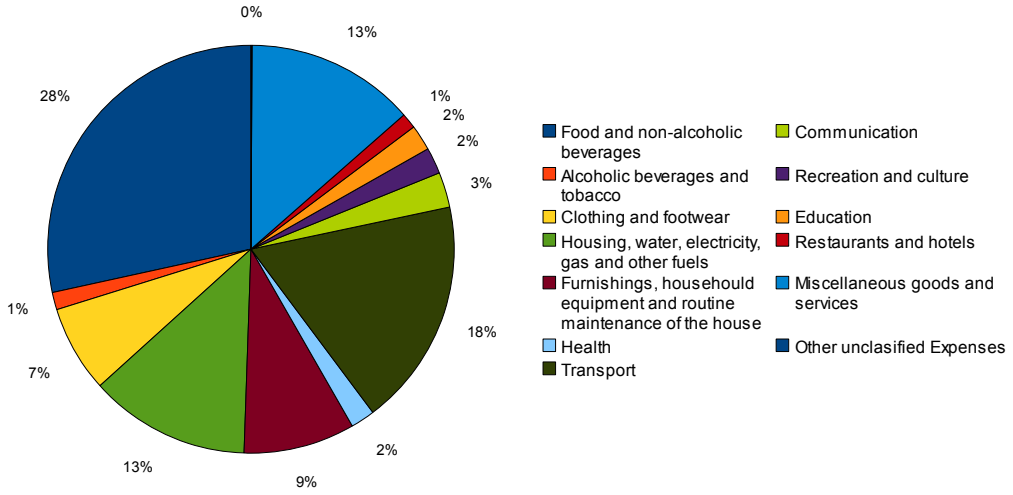


Illustration 4: Categorization of expenses of black households in the rural Eastern Cape

Unfortunately, there is still a great deal of uncertainty in these numbers. They rely heavily on data from the baseline study, which was only conducted in one village. There is also a high degree of variance between the upper and lower estimates. It would be beneficial to reduce the uncertainty through additional surveys in other villages, since the estimated market size is very close to that required for sustainable operation.

	Coverage	Market Size (adjusted)	
		Lower	Upper
Mpume	100%	168	418
Nondobo	70%	46	115
Nqabara	40%	126	314
Mtokwane	60%	120	299
Mcinga	80%	93	230
Nkonjane	70%	91	226
Mampondweni	90%	78	194
Ntobeni	50%	57	141
Ntlangano	50%	42	103
Lutwayizo	40%	114	283
Total:		935	2323

Table 5: Market size adjusted for affordability and coverage

It is also recommended that the likelihood of success is maximised by locating the village connection in such a way as to provide coverage to the largest possible market. This can be done by placing it in a village with a high population (such as Nqabara), or by elevating the antenna (and increasing transmission power) so as to provide coverage to other villages (this is the scenario used for the business model that follows in Chapter 5). It may be possible to spur market growth by sourcing second-hand phones from elsewhere and making them available in Dwesa at low costs. Using coverage estimates for each village derived from Illustration 2, a minimum market size of 935 is estimated (see Table 5). Using the more conservative estimates based on the number of mobile phones currently in Dwesa, and applying the same coverage adjustments, a minimum of 346 customers is estimated for the current market.

We would anticipate that there is a large enough market to support the Village Connection, but there are many unknowns affecting uptake of such a service in an environment like Dwesa. The only way to know for sure will be to pilot it. Analysing uptake from the first implementation will give invaluable insights into the viability of the service on a larger scale in South Africa.

2.2. Consumer interest

Even if the potential market is large enough, viability of the Village Connection depends on consumers being willing to use it. This was evaluated through informal interviews with community members, and finally through focus group discussions. Two focus groups were held in Mpume village, with the objective of exploring the following behaviours and perceptions among villagers:

- current calling patterns
- perceptions of the Village Connection concept
- affordability
- testing boundary conditions (under what conditions would they not use the service)

Illustration 5: Participants during one of the focus group discussions in Mpume school

The participants in the two groups differed in age, with the first group made up of a younger section of the population (younger than 40), and the second group made up of an older generation (older than 40). Unfortunately language was a challenge during the discussions, and much of the valuable discussion between participants could not be understood. Nevertheless, we are confident that the results are a true reflection of the perceptions of the participants. The conclusions from the focus groups are given below.

As has already been mentioned, the focus groups confirmed that people will generally only call within the same village in emergencies. If they need to speak to someone, they will walk or send a message with younger children. Sending SMSs locally is more common than calling, especially amongst the younger people, and if they have free SMSs. It seems that younger people will SMS more frequently, and older people will not

use much functionality beyond voice. People will call to maintain relationships with family members in places further away, but in general, it was mentioned that mobile phones would mostly be used when there was trouble that needed to be sorted out – in times of necessity only. This may be a negative predictor of Village Connection adoption, which is more of a luxury expenditure.

General interest in the Village Connection service was high in both groups, because it addressed a perceived need for improved local communication, at a reasonable price. There was some perception that it will reduce costs, but interest remained high when it was explained that it actually introduces a cost that is not currently experienced. It was felt that this would also reduce the need to send children as messengers, amidst general fears over crime and what might happen to the children. The fact that users could pay once and use the service as much as they wanted was seen as a great advantage.

The cost of transport to Idutywa is currently R30, and this amount was suggested to focus groups as a monthly subscription fee. Both groups felt that this was a reasonable monthly fee that they would be willing to pay, but when higher prices were explored, interest dropped quickly. A monthly subscription was also preferred to a weekly subscription, and it would be best to tie it to government grant cycles, which are a major injection of cash into the local economy. Because of the uncertainty of incomes, there was also some interest in paying for future months up-front when the money is available.

Quite some time was spent testing boundary conditions: under which circumstances would the service not be used. The younger group especially wanted to be able to keep their existing phone number. There are many potential opportunities attached to the number which could be lost if they were not reachable. The older group also felt that changing the number was not a good thing, but for them the concern was more about being available for outside family members. After some discussion amongst themselves they concluded that they would keep their current and Village Connection SIM cards, and family members would know that if they could not be reached on the one number to try the other number.

If the system only worked in Mpume and not in other places such as Idutywa, East London or Cape Town, the perceived value would decrease, but people would still use it. They would prefer not to have to change SIM cards, but would if it was necessary. It also emerged that they are very price conscious, and they would be prepared to use the Village Connection SIM card for local calling, and an alternative SIM card for outside calling if calls are cheaper using the alternative network. This is an important consideration for the GSM operator backing the Village Connection, if their revenue and commercial interest is generated from originating calls. However, since most revenue is generated from terminating calls, the impact is likely to be small – most of the time the villagers will be using the Village Connection SIM cards to benefit from the low cost local calls, and will therefore receive most terminating calls through the Village Connection.

The participants are used to some downtime, and would expect some service availability challenges with the Village Connection. However, the length of these interruptions should be minimised, and if they extend too long, consumers would want a discount on their paid subscriptions. If reliability problems persist, they may switch back to the more reliable networks.

Participants were also asked if they would be interested in listening to advertising before being able to make a call, instead of needing to pay the monthly subscription. The younger group were more negative about the idea, and were more willing to pay the subscription fee. The older group were quite receptive to the idea, and would prefer to listen to advertising rather than paying the monthly subscription.

There was also some investigation of community perceptions of Interactive Voice Response (IVR) systems, with mixed reactions. Partly this was due to difficulties in communicating the technologies involved, and how the community would experience it. Detailed analysis of the community feedback for the IVR is not included here.

Our conclusion from the focus groups and general discussions with community members is that the local calling afforded by the Village Connection is a desirable service which has value for the community. We would anticipate a reasonably high rate of uptake if the pricing can be kept low. The technical challenges introduced if the GSM operator has existing signal in the area are a concern, and if they can not be addressed before implementation, the number of subscribers is likely to be lower, but probably not significantly lower. It is impossible to predict how the existing competition from established networks will influence uptake.

3. Operations

3.1. Governance model

There are several potential governance structures that were considered for the Village Connection implementation in Dwesa. These were narrowed down to three possible implementation approaches:

1) a "franchise" owned and operated by a village operator
2) a company jointly owned by community members and external stakeholders
3) a non-profit structure jointly owned by community members and external stakeholders

Each option has its advantages and disadvantages. An independent owner/operator would be able to run the franchise very efficiently, and would be more motivated to optimise its profitability. Decision-making would be easier and any challenges could be responded to quickly. It is also uncertain whether some potential operators (such as shop owners) would be willing to operate under an external governance structure. However, an independent operator may not make decisions that are in the interests of the community. It would also be more difficult for the universities to work with an independent operator, and other partners may be less willing to donate or loan equipment or money to an independent operator. Finally, if sustainability proves challenging or implementation more time-consuming than anticipated, there would be a greater risk of abandonment from an independent operator.

A company with stakeholders both in the community and outside of the community has the advantage that it is more formally established, and pools knowledge and resources that would increase the chances of success. A company has a profit motive, which would make sustainable operation a priority. The greatest challenge to a company strategy is that the Village Connection is unlikely under any circumstances to generate the sorts of profits to support local stakeholders, let alone external stakeholders. The only conditions under which this approach would make sense would be if the universities or other partners see sufficient value in the Intellectual Property that could be created through this unique community/industry/academia relationship.

A non-profit structure would also be a formally established entity, which makes accountability clearer. It ensures that the interests of the communities involved and also the external partners are considered, and leverages the local cultural knowledge as well as the external expert knowledge. Decision-making would be more challenging than in the case of an independent operator, but the decisions are likely to be more considered with long-term value prioritised. Disadvantages are that there would be additional cost overheads, and operating efficiency is likely to be reduced. There could be a conflict of interest between the operator (who would be employed), and the governance structure. Having too many stakeholders could dilute the focus, and having the wrong representatives could result in hijacking of the operation to serve a personal agenda. Representatives would also need to be willing to donate their time, since the profitability of the system will be insufficient to support a paid governance body. It is also easy for a non-profit structure to prioritise community benefits at the expense of sustainability.

Community leaders and key stakeholders were consulted in order to determine the most appropriate strategy. Among external stakeholders, the universities were seen as the most important, since their relationship with the communities of Dwesa is the most involved. They also have a stake in the implementation of the Village Connection, since many of their students will be basing research projects on the implementation and uptake of the system, and developing new services that can be provided through the system.

Because of this strong involvement, the universities favour a governance structure in which they have a say in decisions surrounding implementation and operation. At least initially they prefer an executive role, although in time as the system becomes more established and the community becomes more familiar with the technology and its potential, they could shift to more of an advisory role.

Within the communities, initial discussions were held with the headman of Mpume and the headmaster of the school at Ngwane. Both welcomed the idea of the Village Connection and thought that it would be of great benefit to their communities. They were, however, unwilling to recommend any appropriate governance structure without first consulting with the people whom they represent (the villagers of Mpume and the school governing body respectively). From these initial discussions, it did not appear that the community would prefer one governance strategy strongly over another, and are more used to the role of taking the lead from external "expert" groups. It was decided not to pursue the matter with the communities, as community consultation processes at this stage would only serve to build expectations and confuse community members.

Because of the number of stakeholders in the Village Connection, and the potential future applications of Living Labs projects, it seems that an independently owned and operated franchise is not an appropriate strategy in this case (although it would be a good option for a scaled implementation). A non-profit structure (in the form of a Section 21 company or a Trust) would seem to be the most appropriate governance structure for the Dwesa Village Connection, although a company structure may be a possibility.

Our recommendation is that the universities should lead the decision-making process, choosing a structure that supports their projects in Dwesa without compromising community interests. Some form of community representation is essential, and this will probably entail community meetings to choose appropriate representatives. The universities benefit greatly from the representation they have from computer science as well as anthropology departments. It may be wise to include a stakeholder (from the universities or elsewhere) with an economic interest, who can focus on profitable

operation. We have no recommendations on the inclusion of other partners as stakeholders, but would warn against diluting focus through too heavy a governance structure.

The long-term future of the Village Connection is uncertain and would probably depend on reaching sustainability, as well as the willingness of partners to continue the project. It might therefore not be wise to establish a formal entity until the long-term future of the project is clear. It might be preferable to simulate the governance structure with all its requirements, but house it as a project within one of the partner organisations (most likely the universities). This will make it easier to establish the governance structure as an independent body once there is clarity about the future.

3.2. Operating model

With respect to the operating model, this study sought to investigate the following questions:

- identify who in Dwesa might be negatively affected by the Village Connection
- determine whether the skills necessary to operate the Village Connection are available, and what the training requirements might be
- identify possible operators
- determine appropriate remuneration levels for an operator
- identify infrastructure or environmental constraints

The only services that would be offered by the Village Connection operator for which there is existing competition are mobile phone charging and airtime sales. Electricity is only available in selected places, but most of these places charge phones as an informal business, at a rate of around R3 per charge. It is unlikely that the Village Connection would affect these small businesses greatly since villagers will generally charge their phones wherever it is cheapest and closest. Similarly, airtime is sold by the spaza shops and by some private sellers who buy bulk airtime and sell it on to community members. Villagers will most likely purchase from friends or family that they are trying to support or from whoever offers the cheapest airtime. The Village Connection operator is unlikely to have a competitive advantage that could create negative sentiment in selling either of these commodities. If the operator is already selling these items, then the impact would be even less.

There is a range of skills necessary to operate the Village Connection, including basic business and entrepreneurial skills, basic computer skills, sales and marketing, and then more professional skills such as financial administration, technology troubleshooting and business management. During this study, Mpume seemed the likely site of implementation for the Village Connection, and so the operational analysis was concentrated there. Several influential community members were asked who might possess such skills, and interviews were held with potential candidates but the investigations were kept informal so as not to raise expectations of possible employment opportunities.

Basic computer skills were seen as a requirement, and investigation thus started with people who had graduated from the computer training centre at Mpume school. According to Ms. Pinky Mcinga, who administers the centre, there are only three people who have been given training certificates, other than the teachers at the school. Since it was felt that the operator should not be chosen from community members who already have stable employment, the teachers were not considered. Of the three other

graduates, one had since moved to Johannesburg, but the other two (Ms. Andisiwe Mcinga and Mrs. Noluvo Mgedezi) were given informal assessments of their computer skills.

Both were able to navigate well enough around a computer, and with some additional training could definitely operate the computer interface of the Village Connection. Basic business skills are more of a concern. There are very few people operating even informal businesses in Mpume, and Dwesa does not have an entrepreneurial culture. Mrs. Mgedezi was the only person who displayed both the technical and the business skills necessary to operate the Village Connection. Because of this concern over entrepreneurial skills and mindset, it is our recommendation that the operator should be chosen from from those who have already demonstrated business skills. It should be noted that a formal application process will likely identify more potential operators that did not come to light during our informal investigations.

More professional skills, including financial administration and technology troubleshooting would need to be outsourced, and these requirements are discussed further in section 1.4 and 1.5. The governance structure should handle business management requirements, so during the establishment it will be necessary to ensure that these skills are present.

Several people were also asked for opinions about appropriate remuneration levels. The responses varied from around R1,000 to R3,000 a month (although teachers earn upwards of R8,000), and it seems that a monthly salary of approximately R2000 would be sufficient for this sort of work. This also compares favourably with the average monthly income of around R1000 per household in Mbhashe. However, since marketing would be one of the requirements from an operator, an incentivized remuneration is recommended, so that the operator would receive more money depending on the number of subscribers.

Distribution would be a challenge if there are subscribers from other villages, but partnerships with shop owners in these villages should be possible (see Chapter 5).

Chapter 4. Alternative Technologies and Business Models

One of the tasks during the study was to benchmark existing models for lessons and success factors. Unfortunately Nokia Siemens Networks was not able to release useful information from earlier sites implemented in India. After a desktop research and email correspondence with a few international ICT for development networks, it became clear that publicly available documentation, other than a few academic reports, was not accessible. Relevant case studies or similar useful documents, describing initiatives of community-based organisations providing voice or data services in under-served areas were not found within the short implementation period of the project.

The following three approaches are mentioned for potential future reference:

A community mobile phone project facilitated by K-Net[1], a Canadian organisation, has been launched in Northern Ontario, but the initiative hasn't yet opened community sites and was not able to share the business model of their concept. The mobile phone project is linked with a privately owned broadband network reaching remote communities, and most of the work so far has been related to licensing, infrastructure, and support issues.

An Indian company called VNL[2] is providing a competing product and service range, and their concept is very similar to the Village Connection (the technology platform is different and based on Linux rather than Windows). But even in VNL's case, the actual community-centric business model is not really explained in any detail since the materials are targeting GSM operators.

An open source technology development project, called OpenBTS Project[3], is also in development. The aim of the OpenBTS Project is to develop a technology solution that could be deployed and operated at a lower cost than existing alternatives. This project is still in it's very early stages, currently very small scale, and will require additional development (such as some important core components and an interface for operating and billing. However, with a more favourable GSM licensing environment (including both GSM standard patents and radio transmission regulations) and a sustainable scaling model, OpenBTS Project and similar approaches might provide an interesting alternative for areas like Dwesa sometime in the future.

In addition, there are a number of other initiatives addressing the challenges related to local communications, where the innovations are based on wireless technologies, including Village Telco[4], WISP-in-a-box[5], and VoIP-in-a-Box[6]. These examples prioritise open source and open hardware design, aiming at keeping the costs to a minimum. The downside for these concepts in rural areas is that most of the handsets used are entry-level phones, and do not have the wireless WLAN functionality required to be able to communicate via the developed services (this is likely to change in the future when the price of WLAN phones will come down). Other likely challenges are the regulatory issues and less refined business model for the scaling of the service.

1 http://mobile.knet.ca
2 http://www.vnl.in
3 http://openbts.sourceforge.net/
4 http://villagetelco.org/ - backed by the Shuttleworth Foundation
5 http://wire.less.dk/ - backed bywire.less.dk and Meraka Institute
6 http://www.it46.se/ - backed by IT+46 and Meraka Institute

Chapter 5. Dwesa Village Connection Business Model

It is important to note that although the business model and the financial projections introduced in this chapter are based on the NSN Village Connection concept, the they do not follow the typical franchise model that NSN recommends.

In the absence of a GSM operator in the project, the business model presented here was of necessity developed with scant operator perspective. Additionally, the business model needed to respond to the needs of the project stakeholders, especially to enable active participation, innovation and service development as part of the Dwesa Living Lab activities. As a result, the business model is uniquely applicable to the Dwesa Village Connection trial, and is not a scalable model.

However, many of the business model components included here would also apply to a scalable model. Components can also be customised or added quite easily to include the service and value chain changes as well as cost and revenue projections needed to fit in with the franchise model.

1. Introduction

The business model follows mainly a nine building block structure developed by Dr. Alexander Osterwalder from Arvetica[1]

Dr. Osterwalder defines a business model as a simplified representation of company's business logic and continues that the business model "describes what a company offers its customers, how it reaches them and relates to them, through which resources, activities and partners it achieves this and finally, how it earns money. The business model is usually distinguished from the business process model and the organization model." In his structure, Dr. Osterwalder recommends that when describing a business model the following building blocks should be described:

Value Proposition

- The value proposition of what is offered to the market

Client Segments

- The segment(s) of clients that are addressed by the value proposition

Distribution Channels

- The communication and distribution channels to reach clients and offer them the value proposition

Client Relationships

- The relationships established with clients

Key Resources

- The key resources needed to make the business model possible

Key Activities

1 http://www.privatebankinginnovation.com/en/wp-content/uploads/tools/Draft-Business-Model-Manual.pdf

- The key activities necessary to implement the business model

Partner Network

- The key partners and their motivations to participate in the business model

Revenue Flows

- The revenue streams generated by the business model (constituting the revenue model)

Cost Structure

- The cost structure resulting from the business model

2. Dwesa Village Connection Business Model Building Blocks

For the Dwesa trial, one revenue-generating and one value-added service bundle are being considered as part of the business model. The core service in the business model is the low-cost local calling for the community (based on the Village Connection concept). A number of potential additional future services have been mentioned, but because there would be a need for a substantial technology development or capacity building effort, the analysis of these options were left outside of the scope of this study. However, because of the close link to the Village Connection, a marketing and announcement service as a part of a telephonic community information portal has also been introduced and analysed. It should be noted that due it's experimental nature this analysis is very brief, and for a comprehensive analysis, a separate study should be implemented.

Highlights of the business model building blocks for the Village Connection service bundle are outlined in this chapter, and the building blocks of the community information portal service bundle is discussed in Appendix se two service bundles are featured in the diagrams below and each building block has been explained in more detail in the following chapters.

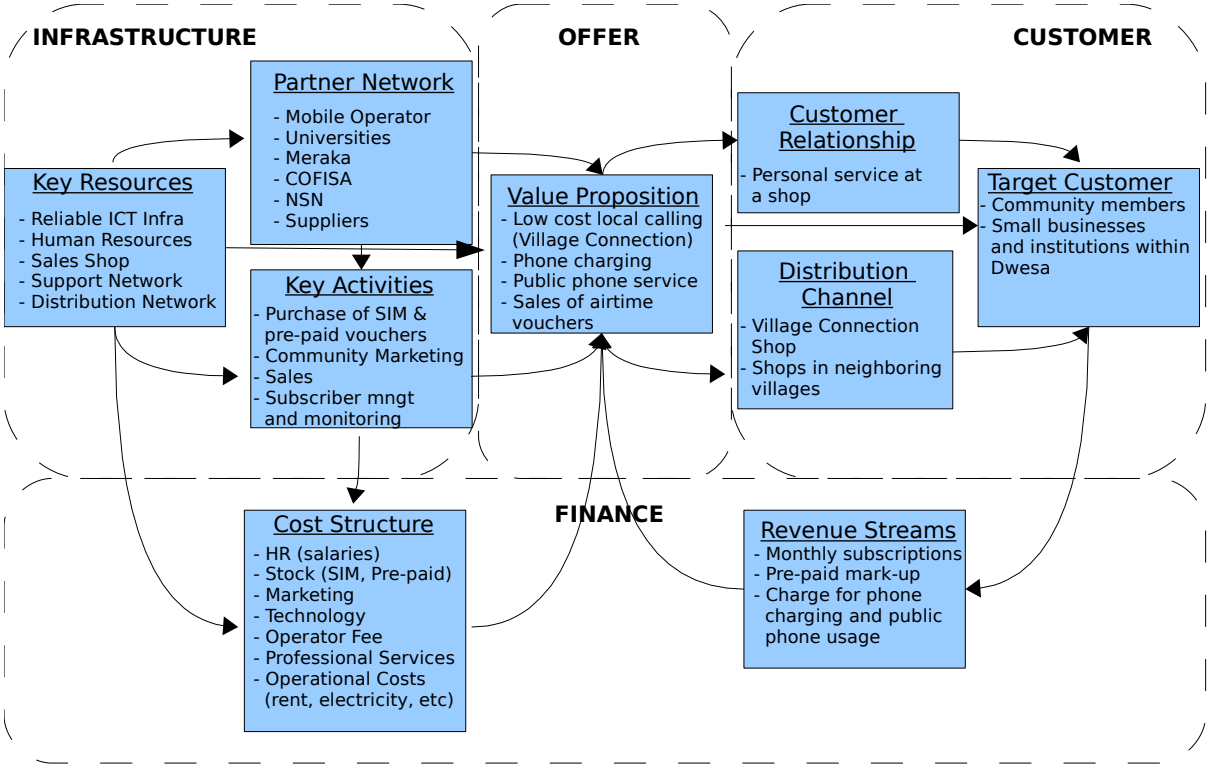


Illustration 6: Building blocks of the Village Connection service bundle

3. Value Proposition

3.1. Village Connection

The first service bundle is closely linked to the Village Connection concept, but within Dwesa community the main benefit for the customers is a low cost local calling within the community, based on a fixed monthly subscription fee. Although the Village Connection concept allows phoning also outside of the community, without aggressive pricing the service will not be able to offer advantages compared to the existing options already in offer via existing GSM operators (Cell-C, MTN, and Vodacom).

Affordable local calling meets community members' needs to save time and the overcoming the necessity of walking several kilometres in some cases when wanting to talk to someone within the community. Some of the identified needs within Dwesa are:

- a possibility for customers to check if a shop or the clinic has stock of a specific item,
- young people's urge to stay in touch with each other and maintain relationships,
- a way to report disputes to the headman without any extra delays.

These are just examples of the benefits that the affordable local calling can bring. For community institutions, such as business owners and the clinic, the affordable local calling may potentially save hundreds of Rand each month.

Some income can be generated from the sales of pre-paid airtime for the existing networks as well as offering the possibility to charge mobile phones within the shop, but these services are already being offered to the community. If the trial does increase the use of mobile phones within Dwesa, there might be room for another service provider, since the demand for battery charges would increase. Also, by competing on price (for example, by charging a lower mark-up for pre-paid vouchers, or R 2.00 for battery charging instead of R 3.00), the village operator might be able to attract customers. The village operator can also provide a public local phone service to people not subscribed to the village network, and charge a nominal fee for the use of the service.

Illustration 7: Phone charging at Mpume school

Many Dwesa trial stakeholders were suggesting that as a part of this value proposition the village operators could also sell mobile phones for the community. This was initially considered as an additional service, but the interviews with shop owners who supply pre-paid airtime showed that the risks are considered higher than the potential financial benefit. As a first contact for the customer, the village operator would be expected to provide fist level support for phones that have problems, a skill that would need to be learnt first. Also, the risks with stock that could be stolen (or not sold at all), reduce the attractiveness of the service. In addition, the potential market would be quite small, since many of the phones currently used within Dwesa are donated to the community members by a family member working outside of Dwesa.

3.2. Other future possibilities

It is assumed that the Village Connection will not take a full-time focus, and there are thus a number of other future possibilities, especially if these are linked with the development of the Dwesa Living Lab.

The operator could help industry and academy to implement their research projects (such as the 'user-centric rapid prototyping cycles for new ideas' which is an important Living Lab activity) by helping to coordinate local activities.

If the logistics to sell green and sustainable technologies (mobile phone solar chargers, light bulbs, water purification systems to name a few) are favourable, this option should be considered too. Second-hand

With additional training, the local operator could possibly provide basic technology support and training to the community. For example, new mobile services such as mobile banking offered by Wizzit[1] requires a local partner. Several international micro-credit organisations work directly with community operators where connectivity is available, and the village operators could also potentially become local agents for these organisations.

1 http://www.wizzit.co.za/

If the demand for internet grows as a part of the school training activities, there might be room for an Internet Cafe, since the access is not always possible at the school. At least some basic services such as helping community members to fill, store and submit forms (such as job applications), would not be too demanding to set-up, once the daily routines for the Village Connection are established.

4. Customer Segments

There are two groups of customers that the Village Connection will serve: community members, as well as local small businesses and institutions.

4.1. Community members

There are various ways of looking at the market, but in its broadest sense, the customer segment consists of all the community members that the Village Connection network covers. There are, however, many factors that affect this, and their impact on the market is discussed at length in Chapter 3. Our estimates suggest that the potential household number should be big enough for the business to reach the maximum of 240 subscribers that the Village Connection is able to serve.

4.2. Small businesses and institutions within Dwesa

Due to the fact that the Village Connection coverage would cover only parts of the neighbouring villages, it is difficult to analyse the total amount of small businesses and institutions that are covered by the service. Mpume itself has only two shops, a school, a community clinic, and few small churches.

Although the service and generated income will not differ between a community member or an institutional customer, this customer group will be the "heavy users" of the network because of the savings the Village Connection network would make available. As a starting point it would make sense to target this customer group, since the bigger the number of subscribers, the bigger the savings would be for these "heavy users", who would most likely help to market the service to the community members.

5. Communication and Distribution Channels

5.1. Community members and local small businesses and institutions

Because the community is relatively small, it will not take long to promote the Village Connection and the information portal services to the community members via "bush radio". The best starting points are to announce the service during a few community meetings, and use local businesses and institutions as marketing channels, because they will benefit more from higher numbers of their clients using the service. In addition to spreading the message, they would most probably allow small advertisements to be set-up if necessary. The only real cost, excluding the time it takes to visit community meetings and local businesses, would be related to the development, printing and acquiring of potential advertisements, and the university partners would hopefully help the village operator to cover these initial costs.

If one of the project partners is willing to sponsor a launch event (such as a community spit braai), such an event would probably contribute significantly to the profile and awareness of the project within the village and spur initial uptake. These costs have not been budgeted, however.

The local distribution would happen via a shop in Mpume. However, the distribution network to reach areas that are not an easy walk from the shop, will need some consideration. It is not feasible to expect customers from other villages to walk to Mpume to pay for a monthly subscription. There will probably need to be arrangements with other shopkeepers to collect payment, whereafter the operator in Mpume will register the customers on the system. On a monthly basis, payment can be collected by the Mpume operator according to some revenue sharing agreement.

6. Customer Relationships

6.1. Community members and local small businesses and institutions

The local customers will receive a personal service at the shop where the subscriptions as well as value added services are sold. It is assumed that many of the subscribers will need to be trained to be able to understand the difference between local and outbound calls as well as the basics how to use the community information portal (The community information portal has an automated user interface, where the caller is required to follow spoken directions). This will be a time-consuming effort, especially immediately after the launch of the service, when the subscriber number is assumed to grow fast.

Based on the discussion with a local shop owner, many of the community members are requesting credit for purchases with the promise to make the payment when they receive a government grant (this question was also raised during one of the focus groups). The village operator will need to have a clear policy for dealing with credit inquiries, since a flexible policy (some people are able to buy with credit and others not) would potentially have a harmful effect on the relationship of the customers. A safe policy is not to give anyone the possibility for credit purchases.

7. Revenue Streams

To generate revenue the customers will need to see value for them, and have the means to pay for the service. Currently the community members do not make local calls regularly. The initial feedback was that this is not because there is no need to communicate locally but because of the high cost of the phone calls. In rural areas, including Dwesa, the people are very price conscious. Because other national GSM operators have network in the area and most of the people know about discount options (such as Vodacom's Yebo4Less or MTNZone), and it is unlikely that the Village Connection would be more affordable than alternative networks to make calls out of Dwesa, the community members are going to consider whether they have additional funds to pay for local calling by comparing the cost against other priorities. Therefore affordability of the Village Connection is one of the key aspects that will determine the success of the service.

From the village operator's point of view, the objective is that a sustainable operation is achievable within a reasonable timeline. Therefore the service fees should be set to a level that can generate enough income to make a small profit, which can be used to develop and introduce additional services, pay a potential GSM operator's franchise fee, or increase the village operators compensation, which is relatively low.

Although there might be additional revenue streams from value-added services (including the featured advertising and announcement service), these are not considered as a part of the revenue calculations. So the revenue stream calculations are based purely on the Village Connection. In addition, many assumptions are made regarding the

uptake of the offered services. These assumptions are not based on any previous experience and should be only taken as a hypothetical guideline (NSN was not able to share the numbers from previous Village Connection implementations because of their confidentiality status). The actual growth rate for Village Connection monthly subscriptions, and related services, may be very different from the estimations used.

The main factors for the revenue estimations are:

- subscription fee, fee per unit, or mark-up per unit
- annual inflation rate
- daily/monthly customer target
- growth rate (how soon the daily/monthly target is being reached)

The annual inflation rate has been set at 10% (the fees for services will increase 10% after each year). Assumptions for the rest of the factors are explained for each offered service below.

7.1. Village Connection subscription

A monthly subscription fee of R 35.00 has been used. Initial estimates based on the baseline study were more or less R 15.00 per month, but the conclusion after the two focus group meetings was that R 35.00 is still seen as affordable for unlimited local calls. Without actually piloting the service, it is very difficult to say how the community reacts to the set fee.

Based on the NSN documentation, the maximum number of subscribers is 240 per one base station. This number was used as a monthly customer target.

The growth estimates are as follows:

First three months:	0% of target
Months 4 - 6:	25% of target
Months 7 - 12:	60% of target
Months 13 - 24:	90% of target
Months 25 - 36:	100% of target

The reason why the estimate is 0% for the first three months, is that as a service launch campaign, it is suggested that the subscription is free for the users in order to encourage uptake and allow for testing of the service.

7.2. Battery charging

Community members are able to charge their phones either at the school or a shop for a R 3.00 fee. The feedback from the focus groups was that on average, people charge their phone batteries every three to four days. Because the Village Connection would increase the phone usage, the battery charging frequency would increase.

Per charge fee has been set for R 2.00 which is 33% cheaper than the current rates. More affordable pricing should be an incentive for community members to charge their batteries at the Village Connection shop.

An target of 10 battery charges per day has been used, which totals 300 monthly units.

The growth estimates are as follows:

First three months:	20% of target
Months 4 - 6:	40% of target
Months 7 - 12:	70% of target
Months 13 - 24:	90% of target
Months 25 - 36:	100% of target

7.3. Public phone service

Currently Dwesa has no working public phones, and community members without a mobile phone are not able to make calls. A public phone service can also be offered to those community members who do not need a monthly subscription of the Village Connection but who want to make occasional affordable local calls.

A R 2.00 unit fee has been estimated for local calls that last a set time limit. The same fee can also be used for calls outside of the Village Connection network, but the time limit would need to be much shorter.

A daily target of 10 units has been used, which totals 300 monthly units.

The growth estimates are as follows:

First three months:	20% of target
Months 4 - 6:	40% of target
Months 7 - 12:	70% of target
Months 13 - 24:	90% of target
Months 25 - 36:	100% of target

7.4. Pre-paid airtime sales

Community members are able to buy pre-paid airtime vouchers for Vodacom, MTN, or Cell-C within Dwesa. The local shops charge between R2.00 and R3.00 mark-up on top of the voucher value (for example R5.00 voucher would cost R7.00), but this is still seen as affordable because the transport fees to Willowvale are high.

A bulk voucher purchase from a wholesale shop at Willowvale would bring between 1% and 5% savings, so a R 2.00 average mark-up fee has been estimated for pre-paid airtime sales for the village operator.

A daily target of 5 units has been used, which totals 150 monthly units sold.

The growth estimates are as follows:

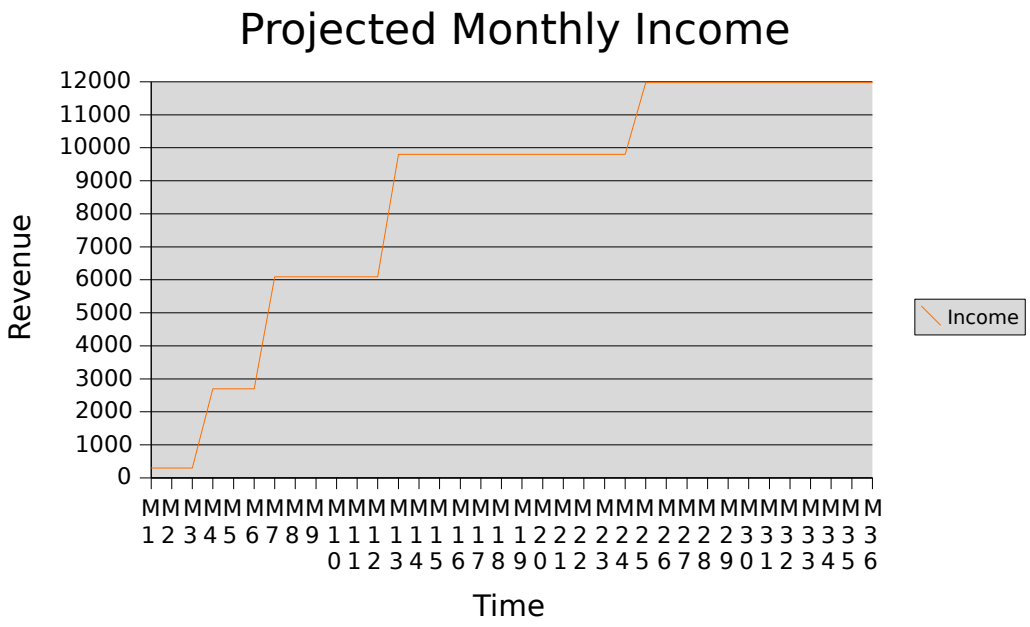
First three months:	20% of target
Months 4 - 6:	40% of target
Months 7 - 12:	70% of target
Months 13 - 24:	90% of target
Months 25 - 36:	100% of target

7.5. Total revenue estimate

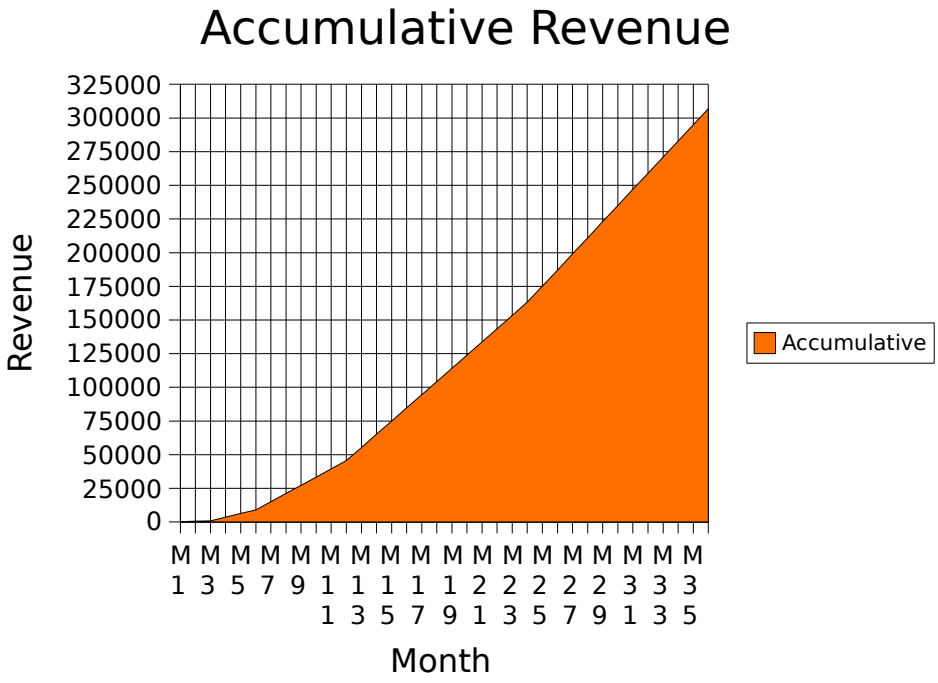
With the revenue targets, the estimated potential monthly revenue for the Village Connection service is R 9,900.00 when inflation is not taken into account.

With the growth and inflation estimates included, the estimated average revenues are feature in the following two charts:

Estimated Average Revenue					
Service	Month 1-3	Month 4-6	Month 7-12	Month 13-24	Month 25-36
Village Connection Subscription	R 0.00	R 2,100.00	R 5,040.00	R 8,316.00	R 10,164.00
Battery Charging	R 120.00	R 240.00	R 420.00	R 594.00	R 726.00
Public phone service	R 120.00	R 240.00	R 420.00	R 594.00	R 726.00
Pre-paid airtime sales	R 60.00	R 120.00	R 210.00	R 297.00	R 363.00
Total	**R 300.00**	**R 2,700.00**	**R 6,090.00**	**R 9,801.00**	**R 11,979.00**



The total accumulative revenue estimation for the first 36 months is R 306,900.00 as featured in the chart below:



8. Key Assets

The most important key assets are a reliable technology infrastructure and human resources. Other important assets are a convenient and secure sales shop, easy access to support as well as an efficient distribution network.

8.1. Reliable technology infrastructure

The income model is dependent on customers paying their monthly subscription fee month after month. If the technology components that the service is built on are not working reliably, it will either mean down-time of the service or inability to operate the service. This would dramatically reduce the attractiveness of the service, especially in Dwesa, which is already being served by different reliable GSM networks. It is likely that customers would also claim that their subscription period should be prolonged in case of a service downtime which would reduce the projected income of the village operator.

8.2. Human resources

The village operator is another key resource for the business model. An ideal candidate will have a mix of business mind-set, computer literacy, and ability to take risks. The business skills include a customer service orientation, skills to promote and sell services, and an ability to administer and manage finances. Computer literacy is needed to learn how operate the Village Connection and IVR interfaces and implement the first level of fault management tasks, communicate with institutional customers via email, and learn how to use a computer to record and report financial information. Risk-taking ability is important factor in case the village connection should fail.

8.3. Sales shop

The sales shop will need to be located conveniently to attract customers. If the shop is too remote, community members might not be willing to visit the shop. Because of the crime in the area, the shop also needs physical security measures to protect the technology infrastructure as well as money that is generated through the services. The shop should also have access to reliable electricity source required by the workstation (which also acts as the IVR server) used at the shop.

8.4. Support network

In a normal Village Connection case the external support that the village operator needs is scaled down as far as possible where many of the maintenance tasks are done by the local entrepreneur. Unfortunately, because the technical infrastructure is not as simple in Dwesa and additional technology components are needed to operate the service as well as to host the community information portal, access to an efficient technical support will be critical (see Chapter 3 for more details about the importance of a reliable technology infrastructure).

For the trial, it is estimated that professional technology support is needed every now and then during times when the universities or Meraka Institute are not able to visit Mpume and fix urgent problems. Bigger shop owners in Willowvale use companies based in East London (largely because the support needs were application-specific), but it would be better to train and use service providers from Idutywa or even Willowvale.

8.5. Distribution network

To reach customers in the outer limits of the network coverage the village operator has to be able to work with additional local shopkeepers to allow community members to subscribe to the service without the need to walk to Mpume. It is important that these sales partners are able to explain and train the most important service concepts to the customers.

9. Key Activities

9.1. Village Connection

After the set-up of the systems and reaching agreements with the other distributors the key activities for providing the village connection service within Dwesa are the following:

- Purchase of Village Connection SIM cards (provided by the GSM operator)
- Purchase of pre-paid vouchers for other networks (Willowvale or Idutywa have suppliers for bulk amounts)
- Marketing is done during community meetings, word-of-mouth, via local small businesses who are important customers, and potentially by using posters
- Sales of the subscriptions and value added services will happen at the shop (the distribution partners only sell the Village Connection subscriptions)
- The subscriptions that are paid to the distribution partners, will need to be collected regularly
- Network subscriber management requires the use of a Village Connection operator interface. This allows adding and editing of subscriber and equipment details, and the activation (or deactivation) of subscribers, as well as monitoring the pool of subscribers.

9.2. General

- Monitoring and maintenance of the technology infrastructure
- Financial administration is important for any business, and should be an integral part of every day task of the village operator. Engagement with an accountant in Idutywa is also required in regular basis.

10. Partner Network

Because the services are initially offered as a trial, most of the partners were defined clearly in Chapter 2. The most important partners are going to be the GSM operator, Meraka Institute and the universities during the trial, and the GSM operator in the long term.

Within Dwesa, there is a need to partner with a few local businesses to support with the sales of the Village Connection network subscriptions outside of Mpume area. Although these partners are relatively easy to substitute, it is important to create a formal agreement with the partners, that clearly defines roles and responsibilities, as well as how the revenue will be shared between the village operator and the partner. The village operator could offer a free network subscription for these partners, as a payment, which would also lower the risk of not receiving the payments, because the village operator can easily unsubscribe the number of the partner.

11. Cost Structure

The cost structure analysis has been divided between set-up costs and operating costs. The estimates are based on various sources, from basic desktop research to actual estimates from the service providers that were interviewed. Although they are as accurate as possible, they should still be considered only as guidelines.

It should be noted that during the trial period (and for some stakeholders such as the GSM operator even after the trial), project stakeholders are expected to absorb costs related to their own participation. Appendix B has a list of different types of costs that the stakeholders should budget for both the set-up and operational phases.

11.1. Set-up costs

It is estimated that a total of R 43,970.00 is needed to cover village operator's set-up costs. also, to keep the cash flow positive, an additional R 25,000.00 would be needed as a seed finance (as explained in the break-even analysis in Chapter 6).

SET-UP COSTS	
Human resources costs	
1 Months salary (training period)	R 1,500.00
Technology (infrastructure and hardware)	
Electricity (link to the grid)	R 3,000.00
Multiplug with a surge protector	R 200.00
Wireless link to the VC server	R 4,000.00
UPS	R 2,000.00
Combined Server (IVR) and PC (virtual access to VC)	R 5,000.00
External HDD for backing up	R 1,000.00
Microphone and Headphones	R 150.00
Cables	R 300.00
Professional Services	
Design and set-up of a financial system + training	R 7,820.00
Legal fees (founding documentation, registration)	R 10,000.00
Administrative costs (bank account, registrations, etc..)	R 1,000.00
Other	
Furniture, office supplies, and stationery	R 2,000.00
Additional security measurements (burglar bars, locks, etc..)	R 6,000.00
Total Projected Set-up costs	**R 43,970.00**

Below is an explanation for some of the budget categories and additional information how the amount was estimated.

Human Resources

A one moth salary for village operator to cover the training and set-up period before service launch.

Technology (infrastructure and and hardware)

Two community members in Mpume advised that in case the shop does not have electricity, it will cost R 3,000.00 to link it to the Eskom electricity grid.

Wireless link to the Village Connection server is needed if the system is not operated from the shop.

UPS should be purchased to protect the PC and other electronics against power surges, electricity interruptions, lightning etc..

Even if the Village Connection server can be installed into the village operator's shop, the system can not be used for any other needs. Therefore an additional personal computer is needed (for administrative tasks, as well as potentially to remotely operate the Village Connection), which can also be used as a server for the information portal (which requires an IVR system to be installed).

Professional Services

A basic financial system design and set-up and training is estimated to take three days. A daily fee of R 2440.00 and additional R 500.00 for travel has been budgeted for this task.

The drafting of founding documentation of any formal entity would require legal assistance (unless a law student from either Fort Hare or Rhodes University can be asked to help). The fee recommended by the Butterworth Regional Attorneys Association for business registration is R 5,000.00, and it is assumed that to register a not for profit organisation requires additional work, so R 10,000.00 has been budgeted.

It is assumed that there is no need for a back-up power, software licenses (applications to be used are run on a linux operating system and are based on open source licenses), and that the village operator is able to provide his/her own mobile phone for any testing that is required.

11.2. Operating costs

The estimated operating costs for the village operator are shown in the table below.

OPERATING COSTS		
Human resources costs		
Base Salary	R 1,000.00	Monthly
Commission	up to R 1,000.00	Monthly based on revenue
Stock		
SIM cards	R 0.00	
Pre-paid airtime vouchers	R 0.00	
Marketing costs		
Marketing materials (brochures, ads, branding)	R 10.00	Monthly average
Technology		
Hardware - Replacement and maintenance of equipment	R 351.39	Monthly average
Professional Services and Fees		
GSM Operator	R 0.00	Monthly
Local Distributors	R 245.00	Monthly
Accountant	R 1,000.00	Quarterly
Audit fees	R 10,000.00	Annual
IT Support/Maintenance Call-out fees	R 1,260.00	Monthly average
Payroll	R 200.00	Monthly
Travel		
One visit to town per month (Idutywa)	R 60.00	Monthly
Other		
Finance payment	R 2,750.00	Monthly (2nd and 3rd year)
Rent	R 250.00	Monthly
Electricity	R 100.00	Monthly
Bank fees	R 100.00	Monthly
Insurance fees	R 200.00	Monthly
Tax	R 0.00	Every six months
Communications (fax, telephone, mobile, email via gprs)	R 50.00	Monthly

Below is an explanation for some of the budget categories and additional information how the amount was estimated.

Human resources costs

From the interviews with community members and a few business owners (as discussed in Chapter 3), the suggested minimum salary should not be less than R 1,000.00 per month. Because the village operator skills requirements include computer literacy and basic business skills, R 2,000.00 should be a sufficient amount during the pilot period, when there are still skills to learn. However, it was strongly recommended, that at least some of the salary should be commission-based, which will increase the commitment of the village operator, and motivate her/him to achieve the targeted customer numbers as soon as possible. Therefore, the budget has a base salary of R 1,000.00 per month, and the other half depends on the number of paid Village Connection subscribers.

During the first three months campaign, when the service is free, the salary is set for R 1,500.00.

From there on, the salary growth has been budgeted as follows (following the growth estimate for the Village Connection):

Months 4 – 6:	25% of target	-> R 1,000.00 + R 250.00 = R 1,250.00
Months 7 - 12:	60% of target	-> R 1,000.00 + R 600.00 = R 1,600.00

Months 13 - 24:	90% of target	-> R 1,100.00 + R 990.00 = R 2,090.00
Months 25 - 36:	100% of target	-> R 1,210.00 + R 1,210.00 = R 2,420.00

It should be noted that the last two periods both include 10% inflation adjustment.

Stock

It is assumed that the Village Connection SIM cards are provided by the GSM operator without any fee.

The pre-paid airtime vouchers for other networks have also been budgeted as R 0.00 costs, since the revenue estimate only includes the mark-up that the village operator will gain. When preparing detailed cash flow estimates, the actual cost of the vouchers should be used, based on the planned stock.

Marketing costs

Because of the limited area, the marketing costs can be kept minimum, and the budget allows printing a few posters once or twice a year.

Technology

To maintain and replace technology equipment, it is estimated that 1/3 of the purchase cost will need to be budgeted per year. The hardware costs of the set-up phase are R 12,650.00, so the budgeted monthly technology budget for the first year is R 351.39.

Professional Services and Fees

The NSN Village Connection GSM operator business model has a franchise fee paid by the village operator to the GSM operator, which is set at USD 100 per month. Because the Dwesa project is a trial, and the actual service-level agreements will most probably only be developed when the GSM operator is preparing to scale up the implementation, the franchise fee has been left out from the budget.

To be able to distribute SIM cards and collect subscription fees from the surrounding villages, a small local distribution network is needed. It is assumed that there is a need for 7 distribution partners, and that each partner will get a free Village Connection subscription. This has been calculated as a cost for the village operator totalling R 245.00 per month.

Even though a basic accounting system will be used, there is a need for accounting services. Local skills are scarce but an accountant at Idutywa currently charges R 600.00 every two months for basic services, which is very affordable compared to the standard fees within the sector. A R 1,000.00 monthly budget has been used, to include support for financial reporting, audit preparations, and tax returns.

A formal not-for-profit organisation has to audit their financial year reports. A basic audit would cost more or less R 10,000.00.

For urgent IT needs, there is a budget for one call-out visit per month. To keep the costs low, an IT technician from Idutywa could be used (current fees are R 120 per hour and R 30 one way as an added travel cost). If the skills level of this or other 'local' IT technician are not enough even after basic training, a service provider from Butterworth or East London might be the only option. However, currently a technician from East London charges R 1,500.00 as a starting fee per call-out for a business that is located in Willowvale, and the additional travel and actual working time would increase the IT support costs remarkably.

A payroll service, that takes care of monthly and annual payroll related submissions should be used. For a one person organisation, R 200.00 per month should be enough.

Other

Seed funding is needed to set-up and operate the Village Connection. Based on the a break-even analysis (see Chapter 6) the village operator would need more or less R 25,000.00 to keep the cash-flow positive until a break-even point has been reached (assuming that both revenue and cost estimates are accurate). When the set-up budget of R 43,970.00 is added, the total finance need is almost R 70,000.00 (R 68,970.00 to be exact). Because the business case is not proven, and the risks are high, it is unlikely that external finance is available. Therefore it is assumed that one of the stakeholders, such as COFISA, is able to provide seed funding for the village operator. Furthermore, it is assumed that the funding is provided on very friendly terms (comparable to social venture capital), with 0% interest rate and three year pay-back schedule (payments made during second and third year of the operation). During the first year, the payments are budgeted to be R 2,750.00 per month with 10% increase for the third year (R 3,025.00), totaling R 69,300.00.

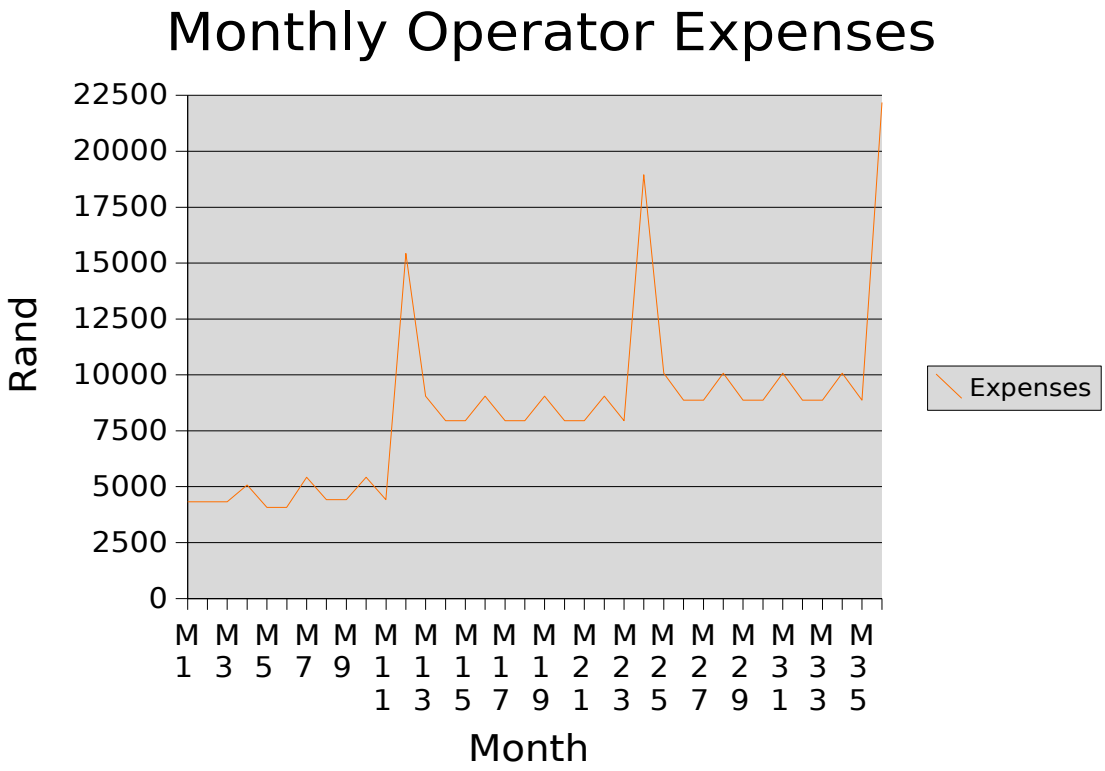
To rent a small office space for the shop, a nominal R 250.00 rental fee has been budgeted. This is based on the fact that many community members are interested in supporting a development project such as the Village Connection, and are not looking for high profits. For example, some of the teachers are renting a home for as little as R 100.00 per month.

Electricity estimation is based on a conservative estimate of 200kWh usage per month (an average PC consumed 500kWh/year) and an electricity rate of 50c/kWh.

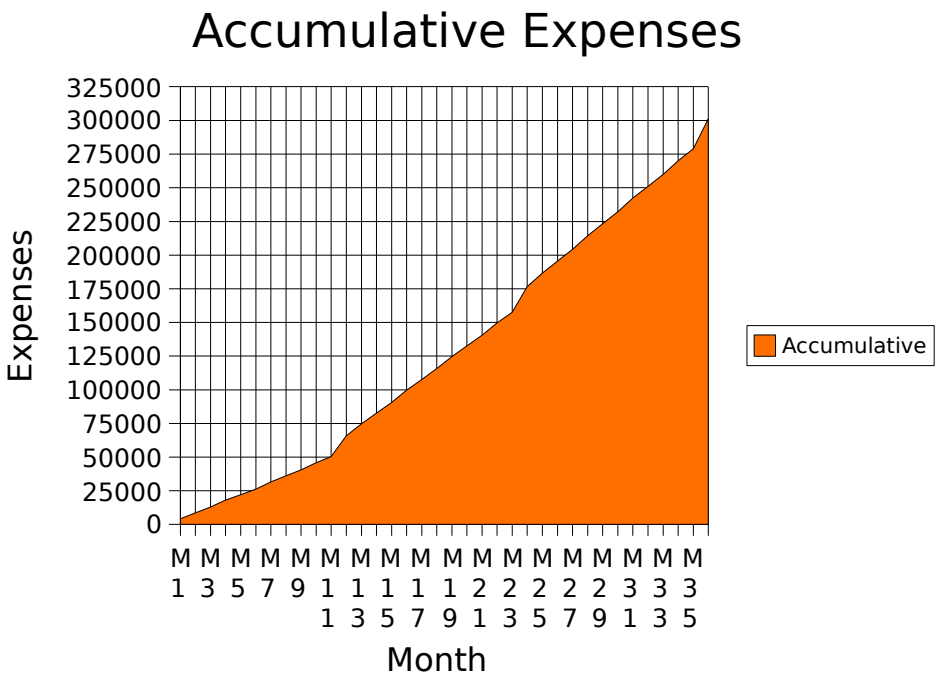
11.3. Totals

When analysing the monthly village operator expense development shown below, the following three steps should be noted:

- The cost estimate has 10% inflation adjustment, and the average monthly cost increases for year two and year three
- The accounting service is paid quarterly, showing a slight jump every three months
- The audit fees are paid once a year, showing a clear peak at the end of every fiscal year



The total accumulative cost estimation for the first 36 months is R 301,084.17 as featured in the chart below.



Chapter 6. Conclusions

1. Local Sustainable Operation

Based on the community feedback, the interest in the Village Connection is high. In an ideal Village Connection area, the population density is high, and no competing networks are on offer. This is not the case in Dwesa and the actual market size is borderline for viability, for many of the same reasons as explained in the previous section.

The ability to grow the subscriber base up to its maximum is essential for achieving the revenue goals. Because of the uncertainty surrounding the market size, Mpume may not be the best location for the trial. Larger villages in Dwesa (that are also more easily accessible due their status as transport hubs) should be considered first.

It should also be noted that the more formal the operation is, the more expensive it is to run, so only the most essential reporting structures should be implemented.

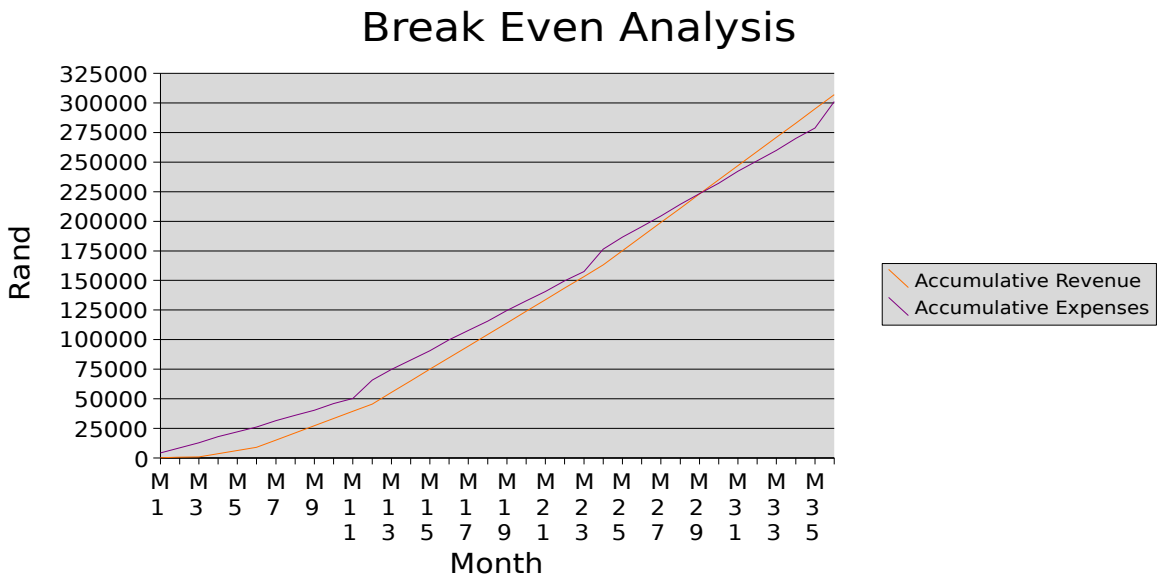
Based on the revenue and cost estimates, the local sustainable operation would be feasible, provided that:

- community members are able to afford the estimated monthly subscription fee of R 35
- coverage is sufficient to incorporate a number of surrounding villages so that 240 monthly subscribers can be reached
- seed finance is available on very friendly terms
- project stakeholders are willing to absorb their costs
- no franchise fee is to be paid to the GSM operator (at least until profitability has been reached)
- the governance body will have to donate their time
- the need for external professional services is minimal

When combining the accumulative revenue and cost estimates, the main points to notice are that

- the cash flow would drop down to R-20,226.67 in the 12th month (therefore R 25,000.00 seed finance on top of start-up costs is needed)
- break even point would be reached after 30 months of operation

The positive balance after the three years is only R 5,815.83. It is however important to highlight that at this point, all repayments have been made and monthly costs will thus decrease by R3,000, improving profitability for the following years.



Because of the small margins involved and the importance of low-cost service delivery, small differences in revenue and expense projections can have a significant impact on profitability and whether break even can be reached. It will be important to monitor costs and revenues closely in order to stay on track.

These calculations do not consider the financial feasibility for the GSM operator to actually set-up and run a franchise network based on the Village Connection within the area, and the project partners should help the GSM operator to prepare and analyse the business case for scaled implementation, which is essential even for the Dwesa village operator to be able to provide the service after the trial project.

2. GSM Operator

It is unlikely that the Village Connection can be implemented in Dwesa without a GSM operator, and finding one to partner with is a basic requirement for continuation. This study has demonstrated the case for local operation, but a GSM operator will need to be convinced by the case for scaled implementation, preferably in the Transkei region. NSN will need to play a strong role in making this case.

Some aspects will need to be clarified with the operator before scaled implementation is considered. Our model assumes that there are no franchise fees payable, and it will need to be re-examined if the GSM operator requires this. The necessary support environment will need to be cultivated, and the terms for accessing this support should be clarified for village operators. This study also evaluated the operating capacity in Mpume, which is a special case because of the universities' involvement in that village. The technical capacity in other places should also be evaluated before scaled implementation is considered.

Some issues are still uncertain and should be clarified to make the case stronger. The size of the market is a concern, and more accurate signal modelling will be useful to confirm coverage. Our research suggests that one village will not be enough to sustain operation, and it needs to be confirmed that several villages will receive coverage. It

should also be confirmed whether or not an EIA will be required for GAP installation. If it is necessary, then the appropriate steps should be taken to request an exemption from the process.

Other issues can only be clarified through the pilot itself. It is not known how big the market must be in order to attract enough subscribers for viable operation. If the GSM operator already has signal in the area, then it is not known how customers will respond to the usability challenges introduced. The influence of the existing GSM operators is also not well understood, and the effect of this competitive environment on uptake will only be clear during the pilot.

3. The Way Forward

If an operator can be found, proceeding with implementation is worthwhile. It is not without risks, but indications are that the Village Connection can be locally sustainable. Even if operation does not continue beyond the pilot, it would provide sufficient value to the community through the services on offer and as a source of scarce employment and revenue. However, the good relationship with the community needs to be the primary concern, and they need to be informed of the conditions and risks of implementation. If it might only be a short-term project, they need to understand that.

Piloting the Village Connection will also be the only way to fully evaluate the potential of the solution on a larger scale in rural South Africa. This technology has the potential to make communication more accessible for a large percentage of the population who are excluded by lack of affordability, and its value should be fully investigated. It is also a completely new GSM implementation that can enable new services that have not yet been envisioned. Meraka and the universities are well placed to explore some of these possibilities.

If it is impossible to find an operator, then alternative technologies should be pursued. The unique relationship between the various partners creates a fertile environment for developing new solutions that are more broadly applicable than only in Dwesa.

This partner relationship is necessary for successful implementation, and we would recommend that responsibilities and commitments be formalised once the project strategy is clear and before implementation takes place. There also needs to be consensus about how to proceed if the trial site becomes sustainable, and also if it does not.

Appendix A. Community Information Portal

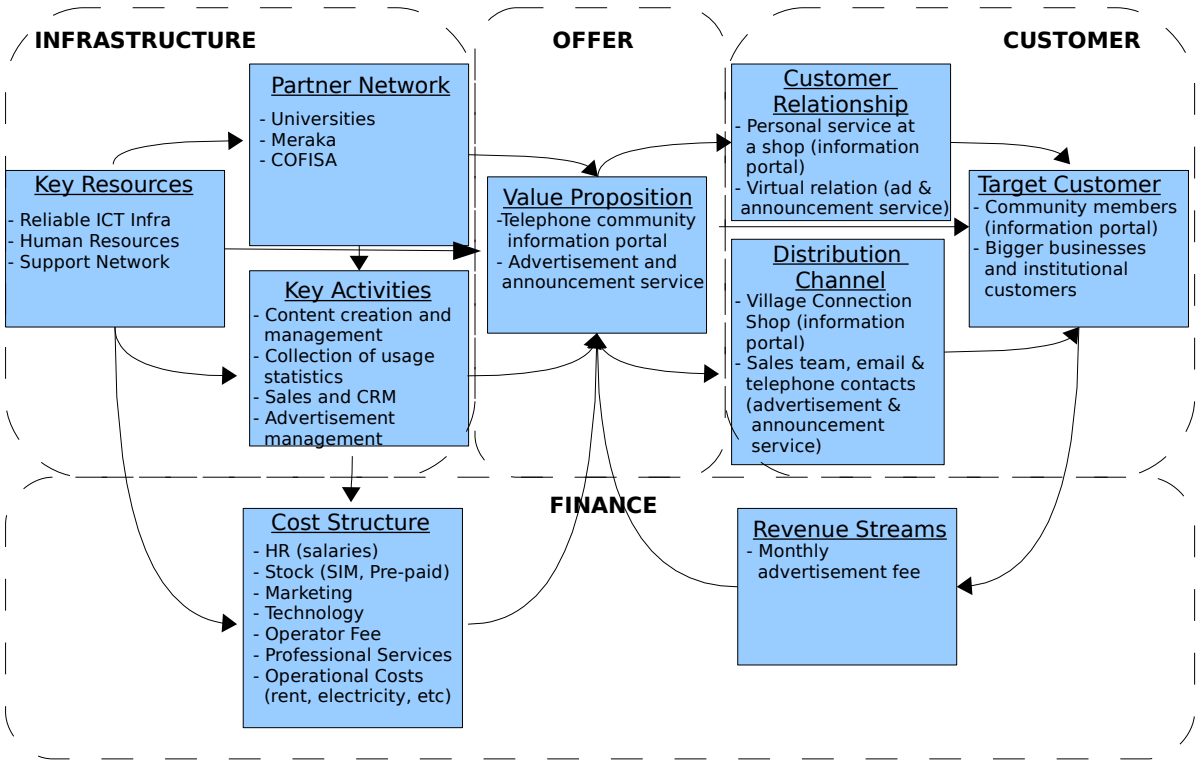


Illustration 8: Building blocks of the community information portal service bundle

A.1. Value Proposition

A.1.1. Telephone community information portal

To attract more customers for the operator and the possibility to generate incoming revenues into the community (as explained in the next section), the Village Connection concept enables the establishment of a local community information portal, where community members could call into a local phone number, to access pre-recorded information by choosing a topic that they are interested in. This service is based on an Interactive Voice Response (IVR) system, and the information can cover various locally relevant topics that the village operator will update regularly.

Examples of locally relevant information are:

- Weather forecast to help farmers to plan their schedules
- Community news to spread information about community meetings or social events such as the birth of a new child or funerals
- Upcoming job opportunities – announcement of new road fixing projects, annual work in Dwesa nature park, etc..
- Health tips linked with the advocacy efforts of the local clinic
- Farming tips
- Locally relevant announcements or advocacy campaigns run by government offices or non-governmental organisations targeting the area (e.g. news about the area development plan)
- General news such as sports results, politics, etc..

Currently community-specific information is mostly spread either by word-of-mouth or during community meetings, or sometimes through flyers that the local clinic has been using to distribute health information (more general information is available through newspapers or community radio). A simple interactive telephone service would be able to reach those community members who can't read and the service can potentially spread information faster than existing methods. But, because the radius that the Village Connection will cover is not very big, and the important social aspects of people sharing information when they visit a local shop or stop for a chat with another community member, it is suggested that this service would be provided without additional cost to the Village Connection customers. The value of the service for the village operator comes through higher number of network subscribers as well as with the possibility to sell advertising possibilities to institutional customers.

A.1.2. Advertising and announcement service

There are retailers from the nearby towns (particularly furniture retailers) that occasionally distribute flyers in the villages. Other marketing channels include television and radio advertisements, but these generally cover a large area and are not very focused, and are not as personal as mobile phones. Also, the scarceness of electricity means that many people don't have televisions or radios.

It might be feasible to generate advertising revenue from these and other businesses in the towns to generate additional income to the village operator (and the community). In addition to the businesses, income could be generated from the government departments that have operations in the area (local clinic, waterworks, national parks etc..), if they choose to use the service to distribute information.

The advertisements or announcements would be distributed via the telephone community information portal, so that when customers call to the service, they are required to listen to the advertisement message before being allowed to access the free information.

A.2. Customer Segments

The consumer information portal will primarily serve bigger businesses and institutional customers.

A.2.1. Bigger businesses and institutional customers

The villages in Dwesa are challenging for businesses and institutions to reach. Not all the people have access to electricity, so radio or television advertisement and announcements will miss some of this group.

From the interviews with the business owners in Idutywa and Willowvale, radio advertising was found to be the most common method to reach rural areas. The subscriber base is usually from tens of thousands upwards (Khanya FM claims that they have 81,000 listeners and Unitra claims 390,000 as their subscriber base). Typically every time the advertisement is broadcasted, there is a fee to be paid.

A few companies have already started advertising via SMS, which is a cost efficient marketing method.

Advertisement boards or handing out flyers are used rarely, because of the distance from Idutywa and Willowvale (the nearest towns where most bigger businesses are located) and the effectiveness of word-of-mouth is difficult to predict.

Rural customers are very important for most of the businesses, and a retail chain manager in Idutywa said that over 90% of their customers are from the rural areas.

These factors make the telephone community information portal an interesting medium for businesses and institutions that have marketing or community outreach budgets.

With the limited timeline, a comprehensive market research was not made. It is clear that the business would need to be big enough to have a separate marketing budget. On the other hand, if the business is run from a head-office located in Cape Town or Johannesburg, the marketing campaigns are often centrally coordinated, and small separate campaigns in Dwesa are unlikely to be even tested, unless there is a potential to reach a remarkable number of potential customers via replicated efforts.

Institutional and government customers would also need to be analysed separately, since all the local representatives immediately communicated that these decisions are not made locally.

A.3. Communication and Distribution Channels

A.3.1. Bigger businesses and institutional customers

Reaching businesses and institutional customers will be a challenging task, where the village operator would need assistance from the universities (and potentially from other partners as well). For chains and government departments where decisions are not made at the local branch level, there is a need to use email and telephone calls to be able to reach the decision-makers. Some potential customers might require face-to-face meetings, which can be costly, unless the potential revenue would justify the time and costs involved. We believe that eventually, the local operator might be able to take over most of the promotional activities, which can be done via email or during a visit to Willowvale and Idytuwa, but she/he would need to understand the concepts very well to be able to discuss about the details with customers.

A.4. Customer Relationships

A.4.1. Bigger businesses and institutional customers

The relationship with customers that are using the community information portal for advertising and announcements would benefit from a close and personal relationship, where the village operator would be able to provide advise on how to design locally relevant advertisements as well as to provide information on the use of the service (such as numbers of calls made, etc..). Unfortunately, this would mean higher costs and time consumption due to the remoteness of Dwesa, and costs should be minimised by using email whenever possible.

A.5. Revenue Streams

A.5.1. Initial revenue notes for the announcement and advertisement service

Rural advertising is seen as very important in the current competitive environment when shops are trying to attract more customers, or even maintain the existing customer base. To estimate revenues for the announcement and advertisement service, one should compare the pricing of the current methods to prevent over-pricing the service.

Radio advertising is one of the most common channels, and based on the information received from Unitra and Khanya radio stations, the advertising fees are between R 180 to R 250 for a short slot, depending on the time and station used. Unitra also charges an additional once-off fee per each advertisement, regardless how many times the advertisement will be broadcast. Each advertisement is likely to reach thousands of rural people, but not all of these would be located in the targeted region.

SMS advertising is very affordable. For example, online SMS service BulkSMS[1] charges between R 0.25 and R 0.42 per message depending on the number of messages purchased (the smallest available amount is 200 messages with the most expensive rate and cheapest rate is for a minimum purchase of 100000 messages). SMS's are likely to be read if the person is literate, and therefore considered effective.

Some monitoring of the service would be needed that would show how many calls are made in total, and per each customer, and what type of content is the most popular. This would give an indication of how many times the community members are exposed to a certain advertisement. The most popular content categories could be priced higher, and content that has less listeners, could be cheaper. Because of the small subscriber base (up to 240 people), the suitable advertising fees are likely to be up to R 500 for the most popular content category (with R 500.00 and advertiser would be able to send four SMS's to the same amount of people).

Some of the reasons why business and institutional customers might not be interested in using the advertising channel is the small scale of the trial. The time involvement that a business would need to invest to be able to reach only 240 customers, might be too much to ask for, unless the process is very simple.

A.6. Key Assets

The key assets are the same as for the Village Connection, and are thus not repeated here.

A.7. Key Activities

A.7.1. Telephone community information portal

After the set-up of the systems with an initial set of local content, key activities including the marketing and sales of the service are done concurrently with the Village Connection. New key activities are:

- Local marketing is done during community meetings, word-of-mouth, via local small businesses who are important customers, and potentially by using posters

1 htto://www.bulksms.co.za

- All the information featured in the portal will need to be either found (such as the weather forecast) or created. These recordings will then need to be updated to the system. It is assumed that at the start, the village operator will rely on the support from the partners.
- Regular collection of user statistics will help to plan what type of information community members are most interested in, which can then be used to plan future content and support marketing and sales efforts of the advertising and announcement service.

A.7.2. Advertising and announcement service

The community information portal is used as a technology platform for the advertising and announcement service, and the information gathering and processing activities are similar. These activities do require lots of initial support from the partners. Due to the very conceptual state of this service, the following steps are not explained in detail:

- Acquiring the ads - A simple and efficient process for acquiring customer ads will need to be designed based on the customer segment needs and requirements.
- Ad system operation - Once a media file that contains the actual ad is available, this will need to be added to the system via a management interface. The quality of the ad should also be tested. Until the village operator has gained enough skills, the technical partners of the trial will need to implement this part.
- Sales efforts are not done every day, but because they will need visits outside of Dwesa in addition to email and phone correspondence, they will need to be carefully planned.
- Customer relationship management for this value proposition includes continuous correspondence and re-sales, where a representation of statistical information might be of help.

A.7.3. General

- Monitoring and maintenance of the technology infrastructure
- Financial administration is important for any business, and should be an integral part of every day task of the village operator. Engagement with an accountant in Idutywa is also required in regular basis.

A.8. Cost Structure

The costs of establishing and operating the community information portal are not significant on top of the Village Connection and have not been analysed separately.

Appendix B. Projected Partner Expenses During Trial

EXAMPLES OF COSTS TO BE COVERED BY PARTNERS DURING THE SET-UP PHASE	
Human resources costs	
Project coordination	COFISA, Meraka, NSN, Operator, Universities
Market research + site selection	Meraka, NSN, Operator
Transmission and IP planning (required for 2 links from Dwesa area to Port Elizabeth)	Meraka, NSN, Operator
Radio Planning, Network Planning, Optimisation	Meraka, NSN, Operator
Technology Preparations	
Tower set-up	Meraka
VC Computer set-up	Meraka
Operators computer set-up	Meraka
IVR set-up	Meraka
Permitting process (Impact assessment, licensing, etc..)	Operator
Initial IVR Content development	Universities, Meraka
Training facilitation	Universities, Meraka
Initial marketing material development	Universities
Technology	
Infrastructure	
Tower/pole additions	Operator
Power	
Ac main supply	NSN
Battery Charger	NSN
Solar Regulator (if applicable)	NSN
Solar Panels (if applicable)	NSN
Wiring, etc..	NSN
Cabinet batteries	NSN
Hardware	
Antenna (GSM access point)	NSN
Inverter/UPS	NSN
Server (GSM unit)	NSN
Cabinet	NSN
Wireless link to the operator's shop (from VC tower)	COFISA
Software	
Operating system (GSM unit)	NSN
Other	
Communications	COFISA, Meraka, NSN, Operator, Universities
Travel (transport, accommodation, meals, etc..)	COFISA, Meraka, NSN, Operator, Universities
General overheads (communications, etc..)	COFISA, Meraka, NSN, Operator, Universities
Marketing materials (brochures, ads, branding)	Universities

EXAMPLES OF COSTS TO BE COVERED BY PARTNERS DURING THE OPERATING PHASE	
Human resources costs	
Project coordination	COFISA, Meraka, NSN, Operator, Universities
Sales and Marketing support	Universities
Support and advice to develop additional IVR content	Universities
Technology and information management and monitoring	Meraka, NSN, Operator, Universities
Technology support and maintenance	Meraka, NSN, Operator, Universities
Training	Meraka, NSN, Operator, Universities
Technology	
Hardware - Replacement and maintenance of VC equipment	NSN?
Software – Server Operating system license renewals	NSN
Other	
Communications	COFISA, Meraka, NSN, Operator, Universities
Internet connectivity for the Village Operator (via existing network)	Universities
Travel (transport, accommodation, meals, etc..)	COFISA, Meraka, NSN, Operator, Universities
Village Connection Equipment insurance fees	NSN?
General overheads (communications, etc..)	COFISA, Meraka, NSN, Operator, Universities

Appendix C. References

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Note that many additional sources were consulted, but only those that are specifically referenced in the document have been included here.