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Contextualising the global information revolution in a development arena: A case study

ABSTRACT

The focus of this article is to contextualise information communication technology (ICT) development within the global information arena through reference to a particular case study where an ICT was implemented in various areas in South Africa. The article sheds light on often-conflicting ideologies relating to the effect of information technology in developing countries in general and in South Africa in particular. It presents an overview of problems and possible solutions regarding acceptability, use, sustainability, and best practices. From a research perspective the article investigates how development initiatives can be supported by adapting this computerised system to the needs of users within specific contexts. It also intends to discuss general prohibiting factors in a development arena extending from implementation to usage at various levels involving diverse role players.

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INTRODUCTION

It is well known that we live in a high technology-driven era, with dynamic advancements globally in computers, software, networks, telecommunications, mass and interactive media. "Globalisation", a term first introduced in the sixties to describe international economic flows, emphasises subjectivity and culture as central factors in an accelerated process of modernisation. According to Giddens (1990), globalisation comprises three critical processes: time-space distanciation, disembedding and reflexivity, each of which implies universalising tendencies that render social relations ever more inclusive and non-localised. "Globalisation", in the words of Malcolm Waters (1994), "breaks down the nexus between nation, state, societal community and territory".

Globalisation has brought about dynamic, diverse and often contradictory effects. It is generally understood that globalization offers societies the promise of more wealth in exchange for the readiness and willingness to change, adjust, to be alert, move people, money and resources in and out of various activities, geographic locations and industries. An obvious consequence is the enhanced need for training, re-training, and acquiring the basic skills that make such flexibility possible (Grunberg, 1998: 597). Globalisation enhances sectoral and geographic mobility, increases demand for public-sponsored goods and services such as social insurance, education, as well as urban and rural infrastructure and telecommunications.

According to Milberg (see Kozul-Wright & Rowthorn 1998:79), the 'globalisation of technology' broadly refers to the increased rapidity with which the new technologies are diffused across national borders. He mentions that this is partly due to new technologies, especially the relative ease with which they can be copied or standardised.

The advantages and disadvantages of the so-called technological era are still being pondered about and debated, especially with regard to developing countries. Some researchers argue that these advancements might further marginalise developing countries (Lewis & Samoff, 1992; Tehranian, 1988; Wilcox, 1996) whilst others argue that it will help to advance modernisation (Olden, 1987; Nkereuwen, 1986; Nwokeafor, 1996).

The rapid development of information and communication technologies has stimulated significant debate about the roles that these technologies might play to accelerate social development. Most of this debate tends to centre on the extent to which the adoption and use of these technologies can contribute to reducing the massive inequity that exists between different societies around the world.

The article thus sheds light on often-conflicting ideologies relating to the effect of information technology in developing countries in general and in South Africa in particular. It presents an overview of problems and possible solutions regarding acceptability, use, sustainability, and best practices.

Aspects of implementing a specific ICT are discussed and feedback is provided on lessons learned that may be of value to other initiatives. From a research perspective the article investigates how development initiatives can be supported by adapting this computerised system to the needs of users within specific contexts. It also intends to discuss general prohibiting factors in a development arena extending from implementation to usage at various levels involving diverse role players and cultural endoginisation of technologies.

GLOBALISATION AND NEW TECHNOLOGIES

The definition of globalisation is complex. For many people, globalisation is understood to be an economic process. For others, it is a broader term that goes beyond economics and can be described as "the confluence of economic, political, social and cultural factors interacting on a world scale thanks to the expansion of knowledge, trade, information, and technology beyond geographic borders and poles of economic activity" (Morales-Gomez, 1997:2). To Robert Keohane of Harvard University (Lopez, Smith & Pagnucco, 1995:4) "globalization is fundamentally a social process, not one that is technologically predetermined". Keohane argues that the global economy and the new communication technologies are necessary components of globalisation, but they alone do not explain social changes. The critical component is the growing number of individuals (with a transnational conscience) who are committed to solving the pressing social and political problems of our age.

Although there are many forms of ICTs, the computer, more than any other product, typifies globalisation. The inexpensive production and rapid distribution of computer equipment owe much to the diversity and mobility of globalised manufacturing and communication. This computer revolution continues to be dramatic: in the 1980s there were fewer than two million computers world-wide; by 1995, there were more than 150 million computers in use. The number of computers is expected to grow by 18 to 20 million annually, and there has been a shift from mainframe to PCs (Lopez, Smith & Pagnucco, 1995). These computer links have proved to be a critical tool in the globalisation of the economic, social and political spheres.

The authors argue that participation in this information age is essential and particularly effective if the technology (be it for communication, financial transactions, medicine or otherwise) is available and beneficial to all levels of society. At national level it can

be viewed as an essential element of survival in a competitive context where globalisation is pre-eminent. However, it should be considered how the global information revolution is contextualised at local level. In the light of this issue, the article reasons that technologies must be adapted within the framework of local cultures and supports the debate that technology is essential provided it is utilised in a participatory framework.

Shifts in technology, transportation and communications are creating a world where anything can be made anywhere else on the face of the earth — leading to global economies and the fading of national economics (Thurow, 1996). Globalisation is used as a synonym for liberalisation and greater openness. However, within this new order it is important not to lose sight of the extraordinary range of cultural diversity that delineates independent communities and dictates worldviews.

GLOBALISATION AND ITS EFFECTS ON SOCIETIES

One of many concerns about globalisation is raised by those opposed to the dominance of westernisation, typified for example, by the singular lens through which the "desirable" political, economic and social ways of life are portrayed in the global media.

Particular concern has been expressed that globalisation does not necessarily result in global development, and that countries and regions unable to integrate into the new global economy are marginalised, causing their development crises to deepen even further. Nwokeafor (1996) advocates that development policy alone cannot solve the problems of developing countries and that among other entities, policy in the sphere of development co-operation should foster democracy and the rule of law, the respect for human rights and fundamental freedoms, the campaign against poverty, sustainable economic and social development of developing countries, as well as the gradual and smooth integration of the developing countries into the world economy. Human rights activists and academics were the first to grasp that computer networks and fax machines were "technologies of freedom" that could be used to enhance democracy.

At its best, globalisation should produce a synthesis of cultural views, not the triumph of one over all others. The greatest strength of globalisation is its potential to improve the economic, social and political life of all people. But it has been recommended that globalisation should unfold in ways that allow local groups to participate as equal partners. They are the resident change agents who understand the opportunities and obstacles in their own local-global nexus.

ICTs IN AFRICA

In developing countries, the majority of the population is still in a state of relative economic poverty. In view of this it is often questioned whether countries battling with a high illiteracy rate and a lack of basic resources can be expected to promote sophisticated technologies. At the threshold of the new millennium, many parts of South Africa are still in post-colonial stages of development. Africa has the world's lowest number of telephone lines, high illiteracy rates, and often lacks amenities. Additional problems are inadequate services such as sewerage, water and electricity supply, as well as a lack of emerging communication technologies (such as computers, Internet and fax connections, etc.), which many agree could impact on socio-economic development and sustainability (Lewis & Samoff, 1992). Samarajiva and Shields (1990) doubt the necessity of the implementation of telecommunications in a third-world setting. They also question the consequences of the installation of telecommunications in relatively closed communities that already have an efficient internal communication system. They further question whether a developing country should invest its funds in telecommunication, thereby withholding funds from other projects such as food supply, road building or employment.

Several authors believe in the economic and social use of information technology in Africa. Authors such as Uche (1988) believe that African countries are as much convinced of the use of telecommunications and information technology for Africa as Western countries. Nwokeafor (1996), however, recognises the advantages of the new technologies and mentions that in analysing emerging communication technologies, such as African Telematics, Internet connectivity, computers, digital/cellular telephone systems, fax and satellite systems, radio and television, it was concluded from research and data collected that most of the telecommunication infrastructures existing in African countries have improved people's quality of life. He continues to say that with applications, strategic planning, public education, public-private partnerships and regional co-operation, most African countries today are utilising the emerging communication technology to "advance modernity and overcome fragmentation" (Nwokeafor, 1996:18). It has enhanced the way business is conducted, has provided an alternative to communication in rural areas and has helped in numerous fields such as health care, education, politics and administration.

Access to information and communications technologies is becoming increasingly critical for African communities' participation in economic and political life at national, international and global levels. Advances in electronic communication networks have created enormous opportunities for developing countries. A sizeable number of African countries have already made progress in their Internet links that have put them on the global connectivity map (source).

Technologies will play an indispensable role in the future, and depend on infrastructures of communication services and interrelated industries that also play an important role in connecting South Africa with the international community. In South Africa, 1998 was regarded as the Year of Science and Technology and of the African Renaissance — two national themes that are intrinsically interrelated. Mr Themba Wakashe, (Chief Director, Department of Arts, Culture, Science and Technology) stated that although we think of the Italian Renaissance as a cultural event, we forget that paintings and poems were carried on the crest of new technology and a resurgence in scientific interest (Department of Arts, Culture, Science and Technology, 1998).

The question then, according to UNESCO (1996) is not whether developing countries should participate in the information society, but rather how information technologies can be applied effectively to development

CONTEXTUALISING INFORMATION AND INFORMATION PROVISION

International literature reflecting on the significance of information reveals that there is no single conclusive definition of information. However, the White Paper on Science and Technology (SA, 1996) states that "the ability to maximize the use of information is now considered to be the single most important factor in deciding the competitiveness of countries" as well as their ability to empower their citizens through enhanced access to information and that "… information empowers people, enables them to lobby, monitor policy, learn, collaborate, campaign and react…" (SA, 1996).

Melody (in Crowley & Mitchell, 1994:255) supports this notion in stating that the functioning of any society depends upon information and the efficient and effective communication of it among its members. Information is generally interpreted as a store of knowledge and values, and in the broadest sense, the social, cultural, political and economic institutions in any society are defined in terms of the characteristics of the shared information within and among those institutions.

Obijiofor (1998:172) focuses on the provision of information through technologies, and he contends that Africa should not embrace the new technologies but should attempt "to match the new technologies to its sociocultural practices". As the advantages of the new communication technologies are weighed against enduring local practices, those that possess the potential to cause social dislocation will be rejected, while those that fit into the culture, and indeed promote the sociocultural practices, will be adopted. He depicts Africa as a continent not eager to relinquish its culture, but at the same time willing to adapt to technologies that are useful to its existence, its environment and its people. Hundreds of billions of dollars per year are spent on information and communication technologies (ICTs), reflecting a powerful global belief

in the transformatory potential of these new technologies. However, failure has often been downplayed. Estimates suggest that the majority of ICT-based initiatives end in total failure of a system that never works; partial failure in which major goals are unattained or in which there are significant undesirable outcomes; sustainability failure that succeeds initially but then fails after a year or so; or replication failure of a pilot scheme that cannot be reproduced (Heeks & Davies, 1999).

There are various theories debating reasons for these failures, and attempting to explain interventions for desirable outcomes regarding technology acceptance.

THEORIES OF TECHNOLOGICAL DETERMINISM

Deterministic perspectives have been common amongst commentators on communication technologies. Some theorists argue that changes in communication technologies have had an important cultural impact, and that these causal theories vary in the degree of determinism they reflect. Critics have made a distinction between 'hard' and 'soft' technological determinism, the latter allowing somewhat more scope for human control and cultural variation, as is explained by Heeks & Davis (1999):

● Strong (or hard) technological determinism is the extreme stance that a particular communication technology is either a sufficient condition (sole cause) determining social organisation and development, or at least a necessary condition (requiring additional preconditions).
● Weak (or soft) technological determinism, claims that the presence of a particular communication technology is an enabling or facilitating factor leading to potential opportunities which may or may not be taken up in particular societies or periods (or that its absence is a constraint) (Finnegan, 1988:38). Other 'mediating factors' are also involved. The mere existence of a technology does not inevitably lead to its use.

Strong technological determinists believe that impact of ICT introduction is mainly determined by inherent features of the technology. Weak technological determinists believe that it is mainly human choices within social structures which determine impact of introducing ICTs. Critics of strong technological determinism argue that the following aspects outweigh technical features, namely social and political issues concerning: the circumstances of production, modes of use, values, purposes, skill, style, choice, control and access, how it fits into the power structure, how widely it is distributed. Issues such as the following need to be considered: political control, class interests, economic pressures, geographical access, educational background and general attitudes (Heeks & Davis , 1998).

It is necessary to take a systematic contextual view of technology in order to understand it. Communication technologies cannot be understood unless one also understands (a) information and its role and (b) the institutional and factorial environment.

Various models have also been constructed to analyse technological acceptance outcomes. The basis of the research methodology employed for the project which follows, are derived from the revised Technology Acceptance Model (TAM) of Davis, Bagozzi and Warshaw (Dillon & Morris, 1996). This revised model is used as initial mechanism to predict technology acceptance and to diagnose design problems before users experience a system. It is important to note that there are many variables that contribute to the success of a system, and the TAM only gages possible predictions of usage.

According to this model, user acceptance of technology is determined by two factors: perceived usefulness and perceived ease of use, which impact on behavioural intentions to use a system as well as on the actual use thereof. According to the TAM, perceived usefulness and ease of use have a significant impact on a user's attitude towards using a system, and both can be affected by external variables. Behavioural intentions to use a system are modelled as a function of attitude and usefulness, and as such determine actual use (see Figure 1). Research has also shown that behavioural intention is the strongest predictor of actual use (Dillon & Morris, 1996:10).

Figure 1: The Technology Acceptance Model (Tam) of Davis, Bagozzi and Warshaw (1989) — revised by Dillon and Morris (1996)

The technology acceptance model of Davis *et al.*
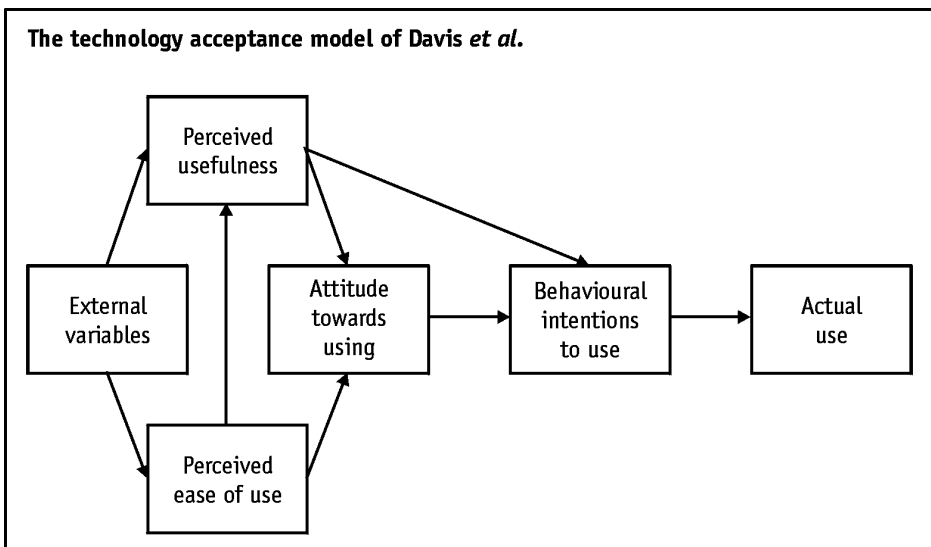
The basis of the research methodology employed for this study derives from the Technology Acceptance Model (TAM) of Davis, Bagozzi and Warshaw (1989), which is used to predict information systems' acceptance and to diagnose design problems before users experience a system. The TAM predicts that user acceptance of technology is determined by two factors: perceived usefulness and perceived ease of use, which impact on behavioural intentions to use a system as well as on the actual use thereof.

The CSIR contracted the Centre for Communication Research at the Human Sciences Research Council (HSRC) to assist them over a year-long trial pilot phase in developing an ICT. In consultation, it was decided that preliminary research should include a needs assessment, prior to the initiation of the pilot phase which essentially consisted of two stages, evaluating both needs of communities and development of systems.

BACKGROUND AND AIMS OF THE CASE STUDY

At the project proposal stage, the official aims and objectives of the case study were the development of a system and service that would function as a support mechanism and resource for community policing forums, as well as extending the reach of community safety centres and community safety centre satellites. This system (and service) aimed at having the following functions and objectives:

- Single source, multiple delivery of information that would enhance the effectiveness of the safety/security structures' reach in communities and delivery of information to them. This network would make use of wireless technologies where needed to overcome the need for existing infrastructure.
- The provision of structured problem solving and guidance facilities for members of communities.
- Two-way interaction and transactional abilities between community members and safety/security structures.

The intention was to provide a self-sustainable *one-stop* information and business service that could stimulate economic activities and simultaneously develop communities. In practice this meant that the individual could use the computer (which was patented as the In Touch system) for utility purposes, e.g. to fax, e-mail, compile curricula vitae, pay bills and shop electronically. It could also be used to access various types of information (or at times used as an interactive system) via numerous sources such as a national information resource centre, a national call centre, information documents compiled by managers of the system and other electronic information resources such as the internet or CD-ROM. A revised model of the information economy model was used as the basis of the research (Van Rensburg, 1997). Although the intention of the research initially was to provide safety and security information,

the focus was redirected to business and development features. The focus had to be redirected essentially due to lengthy negotiations about problems relating to sensitivity and security issues, as well as about the time required to set up a core infrastructure, which would have impeded progress in developing and testing the system.

Subsidiary aims were to test:

- Whether a need for information existed and if so, what type of information is needed in targeted communities;
- Which level of information (local, provincial, national) best empowers communities;
- Which other types of information would encourage usage of ICT;
- The extent to which the system promotes skills development, etc.;
- The sustainability of the model.

RESEARCH PROCESS

The research was divided into three phases. A preliminary investigation was carried out at two sites. Only potential users were consulted. Essentially Phase I was a qualitative pilot study serving as a prelude to the needs assessment. It primarily focused on establishing a general feeling about *the nature of information,* and on identifying specific information needs and preferred media/technology. Forty (n=40) individuals were interviewed for each of the areas, amounting to a total of eighty interviews. The results of phase I recommended that user requirements regarding information content be revisited. Findings indicated that the potential users primarily had specific information needs such as safety and security, jobs, education, health, legal rights, welfare, and the youth in particular, wanted "edutainment".

Phases II and III comprised the main needs assessment and evaluation stages. These phases essentially concentrated on assessing user requirements and focused on technology and methodology (as opposed to information content), although the structured questionnaires focused on obtaining user information as well as information from managers and operators of the system on diverse research issues which included user information requirements. The main purposes of these phases were to assist the CSIR during the procurement stage in developing their system. Ten sites were tested for these phases.

The evaluation stage differed from the main needs assessment of the second phase in that the structured questionnaires posed in-depth questions with the aim of eliciting user perceptions of the information kiosk and computer systems. Non-users were included at sites where there were problems in obtaining users or enough users in order to establish a substantial sample within the specific area.

Areas chosen for the research were diverse, spanning a spectrum representing urban, peri-urban and rural sites. The research concentrated on areas focusing on the needs of the following four types of users namely, the international tourist, the local travelling citizen, the publicity associations of local towns, and phone shop users in "removable railway type" containers essentialy located in previously disadvantaged areas.

The most important sites for this research were the phone shop ones, which used facilitated systems. The two main role players at this site were the phone shop managers and operators. The operators (or at times the managers) acted as "infopreneurs" — central persons with numerous responsibilities in providing information, and at the same time having entrepreneurial skills to develop the business side of the system.

Essentially, the methodology was qualitative in nature, in that it analysed and compared responses to structured questionnaire surveys. The initial needs assessment utilised the Technology Acceptance Model (TAM) of Davis, Bagozzi and Warshaw (1989) used as an initial mechanism to predict information systems' acceptance and to diagnose design problems before users experience a system.

RESEARCH FINDINGS BASED ON THE TAM

As previously described, the TAM predicts that user acceptance of technology is determined by two factors: perceived usefulness and perceived ease of use, which impact on behavioural intentions to use a system as well as on the actual use thereof. According to the TAM, perceived *usefulness* and *ease of use* have a significant impact on a user's attitude towards using a system, and both can be affected by a user's external variables. Behavioural intentions to use a system are modelled as a function of *attitude* and *usefulness,* and *determine actual use.* Research has shown that behavioural intention is the strongest predictor of actual use. Responses in terms of the variables (a) perceived usefulness, (b) perceived ease of use, (c) attitude towards using and (d) behavioural intentions to use, will be considered to assess probable future usage.

External variables possibly impacting on perceived usefulness and ease of use

There were positive and negative factors identified concerning external variables. Some respondents were concerned that costs may be prohibitive, but the information provided at the research sites was free of charge, and other services such as faxes, CVs and business cards, were provided at a nominal rate.

However, another external variable, location of venues, was not considered favourable as many sites were either located in an area where there was no passing traffic, or the computer was situated in a Vodashop (mobile container) where there was little space

and much noise. For example, at Mmabatho the system was located at the back of the Vodashop, an area that was considerably overcrowded and noisy. Respondents at the University of Durban-Westville Vodashop requested that the computer be relocated to a spacious area, preferably on the campus.

Perceived usefulness

At each site, users and non-users indicated that they found the range of topics (namely communication with police, business communication, entertainment, general communication, etc.) and possible services (curricula vitae formats, faxes, e-mail, business cards, electronic shopping and paying bills) categorised within the questionnaire, to be useful. The emphasis on specific needs changed from site to site. These findings support the fact that this system was perceived to be useful to most respondents. In summary, the most popular interactive service was general communication. Vodashops located in close proximity to students would benefit from interactive services such as e-mail and Internet (for international links as well as for facilities to draw up CVs.

Perceived ease of use

At all areas, most respondents (users and non-users) perceived the system to be easy to use, as there were operators/facilitators at the systems to assist users.

Attitude

At all the areas, users and non-users generally liked the system as a means of retrieving information.

Behavioural intention to use

At all areas, behavioural intentions were based on the availability of specific information of relevance to the user at the respective sites. For example, at the University of Durban-Westville, the users comprised students accessing the computer mostly as a utility for gathering academic information and for word processing of their assignments. Respondents requested that educational information in particular, be extended so as to assist students in their studies and assignments. More information was also required on employment opportunities, skills training such as computer courses, and other information including current affairs, business information and sports. Interactive means of world-wide communication and links to information networks via the Internet and e-mail were also requested. Most users requested safety and security information at a local level, integrated with other types of information and not on its own, specifically

concerning rape and child and women's rights.

At <u>Hammanskraal</u>, respondents would use the system if there were information on education and training, business, employment, community issues and entertainment. All respondents were interested in safety and security information (at local level in particular). At <u>Mmabatho</u> most respondents were students, requiring information relating to their studies, such as study opportunities and bursaries, other general information pertaining to employment, business, travel and tourism, sports and local community issues. Most respondents also required safety and security information at local level.

Davis, Bagozzi and Warshaw (1989) conclude that the final variable, behavioural intention to use the system, is the strongest predictor of actual use. It was found that this variable relied on specific needs of the users, which were unique at respective sites. If information could be current, specific to the individual, constantly updated, and pertains to the type of user; there was a strong possibility that the system would be frequently employed. The study also showed that the most important level of information required by the community/users of the systems was the local, as opposed to the national, level. Objective ways to identify a representative spectrum of interests of the whole community to accommodate the interests of all in terms of class, social strata, income group, education, etc. should thus be located.

As was mentioned earlier, it was found that once the system was actually used, needs changed. The system had to be available and physically tested to determine real fundamental needs. The revised TAM of Davis et al. (Dillon & Morris, 1996) was therefore found to be cyclic in practice rather than linear, and thus makes provision for changed perceptions based on fundamental needs.

LIMITATIONS OF THE RESEARCH

A lengthier time period should have spanned between the needs assessment and evaluation phase of this pilot stage of development of CSIR systems to allow sufficient time to develop utilities and compile information that would satisfy the specific needs of users and managers at various sites.

Time also plays a significant role for the implementation of needs. Logistic, managerial, and other factors impeded the development of this system. At some sites, no progress was made due to personal disputes on site, such as at Soekmekaar. This project however was not assessed and discontinued.

At many areas, fieldwork was delayed through technical and administrative problems. Maintenance problems were constantly being reported at most sites, and computers

were often not operational, as was the case at the University of Durban-Westville, or it had just been returned to the site after a long period, which resulted in a lack of users with any real experience to test, and operators who had lost touch with, the system.

During the third phase of the research, field workers in areas such as Mmabatho, Daveyton, University of Durban-Westville reported that software was not delivered timeously, and that breakdowns were not attended to promptly. There were also delays after reporting breakdowns and in returning systems to sites after repairs.

Field workers also observed that both *infopreneurs* and operators devoted their time to other business activities rather than to the CSIR In Touch system which, at the time, did not generate income for them, apart from typing and printing which were not core activities of the system. At Daveyton, the container was being used for typing courses, which seemed to have priority above the use of the CSIR system.

An attempt was made to upgrade information at certain areas, but only a few areas had systems or information upgraded, and as a result little could be tested from recommendations. At times, fieldwork was   delayed by attempts to upgrade. This happened at areas such as Daveyton and Mmabatho where the intention was to create relevant information, and even have an open day to advertise the system within the community.

GENERAL RECOMMENDATIONS

Setting up structures

It is evident from the case study that implementation of an ICT in communities begins with an initiation phase involving intensive preliminary planning between stakeholders and the communities to determine objectives, functions and outcomes and to ensure commitment. The basis for success is laid during this phase, as it determines the relationship between the community, stakeholders and project workers. During this phase, the project workers should be made aware of assumptions and have a clear vision of the objectives that have to be accomplished. The expectations of stakeholders, project leaders and communities should coincide, be documented and agreed upon to make sure that all parties know what is expected of them. Accountability is important, yet at the same time a certain flexibility of approach is required in a developmental project.

At the initial stage, a thorough analysis should be made to identify what needs and resources are available for training, maintenance, etc. Continuous evaluation should be an integral part of all phases of the process to alert project participants to problems,

opportunities and required actions, and to ensure growth.

Time span

A project of such magnitude, involving micro to macro structures, requires sufficient time to accommodate all facets of the model, to allow for deliberations and logistical implementation, as well as any complications that may arise. Time management should make provision for a process of negotiations involving all role players in this model, including communities and stakeholders (such as business and government) at various levels (from local to national level) and in various sectors. Transparency and a system of full representation that embraces all in the growth and development of the initiative should evolve. Continuity of this negotiation process should be ensured throughout the project. Research findings have indicated that co-opting involvement and acquiring commitment requires substantial flexibility on behalf of project planners. Sufficient time allocation is essential, specifically when working in communities with diverse needs.

Role of the information manager (*infopreneur*) and central resource centre

In reviewing similar previous endeavours, it is evident that an essential bonding agent has been absent in the development process. This agent's role is central to the development, operations and networking of the project, such as linking user needs, information, technical skills, managerial and business entities, etc. This study refers to this central bonding agent as an infopreneur (Van Rensburg, 1997).

Planning, organising and managing information resources and assets determine how successfully these challenges will be met. The information manager thus becomes the key in providing the right tools to manage and use information. Information managers need to understand and be sensitive to the users' environment and to the users' needs and must provide effective solutions.

Success in accomplishing the goals of this model seems to be dependent on the provision of the appropriate information and services that communities require at a specific time. The challenge is to find a mechanism that can constantly provide relevant information and maintain and develop services according to unique user needs. This may be accomplished at two levels: the infopreneur located at local level within the community, and the other by a central resources centre at national or provincial level. Both may work hand in hand.
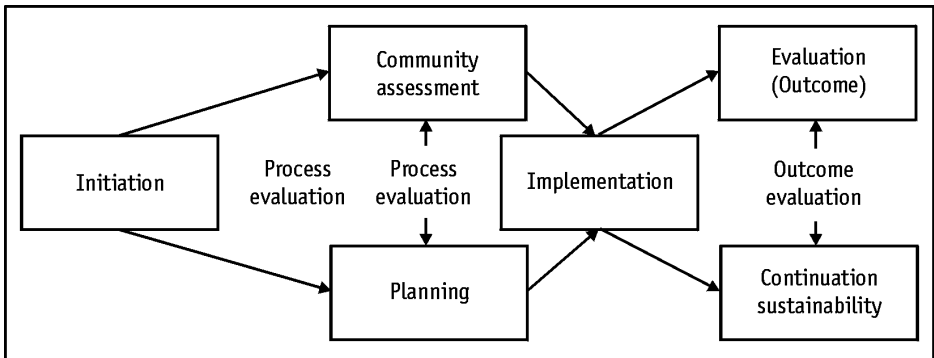
Sustainability

It was clear from the onset of the case study that the implementation of such a development initiative should be driven by the community and community needs. Standards should always be set by host communities in order to ensure that this ICT is a tool used to enhance the community's cultural identity, to diagnose community problems and to act as a vehicle for people's self-expression.

Most development projects aspire to be self-sustainable. From the initial stages of the research it became apparent that commitment was required for this venture from the diverse range of stakeholders and communities to succeed and to become self-sustainable. In the long term the business and commercial features intrinsic to the CSIR model (which is based on the information economy model) should be complied with. Community participation and inputs were essential as it was hoped that the commercial leg of the system, which provided certain utilities such as fax, e-mail, compiling curricula vitae, paying bills and electronic shopping, would generate finances to develop and sustain the system. Therefore the social, ecological and commercial needs should be reconciled.

An important lesson learnt was thus that sustainability, community participation, involvement and commitment from the community are interrelated. To obtain sustainability it is evident that from the first step of project planning, community involvement is crucial for any development project. This entails processes of negotiations, building trust, exchanging ideas and essentially meeting the needs of the communities.

As the CSIR information economy model combines both the needs of business and community development, it is recommended that the initiation and implementation stages of this model consider elements of participatory models such as suggested by the World Bank Source Book in Participation, which recommends methods on generating commitment, accountability, etc. The HSRC/MRC/NCPHPE (1997) collaborative publication **Community Participation in Service Delivery** provides a basic model for the management of participatory development, concentrating in detail on various aspects involved in the initiation, community assessment, planning, implementation and evaluation and sustainability phases which can be of assistance to the implementation of the CSIR model.

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│                  Community                              Evaluation          │
│                  assessment                             (Outcome)           │
│                                                                             │
│   Initiation     Process    Process     Implementation   Outcome            │
│                  evaluation  evaluation                   evaluation         │
│                                                                             │
│                     Planning                            Continuation        │
│                                                         sustainability       │
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SPECIFIC RECOMMENDATIONS

These include:

- Aural mediums: Kiosks/computers should make provision for voice overlay for illiterate and sight impaired users, which would also make this medium more attractive for the elderly.
- Language: Although there was no specific question relating to language at this stage of the research, it was a pertinent problem area reported by some international travelers.
- Centralised and appropriate venues with a comfortable environment would encourage usage.
- Detailed user specific information: Although information topics available on the computer may be of relevance to users, for optimal usage, detailed information is a definite need (such as specific rates, traffic reports and weather reports), which requires a constant process of reviewing data and regular updating.
- Advertising: Advertising the service provided: leaflets advertising the benefits of this service should be circulated in the vicinity, and sign boards indicating where the kiosk/computer is situated should be available. Few people are aware of the kiosks at the airport and the Shell Ultra sites.
- All systems should be clearly visible and well advertised with sign boards indicating the free service, general type of content, utilities, etc.
- In order for the systems to be effective, they must be in working order all the time, and therefore monitoring should be carried out throughout operational times.
- Information on the system constantly needs to be upgraded to also include local information, as well as more details on the topics that are available.
- To accomplish solid results from a project of such magnitude, it is recommended that the pilot study is extended well over the current time span of a year to at least a three-year period to allow for the following

a) time to *sell the project,* negotiate needs, plan together and build up trust and confidence with various business and provincial stakeholders as well as with communities involved;

b) sufficient time to set up structures needed for the type of support for the CSIR information economy model, which requires elements such as strategic information support and a national call centre. This would involve the co-ordination of numerous structures and at various levels.

- The project should commence with initial negotiations and a mapping out of the needs of each site manager as well as the needs of communities prior to the setting up of the kiosks. Commitments should be agreed upon and documented in writing for better control. Agreements should be revised at regular intervals, and there should be clear deadlines for implementation, which should be met by both parties. The manager's needs and expectations should be accommodated from the initial stage. These stages can be structured according to the development of the project and can run concurrently, as most are ongoing processes, for example training, the provision of information, etc.

- A written contract with clear directives was only drawn up with the Brits Provisional Local Town Council. Most other stakeholders were not exactly sure of their responsibilities. Although this was a pilot study that required certain flexibility within the model, it is recommended that stricter control be exerted, with written objectives and goals.

- Negotiations about commitment to the project, motivation, etc. should be intrinsic to the process.

- There should be a team that periodically monitors the progress of the system at regular intervals, and regional experts should be available to assist with maintenance and any other computer-related problem that exists.

- Workshops with stakeholders to share ideas and common problems and aspirations could benefit the development of this system as a whole.

- During the pilot phase, stakeholders should make a written commitment to identify individuals who could act as operators and to allow them to complete the full training course offered by the CSIR. Otherwise, as has been the case at numerous sites, progress is impeded, for example, at the University of Durban-Westville the operators complained that the manager, who was seldomly present, was the only person who had received training but he would not let them be trained. Field workers also reported that these operators did not know how to operate the system, which was only being used for typing purposes.

- Where possible and where affordable, this system should be on the Internet for broader access, which may encourage advertising revenue. Most sites (even the self-help model at Harrismith) requested linkage to the Internet. This would not only serve a broader audience, but would also assist with provision of information

to students who formed the majority of users at many sites.
- The scope of activities should be broadened to generate enough money specifically at self-help models.
- The problem of making provision of information part of the whole business system was not effectively articulated/conceptualised by managers during the survey. Managers at facilitated sites however, expressed an interest in developing their communities, and satisfying their respective community's needs for information and knowledge. They also recognised that the CSIR In Touch system could provide a technological solution. They however need clear business strategies where the use of information and knowledge are included as central elements. Information consumption, use and production are elements that should receive particular attention in training manuals.
- It is recommended that development of this system concentrate on issues emanating from the research. On-going costs and responsibility for maintenance and development, the whole issue of sustainable construction, sustainable maintenance, sustainable development, effective on-site management and constant training of *infopreneurs*, operators, etc., as well as regular monitoring, encouraging on-going commitment to the project, attention to needs which are unique to each site, etc., are all vital issues for the success of the system.
- The highest qualifications of many of the operators/managers who had received training were mostly between Standard 6 and matric. Even though the system is designed to be user-friendly, it may be overwhelming for these operators, with no prior computer experience, to return to their environment after a limited course of three days and be expected to cope comfortably with all aspects of the system, including the provision of information and the operation of utilities. It is therefore recommended that courses be extended and to include constant refresher courses, as well as including guidelines on aspects of business, community development and provision of information to ensure the success and sustainability of this information economy model.

RECOMMENDATIONS FOR FURTHER RESEARCH

It is recommended that additional testing of information and systems must continue until systems are developed further.

Most stakeholders view the information economy model as being extremely impressive with much potential if developed to its full capacity. The model was found not to be genericic, but hybrids exist where each site has stakeholders such as businesses, managers, operators, community and local government with their own needs and expectations. The following is recommended:

- that the time frame of all stages be extended such as to bring about effective training at all levels, on-going negotiations and consultation, joint planning and implementation, etc.
- that this initiative be linked to similar initiatives.
- that the NCPS venture be continued, i.e. consortiums be formed with departments such as health, welfare, etc., and a solid network is being established.
- that a technology plan be considered such as that recommended by Kalseth (1991:155-164), because the findings have indicated business to be the prime factor for sustainability. This application could assist businesses to allow information technology to make accessible information needed to support business initiatives. The technology plan involves aspects such as organisation; training; user/customer contribution; user friendliness and presentation of information; possibilities of expansion; communication; compatibility/standardisation; viable technology; maintenance/support; security/access control; resource sharing (information technology); and cost benefits.

CONCLUSION

One of the most important lessons learned from this research project is that in all contexts, information is often embedded as an integral part of the community process. Globalism and the information revolution should be contextualised within separate communities, and it should not be assumed that the same type of knowledge is relevant in a development situation as in other contexts.

Research findings indicate that ICT development definitely has a purpose in these communities. However, it should be used to enhance and support the communication process and not as a mechanism on its own. The point of departure differs — ICT in this context is not about technology, but about supporting life processes. Information (through technology) cannot be the starting point of a developmental project but should be seen as a means to achieve the ultimate goal of development.

The often-popularised hypothesis that information delivery will make a major impact on community life was redirected with this study. To ensure the success of this project, ways should be identified to support existing businesses and assist established ventures, and within this environment secure information delivery. Developers often make the same mistake — they *throw* solutions at problems instead of letting the problem dictate the solution.

The old ideology that sees science as "laboratory activity", views technology as existing within a narrow framework and defines indigenous people as being without "science and technology", has changed. If the new notion of indigenous technologies gains

ground there will no longer be a chasm between industrial cultures and indigenous societies but a natural co-operation between the two, with each of the two technologies playing an indispensable part in the African Renaissance (Department of Arts, Culture, Science and Technology, 1998). The western world should renounce its conviction of having exclusive solutions to world problems and stop thinking ethnocentrically in a classical teacher-pupil manner, as many international and donor organisations still do.

Obijiofor (1998) supports this notion by stating that a technology that meshes well with local cultural practices has a greater probability of being accepted. He maintains that Africa will opt for that technology, which promotes greater interaction, sustains kinship relationships and promotes sociocultural practices. He furthermore states that Africa cannot remain in isolation and needs to share ideas and information with the rest of the world for research, education and trade purposes, but must be in direct control of their own data.

In conclusion, we support Malan and Agunga (1998) who recognise that after 50 decades of external agencies trying to develop Africa, one fact has become apparent: Development is only possible if people accept it as part of their own cultural transformation. The importance of endogenous, culturally sensitive and community-related communication processes must be stressed.

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