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An ICT-Hub model for rural communities

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ABSTRACT

Information and Communication Technologies (ICT) has the potential to change new and old forms of economic activity. This can result in e-literate groups, low skilled or low paid workers, unemployed people, sole parents, and those with disabilities that do not have access to these ICTs. However, it is likely therefore that assisting people to improve their access to and skills in ICT will be an important means for a Government to grow an inclusive, innovative economy for the benefit of a country. Therefore the ICT-Hub model or mechanism for integrated service delivery to rural communities may be applied for this purpose.

An ICT-Hub can be seen as a sustainable physical centre with the necessary infrastructure to provide generic services like tele-centres, desktop publishing, business support, application development, training and information services to the community.Communities and locations with poor Internet availability are likely to be considered less favourable places for economic investments, thereby limiting enterprise development and job creation and restricting the growth of SMEs, currently seen as a key driver of economic growth.

ICT-Hub provides a structure, which enables communities to manage their own development, by providing access to appropriate information, facilities, resources, training and services.

Keywords: *South Africa, Best Practices, Service Delivery, ICT, Multi-purpose Community Centres (MPCC) and ICT-Hub*

1 INTRODUCTION

Development of the local economy in rural South Africa, and Africa in general, is severely compromised by the lack of infrastructure, services and know-how. This is especially the case for enabling technologies in the Information and Communication arena.

We are living through this revolution, which brings together people from different environments (National Research Foundation, 2004). In these circumstances, people may learn from one another, but they also need basic access to and understanding of information and communication technology (ICT). Not only do people need to understand the rapid evolution of new ICTs, they also need to keep pace with the rapid changes imposed on the social structure at work, at home, in the classroom and in the entertainment field. It is indeed necessary to shape the South African information society by harnessing the key information and communication technologies and skills required for the socio-economic development of the country. This understanding needs to take shape within the context of the realities of the country in terms of information literacy. Interfaces between technology and society will need to be different, as levels of understanding may be very different from those that occur in other parts of the world. If South Africa does not become a major player in ICT, it can result in a scenario where the country will struggle to compete globally.

ICT can be regarded as both a driver and an enabler. In many of the other National Research Foundation (NRF) focus areas, ICT is treated as an enabler - influencing how things are done - but this focus area considers the aspects of ICT as the driving force for current or future change (NRF, 2004).

South Africans need to be part of the information society to be globally competitive, play their rightful role in the region and benefit as individuals. Part of this initiative is access to information and awareness of the possibilities of the effective use of ICT. Broader online literacy is required, as ICT is becoming a popular service delivery channel increasingly used by the government, business and financial sectors. It is important to address the growing functional illiteracy that disempowers people from living effectively in a modern society, by taking away people's fears of ICT (National Research Foundation, 2004).

In many respects, South Africa can at best be a fast follower in this expansive world of technology. There should be a clear distinction between the need to develop ICT capacity and the need to conduct research in this area. Fostering capacity is as important as conducting research. Many of the issues listed in this focus area can only be addressed effectively through partnerships between the NRF, industry, government and social communities. The main business of the NRF, however, remains the support and promotion of research into these issues, whereas building ICT capacity may be the responsibility of the partner.

The purpose of this article is to present the development of a model for successful implementation of ICT in a rural community (Itsoseng) and to make recommendations to the community centre for better sustainability. For this purpose the concept of a community centre first has to be explained and analyzed.

2 DEFINING MULTI-PURPOSE COMMUNITY CENTRES (MPCC)

A great deal of research has already been done on evaluation of the true state of Multi-Purpose Community Centres (MPCC) in South Africa and abroad (MPCC Research Report, 1998; Gomez & Hunt, 2001; Jensen & Esterhuysen, 2001; Conradie & Jacobs, 2003). The emphasis has, it seems, always been on community needs, financial aspects, services provided, management structures and operational aspects. It is therefore important to determine exactly what will the *best practice framework* be for evaluating a Multi-Purpose Community Centre? (This issue will be addressed in the following section.)

In addition with the best practice framework is the importance of understanding what *definitions* various parties are using to describe the operations or existence of a Tele-centre or MPCC or any form of a Community Service Centre. Community Service Centres are widely seen as a key measure of offering a wide range of services needed by the communities to the communities, and empowering communities to bring about their own development (Conradie, Morris & Jacobs, 2003).

There are many kinds or types of Community Service Centres or better known as Tele-centres. Tele-centres may be independent individual agencies, or various government initiatives like Universal Service Agency – Tele-centre Programme, Government Communications and Information Services (GCIS) - Multi-purpose Community Centre (MPCC) Programme, part of a project or national agency. It is also known as Community Service Centre, Community Information Centre, Community Resource Centre or Community Computer Centre according to the *MPCC Research Report* (1998:4).

At the end of the day, Tele-centres or MPCCs aim to stimulate and respond to the demand for information and communication services needed by the community. An indicator of the success of any Tele-centre or MPCC is the degree to which it becomes an integral part of the community it serves.

According to the South African Government Multi-purpose Community Centres programme (Government Communications and Information Services, 2001b), MPCCs have been identified as the primary vehicle for the implementation of development communications and information programmes, as these are capable of offering a wide range of services that communities can use for their own empowerment. *The MPCC Research Report* (1998:5) points out that there have been discussions around the definition of a MPCC at many conferences and meetings, but an initial definition could be:

> *"An MPCC is an organisation offering a range of developmental services (including information services) to a specific community and with a large degree of community involvement."*

According to the *Tele-centres for Socio-economic and Rural Development in Latin America and the Caribbean* (Proenza *et al*., 2001:iii), a Tele-centre may be defined as:

> *"A shared site that provides public access to information and communications technologies"*

The report from the South African Government Communications and Information Services on the Establishment of Government Multipurpose Community Centres (Government Communications and Information Services, 2001a) provided the following brief description of an MPCC;

> *"An MPCC is a place where a number of services are provided by local, provincial and national government, as well as parastatals, NGOs, CBOs and the private sector. The services offered at an MPCC are those that have been identified by communities"*

Analysing the definitions of a MPCC as explained by various parties in South Africa and abroad (indicated in examples above), it is clear that Community Service Centres are playing a major role in **integrated service delivery** to the various communities across the globe in developing countries. Apart from defining a MPCC for the purpose of this article it is also necessary to highlight, which best practices have been identified and applied in the development of the an ICT-Hub for rural communities.

3 IDENTIFY BEST PRACTICES OF MPCCS

According to the Tele-centre Research Framework for Acacia best practices (Whyte, 1998) they use a framework in terms of defining the following characteristics regarding case studies:

- Background;
- Financial Issues;
- Infrastructure;
- Service Provided;
- Management Structure;
- Operational Aspects;
- Linkages;
- Issues.

With reference to the MPCC Research Report conducted by the National Information Technology Forum (MPCC Research Report 1998:24) best practices identified for use as a framework in terms of defining the characteristics regarding case studies are discussed in the Table 1.

Table 1: *Defining the characteristics*
Source: (Adapted from the MPCC Research Report 1998:24)

Best Practice Characteristics	Description
Sustainability	One of the main characteristics of best practices is sustainability. It involves all the facets of the project from financial to political issues. Sustainability for a project or an organization means being able to maintain or prolong the services with the means available and this depends largely on the type of services provided, income generation and future plans.
Ownership	Management structure is also important in determining the success of the project. Depending on the services provided and resources available, small and efficient managerial staffs is important for a MPCC.
Linkages	Linkages in this instance mean the relationship that MPCCs have with other related and unrelated organisations. It also means that centres communicate with each other on matters of common interest, which could bring many far-reaching spin-offs. The extent of the centre's connection or link with other centres determines largely its success or failure.
Services	Services provided by the centres vary from area to area, but one of the best practices in terms of services is demand driven services i.e. that the services needed are defined by the clients which will convince them to sacrifice their resources to get them.
Finances	Financial issues are very important to the success or failure of MPCCs. It is important to have clear strategy on fundraising and raising income for centres. A clear business plan is generally accepted as a good practice for MPCCs.

Apart from best practices for a community centre one also needs to focus on key elements to address the needs in communities.

4 KEY ELEMENTS/COMPONENTS

Every MPCC is different in providing appropriate information, facilities, resources, training and services to the community. The most important key elements/components that should exist in community centres will now be provided as these should serve as mechanisms to determine the focus of service delivery in relation to the needs of a community. With reference to the Government Communications and Information Service (GCIS), some of the key elements of the MPCC programme were identified in terms of the following (Government Communications and Information Services, 2001a):

Political Neutrality: An MPCC must be a non-political community institution that brings services closer to the people.

Physical Infrastructure: The community needs to use an existing accessible infrastructure as a site for providing services. If an under-utilised existing building (where potential for growth is available), the community should look at the possibility of using it as an MPCC site. In some areas, there are no appropriate buildings to be used as MPCCs, in which case, other options of providing prefabs, containers or mobile units need to be explored.

ICT Infrastructure: In order to provide fast, efficient and effective services, there is a need to have appropriate Information and Communication Technology infrastructure at MPCCs. This will help people in rural areas to have access to technologies, thus enabling them to participate meaningfully in the global economy.

Integrated Service Delivery: An MPCC is a place where people have access to information and services from various service providers. This may include government (Labour, Home Affairs, Welfare, Education and Agriculture) parastatals (e.g. Eskom, Telkom and DBSA), NGOs, CBOs as well as business and private sector.

Information: Information from all sectors is critical in MPCCs. Government information, policies and plans should be communicated through this institution to communities.

Sustainability Issues: There are many different types of centres termed MPCC in South Africa. For the purposes of the government initiative, MPCCs are defined as those centres that have at least six government departments offering services. Government services add value to other services that are offered by the NGO and Business sectors. An MPCC should also have access to technology in the form of an Information Technology Centre (ITC) such as a Tele-centre or other forms.

Apart from these key elements as identified by Government Communications and Information Services (2001a:7), Berlyn (1997:4) determined that Multi-purpose Community Centres should be directed towards content. However, a MPCC can be made up of a mix of the list of collective contributory components that appear in the figure below. The actual mix depends on what the community wants and what it is possible and/or feasible to supply with the limited resources at hand.

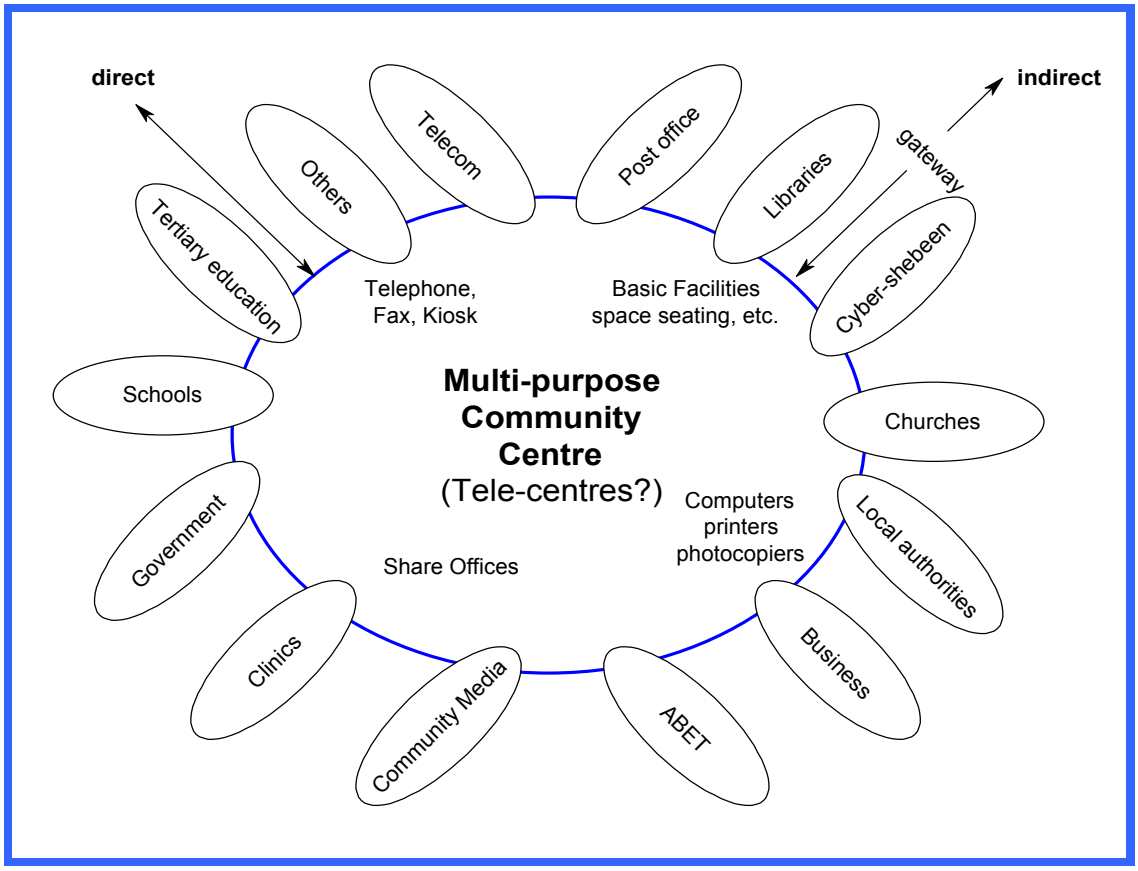

Figure 1: *MPCC Collective Contributory Components (Adapted from Berlyn, 1997:4)*

The direct contact services, which the individual community members can access in a MPCC without intervention of a third party, include telephone, fax and e-mail. The indirect contact services that might have to be rendered by or through a third party or "gateway" at an MPCC include electronic library, tele-education, tele-medicine, the Internet and Government online (Berlyn 1997:4).

A survey was conducted and information where collected and analysed at the community centre in Itsoseng with regards to service provision based on the best practices, which were identified earlier by Whyte (1998:1).

5 METHODOLOGY

The first step was to let the relevant organisations and stakeholders of the Ikageng MPCC know of this case study and even more importantly to have the buy-in of the community leadership and MPCC staff members of Itsoseng to conduct the case study. The organisations and relevant stakeholders that were contacted regarding the case study include the following list:

- Tshwane University of Technology (TUT);
- Council for Scientific and Industrial Research (CSIR);

- Ikageng MPCC Coordinator;
- Ikageng Community Management Board;
- Ikageng MPCC Staff Members.

A single case, case study was used, because like Creswell states (1998:8) the real business of case study is to take a particular case and come to know it well, not particularly as to how it is different from others, but for what it is and what it does.

> *"The case study is in a sense a kind of simulation of a real-life situation in which the experience is second-hand and probably condensed. The important merit of the case study is that it allows a problem to be studied in a complex form, including elements of real-life events, which it might be impossible to reproduce in the classroom. The main virtue of case studies is the way in which they can efficiently integrate a wide diversity of subject matter. (Jaques 1994: 94)"*

The case study researcher typically observes the characteristics of an individual unit - a child, a clique, a class, a school or a community. The purpose of such observation is to probe deeply and to analyse intensively the multifarious phenomena that constitute the life cycle of the unit with a view to establishing generalisations about the wider population to which that unit belongs (Cohen & Manion 1994:106). Whatever the problem or the approach, at the heart of every case study lays a method of observation. As a case study, it can be intrinsic because of its uniqueness or instrumental because of the stating of issues.

Creswell (1998:118) states that a purposeful selection of participants represents a key decision point in a qualitative study. This could be regarded as important because it *"permits logical generalisation and maximum application of information to other cases"* (Creswell 1998:118). The participants in the case study consisted of the centre coordinator, staff members and users of the centre. Information and viewpoints from the community leader and his management team were needed as well as the Ikageng Multi-purpose Community staff members. Their inputs were needed in order to obtain as much detail and insight as possible on the Ikageng Multi-purpose Community Centre (MPCC) and the community at large. The data in this study was collected through semi-structured interviews and questionnaires. Three different sets of questionnaires were prepared and used during the survey process for the purpose of the case study in Itsoseng:

- One set for the Ikageng MPCC Centre Coordinator and IMCOP Management;
- One set for the Ikageng MPCC Staff members;
- One set for the Ikageng MPCC users.

6 DATA COLLECTION AND ANALYSIS

Techniques employed in data collection were those typical in case studies. They included observation, semi-structured interviews, literature studies, open-ended questionnaire and personal experience. Observation is one of the earliest and most basic forms of research. Adler and Adler (1998:80) state that we make observations of the everyday world, which guide us in forging paths and interpreting actions and reactions of others. The nature of this observation is systematic and purposive.

The Ikageng MPCC (figure 2) is located close to the taxi rank in Itsoseng. It is not visible from the taxi rank, but signboards (figure 3) display the details of the MPCC and the services they offer. The local post office is within walking distance from the centre and a retail shop is on the opposite side of the street where the MPCC is located.

Figure 2: *Ikageng MPCC*

Figure 3: *Signboard at Taxi Rank*

The MPCC is a brick building consisting of three rooms and a toilet and is hosted next to a medical doctor's practice. A reception area, office and training room exist at the centre. A computer network with network points and ducting are installed at the centre to give it a more professional look a like. The services they offer are displayed on their information board (figure 4) with some examples thereof. Furthermore the MPCC mission and vision statement are displayed on the notice board and community members used the photocopying and training facility during the visit.

Figure 4: *Ikageng MPCC Services offered Display*

The observations and interviews done at the Ikageng MPCC in Itsoseng were conducted after a number of visits over a period of two and half years. A detailed training session dates are shown in Table 2 stating the minimum training and support requirements that were applied on the participants in the case study.

Table 2: *Ikageng MPCC Staff Training Sessions*

Ikageng MPCC Staff Training Session	
Period	**Description**
02 July 2001 to 06 July 2001 (Week 1)	1) MPCC Orientation *2)* Introduction to Windows *3)* MS Word Tutor Training: *CBT CD-ROM* 4) MS Excel Tutor Training: *CBT CD-ROM*
30 July 2001 to 03 August 2001 (Week 2)	1) MS Word Tutor Training (continue) 2) MS Excel Tutor Training (continue) 3) MS Publisher Tutorial
25 September 2001 to 28 September 2001 (Week 3)	1) Business Skills Training: *Your Approach to Business* 2) Business Skills Training: *Costing and Pricing* 3) Business Skills Training: *Your Business Plan* 4) Content Creation: *Front Page Tutorial* 5) PC Components: *Technical CBT CD-ROMs*
22 October 2001 to 26 October 2001 (Week 4)	1) Business Skills Training: *Costing and Pricing (continue)* 2) Business Skills Training: *Your Business Plan (continue)* 3) Business Skills Training: *Marketing* 4) Content Creation: *HTML Tutorial* 5) PC Components: *Technical CBT CD-ROMs (continue)*
12 November 2001 to 16 November 2001 (Week 5)	1) Business Skills Training: *Your Business Plan (continued)* 2) A+ Tutorial Material and Orientation 3) Content Creation Continue
13 May 2002 to 17 May 2002 (Week 6)	1) Business Skills Training (Support) 2) N+ Tutorial Material and Orientation 3) Content Creation (Support)

Mason (1996:38) refers to semi-structured interviews as qualitative interviewing, which are characterised by the following:

- A relatively informal style, for example with the appearance of a conversation rather than a formal question and answer format;
- A thematic; topic-centred, biographical or narrative approach, which covers the issues or themes the researcher wishes to cover; and
- Assumption that data are generated via interaction.

Semi-structured interviews have the advantage that the interviewer is allowed to introduce new material into the discussion, which has not yet been thought of beforehand, but developed during the course of the interview (Hitchcock and Hughes 1989:79). The semi-structured interview approach was very beneficial as the element of flexibility allowed the interviewees to freely express their views. The purpose was not to get simple yes or no answers but descriptions of episodes, linkages and explanations (Stake 1995:65).

Although different sets of questions were posed to the Ikageng Multi-purpose Community Centre (MPCC) management, staff members and users, the questionnaires focussed on the background, sustainability, ownership, linkages, services, finances and uses of the centre (best practices - *cf* 3). Questions to the Ikageng MPCC Coordinator and staff members include issues with regards to sustainability, ownership, linkages, services and finances. Questions to the Ikageng MPCC users include the opinion of the users on the centre (for example; “do you think the centre is useful to the community?”) Open-ended questions were chosen as they permit free response from the subject and allow greater freedom of expression and a wider range of responses (Ary, Jacobs and Razavieh 1990:411). As the researcher was interested in whether the management and staff of the Ikageng MPCC initiative has motivation, stability and direction in terms of the operations, the open-ended questions were preferred. The open-ended questions were put to the Ikageng MPCC Management to have more information on the needs and perspectives of the leaders of the community in Itsoseng. A second set of questionnaires was given to the Ikageng MPCC management to complete as part of the case study. Important data collection instruments were personal experience with regard to ICT-equipped rural community centres (Conradie & Jacobs 2003:30-33; Conradie, Morris & Jacobs, 2003:199-217) and a literature study review.

The case study research method was complemented by qualitative analysis during this study as Babie (1992:6) defines this term as “the non-numerical examination and interpretation of observations, for the purpose of discovering underlying meanings and patterns of relationships”. According to Ary, Jacobs and Razavieh (1990:449) data collection and data analysis take place simultaneously. From the outset of the first interview or observation, the qualitative researcher is reflecting on the meaning of what has been heard and seen. This process of data analysis is inductive as it proceeds from data to hypotheses to theory (Ary, Jacobs and Razavieh 1990:450). They (1990:451) further state that it involves working with data, organising it, breaking it into manageable units, synthesising it, searching for patterns, discovering what is important and what is to be learned, and deciding what to tell others.

This study has therefore involved all the above-mentioned processes in order to make a qualitative analysis of the findings. The research data obtained through the interview process, site visits and questionnaires used in conducting the survey in the Itsoseng Community, but more specifically the Ikageng Multi-Purpose Community Centre. However, it is important to be reminded of the best practices (*cf* 3) indicated in the previous section identify a framework that defines the characteristics regarding case studies for community centres. Therefore, the questionnaires sets used during the case study in the Itsoseng Community was researched and developed within the framework of the best practices as discussed earlier.

7 RESEARCH FINDINGS

According to the community leader, a retired human resource manager and resident in Itsoseng since 1970, the idea of establishing an Information Technology Centre in Itsoseng originated in February 1999. The idea was developed with the CSIR lead consortium and a proposal was born out of the discussions, which led to the establishment of the Ikageng Multi-Purpose Community Centre in the Itsoseng community.

The Ikageng Multi-purpose Community Centre (MPCC) initiative was started in June 2001 by a consortium of parastatals and private sector companies in conjunction with the Itsoseng Community. The consortium consisted of the Council for Scientific and Industrial Research (CSIR), Human Science Research Council (HSRC), Agricultural Research Council (ARC), Renewable Energy Africa (REA) and later the Tshwane University of Technology (TUT) funded by the former Department Arts, Culture, Science and Technology (DACST). According to the community leader, the Ikageng Multi-purpose Community Centre (MPCC) started operating on the 1st July 2001 from Itsoseng Butchery Building in Zone 2 extension with the *two* managers from Itsoseng Mpepu Community Project (IMCOP), *six* selected youths who received prior training on Microsoft Office, Microsoft Publisher and Business skill training by the consortium. The consortium provided the Ikageng MPCC with Information and Communication Technologies, various other peripheral hardware and stationery to start the centre. Members of the Itsoseng Mpepu Community Project (IMCOP) who also raised funds to support the project organised initial office furniture. The Ikageng MPCC in support of this new initiative in the Itsoseng community received a further donation from a large cement company.

During a number of visits by the research team during 2003, the Ikageng Management were interviewed on general issues concerning the current and future existence of the Ikageng Multi-purpose Community Centre. During the discussion session the leadership pointed out a number of stumbling blocks for the successful existence of the Centre. The results obtained from these interviews, questionnaires and discussions were used as inputs to develop an ICT-Hub Model (*cf* 8) for rural communities.

Results obtained from the Ikageng MPCC Coordinator(s)

The first set of questionnaires, addressing the services provided, financial issues, management structures, linkages and sustainability issues of the centre were researched, developed and constructed to assist the researcher in the information gathering process with the centre coordinators or management committee. These questionnaires were constructed to comply with the research framework in terms of defining the best practice (*cf* 3) characteristics regarding case studies of community centres.

(a) Services Provided: The services provided by the Ikageng MPCC is one of the framework characteristics identified in section three (*cf* 3). The following section (*cf* 8.1) indicates the importance of the services that this centre must fulfil to satisfy the customers needs. Questions were ask to the Ikageng MPCC Coordinators regarding the services of the centre in order to establish the profile of the clients using the services and not the detail concerning specific services.

The feedback from the questionnaires indicates that the Ikageng MPCC provides affordable good quality work within the reach of the residents they serve in the Itsoseng Community. The Centre either provides in or facilitates in the needs of the local community in which they are located. The clients that use the services of the centre, have an average education level of standard six and an average income in the region of R300 per month.

(b) **Financial Issues:** The next framework characteristics identified (*cf* 3) includes the financial issues regarding a Community Centre and the following section (*cf* 8.10 and 8.12) outlines a business model which defines the income generating potential of a centre. From the questions concerning the financial issues of the Ikageng MPCC, indicated that most of the funding is generated currently from internal funds (organisations within the community of Itsoseng) and not raised from donations or other funding sources outside the community. The coordinators felt that they will continue raising funds this way for as long as the centre exists. At the time of the survey, the bank balance of the Ikageng MPCC was R1 700. The Ikageng MPCC future plans concerning the fundraising include donations and financial support of companies in the area as well Government. At the time of the survey, a business plan exists and was available. To enable the centre to improve their current income, they need to expand and grow their current services offered to the community, their customers.

(c) **Management Structure/Ownership:** The management structure and ownership plays a vital role in determining the success of a centre or initiative as highlighted by the best practice characteristics (*cf* 3) of a community centre. Therefore the centre coordinator (*cf 8*.7) plays an anchoring role for the centre with regards to the responsibility for the day-to-day management of an ICT-Hub, which applies to the Ikageng MPCC as well.
The reporting structure lies with the same two persons for management and financial decisions in the Ikageng MPCC, one person from the Ikageng MPCC staff members and one from the Ikageng management board. According to the Ikageng Centre Manager, the perception of the community of the centre is very good and supportive. The Centre gets support from various leaders and institutions in the area (e.g. Post Office, Police Station Department of Welfare, Minister of Religion, etc.). Currently the Ikageng MPCC have six staff members running the centre on a daily basis, with skills ranging from managerial to computer related, to provide in the needs of the community. Some of the skills gaps or shortages that were identified by the centre management are (1) N+, (2) Windows Network Infrastructure Administration, (3) Windows Server and (4) Windows Directory Service Administration. According to the management these areas of improvement will help the centre considerably with the expansion of the range of current services to the community and grow their revenue stream.

(d) **Linkages:** The literature study (Benjamin, 1998; Whyte, 1998; Jensen & Esterhuysen, 2001) also indicated that linkages with or from other MPCC in the area is an indication that centres communicate with each other on matters of common interest, which could bring lots of far reaching spin-offs for the participating centres. Therefore the ICT-Hub model (*cf* 8.3) revealed the importance of establishing the communication systems in an ICT-Hub and other community centre initiatives. At the time of the survey the Ikageng MPCC had no relationship with other MPCCs in the area, as they where the only true Multi-Purpose Community Centre in the Itsoseng area. The Centre uses mostly the media as a source of referrals according to the centre management.

(e) **Sustainability:** One of the main characteristics or most probably one of the most important best practices identified of any centre or initiative is sustainability (*cf* 3). Therefore the operational components and business model (*cf* 8.10 and 8.12) of an ICT-Hub is based on defining the income generating potential of the main operational components (*cf* 8.10) in order to achieve sustainability.

The estimated monthly budget of the Ikageng MPCC is R4 800. This income needs to be generated internally from their own earnings through the services the Centre provide to the community. The figures include no donor funding. The Ikageng MPCC services are used not by a specific group of people but by all age groups, sex, youth and occupation from the Itsoseng Community. The average number of people that visit the Centre per day over a period of a week is estimated at a minimum of 30 and a maximum of 50 per day.

Results obtained from the Ikageng MPCC staff

The second set of questionnaires was directed towards the Ikageng MPCC staff members to gain insight on operational issues as perceived by the centre staff. The specific operational issues included the centres uses and users, local stakeholders, organisation, facilities and equipment, languages used in the centre, location of the centre, funding of the centre, problems experienced and needs.

(a) **Centre Uses:** From the three respondents of the Ikageng MPCC staff members two have indicated that one of the main uses is as a (1) resource centre and all three have indicated that the other main uses for the centre is (2) copying documents, (3) computer centre, (4) training and education. This information assisted in the identification of the key services that an ICT-Hub must offer to a rural community (*cf* 8.1).

(b) **Centre Users:** The ICT-Hub model goes further by identifying the potential target groups (*cf* 8.1) in the area and matching them to the services they require. The feedback from the three respondents indicated that the Ikageng MPCC is servicing four target groups in the Itsoseng Community. These target groups and the number they serve per group is captured in the following table:

Table 3: *Ikageng MPCC User Groups*

User Groups	**Number**
Individuals	800
Pupils and Students	1 500
Community Organisations and NGOs	50
Business	8

(c) **Local Stakeholders:** Of the three respondents, two indicated churches/religious bodies and educational groups as the important local stakeholders of the Ikageng MPCC. The third respondent did not indicate any stakeholders.

(d) **Organisation:** The management structure and ownership was identified as important in determining the success of a centre or initiative (*cf* 3). The ICT-Hub model (*cf* 8.7) indicated that the centre coordinator plays an anchoring role regarding responsibility for the day-to-day management of an ICT-Hub. Therefore the decision taken by the stakeholders was to establish a Close Corporation for the Ikageng MPCC. This allows the Centre to operate as a legal entity and open new business opportunities for them.

(e) **Facilities and Equipment:** The literature study revealed that appropriate information and communication technologies infrastructure at a centre, supports fast, efficient and effective services (Jensen & Esterhuysen, 2001; Conradie, Morris & Jacobs, 2003). However, study indicated that the Ikageng MPCC have access to telephone lines at the Centre to enable them to provide the Tele-centre component services such as e-mail, phoning and faxing to their clients as discussed identified by the ICT-Hub model (*cf* 8.2 and 8.10).

Table 4 summarises the facilities and equipment available at the Ikageng MPCC in Itsoseng. An additional Unix FreeBSD intranet server is installed on the Ikageng MPCC network providing services such as web, mail, ftp and DHCP servers. A detailed description, including serial numbers, quantity, specifications and delivery dates of the various infrastructures such as office equipment, information and communication technologies, stationery kits, application software and books and training networks were obtained during the research.

Table 4: *Ikageng MPCC Facilities and Equipment*

Number	Item	Number	Item
8	Computers	14	Chairs
1	Printer	3	Rooms
1	Photo Copier	0	Toilet
1	Fax Machine	-	Security in place
10	Desks	1	Scanner
1	Laminator	1	Digital Camera
1	Binding Machine	-	Computer Network (Windows 98)

(f) **Languages Used:** Communication is a very important ingredient in any business or operation to achieve success. Therefore it is of importance for the staff members of the Ikageng MPCC to understand the languages their customers use. The results from the survey indicated that four languages are used in the Centre, namely Sepedi, Sesotho, Setswana and English. The two most used languages in the Centre are Setswana first and English second. All the staff members' home language is Setswana, except for one staff member whose home language is English.

(g) **Location of the Centre:** The location of a community centre is another contributing component towards the success of such an initiative (Berlyn, 1997; Jensen & Esterhuysen, 2001; Conradie & Jacobs, 2003). Therefore the best location for an ICT-Hub (*cf* 8.11) is also highlighted as critical for success. However, passing traffic is very important for the viability of such a community centre as the Ikageng MPCC. The survey indicated through questionnaires and observations, that the Ikageng MPCC is located next to a taxi rank, 3 minutes walk from a clinic and 4 minutes walk from the nearest school. Further more the Centre is located in a large residential area with a number of working camps located within 4 minutes walk from the Centre according to the feedback received from the staff members.

(h) **Funding of the Centre:** Financial sustainability of the Ikageng MPCC is crucial for their continuous existence of the Centre and is well supported by the literature study conducted during this research project (Doczi, 2000; Proenza *et al*, 2001; Jensen & Esterhuysen, 2001; Conradie, Morris & Jacobs, 2003). Therefore the purpose of the ICT-Hub is to use the operational components (cf 8.2) and the business model (*cf* 8.10) to define the income generating potential of the services in the main components of the model.

Only two of the Ikageng MPCC staff members responded to this section of the questionnaire on the financial sustainability of the Centre. Asking the question how much money was required to setup the centre and how they raised it; both responded R10 000 of donor funds is needed to setup a centre of such nature as the Ikageng MPCC. This indicates that they rely on donor funds to equip and kick-start the centre and that they are not really familiar with the cost associated in establishing the infrastructure of this Centre.

During the interview process with the management of the Ikageng MPCC, it was indicated that they are not generating sufficient funds by themselves, and were reliant on external donors. However, the Ikageng MPCC is successful to a degree, although they have not yet found a way of guaranteeing their own financial sustainability.

(i) **Problems Experienced:** The feedback from the questionnaires indicated that the Ikageng Multi-purpose Community Centre experience two main problems, namely suitable premises and funding. Therefore, the issue of permanent suitable premises is dealt with in terms of the requirements for the best location for an MPCC or ICT-Hub (*cf* 8.11) in this model. Secondly, the centre experience problems in terms of funding capital and working capital expenses and more importantly the registration with ISETT SETA. Therefore, sustainability (*cf* 8.2 and *cf* 8.10) of the Centre will be boosted with the accreditation of the Ikageng MPCC with ISETT SETA regarding the training services they offer. The Centre will definitely boost the generation of funds as explained in terms of the income generating components (*cf* 8.10), more specifically the training component.

(j) **Needs:** The survey identified the current needs of the centre with regards to training and advice as continuous improvement of qualified training officers (*cf* 8.9) and secondly the need to start sales of stationery in the area. Last but not the least, a need was identified for equipment such as a digital duplicator, request for funds and permanent facilities for the centre.

Results obtained from the Ikageng MPCC Users questionnaires

A third source of information obtained during the survey was the users of the Ikageng MPCC that have completed the questionnaires to provide feedback on their view on the perception of the services and support that the centre itself provides to them and the community at large. The result of this questionnaire was aimed to reflect whether the users of the Ikageng MPCC could afford the services, the perception of the community regarding the Centre and the estimated number of people who use the Centre according to the users. Questionnaires where placed at the centre and completed by voluntary users. The completed questionnaires have been sent back to the research team.

(a) **Community Perception of the Centre:** The first question that the community members that visit the centre have to answer during the survey was related to the community perception of the centre as well as the reasons why. A large portion of the respondents (approximately 40%), indicated that the Ikageng MPCC is "*very good and needed by the Itsoseng Community"* with reasons for motivation such as:

"People are happy about all the services they receive from the centre"

"Because many people or children can learn what to do at the centre"

"Because people learn about computers"

"Because many people find work because of this centre"

"Some youth from the community are working as volunteers"

"It offers variety of services and is the only one around"

The second largest portion (approximately 14%) replied that the Ikageng MPCC is "*essential and needed by the Itsoseng Community*" and all respondents' reasons were *a "wide range of services are rendered by the Centre"*. However, 13% of the respondents indicated that the Centre is "important for the Itsoseng Community" with the motivating response are *"they don't have to go far for such services provided by the Centre"*. Another 13% of the respondents have the perception that the Centre is very important for "education support" and the reasons mostly are because *"they educate and give us computer related training and information".* The rest of the responses were reasons such as *"technology development, create jobs for the youth and information centre."* These statements were motivated with reasons such as *"information centre and different services available."*

(b) Number of People using the Centre: The community members using the Ikageng MPCC where asked a second question related to the number of people using the Centre and the reasons therefore. The feedback from the survey indicate that the perception of the community users of the Centre is that between twenty to a thousand people use the Centre on a weekly basis and between fifty-two and four thousand five hundred people per month. The survey further revealed that the perception of the type of services used by the community members are for example photocopying, typing of cv's and assignments, computer lessons, internet services and funeral programmes. Therefore, the Ikageng MPCC use three of the four identified operational components of the ICT-Hub Model (*cf* 8.10) for generating income.

(c) Factors for Success and Failure: All the respondents think that the Ikageng MPCC is a success. None have indicated that the Centre is a failure. Reasons given for the success of the Centre are:

"The MPCC Staff are always positive and the Centre is growing"

"Teaching the Community about Computer Technology"

"Various types of services are provided"

"Most respondents said the services rendered by the Centre are needed in the Community"

One respondent said: *"If it wasn't successful it could have been closed long time ago"*

"Resource to the Community in terms of the current services it provides"

However, the feedback indicated that the users of the Centre realise that the equipment is expensive and fulfil their current information and communication needs.

(d) What Users like about the Centre: The objective of any business or intervention is to understand what the users of the services offered like and don't like. This will enable the Centre to stay focused towards customer's real needs and not perceived needs. Listed below, is feedback from the Ikageng MPCC users regarding the things they like about the Centre?

"Friendliness towards the customers"

"Fulfil a need in the Community"

"Improving computer literacy and knowledge in the Community"

"Services not too expensive"

"It is central in Itsoseng"

"Creates employment opportunities"

"Provides Internet access in the Community"

"The staff members are good in fulfilling their job"

The following responses were received during the survey regarding the things that the users of the Centre do not like at the Ikageng MPCC:

"Limited resources e.g. one telephone line for internet, faxes and communication"

"It should be extended and have more computers"

"To small and no toilets"

(e) Afford to pay for services: The feedback indicated that the customers could afford to pay for the services. Most said that the prices are very reasonable with only one respondent saying that the business cards are too expensive.

8 THE ICT-HUB MODEL

From the previous sections, the purpose of this study indicated the need for a model to implement successfully information and communication technologies in rural communities (a technology centre in the rural communities). The Ikageng Multi-Purpose Community Centre (MPCC) in Itsoseng as a case study supported the need for a sustainable information and communication technologies (ICT) model for integrated service delivery to rural communities.

The focus of the research project is initially through training, to equip and empower the Ikageng MPCC members in the Itsoseng community, to build up the necessary computer and business skills to be able to integrate the use of computers into learning and business opportunities. Therefore the purpose of this research was to develop such a model supporting effective service delivery by a community centre equipped with ICT, with the best practices identified (*cf* 3) used as framework for the development of this model. This section addresses the issues regarding the effective utilisation of ICT in community centres, starting with the identification of the key services (*cf 8.1*) required by the community. Then group the various services into key operational components (*cf* 8.2) for the centre. After establishing the service needs of the community, the infrastructure needs (*cf* 8.3) and infrastructure components can be identified based on the service needs. This model takes it one step further by determining application needs (*cf* 8.4) and content (*cf* 8.4) for the applications identified. This model identifies tele-medicine and distance education as an application need. Human resources are needed to enable community centres to provide information and communication technology services to the community. Therefore this model addresses the human resource identification and capacity building (*cf* 8.7) activities along with the career path identification and development (*cf* 8.9) for the centre staff members to equip them with the necessary skills to provide an effective service delivery to the community at large. Once the infrastructure (technology), training (HR capacity), content (information) and customers (community) needs are identified, the best location can then be identified (*cf 8*.11) to support the drive towards sustainability (*cf* 8.12) for the community centre.

In South Africa and abroad, community service centres are playing a major role in educating and disseminating information to a spread of communities whether rural, peri-urban or urban. Historically, community centres have been meeting places for youth, pensioners and many other community activities organised in community halls, clinics and schools (Gómez & Hunt, 1999).

Therefore, community centres serve a variety of needs to the community as well as meeting points. However, the importance of the role that telecommunication plays in facilitating the activities and extending access to information to the community service centres, illustrated by various studies (Whyte, 1998; Jensen & Esterhuysen, 2001; Conradie, Morris & Jacobs, 2003), show that centres that are linked to other centres have greater access to a wider range of information (e.g. health, agriculture, tourism and education).
Considering the above stated information; the ICT-Hub therefore provides a structure that enables communities to manage their own development, by providing access to appropriate information, facilities, resources, training and services. However, in order to describe the ICT-Hub, is it important to formulate a definition of an ICT-Hub as summarised by the researcher:

> *"An ICT-Hub is a sustainable physical centre with the necessary infrastructure to provide generic services like tele-centres, desktop publishing, business support, training and information to the community and SME support through the use of Information and Communication Technologies"*

The focus of the ICT-Hub will therefore be on addressing the problems related to ICT in a community. Some of these problems are listed below (Benjamin, 1998; Gómez & Hunt, 1999; Jensen & Esterhuysen, 2001; Conradie, Morris & Jacobs, 2003):

- Insufficient telecommunications services particularly in areas of lower population density;
- A basic lack of knowledge regarding the benefits of ICT among certain groups;
- A lack of skills to utilise ICT to best effect in a community;
- An inability to afford the costs of access to equipment and the network;
- Communities and locations with poor Internet availability are likely to be considered less favourable places for economic investments, thereby limiting enterprise development and job creation and restricting the growth of SMEs, currently seen as a key driver of economic growth of a developing country;
- For telecommunications to be most effective communities must identify first how they could use ICT and generate markets for goods and services which ICT would enable them to produce;
- Lack of awareness or understanding of the potential of the Internet to improve personal and economic well-being of a community;
- Insufficient Training and professional development in ICT Skills for Education Professionals and Community Advisors;
- Inadequacy of technical infrastructure in small towns and rural locations;
- Lack of new product developments in a community.

These are some of the problems experienced in communities where ICT could play a major role in the economic growth of an area. The ICT-Hub Model aims to address most these issues by identifying services and functions needed by communities. Needs in every community differ and therefore the functions and services will differ from community to community. This ICT-Hub model is developed from a practical implementation point of view. There are various guidelines and manuals available (Fuchs, 1998; Murray, 1998 & 1999; Universal Service Agency, 1998 & 1999; Jensen & Esterhuysen, 2001), regarding Community Centres, as reference for planning the set-up of a centre. But the ICT-Hub focus on a logic flow of events in order to assist a project manager with the planning and implementation of such a centre(s) based on previous experience and research. Proper planning of the various aspects of the ICT-Hub before hand, as discussed in this section, before embarking on the process of creating expectations in a particular community regarding their perceived needs and expectations.

The implementation of an ICT-Hub must be seen as a process to empower and grow a community to its full potential by identifying and utilising the local resources to achieve the community common goal and vision, and not a once off event of technology dump and go. The ICT-Hub can serve as information and communication learning centre for farmers, students, professionals, and entrepreneurs, NGOs, community leaders and other members of the community, including disabled people. Although it is advisable for an ICT-Hub to develop an initial focus, it is more than likely that the ICT-Hub expands as the focus area may change or broaden. It is important not to try and accommodate every need or interest of the community at first, but to leave room to respond once usage patterns emerge and active participant needs can be identified. The ICT-Hub solution is based on existing Tele-centres or Multi-Purpose Community Centres, and therefore an existing Tele-centre or Multi-Purpose Community Centre can be transformed into an ICT-Hub where the focus will be more on ICT for the community it serves.

8.1. Identify Key Services or Functions

An important starting point to set-up an ICT-Hub is to identify and list the key functions and services that this centre must be able to fulfil. Therefore, provide in the needs of the targeted customers (community). A functional requirement or analysis of such a centre should be compiled.
In order to determine the type of services that are needed by the community, is it important to identify the potential **Target Groups** (e.g. schools, youth, farmers, women groups, etc.) in the area and match them to the services they require.
The ICT-Hub is likely to focus on a few priority sectors at first and then expand its focus as it develops. A good centre manager (Coordinator) will always have his or her finger on the pulse of the community and be looking out for new target groups or activities that require the ICT-Hub services. Jensen and Esterhuysen (2001) explore the **range of potential services** that MPCCs or an ICT-Hub could offer in their Tele-Centre Cookbook. Some of these services are telephone calls, e-mail and Internet access, word processing, desktop publishing, computer use, education and training, binding, laminating, etc. The information on the services that such a centre must deliver to their customers, determine the equipment requirements to offering these services. Once the services are identified for a specific community centre, the services can be group into key operational components for a Centre.

8.2. Identify Key Operational Components

The defined key services and functions of an ICT-Hub can be use to identify the operational components in order to create an operational model for the ICT-Hub to be deployed.
Each of the operational components of the ICT-Hub has specific service groups under an operational component. Therefore, each major component provides a range of services to the community at a fee. Identifying the service needs and operational components, will assist in

determining the centre infrastructure and human resource requirements in order to operate the ICT-Hub sustainable and create job opportunities within the community it serves. A summary of the types of services within each component are given below:

- **Tele-centre Services** (Telecommunication and Internet services):
  - Make and receive telephone calls
  - Send and receive faxes.
  - Send and receive e-mail
  - Get on the Internet
- **DTP Services** (Desk top publishing designing and copying services):
  - Typing
  - Preparing professional CV's for job seekers.
  - Copying and Creating business cards and letterheads.
  - Designing brochures, pamphlets and advertising material for small businesses and making copies for distribution.
  - Designing and copying community notices like funerals and weddings.
  - Assisting schools with copying, reports and question papers.
- **Training Services (Various types of training):**
  - Computer training, including operating systems, word processing, spreadsheets and databases.
  - Business training; including marketing, business planning, pricing and costing.
  - Project management training for community projects and SMEs.
  - Financial management of community organisations and SMEs.
- **Business Support Services** (Providing professional business support services):
  - Assistance with conducting viability studies, environmental scans and competition analysis.
  - Generating professional business plans.
  - Assistance with compiling funding and financing proposals.
  - Tender advice and assistance with responding to national, provincial and local tenders.
  - Financial management advice.
  - Assistance with implementation and maintenance of businesses through a system of aftercare, mentoring and ongoing support.

After key components one will also have to identify infrastructure needs.

8.3. Identify Infrastructure Needs (Technology)

Since the operational components of the ICT-Hub are established, the necessary physical infrastructure can be determined by analysing the service needs of the community.
The start-up costs of an ICT-Hub in terms of computer, telephone, other hardware equipment and capital investments should be minimised. It is not always necessary to purchase new equipment for the start-up of an ICT-Hub, although it would be ideal (Jensen and Esterhuysen, 2001). In this section only the basic infrastructure or technology needs are discussed, since Jensen and Esterhuysen have compiled a more complete list in their Cookbook for Tele-centres (2001).

- **Hardware and Equipment:** An ICT-Hub can make use of second-hand telephone systems, photocopiers, computers, printers and furniture from various organisations. However, new computer equipment will be the ideal in order to reduce the support during the implementation phase of an ICT-Hub. Regardless of whether new or second hand equipment is used initially, it is important to develop a good working relationship with a reliable supplier of computer equipment and software.
- **Computer System:** An ICT-Hub should start out with between three to five computers which can be linked with a standard Co-axial Ethernet cable or with a small 8-port hub at low cost. One machine will normally be a dedicated administration computer that is only used by the Co-ordinator and other ICT-Hub staff at the point of sale. If possible, at least four machines should be provided for ICT-Hub users. When it becomes necessary to increase the number of Computers at the ICT-Hub to accommodate more users, low-cost options for expansion should be explored rather than investing in brand new Computers. For example, it may be possible to add some older, recycled Computers. Companies that are upgrading their equipment may donate their old computer equipment to an ICT-Hub.
- **Printers:** An ICT-Hub ideally should have one printer for every 5 to 10 computer systems, all linked together over the LAN (Local Area Network). However a small or start-up ICT-Hub will operate with a printer attached to a single PC. There are a wide variety of different printers to choose from, and the choice will depend on the type of printing that the customers in the community want. An operational component of the ICT-Hub is desktop publishing work for their local communities. This type of work needs printers that are able to produce commercial, professional-looking jobs. The old dot-matrix printer is not suitable for the ICT-Hub, because the quality is too low.
- **Telephone Systems:** Generally, an ICT-Hub will aim to have at least three lines to start with – a voice line, a fax line, and a modem connection for the PC. If the ICT-Hub is small and phone services are not a big part of the planned operation, then it is possible to start out by sharing a single phone line for all services (voice, fax and Internet). This will not allow simultaneous use by all three and the phone line will have to be carefully shared. It is possible for 5 to 10 PCs to share the same phone line for simultaneous Internet access. E-mail can be provided off-line via the batched UUCP service, and the phone line need only be used for short periods to send and receive the mail. To enable the ICT-Hub operators to have control over the telephone bill, it is recommended that a pre-paid system be installed for better-cost control from the start. This will avoid the cut-off of telephone lines by the local telecommunication service provider due to late or no payments, as well as continuous service delivery to the community.

- **Internet Access System:** A modem is essential for Internet/data communications. It is the piece of equipment that enables the computer to send and receive data over telephone lines, and to communicate with Internet Service Providers to provide access to the Internet. Although many computers today have internal modems, it is better to buy external modems because of the rapid changes in modem technology. Internal modems have the constraints of operating at higher temperatures and can suffer more damage from lightning and power surges. With the telephone line plugged into a PC with an internal modem, a lightning strike can easily damage your computer. The term *peripheral* refers to all the equipment that is not part of the basic computer system package for the ICT-Hub. However, it forms part of the equipment to enable the ICT-Hub to provide an integrated service delivery to the community. (Jensen & Esterhuysen, 2001:44-47)
- **Photocopier:** A photocopier is essential for the daily running of an ICT-Hub as photocopying facilities are generally in demand. If a second-hand photocopier is bought or one is donated, make sure that the quality of copies is good enough for customers and that it can be serviced and maintained. It is not advisable to buy a very expensive photocopier to begin with. A photocopier that collates, staples and produces double-sided copies is wonderful to have, but not essential. An integrated 4-in-1 fax/photocopier/printer/scanner can be used for low-volume copying (1-10 copies) and a separate high-volume photocopier can be used for larger runs. It is important to decide whether the ICT-Hub should lease/rent or buy the photocopy equipment. Because of the high maintenance costs, renting or leasing may be the best option.
- **Binding Machine:** If there is a demand for large quantities of copying and print production work, a binding machine will be useful and can generate additional income. There are different types of binding machines to choose from, depending on the size of documents to be bound and the kind of binding used.
- **CD-Writer:** An ICT-Hub can distribute photo-albums, videos and music on CD-ROM, make back-ups, distribute web sites, save other databases and make copies of CD-ROMs. Cultural records of the community and newsworthy events can be recorded and stored in this way for future use. It is important to educate the ICT-Hub operators in the responsible usage of the device in order to prevent legal action from for instance software companies.
- **Scanner:** Flatbed scanners are the most popular. As with photocopiers, the material you want to scan is placed flat on a glass plate. Hand-held scanners cannot be used effectively for books or publications. The software for manipulating and editing scanned images is usually provided with the scanner.
- **Digital Camera:** A digital camera has become a popular item at an ICT-Hub as pictures can be transferred into documents or e-mail messages at no cost – the pictures are simply copied from the camera to the computer. A digital camera is particularly useful for an ICT-Hub servicing the needs of the local community; international travellers or visitors can easily generate additional income with a digital camera.
- **Laminator:** Laminators allow printouts to be preserved by covering them with a thin film of transparent plastic. There is a wide variety of sizes, shapes and prices. Where the community has indicated a demand for laminating services, it is important to be clear about the kinds of documents the ICT-Hub will be asked to laminate. For example, will documents primarily be A4 certificates or A3 posters?
- **Software Needs:** There will always be new software on the market making the appropriate software selection process difficult. Therefore the ICT-Hub will make use of commercial office application suites for example Microsoft Office for word-processing, spreadsheets, etc.

- **Introductory on-screen tours and tutorials:** Most software packages include introductory tours and tutorials, which can provide a starting point for learning how to use them.
- **Manuals and other texts:** Software packages usually come with manuals. Additional books and publications are available for the more popular software applications. Although an ICT-Hub should have a shelf of reference books and manuals, computer assisted training is more effective for new users.
- **Typing tutors:** Some users will certainly ask for a typing tutor program, which is an important addition to an ICT-Hub software collection. The best programmes give feedback and automatically provide tests, which are appropriate to the users' skills level. *Mavis Beacon* is a popular program.
- **CBT Material:** A range of multimedia training courses forms an integral part of ICT-Hub model training software collections that will give the practical skills needed to succeed in today's fast moving business world. Each course is a comprehensive and self-contained interactive learning environment that will rapidly equip the user of the ICT-Hub with a lifelong career skill. These type of courses take less than a minute to install and will run on any multimedia Computer.
- **Educational Software:** New educational software has developed more rapidly than many other software programmes, and the philosophy behind the software changes continuously. For example, in recent years there has been a shift in emphasis for educational software programmes to give learners more freedom to express their personal ideas and obtain individual feedback. In addition, an increasing amount of educational 'content' is delivered via the Internet, rather than as separate software that is purchased from a shop or supplier. It is important to note that these programmes should be used to supplement traditional Teaching, as learners still need the assistance of skilled teachers before they can use them effectively. It is very important for an ICT-Hub wanting to supplement educational courses, or to fill an educational gap in the community, to work together with the staff of educational institutions in the community and to find out what are the best programs to obtain.
- **Communications software:** One of the main aims of all ICT-Hubs is to provide access to the Internet. Dial-up services will be the primary means of access. Ideally, an ICT-Hub should be able to access the Internet for the cost of a local telephone call. Unfortunately, an ICT-Hub which is situated far from the nearest Internet Service Provider (ISP), may have to pay the high cost of long distance calls and this is likely to restrict use to e-mail only. An ICT-Hub should always aim to reduce operating costs so that users can pay lower prices for the services. The amount of telephone time used to transfer messages and information must be kept to a minimum. The local Internet Service Provider should provide an ICT-Hub with Internet access, E-mail and Web hosting services.
- **Stationery and Supplies:** The basic supplies are essential for an ICT-Hub (a more detail list was used during the research). Therefore, for every equipment in use, there must be stock available in the ICT-Hub to prevent the interruption of the services (for example an laminator must have enough laminating pouches in stock to serve the community needs when needed)
- **Furniture:** When introducing an ICT-Hub in a rural community, is it important to budget for the furniture needs of the ICT-Hub and not rely on using redundant furniture in the community. However, plan the furniture needs for equipment needed in the ICT-Hub to comply with the needs of the community (e.g. computer desks, chairs, cabinets and reception desk) bear in mind the reception area, computer area, office area and meeting rooms that might be required. The ICT-Hub is in the community for the community. Therefore to fulfil the furniture needs of the centre, make use of local carpenters to provide the necessary infrastructure for the ICT-Hub where possible.

8.4. Identify Application Needs

The ICT-Hub needs to identify application needs that will contribute towards the growth and development of the community and develop these needs in conjunction with the relevant institution. Some of these needs are captured and explained in the following table:

Table 5: *Application Needs for an ICT-Hub*

Application Needs	Explanation
SME	The ICT-Hub can assist small business initiatives in the community with communication, desktop publishing and business needs. It can facilitate business plan writing and funding applications.
Education	The ICT-Hub can provide distance education solutions for rural communities and training on computer aided mathematical instructions for teachers.
Health	Tele-medicine applications could be done through the infrastructure of the ICT-Hub (e-mailing health information for assistance from the specialists in the cities)
Agriculture	Small-scale farmers could use the ICT-Hub as a support mechanism for their agricultural needs.
Tourism	Community Tourism could be facilitated through the ICT-Hub.

8.5. Identify Content Needs

After identifying the relevant applications according to the needs of the community, the relevant content needs to be researched, created or populated to support the selected applications in conjunction with the relevant content providers or institutions in the field of interest of the community. Some of these content needs are explained in the following table:

Table 6: *Content Needs for an ICT-Hub*

Content Needs	Explanation
SME	An ICT-Hub should strive to improve the competitiveness and growth of small business (SMEs) in the community through the supply of relevant, value-added business information.
Education	Educational content could be hosted at the ICT-Hub and the ICT-Hub can be used for supporting teachers in the community with the education process.
Health	Health content could be hosted at the ICT-Hub as a source of basic health information for the community members, especially the youth, who would be more interested in computer technology.
Agriculture	Agricultural content in the form of “infotoons” can be digitised and hosted at the ICT-Hub to support food garden and farming activities in the community.
Tourism	Tourism information regarding the community could also be hosted on a server at the ICT-Hub and the ICT-Hub can act as an advertising agency for the community resources.
Information Dissemination (i.e. Government)	The ICT-Hub can be used for the collection and dissemination of Government information in the communities.

8.6. Identify Monitor and Evaluation Criteria

A continuous monitoring and evaluation action is recommended when implementing an ICT-Hub in order to measure the strengths and the areas of improvement of such a centre as well as gathering information to be disseminated through publications. The monitor and evaluation process should take the best practice characteristics identified into consideration when reporting on the progress status of such an ICT-Hub in a community.

8.7. Identify Human Resource Capacity

ICT-Hub Personnel Profiles: Different types of skills are needed to run an ICT-Hub effectively. The skills are based on three functions, which were derived from the key components identified, namely: (1) Business support, (2) Content creation and (3) Technical support. Each position is suited to a different personality profile. The personnel identified for training and implementation, need to conform to the following general profiles:

Table 7: *Personnel Profiles*

Aspect	Business Support	Content Creation	Technical Support
Minimum educational qualification	Matric and tertiary qualification in business or related field	Matric and tertiary qualification in related field	Matric and tertiary qualification in technical or related field
Business orientation	Proven entrepreneurial acumen and verifiable business activities in the community. Some experience in starting and maintaining a business.	Awareness of business principles and the economic conditions in the community.	Knowledge of the role and use of ICT in business.
People skills	Ability to motivate and mobilise. Thorough knowledge of the business environment in the community. Well-spoken and presentable. Can speak with authority on business issues. Able to do presentations.	Ability to liaise with community leaders and members on information issues. Knowledge of the community environment and issues relating to community development.	Understanding of support and training principles. Excellent customer service skills. Problem solving, troubleshooting, and technical support experience.
Computer skills	Basic awareness.	Basic word processing skills.	Basic competence in operating systems and productivity tools such as MS Office.
Language	English and local.	English and local.	English and local.
Responsibilities	Overall management of the centre. Business development. Assisting SMMEs with viability studies, business plans, financing proposals and financial management of businesses. Mentoring and aftercare of businesses.	Management of the Tele-centre and Desk Top Publishing tasks. Administration of income and expenditure. Content sourcing, formatting, data entry and distribution.	First level problem solving, troubleshooting, and technical support. System maintenance, efficiency and operations. Communications management. Content creation assistance.

ICT-Hub Personnel Functions: The following figure summaries some of the functions that personnel have to fulfil in the ICT-Hub. Therefore the importance of personnel to fit the ICT-Hub personnel profiles.

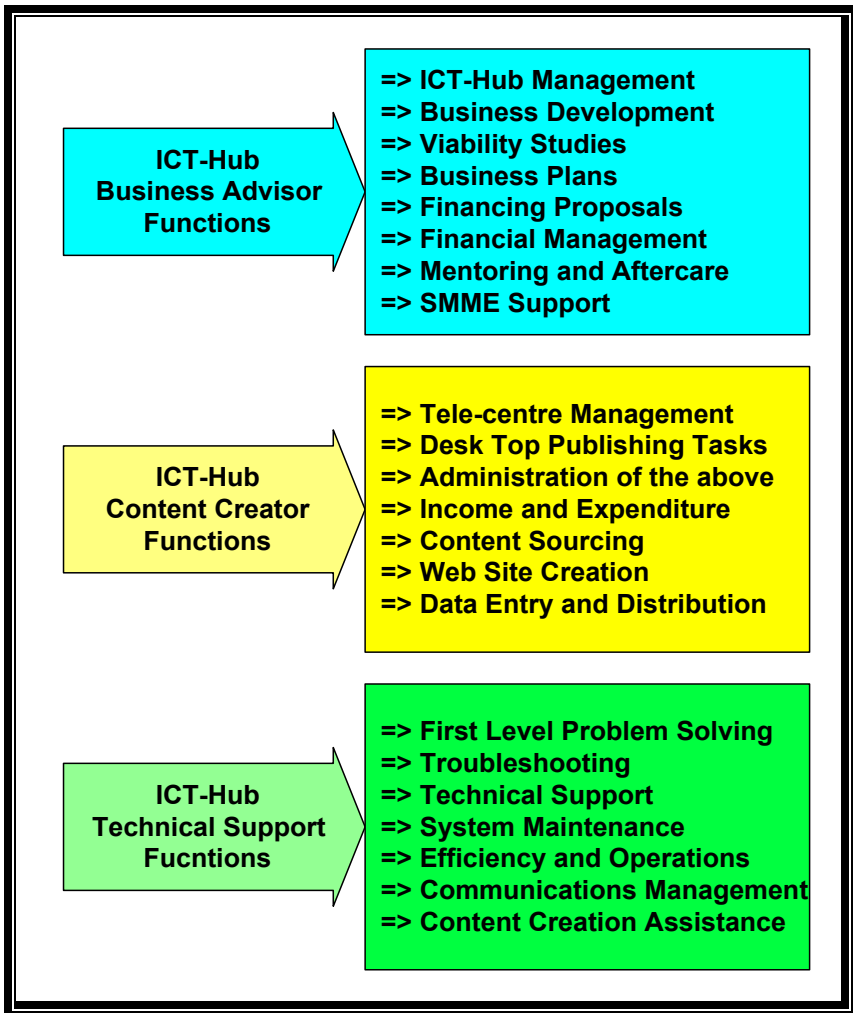

Figure 5: *ICT-Hub Personnel Functions*

ICT-Hub Centre Co-ordinator Profile: Finding a good Co-ordinator is probably the most important factor to ensure that the ICT-Hub achieves its goals. The Co-ordinator takes responsibility for the day-to-day management of the ICT-Hub. He or she is usually somebody from the community, somebody who is liked and respected, somebody who understands the community and can create the kind of atmosphere in the ICT-Hub, which will make it an important asset to the community. A good Co-ordinator will have a **vision** that incorporates his or her community and also expands beyond the community and even beyond the country. A good Co-ordinator needs to develop a sense of the value of networking, and the value of sharing information across boundaries and borders.

The Co-ordinator must account to the Management Committee of the ICT-Hub, but it is essential that they work as a team, with the Management Committee playing a hands-on role in providing the overall direction for the ICT-Hub and for the Co-ordinator. An ICT-Hub can collapse very quickly if the Co-ordinator does not have the right qualities for the job.

ICT-Hub Centre Coordinator Functions: Surely not all of the Co-ordinator's tasks will be the same for every ICT-Hub. However, there are certain essential functions like managing the day-to-day operations that a Co-ordinator will have to perform for an ICT-Hub. However, Jensen and Esterhuysen discuss the role of the Centre Coordinator in detail in the Cookbook for Tele-Centres (2001:71,72).

8.8. Identify Stakeholders and Influencing Factors

The ultimate success of an ICT-Hub is determined by the stakeholders of a community centre and influencing factors beyond the control of the various individuals that have taken ownership of the initiative. In order to reduce these risks, is it important to take the identified best practices (*cf* 3) into consideration along with the individual's political environment or factors they operate in.
Therefore, the importance of getting to know the role players within the targeted community before the research and development of an information and communication technology centre in a rural area can take place as new influencing factors will arise during the process.

8.9. Identify Training Programme (Train-the-Trainer)

Training and Support Needs: The main objective is to establish a sustainable information and communication technology resource centre in a community. The focus will be on the ICT-Hub operations and business principles. Therefore the broad training objectives are as follows:

- **First level:**
    - Develop or consolidate basic computer skills.
    - Expand these skills into the business arena through the Microsoft Office system.
    - Establish the fundamental business skills required.
    - Integrate computer and business skills for application on site.
    - Create a business plan to run the components of the pilot sites effectively.
    - Understand how this business plan will be implemented effectively.
- **Second level:**
    - Consolidate the business plan for the operational components of the site.
    - Expand the range of business skills needed to provide business support.
    - Get to grips with assessing business ventures.
    - Develop business support and counselling competencies through case studies.
    - Be able to maintain the technology on site.
    - Develop the ability to generate quality documentation and meaningful information.
    - Establish an effective training facility.

The minimum training and support procedures for participants are given, based on the following considerations:

- All participants will need both training and support.
- Further attention needs to be paid to the weaker participants in the areas of computer literacy and business support.
- The support function is a critical extension of the training and development function.

Training and Support Minimum Requirements: The ICT-Hub model make use of members of a specific rural community, some of the candidates selected to participate in the establishment of the centre may have no prior computer experience. Therefore the importance in the selection of the training content and training approach of the community members to turn their weaknesses into strengths for the benefit of the community at large. The following table summarise the recommend minimum training and support requirements to establish an ICT-Hub:

Table 8: *Training and Support Minimum Requirements*

ASPECT	RECOMMENDATION	
Description	**Duration**	**Support material**
Computer literacy and Content creation		
Windows orientation	2 days	Win Tutor computer-based training CD or equivalent
MS Word orientation	2 days	MS Word tutorials computer-based training CD
MS Excel orientation	3 days	MS Excel tutorials computer-based training CD
MS Publisher orientation	3 days	Publisher tutorial
MS Front page orientation	5 days	Front page tutorial
HTML orientation	5 days	HTML tutorial
Total	**20 days**	
Business support		
Understanding business principles	2 days	BSSA: Your approach to business.
Marketing	3 days	BSSA: Marketing
Costing and pricing	5 days	BSSA: Costing and pricing
Business planning	5 days	BSSA: Your business plan
Compiling a business plan	5 days	Electronic template of BSSA business plan.
Total	**20 days**	
Technical support		
PC components	5 days	Technical support CD-ROM
Introduction to A+	5 days	A+ tutorial material
Total	**10 days**	
Support		
Computer literacy per application	2 hours	First site visit
	1 hour	Subsequent visits
Business support	2 hours	Per site visit
Frequency of visits	Weekly	First month
	Fortnight	Next 2 months
	Monthly	After 3 months

ICT-Hub Personnel Career Path: The table below illustrates the personnel career development path to equip ICT-Hub staff members to provide efficient services to the community. The purpose of this illustrated path is to ensure maximum usage of the technology in the ICT-Hub to assist with the economic growth of the area it serves.

Table 9: *ICT-Hub Personnel Career Path*

ICT-Hub Personnel Career Development Path						
	Operational Competencies			Specialised Competencies		
Business Advisor	Introduction ICT-Hub Model	Basic Computer Training	Basic Business Skills Training	Business Cases and Plans	Advance Business Training	
Start →						
Content Creator	Introduction ICT-Hub Model	Basic Computer Training	Basic Business Skills Training	Microsoft Publisher and Front Page	HTML Training	
Start →						
Technical Support	Introduction ICT-Hub Model	Basic Computer Training	Basic Business Skills Training	Microsoft Publisher and Front Page	A+ and N+ Training	
Start →						

All participants have to understand the operational model of which they will take ownership to provide a service to the community through this ICT-Hub model as a resource to the community at large.

ICT-Hub Personnel Training Agenda: Training forms are a vital component when equipping the human resources of an ICT-Hub with the relevant skills to enable them to serve the needs of the community at large. Therefore the training approach must be carefully considered and compiled as well as the duration and time span from start to end. Conduct the training first before creating a technology thread with the candidates. However, there is a fine line with regards to *technology dump* versus *technology push* in a community.

This training model proposed a week of intensive training and three weeks of skill absorption and practice by the personnel of the ICT-Hub before the next week of intensive training took place.

However, the proposed period of establishing the ICT-Hub is twelve to eighteen months at least, within the first six months most of the intensive training must be completed to equip the personnel with the relevant operational competencies to operate towards a sustainable ICT-Hub in the community. The table below is a summary of a proposed training agenda over an eighteen-month period divided into a six-month period and a twelve-month period:

Table 10: *ICT-Hub Training Agenda*

ICT-Hub Training Agenda						
	ICT-Hub Operational Competency Training			Specialised Competencies		
	Fist Six Months Period			Twelve Months Period		
Business Advisor	Basic ICT-Hub Operations	Basic Business Skills Training	Business Cases and Plans	Advance Business Training	Advance Business Training	
Start	→					
Content Creator	Basic ICT-Hub Operations	Basic Content Creation Training	Microsoft Publisher and Front Page	HTML Training	JAVA Training	
Start	→					
Technical Support	Basic ICT-Hub Operations	Basic Content Creation Training	Microsoft Publisher and Front Page	A+ and N+ Training	MCSE and MCSD Training	
Start	→					

A detailed training agenda needs to be determined with the community stakeholders before any activity can commence. A summary of activities for the establishment of the ICT-Hub is captured in the table below:

Table 11: *ICT-Hub Summary of Activities*

Task nr.	ICT Hub Establishment Activities	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18
1	Social Facilitation																		
2	Orientation and Training																		
3	Specialised Training (Certification)																		
4	Infrastructure Development																		
5	Content Creation																		
6	Application Development																		
7	Support Period																		
8	Monitor and Evaluation																		

8.10. Identify Management Model

The operational and business model is based on defining the income-generating potential of the main operational components of an ICT-Hub. The main operational components of an ICT-Hub are (1) Tele-centre Components, (2) Desk Top Publishing Components, (3) Training Components and (4) Business Support Components; with all services provided within these components have an income generating potential. The income generating components can be illustrated graphically in the figure below:

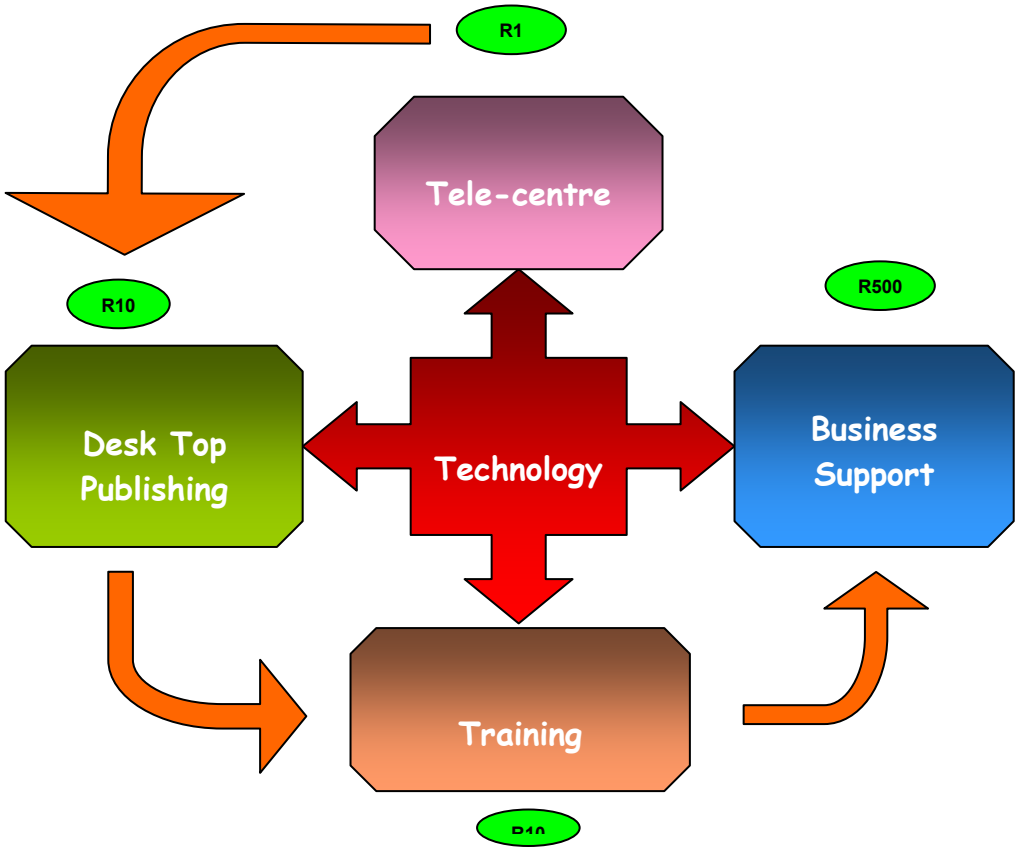

Figure 6: *ICT-hub income generating components*

8.11. Identify Best Location for an ICT-Hub

It is a costly exercise to research, design and build ICT-Hub premises from scratch in a rural community. Therefore ideally the community should provide premises for the ICT-Hub rent-free and maintenance free. If this not possible, an organisation(s) in the community might be able to provide the space or pay the rent as part of their contribution to the ICT-Hub, at least until it becomes viable.
There is the possibility to renovate a recycled shipping container; this can serve as adequate premises. Alternatively, an existing building can be transformed into an ICT-Hub. The costs of upgrading premises will vary from site to site. In some cases only the addition of a security system and paint will be required. The installation of electricity supply and a telecommunications link will be needed. In some buildings the roof will need to be fixed and an insulated ceiling installed. Insulated ceilings and/or air-conditioning is recommended to reduce the heating/cooling power consumption and to reduce the amount of dust.

As with all services aimed at the public, experience has shown that the right location is at the top of the list of key ingredients for the success of an ICT-Hub. A ICT-Hub that is far away in a side street, or hidden away in a location, will have to work very hard to make itself known to the community and is unlikely to attract any passing traffic. Therefore passing traffic is very important for the viability of the ICT-Hub. Sustainability hinges on an ICT-Hub's visibility and accessibility to

as many users as possible in the area it is located. Where highly visible premises is not available for the establishment of an ICT-Hub, marketing plans should take this into account, and relationships with other organisations in the community will be especially important.

An ICT-Hub can operate in almost any space that is available and affordable for the community, provided it has electricity (ESKOM or Renewable), a telephone connection and is reasonably secure. The number of rooms is determined by the various services the ICT-Hub needs to provide to the community. The preference would be separate rooms rather than one large room. If there is a choice of premises, look for space that is large enough to accommodate the expansion of the computer network and other small business activities.

8.12. Sustainability of the ICT-Hub

The operational components and business model is based on defining the income-generating potential of the main operational components of for example, an ICT-Hub. Each major component provides a range of services to the community at a fee. The typical transaction value of the components of service delivery follows an exponential increase from R1 through to R500 as illustrated in figure 6.

The low-cost, high volume business found in the first two components (Tele-centre and DTP) can create the fundamental cash flow needed to support the higher-level activities (Training and Business support). These elements have been combined with anticipated volumes of transactions to arrive at the target income and other aspects of the business plan, to analyse the potential for the ICT-Hub to support itself as a self-sustaining business. The ICT-Hub also reduces the *digital divide.*

The sustainability of the ICT-Hub will largely be determined by the increase in the number of members or users of the facility. Therefore the centre needs to be managed within the framework of a sustainable business plan.

9 CONCLUSION AND RECOMMENDATIONS

The motivation behind this study was to develop and investigate a mechanism to successfully implement information and communication technologies in a new or existing community centre of South Africa to contribute towards integrated service delivery mechanisms for rural and peri-urban communities.

An ICT Hub is a physical centre with the necessary infrastructure to provide generic services like tele-centres, desktop publishing, business support, training and information to the community.
The main purpose of the concept is to utilise existing government initiatives as far as possible to create self-sustainable centres by removing the burden on scarce resources. This model complies with all the requirements of the characteristics of a good model (Olivier, 2004:49), which are:

Simplicity: Miller's rule states that humans can only have seven (give or take two) concepts in short term memory at a time. A simple model makes it possible to comprehend the essence of the modelled concept as is evident in the concept of ICT provision to rural communities.

Comprehensive: Models often systematically address all (or most) aspects of a problem. This can be done because the model prevents you from getting lost in the detail of the actual problem. The more aspects of a problem the model covers, the better. All aspects of the problem of ICT provision to rural communities are addressed in the model.

Generality: The more variations of a problem the model addresses the better. The model addresses all related issues of any MPCC/Community Centre (technology, business, training, communications and desktop publishing).

Exactness: If the model closely fits the perceived problem it is more likely to be accepted. For example the model addresses the problem experienced in the case study.

Clarity: The purpose of all components or facets of the model, the operation or use of each facet, and the interaction of flow between components should be evident. In particular one should guard against ambiguity. The proposed model does indicate the flow and importance of each facet and its sustainability.

Therefore this proposed model, as developed by the researcher, can be used or applied in any rural community to address and assist with the provision of ICT and integrated services.
It appears from the study that more research needs to be done regarding Governance of these Community Centres to develop processes and templates to improve the quality of the business results of an ICT-Hub and therefore improve sustainability.

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