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The START - Net work: ICT & Mobile Applications

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ABSTRACT

The potential of ICT to enable micro-entrepreneurship in peripheral and resource-scarce countries has been well documented in contexts, such as agribusiness, fisheries and manufacturing. There has been, however, a paucity of research in ICT's potential to support tourism micro-entrepreneurship. While tourism has often been proposed as a mechanism for sustainability in developing countries, most host communities remain relegated to the role of passive "tourees" who fail to benefit from the economic capital often dominated by Western economies. Guided by design science theory, this work was informed by fieldwork conducted in South Africa in January and February 2011 which aimed at designing and testing an information technology artifact. Using action design research principles, we included the perspectives of individuals from rural communities and with high-level stakeholders in tourism planning and telecommunications corporations. Early findings suggest that mobile telephones and applications play a significant role in SME and potential entrepreneurship development and sustainability. The findings, herein, also guided the development of an information technology artifact, START-Net, to support community-based tourism entrepreneurship in rural South Africa.

INTRODUCTION

Tourism has not been a traditionally studied industry in the information systems (IS) literature. Yet, to support small and medium enterprises (SME), information and communication technologies (ICT), in general, and mobile applications, in particular, offer the ability to create authentic and locally-beneficial tourist experiences. Hence, this untapped market can afford opportunities for individuals in resource-scarce rural regions to spawn economic development and entrepreneurship as a path to prosperity.

Despite the efforts of numerous non-governmental organizations (NGOs) and tourism providers, however, the majority of host communities are not significant players in the economic development of tourist industry. Rather, these communities are passive recipients of foreign investments – resulting in smaller stakes in the economic gains of a potentially flourishing market. Further, communities adjacent to destinations remain in desperate poverty, leaving government agencies to police local use of resources and to provide for the welfare of the most

under-resourced. Scholarship focused on planning for sustainable tourism have yielded modest progress in informing how tourism can play a critical role in mitigating human development disparities and environmental degradation. Therefore, our research question is: *"How do local South African residents view mobile applications for the use of entrepreneurship and SME support?"*

This project focused on examining whether tourism micro-entrepreneurship is a viable option for rural poverty in the context of South Africa. Hence, the Sustainability and Technology for the Advancement of Rural Tourism Network (START-Net) was conceptualized as a virtual marketplace, akin to a real village market, that mediates transactions between networks of micro-entrepreneurs and their markets (i.e., independent tourists and some tourism providers). The system functions similarly to more common online tourism booking sites, but it allows micro-entrepreneurs to participate with the use of the simplest mobile-phones – making it accessible to virtually anyone worldwide. This research accounts for a yearlong process of delineating the START-Net and testing its scope and functionality through a ten day field study in January 2011. The field study focused on examining prevalence of mobile-phone use and entrepreneurial activity with a primary interest in tourism micro-ventures. This research was also informed by action design research interactions with high-level stakeholders in tourism planning and telecommunication industries.

This paper is structured as follows: We will provide a literature review and an overview of the START-Net artifact. A description of the research method is provided with findings from the field study. Finally, we discuss the research implications and conclusions.

LITERATURE REVIEW

IS Design Science

IS scholars (Klein and Myers, 1999) offered seven guiding principles for conducting and evaluating interpretive field studies. Relative and relevant to our research, Klein and Myers (1999) discussed the Principle of Multiple Interpretations. This principle *requires sensitivity to possible differences in interpretations among the participants as are typically expressed in*

multiple narratives or stories of the same sequence of events under study (p. 72). As the authors noted, this theory can enable researchers to uncover and understand issues of power, economics and values, particularly where conflicts can be present. While conflicts are not a required condition, researchers can probe for additional meaning of the actors and context involved. Hence, this can encourage auxiliary investigation as outlined in the Principle of Suspicion. The result of the Principle of Suspicion leads the researcher to assess and interpret the presence of power, vested interests and scare resources that impact the social world of the actors involved.

To this extent, Gregor (2006) guided the IS field relative to "how to do" something via the Theory for Design and Action. *This theory is about principles of form and function and justificatory theoretical knowledge that are used in the development of IS* (Gregor, 2006, p. 25). The "how to do" merges IS development processes and IS development concepts, and can be termed design science.

Moreover, design science lends itself to the concept of development with emphasis on the IT artifact (Hevner, et al, 2004) which can be informed by models, foundational constructs and evaluative metrics. Gregor posited that the focal point of this work is the design of an activity not the problem which can be investigated using a myriad of methodologies, such as action research. As articulated by Lau (1997) and demonstrated in Payton and Kiwanuka-Tondo (2009), action research has been used by IS scholars in their discussion of systems analysis, design, implementation, usability and human computer interaction.

Contribution to knowledge based on the Theory for Design and Action can be ascertained by the presence of specific conditions. *These criteria include utility to a community of users, the novelty of the artifact and effectiveness, while methods and models can be evaluated for completeness, simplicity, consistency, ease of use and quality of the results* (Gregor, 2006, p 26).

Sein, Henfridsson, Purao, Rossi and Lindgren (2011) posited that design research (DR) has traditionally been rooted in a technologically perspective. This perspective is centered about designing and building IT artifacts in an almost customary sequence of steps. The result is a conventionally design of IT artifacts absent of organizational context and relevance. To address this void and engender learning from the intervention (Sein, et al., 2011, p 38), the researchers proposed action design research (ADR) as an innovative method to address this problem. In an

effort to incorporate action into the DR, Sein, et al. (2011) calls for a shift from the design, build and evaluate perspective. Further, ADR moves the emerging IT artifact from the sole influence of designers to that of users in a given context while remaining attentive of the problem formulation. According, the Problem Formulation stage is characterized by two principles: Practice-Inspired Research and Theory-Ingrained Artifact. The Practice-Inspired research theory regards field problems as knowledge-creation opportunities while the Theory-Ingrained Artifact principle emphasizes that the IT artifact created and evaluated via ADR is informed by theories (Sein, et al., p 40).

Hence, in the case of START-Net, the practice-inspired research seeks to answer a question of utility to community users and is stated as follows: "*How do local South African residents view mobile applications for the use of entrepreneurship and SME support?"* By addressing this research question, we are presented with opportunities for knowledge-creation. On the other hand, the Theory-Ingrained Artifact principle guided the creation of the actual artifact and evaluation of its use and potential uses for the South African residents. Figure 1 illustrates the principles that define ADR which are defined by **P**roblem **F**ormulation; **B**uilding, **I**ntervention and **E**valuation; **R**eflection and **L**earning; and **F**ormulation of **L**earning.

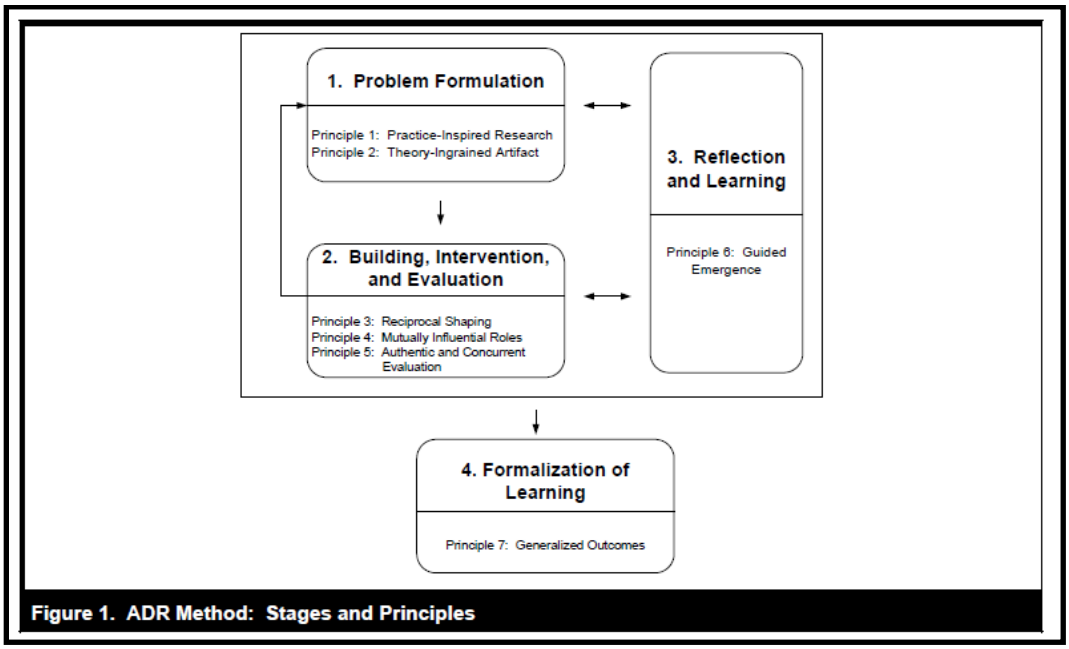


Figure 1: Adopted from Sein, et al. (2011), p 41

Mobile Telephones

In its Working Paper No. 51 (2005) entitled, *Connecting Sub-Saharan Africa A World Bank Group Strategy for Information and Communication Technology Sector Development*, the World Bank stated:

> *To help Sub-Saharan Africans connect more efficiently with one and other and the world, the WBG has supported the promotion of competition, the development of regulatory agencies and frameworks, the clear separation of postal and telecommunications activities, the privatization of incumbent telecommunications operators, and the strengthening of telecommunications ministries.*

In the mobile phone provider space, the Informa Telecoms and Media Group reported that the growth market is Africa. Africa was shown second only to India with regard to percentage increase from the prior year, then 2008. The percentage increase on a year earlier for India, Africa, China, Indonesia, Vietnam and Brazil was 52, 32, 16, 46, 86 and 22, respectively. Specific to the context of Sub-Saharan Africa, the International Telecommunication Union reported the growth in mobile phone subscribers per 100 inhabitants among several countries from 2000 to 2005. South Africa (71.6), Gabon (estimate 48), Nigeria (estimate 15) and Kenya (estimate 14) showed the greatest penetration of mobile subscribers.

These trends have persisted. *Time Magazine* (June 30, 2011) led with a story, "Silicon Savanna: Mobile Phones Transform Africa", to capture the use of mobile phones in the region. In sum, the *Time* article speaks to the economic impact of mobile technology on Sub-Saharan African health, farming, and education sectors, and offers these observations:

From almost none a decade ago, there are now half a billion mobile phones in Africa, roughly one for every two Africans, according to industry analyst Informa Telecoms & Media. The economic effect has been just as dramatic. According to studies by the London Business School, the World Bank and consultants at Deloitte, for every 10 additional mobiles per 100 Africans, GDP rises 0.6% to 1.2%...For rapid, catalytic growth, it's the biggest opportunity there is.

Scholarly works (Donner, 2008; Dwivedi, Williams and Venkatesh, 2008; Loudon, 2010) confirm the observations noted in *Time Magazine.* Dwivedi, et al (2008) summarized

publications in a special issue of *Information Systems Frontiers* and determined that the Technology Acceptance Model (TAM) was the most widely used framework among ICT which was followed by Diffusion of Innovation (DoI). Specifically, one study in the special issue, Hong, Thong, et al (2008) examined personal motivations for using mobile data services, such as information content, communications, commercial transactions and entertainment. The results of this work provided empirical evidence that social influence, perceived mobility and perceived monetary value influenced consumers' use of mobile services. In addition, perceived ease of use and perceived usefulness significantly impacted continued usage of mobile data services.

In the context of the developing world, Donner (2008) provided an extensive literature review using 200 published works focused on mobile phones. Drawing from an interdisciplinary body of work, the review identified studies in a myriad of fields including communication, computer science, sociology, policy, information science, just to name a few. One dimension that emerged from the Donner (2008) review was economic development that spawns from mobile use and adoption. Donner reported that the determinants of mobile adoption fall into three categories: 1) diffusion of innovation as often cited by Rogers (2003); 2) regulatory frameworks and industry structures governed often by local, national and public policy; and 3) the digital divide and universal access which can be inclusive of use, access and inequities (Kvasny and Payton, 2005, 2007; Payton, 2008).

Withstanding the theoretical frame, the impacts of mobile use in the developing world, in general, and Sub-Saharan Africa, in general, are vast and engendering economic development and broader well-being (Donner, 2008, p 146). The growth of SME and health care intervention and prevention initiatives continues to provide methods to address poverty, education and social movement (*Time Magazine*, 2011; Informa Telecoms & Media, 2009).

The mobile phone has gone from being a rare, expensive item used by the business elite to a pervasive, low-cost personal item that has become the world's leading telecommunications technology –with a profound impact on the social connectedness of users (Aker & Mbiti, 2010). Mobile phones are now able to reach people in remote places and grow their social and economic networks but still lack practical and inexpensive systems to access markets and mediate commercial transactions, and facilitate business networks (Aker & Mbiti, 2010).

Given the findings in the IS design science and mobile applications research, we return to our research question: *"How do local South African residents view mobile applications for the use of entrepreneurship and SME support?"* This question is addressed in the following sections as we present our IT artifact (START-Net) below and determine how a community of users can use the artifact's functionality.

The START-NETWORK OVERVIEW

The WishVast system is a cell-phone-enabled social network system developed to connect networks of micro-entrepreneurs initially in the context of small-scale Kenyan farmers and agricultural retailers, and later adapted to informal employment, micro-lending and other applications. Currently, we are using an open-source software platform as a benchmark for the development of a related system that might support future tourism micro-entrepreneurship projects. The START-Net system (see Figure 2) is being designed to create a virtual marketplace of tourism services, akin to a traditional village marketplace. The system allows entrepreneurs to compete and collaborate with each other selling their tourism services to networks of independent tourists, or possibly to tourism providers interested in supplementing their offerings.

In the prototype version of the system, independent tourists intending to visit a rural region can register on the web portal for a small fee and can download an app for their smart-phones. They will register a mobile phone number to be used during their travels, and can use their own global-ready cell-phone, rent a travel phone (e.g., National Geographic Travel phones) or purchase a cell-phone at the international destination. The website forms a gateway to the START-Net Marketplace and the tourist's cell-phone becomes a customer-member in this virtual network.

Networks of tourism micro-entrepreneurs in poor rural areas will also register in the system as sellers, and their registration will generally be mediated by non-governmental organizations (NGOs) with stake on and history of empowerment work in the area. Each entrepreneur will have a geographically anchored seller's profile describing services provided, visitor comments and quality ratings. The system allows tourists to browse the marketplace geographically to plan their trip, and to use their GPS-enabled smart phones to add-on experiences while traveling.

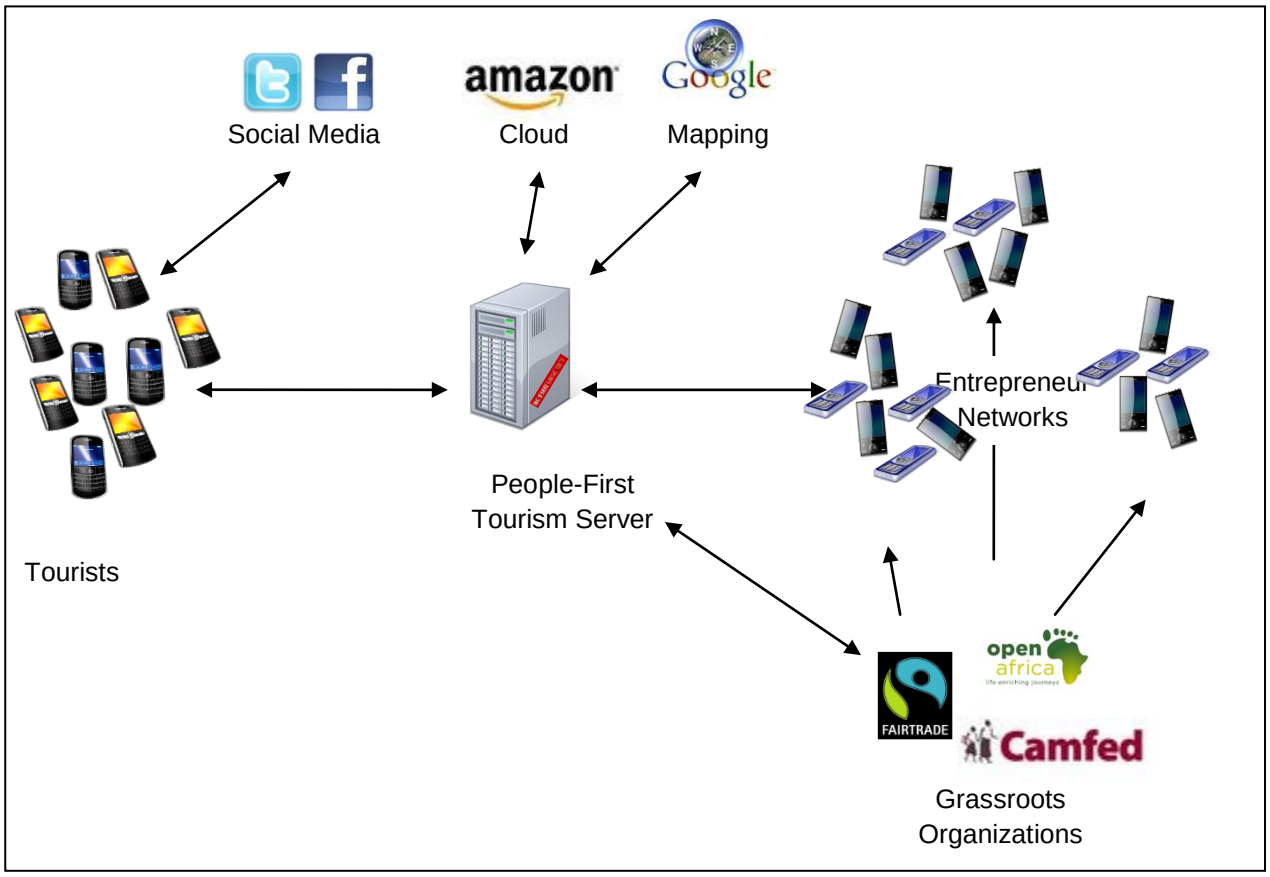


Figure 2. START-Net System

Tourists will be able to send web-based messages that are, then, translated to SMS to be received by the simplest cell-phones – making participation in this system affordable and accessible to virtually anyone globally. Once tourists are in the destination region, they may receive short advertisements about the services offered based on their preferences and, if using a GPS-enabled smart-phone, based on their exact location. The system will operate in a cloud, processing and storing tourists' ratings of tourism services, learning tourist preferences and mediating communication.

METHOD

The technical component of START-Net evolved from WishVast, a cell-phone-enabled social network system originally developed for the context of small-scale Kenyan farmers and agricultural retailers by scholars with an interest in humanitarian engineering, social entrepreneurship, indigenous knowledge and tourism. Over the last 12 months, the authors of this

paper have been working on the extension and adaptation of the system to the context of rural tourism entrepreneurship and have tested the concept in the context of rural South Africa.

Between May and September of 2010, investigators deliberated asynchronously and synchronously online about the scope of the START-Net concept and its theoretical foundations. Using action design research theory, the investigators planned a 1-week field study scheduled for January and February 2011. Planning involved developing a YouTube video illustrating the scope of the project to be used as a tool to recruit community leaders and high-level stakeholders to participate in a group workshop or in individual interviews as appropriate. During this period, the investigators also developed interview protocols to be used in the field and obtained institutional approvals for collecting data from human subjects. The interview protocols included a section inquiring about mobile phone ownership and use, livelihoods and entrepreneurial activity and interests, and perceptions of tourism within their communities. These protocols enabled us to answer our research question: "*How do local South African residents view mobile applications for the use of entrepreneurship and SME support?"*

In addition, we refocused on the aforementioned Theory for Design and Action in developing the protocols. That is, we included themed inquiries as prescribed by Miles and Huberman (1994) and implemented in Mbarika, Payton, Kvansy and Amadi (2007) in their study of IS education and workforce development among Kenyan women. The themes, herein, included the IT artifact utility, ease of use, economic development and simplicity relative to the START-Net.

Lastly, we deliberated extensively on the most appropriate study sites and on the format of a group workshop for high-level stakeholders from national and regional tourism government agencies as well as from multinational telecom corporations. A diverse group of faculty and students from two American institutions and one South African institution were involved in this project. This team included one professor, two lecturers and two undergraduate students from South Africa, as well as two undergraduate students, two graduate students and one professor from the US.

Community Assessment

Two semi-rural townships north of Pretoria and a rural village adjacent to Pilanesburg National Park were selected for this study. Key colleagues in each of the communities were contacted by investigators from South Africa, whom had extensive involvement in those communities. These

individuals helped us recruit other members of the community and enabled us to recruit male and female informants with varying ages and income levels. In addition to this snow-ball sampling method, we also included individuals in the local communities to avoid restricting our sample to particular community factions. From a random, convenient sample of local community residents, we interviewed 54 individuals (28 females and 24 males) with a median age of 27 (age ranged between 18 and 74). This enabled us to engage in action design of the IT artifact while capturing a broader demographic in the Pretoria communities.

Interviews were initially conducted in pairs, and the field team met regularly after a few interviews to assure consistency in interview and probing styles. Most interviews were conducted in English, but some of the field team members spoke several regional languages and two occasions those team members were assigned to older female informants that did not speak English. Data were recorded directly in individual interview protocols and then transcribed to MS Word.

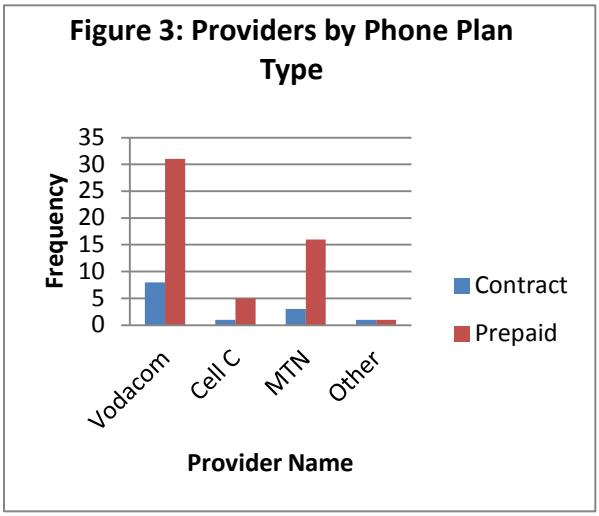
Corporate Stakeholder Input

National and regional-level stakeholders were invited to a 2-hour workshop in Pretoria individually by the South African co-principal investigator. The fifteen stakeholders in the workshop included representatives from the Tourism Ministry, provincial governments, tourism and regional planning academics, and telecommunications, multinational corporations. The South African principal investigator moderated the structured meeting soliciting answers from participants in a round-robin fashion regarding challenges and opportunities facing the implementation of the system in rural South Africa. The answers given by participants were summarized and typed directly in a computer and visualized on a large screen. The meeting was conducted in English, with occasional comments in African dialect. In the event a word or comment was given in the local dialect, the moderator, fluent in both languages, typed it in English and asked for confirmation of his translation.

FINDINGS - BASED ON THEMATIC ANALYSIS

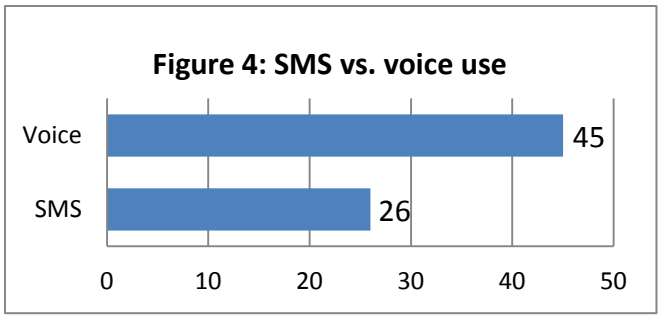
Utility of Mobile Phone

The use of cell-phones in Africa has grown substantially in the past several years due to the production of inexpensive handsets and prepaid offerings. One of the primary areas of interest for this study was how South Africans in rural communities use cell-phones on a day to day basis, in part to test the feasibility of introducing the START-Net in the region. Interviews revealed that all informants owned at least one cell phone, with some owning two or more phones. The predominant telecom providers were Vodacom and MTN (Figure 3), and respondents overwhelmingly stated a preference of purchasing pre-paid cell phone cards rather than entering into a contract with the cell phone provider.



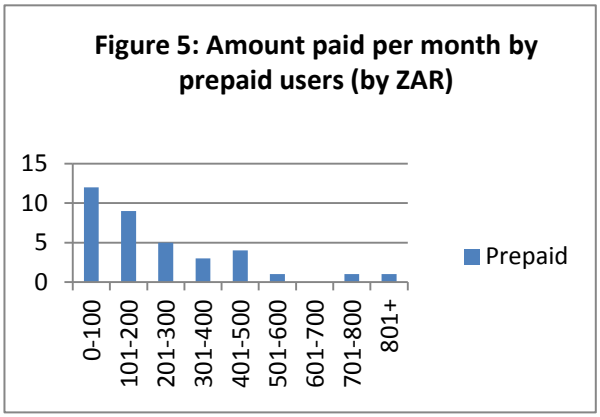
One goal of this study was to determine to what extent individuals used their mobile phones for business versus social use. We found that all but two respondents used cell phones for social use in some capacity (calls to friends and family, SMS, Facebook, etc.). Seventy-one percent (71%) indicated that they used their phones for business. Although the intention of this question was to determine to what degree cell phones were being used in SME, question wording prompted individuals to also respond yes if they use their personal cell phone to look for work or receive information about possible jobs.

Voice versus SMS use was also of key interest due to the fact that the START-Net system relies on mobile internet and the increase use of SMS by travelers and service providers. Figure 4 illustrates the number of respondents who indicated use of SMS versus voice calls. Of those that responded to the inquiry of SMS/voice use (n=43), approximately 60% indicated that they do, in fact, use SMS at least occasionally. Overall, however, voice was by far



the preferred method of communication, with respondents citing SMS as difficult to use, lacking sufficient detail, and more expensive than simply making a short phone call. The average age for individuals who indicated that they used SMS as a form of communication was 29 as opposed to 36 for those that did not use SMS. This suggests that there might be a difference in technology use by age group which has also been seen in other parts of the world.

Reasons cited for preferring pre-paid included not wanting to be indebted to the mobile phone providers and not having a steady income to guarantee payment. Information was also collected about the average monthly expenditure for cell phone service among informants. Among prepaid users which represented the majority of respondents, 57% reported spending between R10 and R200 per month as illustrated in Figure 5.

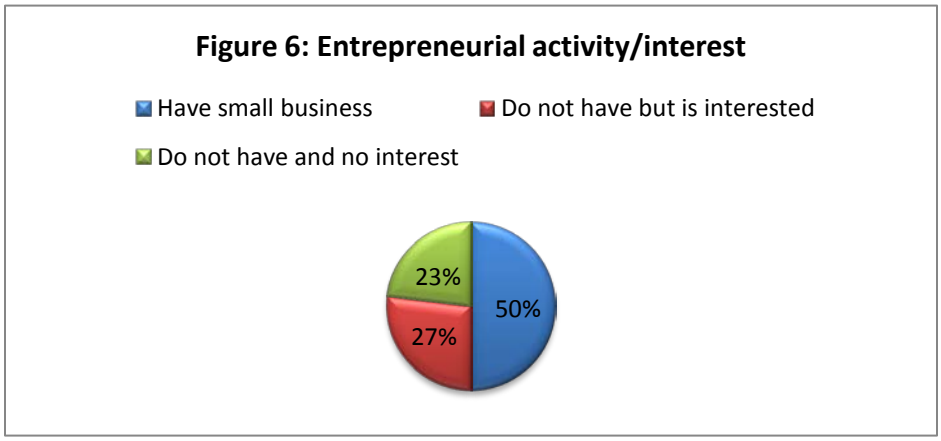


A 2008 report of mobile phone use in Africa reported that, while SMS is a growing market on the African continent, only larger, more advanced markets such as those in South Africa, Egypt, Nigeria, and Morocco are likely to see significant gain in SMS use (Africa & Middle East Telecom Week, 2008). This should be taken into consideration when considering African states with less mobile penetration than these major players. In addition, the real impact and significant disparity of mobile use among Sub-Saharan and Northern African countries cannot be omitted from the discourse. Issues of economic development, infrastructure, educational attainment and health play a vital role in distinguishing these regions though on the same continent (Mbarika, 2002; Kvasny, Payton, Mbarika, and Amadi, 2008; Donner, 2008).

Economic Development

The data revealed that participants had a keen interest in entrepreneurial ventures, including SME. Namely, twelve out of fifty-two (23%) respondents indicated that they were not involved or interested in owning a small business as shown in Figure 6. One of the respondents, a 28-year old women simply declared that she "trust[s] no one." A 50-year old woman indicated that she was not interested because she had "no knowledge about business." Other comments, however,

ran counter to these conjectures with 77% engaged and/or planning engagement in some SME. Fourteen respondents indicated that they did not own a small business but would like to or planned to own one soon.



SME of interest by the participants included: catering businesses, salons, bakeries, and even agriculture (i.e., goat breeding). Most pointed to lack of start-up funds as the main constraint for starting a business. As an example, a 26-year old woman indicated, "No [I do not have a business], but I am very interested in opening a catering business. I haven't because of lack of capital." A 49-year old woman explained: "It's very hard to do business in this country. To get funding you need business security, property, or a job even though it is hard. Being blacklisted in [ITC Credit Reports] means you cannot access money; you can get blacklisted even by default (for being black)." Further, a 56-year old man indicated, "Funding, no banks will make a loan without collateral. Honestly the blacks can't get a loan. If a white man walks into a bank, in two hours time he will leave with the money."

The twenty-six remaining respondents indicated that they were currently involved in some sort of entrepreneurial activity. These businesses included sandwich shops, internet cafes, spas, video and decorations for weddings, tour guide services, and others – all targeting local customers from the township or village. When asked what was most difficult about doing business in their area, responses pointed mainly to limited markets. A 22- year old woman, for example, responded, "There are products made by people, but there is no market for them (beads, vegetables)." Many respondents indicated that they had few customers and that their few

existing customers were not always able to pay their debts. As a 26-year woman delineated, "People normally don't pay after they have been given the goods."
Additionally, despite the fact that all three study sites were located adjacent to popular tourism destinations with vans, buses and SUVs driving by constantly, it was evident that existing businesses catered almost exclusively to local residents. A 68-year old woman explained that "There are no outside relationships with other organizations or tourism agents. There are people but it's hard for travelers to hear about my business."

Utility & Economic Development of Mobile Phones by Technology Stakeholders

As aforementioned, technology stakeholders interviewed for this research included those from the Tourism Ministry, provincial governments, tourism and regional planning academics, and telecommunications, multinational corporations. Challenges and opportunities identified by these stakeholders fell into one of three themes. First, many comments focused on desired or necessary functional characteristics of an IT-enabled system. In particular, stakeholders noted that "the cell-phone enabled system would address key needs among current and potential rural tourism entrepreneurs, namely that of networking, collaboration and coordinating their tourism service offerings." While they commented favorably regarding mobile phones use to promote current and potential rural tourism SME, the stakeholders cautioned that the system should carefully mediate currency exchanges between tourists and entrepreneurs, perhaps through a system like MPESA mobile banking currently supported by Vodacom. This Vodacom-supported system allows tourists to pay services in air-time which entrepreneurs can cash out in any Vodacom air-time sales booth in Africa.

Second, the stakeholders made several recommendations regarding capacity building with participating individuals or communities. They recommended implementing a digital awareness and literacy drive as well as training in a (business) code of conduct and customer service care. They also indicated that "a representative from participating communities should be appointed to serve as mediator/ambassador/ gatekeeper for the project." In addition, the technology stakeholder participants articulated that data management and services will need to incorporate collection and organization of SME services and tourists' preferences. Hence, this is service-preference match is similar to a Priceline.com, Travelocity or Expedia consumer experience.

Simplicity and Ease of Use

We asked participants about the themes of simplicity and ease of use relative to mobile technology and an IT artifact to support entrepreneurship and SMEs. Most participants indicated that mobile capacity and functionality are critical. The mobile phone was viewed as a simple technology and ease to use, and the START-Net must to accessible via the mobile infrastructure. Participants discussed simplicity and ease of use in terms of the IT artifact providing a mechanism to improving their use and engagement with local government and larger tourist enterprises. START-Net was seen as an IT artifact that could potentially level the playing field between tourism companies and community-owned businesses because these companies will lose their monopoly of access to markets while tourists will know how ethical the tourism companies really are. The "system" will engender trust and transparency within and between numerous groups or rural tourism entrepreneurs as well as between these groups and business partners nationally and globally. In addition, START-Net could assist with providing rural communities with a collective voice against exploitative business partners.

Lastly, stakeholders emphasized the need to nurture key strategic partnerships to build and sustain infrastructure. Specifically, they noted that once the system is ready to go live, public-private partnerships will have to invest in a considerable marketing campaign. They also suggested that "it may be wise to pilot the project (START-Net) in the domestic tourism market before rolling it out into prospective international target markets. Initially, the focus could, for example, be on self-driven [tourist] segments and special interest segments, such as local and international volunteer tourists." Hence, the pilot can serve as an assessment of simplicity and ease of use.

IMPLICATIONS

Guided by and Action Design Research (ADR) theory, our research provides insight into the utility of an IT artifact, START-Net, which was designed to assist local South African micro-entrepreneurs to be successful in the tourist industry. In particular, ADR enabled the START-Net to materialize, in its innovative current state which was informed by interactions with South African residents. As a virtual marketplace of tourism services, START-Net will allow South African entrepreneurs to sell their services to networks of independent tourists, or potentially to

tourism providers. We sought to answer the question as stated: "*How do local South African residents view mobile applications for the use of entrepreneurship and SME support?"*
One key finding of this research is that South African entrepreneurs are becoming more reliant on mobile phones to provide, improve and create services. This finding is coupled themes of utility, economic development, simplicity and ease of use. Moreover and relevant to the tourism industry, local South African participants did speak of the need to co-exist within the context of the IT artifact with sizable organizations in the business of attracting consumers. These sizable tourists organizations could support the infrastructure to tailor services to potential consumers who can, then, communicate with the SME and entrepreneurs via mobile services.

Another clear development of this research is the development of and IT artifact, "People-First Tourism", an application based on open-source WishVast networking software. Rooted in action design research (Sein, et al., 2011), "People-First-Tourism" (www.people-firsttourism.blogspot.com) is a practical outcome and a consequence of the emerged themes in our data collection and analyses. While the IT article of Start-Net demonstrated viable utility in a mobile environment, action research design theory enabled us to capture additional themes beyond the scope of IT but have a salient impact on the community context and implementation of the artifact. The supplementary themes, principled by the Guided Emergence of Sein, et al. (2011), are focused on the economic infrastructure required for sustainability and are noted in the blogspot as:

- Training micro-entrepreneurs in efficient/effective/timely/affordable ways
- Challenges associated with new micro-businesses competing with existing and more established businesses
- Identification of business/tourism products/services that are new/profitable/attractive
- Legal and pricing constraints associated with obtaining business permits and their insurmountable

To this end, participants in this study were keen on one barrier to entry: the lack of financial resources. Despite the frequent use of mobile devices, one participant summarized the financing of SME and indicated: *Funding, no banks will make a loan without collateral. Honestly the blacks can't get a loan. If a white man walks into a bank, in two hours time he will leave with the money.*

Others noted that their financial resources were limited, at best, but health care and education costs largely influenced their decisions to engage (or the extend of engagement) in SME.

In accordance with Action Research Design theory, we paused to engage in Reflection and Learning as espoused in Principle 3 shown in Figure 1. These reflections generated implications for this research as offered below:

1) Providing and building a sustainable infrastructure for user input via an open source application;
2) Engaging with local technology stakeholders to garner their involvement in public-private partnerships for infrastructure support;
3) Enabling the local South African SME to use mobile technology to leverage the local and natural resources to support tourism; and
4) Engendering access to capital and business acumen for those local with entrepreneurship interests

Hence, the IT artifact will need to consider the consequences of building, intervention and evaluation of Start-Net. Unlike the organizational setting (Volvo) contextualized by Sein, et al. (2011), we must account for the fragmented, often unified voices of local South African entrepreneurs and SME. Similar to Sein, et al. (2011), however, the above reflections suggest that future work must account for the unforeseen, unintended consequences associated with the IT artifact, its context, utility and policies that impact SME, government and telecommunications stakeholders.

CONCLUSION

Overall, the findings suggest that the rural, under-served are exceedingly entrepreneurial, running sometimes several micro-ventures catering to the needs of those in their communities. They have difficulty accessing capital and to customers with sufficient income. Further, these entrepreneurs have meager ways to capture and sustain business in the tourism industry, even if tourists are centrally and conveniently located local communities. In addition, the data also reveal that most individuals own and use mobile phones. In some cases, these individuals have multiple mobile phones and use SMS, voice and internet services via their devices. Guided by

Action Research Design Theory, our findings provide preliminary validation for the proposed plan to foster a sustainable platform to support rural livelihoods via an open-source network supporting mobile applications and enabling SME and economic development.

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