

CHAPTER 3.1

A RESEARCH-ANCHORED E-ENTREPRENEURSHIP EMPOWERMENT APPROACH TO BUILDING A SMART COMMUNITY

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1. Introduction

From its inception just over three decades ago, the Siyabuswa Educational Improvement and Development Trust (SEIDET) believed that to achieve its goals, it needed to put research and development at the center of its strategic and operational plans. For this reason, it has collaborated with universities and research institutes in all its programs—bursaries for its students, career guidance, Seidet students project, UniSchool and ICT introduction, visits by international professors, research, and special projects. It understood that in efforts to respond to ongoing community needs, there will always be unanswered questions that would be of interest to the research community.

The research-anchored e-entrepreneurship empowerment approach to the development of smart communities that we propose in this chapter is informed by this belief, understanding, and practice. Drawing from a number of case studies, examples, and projects reported in the literature and comparing these to the lived experiences and lessons from our involvement in Seidet, we argue and illustrate in this chapter that one way to build a smart community is to adopt a research-anchored, e-entrepreneurship empowerment approach.

The rest of the chapter is organized as follows. Related work and literature is presented next, followed by some examples used elsewhere on how smart communities could be built. The digital village concept spawned from entrepreneurship training and related ICT interventions is presented next, after which our key argument for a research-anchored e-entrepreneurship empowerment as an approach to development of a smart community is presented. The chapter ends with a concluding discussion.

2. Related work and literature

Research-anchored development of community

Although there are many development theories and approaches one could borrow from when initiating development interventions or projects at community level, these are not readily accessible to most projects initiated by ordinary community members. At the same time, researchers at universities and research institutes are too cautious not to be seen by communities as pursuing their own research interests at the expense of needy communities who are hungry for development opportunities. Linking research to community development initiatives or initiating community development projects that are informed by research is not a simple undertaking. A research-anchored approach must create a win-win situation between those doing research and those seeking to benefit from the outcome of the research process at community level.

An interesting aspect of Seidet is the collaborative nature of the activities undertaken. One of the most significant has been the collaboration between Seidet and the Department of Informatics at the University of Pretoria, which has benefited both parties significantly. From an academic perspective, the culture of trust that exists between these two entities has allowed researchers to do valuable research on the unique context and processes of Seidet.

Looking back during the earlier years of collaboration between the Department of Informatics at the University of Pretoria and Seidet, Helena Scheepers conducted a case study in 1998 (Scheepers and De Villiers, 1998) at the Seidet Community Center in Siyabuswa as part of a PhD research. Helena was at that time a lecturer at the University of Pretoria. The research was done on Saturday afternoons as this was the only time available to the teachers. The outcomes from this research identified a number key issues. Firstly, 38 teachers were made aware of the possibilities of IT and became computer literate. They also learned what cooperative learning meant. Secondly, the teachers wrote a procedure for the availability of the computer laboratory. Thirdly, a request for funding for a computer laboratory manager was realized and two teachers were identified for this role; these two teachers received training in the maintenance of computers. Lastly, the Computer-Ndaba started a process at Seidet

in which other courses were identified and initiated as well as the creation of more computer laboratories at other branches of Seidet.

A good description of the research-anchored complexity can be found in Roode (2008, 169), who puts it this way:

These early attempts at coming to grips with a subject that proved to be of immense complexity were all of a theoretical nature in which researchers developed theoretical arguments, but did not actually engage with the subject matter at the grassroots level. When the Department became involved in SEIDET in 1994, the obvious connection between our theoretical interests and the practical needs at SEIDET soon became clear. To be sure, our approach, in spite of the best of intentions, can with hindsight be described as “laboratory-oriented.” In other words, we embraced the opportunity to at last work in a “real” environment, but implicitly regarded SEIDET as a place where we could experiment with our ideas. Of course we did not see it like that at the time, but the projects referred to in this chapter, which date back to those early times, bear their own testimony. In terms of concrete happenings, these initial efforts at least led to the establishment of the SEIDET computer laboratory and the introduction of computer literacy training—first for SEIDET teachers, later for all SEIDET students, and eventually for the Siyabuswa community.

Roode was referring to a chapter in a book that describes one of the classic examples of a research-anchored approach to ICT introduction and use by a community. The book describes a more than two decades relationship between the Department of Informatics at the University of Pretoria and the Siyabuswa Educational Improvement and Development Trust (Phahlamohlaka, 2008). A few statements taken from a media release issued by the University of Pretoria just before the book launch in 2008 accentuate this:

The university has, over the years, brought a number of overseas professors to visit SEIDET. SEIDET is regarded by the University of Pretoria as a high priority center for research and community involvement ... Through SEIDET, the Faculty of Agriculture and Natural Sciences has learned the benefit that is gained by teaching the teachers so that they in turn teach the children—which is sustainable ... One thing that strikes Prof. de Villiers about SEIDET is the extent to which it has prepared the people of Siyabuswa to participate so willingly in community development projects and in the research projects conducted by the University of Pretoria ... Our involvement with SEIDET has brought computer lessons to the SEIDET learners, their teachers, and community. This will inspire and stimulate an interest in the information technology industry. This will lead to the advancement of their skills in this field.
(Prof. de Villiers, media release, University of Pretoria, May 8, 2008)

A year later and in recognition of the ground breaking work done in partnership with the University of Pretoria on ICT use at Seidet, a national seminar leading to the launch of the National e-Skills Plan of the Department of Communications (DoC) was cohosted by Seidet in Siyabuswa. The following quote from the DoC press release in 2009 succinctly captures the recognition:

It is fitting that this first iJima be located in Siyabuswa, the site of SEIDET and the location of a partnership with the University of Pretoria including more than fifteen years of community focused research on ICT enabled socioeconomic development.
(DoC press release, 2009)

Without attempting to find all the words to coin the definition of a research-anchored approach referred to in this chapter, we believe that the descriptions, quotations, and references provided above will give the reader a good sense of what a research-anchored development approach entails:

A mutually beneficial collaborative research relationship built over an extended period between a university or a research institute and a willing and an engaged beneficiary community.

Defining e-entrepreneurship empowerment

The concept of e-entrepreneurship comes out of a training program conducted by the University of Pretoria in collaboration with Seidet and the Council for Scientific and Industrial Research (CSIR). Leveraging its long-term relationship with Seidet, the University of Pretoria, through its Department of Economics, initiated an entrepreneurship pilot training in 2011 involving sixteen members of the Seidet community in Siyabuswa. This emerged from the Gauteng e-Skills Knowledge Production and Coordination Hub (e-SKPCH) provincial e-skills environmental scan that was commissioned by the e-Skills Institute of the Department of Communications of the South African Government (Department of Communication, e-Skill Institute, 2012). Figure 3.1-1 below shows some of the people from Seidet who completed the pilot.

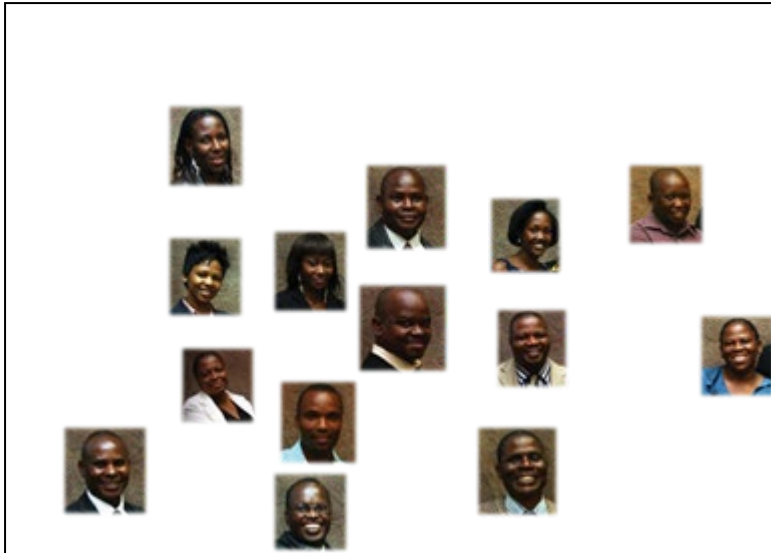


Figure 3.1.1: Entrepreneurs from the Seidet environment (Department of Communications, e-Skills Institute, March 2012)

The first author of this chapter and editor of this book, Dr. Jackie Phahlamohlaka, as part of the pilot coined the concept of digital village being used as an exploratory lens throughout this book. The details of the digital village and its associated ICT interventions are discussed in Section 4.

Another group of fourteen people from the broader community of Siyabuswa followed the pilot in 2013. The Department of Informatics at the University of Pretoria facilitated the e-Skills training which formed part of the e-Skills Program of the National Department of Communications as already indicated, while the CSIR focused on cybersecurity awareness training. It was the combination of the entrepreneurship and the e-Skills training involving ICT use and the security around their use that was called *e-entrepreneurship*. It is this type of entrepreneurship that we argue should be embraced as one of the approaches to building a smart community.

We see the e-entrepreneurship training described above as both *research-anchored* and *empowered*. It is empowered because it was developed with a learner-centered approach and embedded appropriate technology, and included a ten-week mentorship program. Key competencies included that of general entrepreneurship training and the utilizing of technology to support business development. Of course, a question will always arise as to the extent of empowerment and how to measure its effectiveness and success; but that is a topic for another time.

It is research-anchored because evidence-based research was ongoing with regard to the e-entrepreneurship pilot project. For the Department of Informatics researchers, the intention was to better understand entrepreneurs' processes in adopting ICT to make their business more productive, as well as refining methodologies and course content. The outcomes of the research were to be fed into new e-skills curriculum development, new policies required to promote entrepreneur usage and uptake of ICT, and the development of locally relevant applications that support e-entrepreneurship growth in the country, especially those residing in rural and peri-urban communities (Department of Communications, e-Skills Institute, 2012). For Seidet, it continues to be the creation of collaborative-shared environments and the envisaged state-of-the-art infrastructure and spaces for the entrepreneurs through the systematic conversion of its center to a smart community center.

We discuss in the next section some examples of building smart communities. We take lessons from these examples to argue in that section that one way to build a smart community is to adopt a research-anchored, e-entrepreneurship empowerment approach.

3. Some examples of building smart communities

Several examples are described below and compared to our lived experiences to our own involvement with Seidet and other community projects we have had opportunities to be part of, or have observed.

Example 1: The USA workshop example

On June 21–22, 2016, the Government-University-Industry Research Roundtable (GUIRR) in the USA held a meeting to explore the role of connectedness and sustainability in developing smart communities, the challenges

and opportunities associated with the roll-out of intelligent systems, and the partnerships among governments, universities, and industry that are integral to these advances. This was partly in realization that over half the world's population currently lives in urban areas, with the United Nations projecting that by 2050 that this will rise to 70 percent. Given the rapid urbanization trend happening around the globe, coupled with shifting demographics and disruptive technological change, it was their realization that many countries have started planning the development of smart cities and communities: urban centers that use intelligent, connected devices, and automated systems that maximize the allocation of resources and the efficiency of services.

Several presentations were made during the workshop and these have been documented (National Academies of Sciences, Engineering, and Medicine, 2016). We note several lessons from the presentations that we found helpful in supporting our argument in this chapter. The first lesson is that the building of smart communities in the USA was led from the highest level in government as part of the smart cities initiative. The initiative included three parts: (1) R&D investment—the White House announced \$160 million in investments but by now has invested over \$200 million; (2) test beds, meaning multisector collaborations to try new technologies in cities; and (3) a focus on multisector partnerships that involve universities, entrepreneurs, companies, and government.

The second lesson is that a partnership approach between universities, research institutes, and municipalities is a good partnership for the building of smart communities. One of the presenters highlighted interesting but critical points in the partnerships:

“A good research project has people thinking about it day in and day out, and that's essential to achieve some of the projects the city wants to achieve, but that does not work well for city staffers who have a dozen items that need to be turned around on a short-term cycle,” he said. “So the partnership allows ideas like the Array of Things to thrive and be successful.

One secret ingredient from the university side is involving students, who are on the same short-term timeframe as cities—they want to get things done,” said Brown. “We have a responsibility as a university to be responsive even.” (National Academies of Sciences, Engineering, and Medicine, 2016)

The third lesson is that three areas identified as key for partners to collaborate on in the building of smart communities are smart infrastructure building and its protection, the ability to respond quickly to emergencies, and the resilience of city services.

The fourth lesson is that the internet of things (IoT) concepts applied to the public sector would result in a smart city. From this it can be deduced that the same concepts applied to a community would result in a smart community. The emphasis though in this lesson is that while the first and second layers of devices and their connectivity and communication are what most people think of when talking about smart cities, the third and fourth layers on data analytics and services, and decision layers where humans may be involved, are more important as they are value-adding layers.

The fifth lesson is the importance of the economy of scale in the collaboration process. Another of the presenters articulated it this way:

Instead of each city working with a company one-by-one, we want multiple cities to jointly address issues and coalesce around the topics and come up with joint solutions. We bring in municipal governments, companies, academic institutions, and non-profits, and start the process of team forming; eventually we want deployment and for them to report the results. Even before starting deployment, we want the teams and project managers to think about the operational and business sustainability of the project.

(National Academies of Sciences, Engineering, and Medicine, 2016)

Example 2: The Canadian example

The Government of Canada believe that continued technological, socioeconomic, and environmental disruption will eventually push all communities to become smart. It was for this reason that it announced in its budget vote of 2017 that it will provide Infrastructure Canada with \$300 million over 11 years to launch a smart cities challenge fund (the Fund). The purpose of the Fund which is modeled after similar initiatives in the United States (as seen in the USA workshop above) is to encourage communities to explore and invest in creative new approaches to solving socioeconomic issues identified by their community (Loreto et al., 2017). Through the Fund, the Government of Canada chose to give a chance to its communities to pursue innovative approaches to their own local priorities, identified by them.

They define a smart community as one that uses technology and data to improve livability and opportunities for the community and its residents. The federal government thinks of smart communities in terms of how infrastructure (physical, digital, and social) can positively affect communities and the lives of its citizens. Because of this thinking, they placed the smart cities challenge with the Department of Infrastructure and Communities.

To take advantage of the Fund, communities had to go through five steps: 1) engage the community to define the vision; 2) be strategic; 3) know the levers to be pulled; 4) measure results to prove success; and 5) apply.

The lesson from the Canadian example is that by encouraging your community to go through the five-step process, they can begin to set out their own path to becoming a smart community; one that improves the lives of residents and retains and attracts new business, talent, and investment (Loreto et al., 2017).

Example 3: The Esri frameworks for building smart communities

In their industry report *Delivering Smart Communities Through a Geospatial Strategy* (Esri, nd) Esri, a leader in geographical information systems (GIS) together with their partner govloop, explore what they call the four defining technology tenets of a smart community and the role of GIS in each of those areas. They describe them as the four technology tenets of a smart community information system, namely *planning and engineering, operational efficiency, data-driven performance, and civic inclusion*. They point out in concluding their report that smart devices are a part of the solution, but it is much more.

For us, being a smart community is [about] using technology to actually improve the lives of our citizens—where they work, live, and play. Anywhere where we can make it more convenient for our citizens to do things.

Esri¹ list the following as smart community characteristics:

1) Forward-thinking leadership and strategy; 2) data-driven decision-making; 3) real-time awareness; 4) collaboration across departments; 5) civic engagement.

Example 4: What does it take to build a smart community?

Chris Thomas of Esri explains that after interacting with many governments around the globe, they found that there are four steps for creating a successful strategy to support smart communities. 1) start with an excellent GIS platform; 2) develop a location strategy that allows governments to prioritize the GIS applications they need; 3) deliver real solutions that serve government priorities; and 4) develop strong relationships with business partners (Thomas, 2015).

For the first step, Esri indicates that the platform needs to support the five major government workflows: collecting data, analyzing and performing what-if scenarios against information, improving operational awareness, improving field operations, and enabling civic engagement.

What appears to be unique for Esri in step three is their proposition that after working with government to develop the apps and the tools that they may need, these must be given back to government without charge:

We have found that working side by side with governments and asking what apps they wish technology companies would build results in the development and delivery of apps that successfully meet real needs. These apps are honed by working directly with governments on design and testing. Once completed and tested, the solutions are given back to governments at no charge. These apps can be deployed immediately and tailored over time.

Example 5: Thusong Service Centres in South Africa

Like the rest of the world, the talk in South Africa about building smart communities is not audible yet. Rather, we continue to hear more about smart cities, again in congruence with the rest of the world. With South Africa made up mostly of villages and townships, it might be expected that talks about smart villages and smart townships would have entered the discussion and policy spaces of government, especially now when discussions abound relating to the Fourth Industrial Revolution.

Perhaps the closest to this chapter that one could draw from is the existence of the Thusong Service Centres (Department of Communications and Digital Services, nd). These are the centers that the democratic government prides itself as having initiated in 1999 and integrate services across the three spheres of government. The relevant departments that have offices at the centers provide the services.

The Thusong Service Centre program aims to:

- bring government information and services closer to the people to promote access to opportunities as a basis for improved livelihoods;
- promote cost-effective, integrated, efficient and sustainable service provision to better serve the needs of citizens;

¹ go.esri.com/smartguide

- build sustainable partnerships with government, business, and civil society;
- create a platform for greater dialog between citizens and government.

It is unclear as to the exact number of Thusong Service Centres in the country, but numbers reported range from 146 to 400 in 107 local municipalities countrywide with 114 integrated mobile routes taking government services to remote areas complementing these.

Services such as applications for identity documents, birth certificates, social grants, and the Unemployment Insurance Fund, as well as municipal services, can be found at the centers. The program not only creates access to government information and services, but also enables communities to access opportunities offered by other civil society groups such as businesses, non-government organizations, and parastatals.

Young entrepreneurs manage some of these telecenters linked to the Thusong Service Centres. This creates job opportunities and helps widen government access to information, particularly in the rural areas.

It is reported that about 109 center managers and caretakers have been assigned to date², to oversee the operations of the centers and to ensure that they operate at their best. The program celebrated 20 years of existence in September 2019.

4 The digital village concept and related ICT interventions

The digital village concept used as an exploratory lens in this book is an outcome of the e-entrepreneurship program described in Section 2 above. The first author of this chapter and the editor of this book, Dr. Jackie Phahlamohlaka, conceptualized it in 2011 as a variant of the Seidet model, which focuses on enabling communities and individuals to participate in economic activities.

It was envisaged that after the conversion of the Seidet Community Centre in Siyabuswa to a smart community center with an embedded digital village, such a model could be used as a basis for building smart communities across the country and elsewhere in the world.

A number of entrepreneurship initiatives within Seidet and its associated environments took place over the years. In describing the computer literacy training at Seidet, Roode had the following to say:

Since 2000 the SEIDET computer training centre operated as a franchise of the Pretoria-based private training company, but eventually acquired, in 2006, the rights to the training material of the company and now operates totally independently. Apart from the provision of training to the community, the business now enables graduates of the training program to provide IT services to the community—ranging from computer repair and upgrade services, to software and printing services, while basic accounting services to local businesses will eventually follow ... Many of the graduates have benefited from the training in the sense that it helped them in finding employment. As mentioned earlier, some graduates have also built on their newly acquired skills and as *entrepreneurs* are offering ancillary services, and their activities show all the signs of developing into small businesses. The facility is self-sustaining, and receives no outside funding—in fact, it provides employment to a number of people and contributes a modest profit to SEIDET. After eight years of continued, albeit slow growth, the facility and what it stands for has become an accepted fact within the Siyabuswa community.

(Roode, 2008, p. 175)

The thinking around commercial significance of some of the Seidet programs is documented in Phahlamohlaka and Lotriet (2002) and Phahlamohlaka and Friend (2004). Other efforts include the acquisition of UniSchool Pretoria by Seidet in 2006 (Roode 2008, 175) as described above, the pursuit of Izandla Zethu (Pty Ltd) in partnership with Business Enterprises at the University of Pretoria, the Sustainable Development Initiative and the Seidet Business Communications and Technology Centre (SEIBCOMTEC).

Also related to the exploration of the digital village concept is the Broadband for All (BB4ALL) program led by the Meraka Institute of the CSIR. This program was facilitated by Seidet through liaison with the District Office of the Mpumalanga Department of Education. The BB4ALL project interconnected over 200 schools in the Nkangala District of Mpumalanga province. Village operators (VO), received entrepreneurial training, business mentorship, personal development, and technical training on the network infrastructure maintenance, technically supported these schools and technical support of the BB4ALL. This training equipped them with skills to start their own ICT and network businesses, such as running internet cafés or computer repair shops. These village operators also received the cybersecurity awareness training offered by the CSIR.

²<https://www.vukuzenzele.gov.za/thusong-service-centres-put-people-first>



Figure 3.1.2: The village operators (VOs) of the *Broadband for All* wireless mesh project during cybersecurity awareness training, 2011, CSIR

In collaboration with the CSIR and the University of South Africa (Unisa), Seidet introduced learners that had recently finished high school to computer programming (Unisa College of Science, Engineering and Technology, 2017). These learners later participated in the computer programming hackathon. It was heartwarming that Seidet learners who had relatively little exposure to programming won the hackathon competition. This was the latest project executed related to the exploration of the digital village concept as envisioned by Seidet:

The initiative was sparked earlier in the year in a meeting with the Municipal Manager of Dr JS Moroka Municipality, Benny Mahlangu, who challenged Unisa academics to participate in alleviating the problem of youth unemployment in the area. The CEO of the Siyabuswa Educational Improvement and Development Trust (SEIDET), Vusi Ndala, and Horner have been working tirelessly behind the scenes to put together a project that will prepare ten unemployed youth to participate in an upcoming hackathon. Selected to participate in the Mobile App Development Program are five males and five females who show remarkable potential and youth from the Siyabuswa community itself. This initiative, ultimately, requires that the tools provided to the community youth further enable them to promote reciprocal facilitation of skill enhancement. The program, designed to promote a much larger project, will see the ten initially selected participants evolve into trainers for an envisioned SEIDET Digital Village in Siyabuswa. (Unisa College of Science and Technology, 2017)



Figure 3.1.3: The CSET ICT4D Flagship, CSIR and Siyabuswa Community representatives (Unisa College of Science, Engineering and Technology, 2017)

The last initiative related to the exploration of the digital village concept of Seidet is a plan that still needs to be executed. The plan was developed in December 2018 in a workshop held between CSIR, Seidet, and the Unisa ICT4D flagship. Under the theme “using ICT to enable communities to be active participants in the information society and the Fourth Industrial Revolution (4IR),” the entities developed five objectives they agreed to work toward:

- Training of youth in computer programming and IT;
- Encouraging youth to take up careers in computer programming and IT;
- Equipping trainee and qualified educators with computer programming and IT;
- Using local ICT facilities to carry out experiential training for the participating youth and educators;
- Responding to the challenge of the need for data science and its applications in communities.

It can be seen from the various initiatives described in this section that the digital village concept is being actively explored in various ways since its inception in 2011. Taken together with the early days of ICT and socioeconomic interventions at Seidet (Roode, 2008) and efforts by other research institutions such as the CSIR through the Digital Doorway and the Village Operators projects, a good groundwork for ICT entrepreneurship in the area has been developed. It can thus be reasonably argued that the Nkangala Region of Mpumalanga Province within which Seidet is located is ready to experiment with initiatives to convert its villages and communities to smart communities. One approach to do this is what we propose and argue for in the next section: a research-anchored e-entrepreneurship empowerment approach to building a smart community.

5. The e-entrepreneurship empowerment approach to building a smart community

We defined a research-anchored approach to development as

A mutually beneficial collaborative research relationship built over an extended period between a university or a research institute and a willing and an engaged beneficiary community.

Through the use of several examples and published work over the years, we have shown how such a relationship was built between Seidet, the Department of Informatics at the University of Pretoria and the Council for Scientific and Industrial Research (CSIR).

We indicated that we saw the *e-entrepreneurship* training as described in Section 2 as both *research-anchored* and *empowered*, and that it is this type of entrepreneurship that we argue should be embraced as one of the approaches to building a smart community. *Empowerment* in our working definition means enablement through provision of support mechanisms and access to basic resources required to operate. A typical working definition (Naidoo and Fourie, 2013) draws our attention to the use of communication technology as a potential source of empowerment in that information and communication technologies (ICTs) may be used to promote literacy in the development communication process.

Before we get to the heart of our argument and proposition, we want to take the reader back to the detail of the e-entrepreneurship whose use we are arguing for as the basis for an approach to building a smart community.

Under a theme of using the education value chain for greater entrepreneurial impact, the e-Skills Institute of the Department of Communications, with its multistakeholder partnership model, created a framework whose target was to e-skill 10 million South Africans over a five-year period from 2014. It was a collaborative framework geared for greater impact and entrepreneurial growth at grassroots level (Department of Communication, e-Skills Institute, 2013, p. 3)

The Gauteng e-Skills Knowledge Production and Coordination CoLab, based at the University of Pretoria, ran the training. The focus of the training was e-skills for entrepreneurs—targeting an important sector of the economy and one that has been highlighted by national government as having the potential to drive the South African economy forward.

The e-entrepreneurship emphasis was on creative industries and new media, including mobile application development. The training was run in partnership with the Council for Scientific and Industrial Research (CSIR), with the CSIR contributing the cyber security component. Collaboration on multiple levels—government, civil society, education, business, and global partners—was seen as essential for the e-skills agenda to be aligned to national goals, and to have greater significant impact.

From the bottom-up, the training was run at the Smart Community Knowledge Production and Coordination Centre, Siyabuswa, in partnership with Siyabuswa Education Improvement and Development Trust (SEIDET). Working at a grassroots level, responding to the specific needs of those within the community, is another internationally endorsed framework that has been shown to have increased impact. The training was administered such that there is transfer of skills to Seidet entrepreneurs. The e-entrepreneurship training program intends to create an enabling learning digital environment for entrepreneurs and trainers to thrive in the knowledge age.

The organizers of the e-entrepreneurship training program understood and emphasized that it is not enough to have access to the surrounding technology, but empowered individuals need to be able to use and develop ICTs to actively participate and advance within business and society (Department of Communication e-Skills Institute 2013, p. 3).

Looking at the characteristics of the research-anchored e-entrepreneurship we have just presented, and the approaches and lessons from the USA, Canada, and Esri presented in Section 3 on how smart communities could be built, we present our argument and propositions as follows:

- That a government is best positioned to enable the building of a smart community through a research-anchored e-entrepreneurship collaborative program with universities, the private sector, and research institutes. The examples from the USA, Canada, and Esri all point in this direction.

- As we have noted from both the USA and the Canadian observation, continued technological, socioeconomic, and environmental disruption will eventually push all communities to become smart. Disruptions by their nature require research, innovation, and entrepreneurship in response. Our argument for a research-anchored e-entrepreneurship in building such smart communities applies.
- That a partnership approach between universities, research institutes, and municipalities is a good partnership for the building of smart communities. Some investment through a research-anchored e-entrepreneurship program in facilitating the building of such partnerships is therefore proposed in any smart communities building initiative.
- That infrastructure (physical, digital, social) and the related cybersecurity are key to the building of smart communities. Shared use and access to infrastructure by any community aspiring to be a smart community should therefore be encouraged. In the South African case, the Thusong Service Centres Infrastructure could be used as the base infrastructure for the building of smart communities.
- That the research-anchored e-entrepreneurship approach as presented in this chapter be resuscitated in the Nkangala District of Mpumalanga Province and be adopted and used as a model for the building of smart communities in South Africa, and possibly in the rest of Africa and other parts of the world.

6. Concluding discussion

We acknowledge in this chapter that continued technological, socioeconomic, and environmental disruption and disasters will eventually push all communities to become smart. Covid-19 is a case in point, where nations around the world had to rely on the use of technology to keep communication and their businesses going. It acknowledges further that the building of smart communities has potential to address both challenges of rapid urbanization and that of sparse establishments in rural communities.

In recognition of the fact that governments the world over is best positioned to enable the building of smart communities, we identified the possible use of Thusong Service Centres Infrastructure in South Africa as the basis for building smart communities. The research-anchored e-entrepreneurship approach that we propose in this chapter could leverage the existence of such infrastructure as well as their stated objective of building sustainable partnerships with government, business, and civil society.

We encourage South African researchers and technologists to contextualize the debates and thinking that are flowing out of the smart city literature as the country is mostly made up of villages and townships. Research collaboration with local municipalities along the lines proposed in this chapter is encouraged.

We argue in this chapter for the endorsement and adoption of the research-anchored e-entrepreneurship approach as one way of building a smart community. We shared with the reader some examples of projects and initiatives which were undertaken over extended periods of time, and we trust that these will assist the reader to see the basis of our argument, and as a result be convinced to try out our proposition to contribute toward making their community a smart community.

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