SMALL TOWN GEOGRAPHIES
IN AFRICA: EXPERIENCES FROM
SOUTH AFRICA AND ELSEWHERE
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IN AFRICA: EXPERIENCES FROM
SOUTH AFRICA AND ELSEWHERE
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RETHINKING SUSTAINABILITY OF SMALL TOWNS: TOWARDS A SOCIO-TECHNICAL APPROACH

Andre Pelser, Alta van der Merwe and Paula Kotze

INTRODUCTION

Over the past few decades, issues such as stagnating and declining local economies, high levels of unemployment and poverty, and the out-migration of young, skilled and highly educated community members have taken their toll on the sustainability of small rural towns in Africa and elsewhere in the world. The declining economic situation of such towns, often triggered by the demise of the core or dominant industry, results in numerous negative socio-economic and environmental consequences and is called “ghost towns” (Pelser et al., 2003).

Similar to elsewhere in the world, the South African rural landscape is dominated by economically undiversified, single-resource small towns that have either bleak future development prospects. The overwhelming economic dependence on a single industry in such towns has resulted in descriptions such as the “company town syndrome” (Crabb 2002) and “the tyranny of single-industry towns” (Wolfe 1992). At the same time, single-industry towns form the backbone of resource economies, and therefore they often find themselves on the front line of both the creativity and the destructions that are unleashed by the extreme cycles typical of resource economies. Internationally, much has been written about the plight and crises of single-resource towns, especially those associated with the forestry, wool, chemical, paper and mining industries (Uddo 1992; Napier 1993; Northcote 1997; Phillips & Bell 2002). Such towns enjoy rapid growth following the discovery of a new resource, but they are abandoned with equal haste when the resource runs out or when the industry falls victim to market fluctuations (Bremner, Hayter & Hay 2001). The monolithic character of a large-scale operation often means that there are no competing industries in these towns to fill the gap in the absence of the core industry (Crabb 2002; Wolfe 1992).

Consideration current trends in technology and the modern-day realities of a knowledge economy, the challenges faced by small, single-industry rural towns will remain in years to come. Very few, if any, of these towns have the fiscal means to reverse their declining economic situation, despite the infusion into some of these communities of younger, well-educated and creative persons, including “bohemians” such as artists and craftsers (Peterson 2003). Their dependency on a symbiotic relationship with a single-resource industry causes small towns to be ill-prepared to compete in a modern knowledge economy, because their economies are unskilled and particularly vulnerable to any negative impact. Municipalities and other decision makers must therefore have information about the impacts of the single industry (in this case, mining) on both the social and biophysical environments in order to formulate appropriate policies and promote the sustainable development of their respective towns. Such a database of information provides the basis for making the best possible predictions and decisions about the socio-economic impact of the respective industry on the local community. Thus, decision makers can quickly and pro-actively position and steer the town towards sustained development and growth in the period following the demise of the core industry.

This chapter suggests that a socio-technical approach (STA) can support decision-making, enhance economic diversity and foster sustainable economic development within small, single-resource towns. For the purposes of this chapter, the concept socio-technical describes a multidisciplinary and interactive collaboration between the social sciences and information technology. Using the case of mine closure at Koffiefontein in the Free State Province of South Africa, it is argued that the optimisation of productive economic and social development in small towns requires a systematic approach that allows for continuous information capturing. This can then be used to mitigate and manage the impact of single-industry demise and enhance the social and economic sustainability of such towns. Conducting regular assessments of local socio-economic dynamics and tapping into the socio-economic information base of local agencies and stakeholders (such as a mining company), can provide a longitudinal database of social and economic status before, during, and after the various stages of mine development. This information base on “what is” can be used to introduce development initiatives that diversify and propel economic sustainability. In other words, intelligent tools can assist role players to more efficiently manage complexity and change within the affected towns and to create a more sustainable economic environment.

The remainder of this chapter unfolds in four sections. Section 2 briefly explains the methodology used to gather information for the case study, while sections 3 portrays the challenges of single-industry demise, economic diversification, and proactive planning in single-resource towns. Section 4 examines the small mining town of Koffiefontein as a case study that exemplifies the challenges of many single-resource towns in the face of a resource economy in decline or demise. Section 5 presents the social and economic context of single resource towns and assess the many challenges that municipalities face in such environments, while section 6 offers a framework for using intelligent tools to support decision-making in small towns. The proposed approach promotes continuous information capturing that will enhance initiatives aimed at economic diversity and propel sustainable development in small, single-resource towns such as Koffiefontein.

METHODOLOGY

This chapter draws mainly on the findings of a social impact assessment (SIA) that was conducted in 2004-2005 prior to the closure of the Koffiefontein Mine (Pelser et al., 2003).
Rethinking Sustainability of Small Towns

The SEA is supplemented by a literature review that reflects developments subsequent to the completion of the initial study in 2002. The SEA utilized a mixed methodology, gathering primary data by means of public meetings, interviews with key informants and interested and affected parties (IAAPs), focus-group sessions with stakeholders, and a comprehensive stakeholder survey.

The main purpose of the SEA was to record the concerns of affected stakeholders and to determine the nature of impacts likely to result from mine closure. To capture information from all affected parties, the Koffiefontein social environment was divided into three broad sectors: the local economic sector, the public sector, and the community sector. IAAPs were identified and targeted within each of these broad sectors as well as several subsectors. The probable impacts of mine closure on the Koffiefontein environment were realistically projected by means of scenario simulation and linear extrapolation, as per recognized SEA methodology. The projected impacts were also informed by similar developments elsewhere in the world and in South Africa and by aggregated consensus of the various role players, including the professional members of the project team. Secondary data were obtained mainly from official records and historical documents.

The socio-technical approach (STA) utilized in this chapter complements the initial SEA. It argues that the inclusion of intelligent tools will enable policy makers to more efficiently manage the complexity of impacts and changes in a single-resource environment by allowing for continuous information capturing in the affected environment. The STA approach is based on a combination of systems-thinking principles and organisational learning theory.

THE CHALLENGES OF MINE CLOSURE AND ECONOMIC DIVERSIFICATION IN SINGLE-RESOURCE TOWNS

Mine closure affects communities in both the developed and the developing world. The 1990s in particular saw a significant decrease in mining operations in developed countries, accompanied by millions of job losses. Almost simultaneously, however, new mining operations increased dramatically in developing countries, with a surge in mining investment in the 1980s, 1990s and 1990s (World Bank 2002). Many of these mines are now approaching the end of their operating lives. At the turn of the century, the World Bank predicted that at least 25 large mines in developing countries would be closing by 2015—with large-scale impacts on the local and national economies of affected countries (World Bank 2002).

Studies of previous mine closures have revealed that such closures have severe impacts on the socio-economic fabric of many reliant on the mining industry. That is even more so in small "company towns". Towns that depend on mining as a mono-industry see the hardest because the town’s economic base disappears upon closure of the mine (Laurence 2002). Strongman (2000:13) observed that "mine closure is often traumatic for local communities—especially in remote areas if local government is weak, labor productivity and non-mining income are low and labor mobility minimal". Kehoe & Costanza (2000) echo the same sentiment by pointing to the fact that the higher the dependency on the mining sector, the higher the social impact when the mine closes. Small-resource towns whose economies are predominantly reliant on mining are therefore particularly vulnerable in the face of the progressive demise of mining operations.

Mine closure deals the municipalities of affected environments a dual blow. On the one hand, local government is severely hit by the loss of the local tax base when the mine and other businesses close (Ndlo et al., 2003); while on the other hand, the sudden unemployment of a large part of the community can lead to a dramatic decrease in the number of people needing government support. On the other, in addition to the income and revenue base of the municipality decreasing, the service demands and expenditure obligations of the municipality simultaneously increase (Citron et al. 2000). In addition, the municipality must still maintain its infrastructure. Devastating communities to accommodate the reduced number of inhabitants is possible, but quite difficult, as various systems and facilities such as water and sanitation would have to be modified to serve only a pre-selected area. As municipalities face the double blow of maintaining infrastructure and dealing with an increased number of outmigrants simultaneously losing a large part of their revenue, provincial and national financial assistance becomes imperative (Welsh 1992).

Upon mine closure, communities often continue to utilize mono-related infrastructure such as drinking water systems. However, these facilities could economically break down because of a lack of maintenance. Local government is forced to take over the operation and maintenance of these facilities to ensure adequate service standards. Simply handing over mining infrastructure to local government merely produces the desired results because local government is often not capable of maintaining the assets (World Bank 2002).

Liénard (as Ndlo et al., 2003) identifies four stages of local response to mine closure that can help a town’s economy recover. Firstly, the community attempts to preserve existing economic life. This is followed by the second stage, economic diversification, which entails finding and expending existing alternative local jobs. The third stage involves the development of new economic activities, such as small, medium-sized and micro-enterprise (SMME) development, tourism, etc. Once this has happened, the fourth stage consists of the affected town moving towards high-technology sectors. It remains questionable whether rural, rural mono-industry towns that depend on mining will be able to carry out such changes. Economic diversification of affected areas is the key element in successful migration strategies. Kees (1992) identifies two kinds of economic diversification: vertical and horizontal. Vertical diversification is a means of diversifying industries within the expansion of the economic base through mining-related activities such as processing, transportation and the mining of other commodities. This form of diversification perpetuates the dependency of a community on the mining and mining-related sectors. The second kind of economic diversification, horizontal diversification, aims at creating enterprises in entirely different economic sectors, for example, in agriculture or forestry. This kind of diversification is considered to be a more appropriate migration strategy in that it lessens a community’s dependency on the mining sector. It is therefore important to establish before the mine closes whether there are any secondary industries or economic resources in the affected environment that residents are able to rely on (Ndlo et al., 2003).

In the event of mine closure, the local economy has to absorb a large number of unemployed people. The economic environment should therefore be reshaped to enable it to accommodate the unemployed (Conor 2000). Local Economic Development (LED) initiatives and Integrated Development Plans (IDPs) should aim to promote horizontal diversification and lessen mine dependency. Research conducted internationally, however, has shown that very few LED initiatives have significant positive effects (Ndlo et al., 2003).

At the same time, it should be borne in mind that LED initiatives might not create sufficient jobs

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immediately, let in the long term, the potential impact of these initiatives on the local economy is crucial for the town’s survival.

As mentioned, LED strategies such as economic diversification, S&A development, credit provision and business development assistance for entrepreneurs, and training and skills-development programmes only have an effect over a long period of time. Even using these strategies, local systems have limited capacity to react to the phenomenon of sudden large-scale job losses (Oliver & Skaburskis 2000). In contrast to local economic development, Setzmann (1999) argues that the only way to prevent economic decline in an affected area is through large-scale job creation. He claims that retaining mines workers will not be sufficient as there are no local jobs available to retained workers. He also claims that in most cases, LED strategies will not suffice, as few former miners are likely to be able to sustain independent small businesses. Therefore, traditional economic development techniques without the necessary local growth will not result in sustainable employment opportunities.

The ultimate survival of mining communities in the event of mine wind-down or closure is determined by the successful development of alternative local economic activities (Naidoo et al. 2003). However, faced with a dramatic decrease in revenue and income and an increase in demand for services from residents, local government must be assisted with revenue mobility initiatives in order to have the capacity to play a role in cultivating the town’s economy. Unfortunately, the reality is that the development of alternative economic activities is often low on the agenda of small towns during the life span of the mine; it is left for the period after closure (Pelser et al. 2003).

Even more problematic, is the absence of an information base of “what is” and “what can be” local authorities and stakeholders in small, single-resource towns struggle to introduce development initiatives that will ensure economic diversity and sustainability in the aftermath of mine closure. As demonstrated in the case study of the Koffiefontein mine closure below, an information base of this nature is a prerequisite for the effective management of the socio-economic impact associated with the demise of a mono-industry in a single-resource town.

More importantly, such an information base can serve as an important tool to assist stakeholders and policy makers to plan proactively for alternative economic opportunities during the operating life of the mine instead of waiting until the mine closes.

THE PLIGHT OF A SINGLE-RESOURCE TOWN: THE CASE OF MINE CLOSURE AT KOFFIEFONTEIN

Koffiefontein is a small mining town with a population of approximately 12 900 people. It is situated on the banks of the River in the southern part of the Free State Province of South Africa. The first diamonds in the area were discovered in 1870 on a farm that was later purchased by the London firm of E.W. Fiske Exploration Company when the Koffiefontein kimberlite pipe - i.e. a long, vertical volcanic rock pipe best known for sometimes carrying diamond ore - was discovered in 1889. A town soon developed around the mining activities. Following the registration of the claims of diamond diggers in 1881, Koffiefontein was officially recognised as a town in 1872, making it the second oldest town in the Free State (Kothen 2004). The history of Koffiefontein has ever since been intimately
employees contributed a substantial amount to the Koffiefontein economy, and mine closures again caused a series of negative economic impacts. After lengthy negotiation, DBCM sold the mine to Petra Diamonds, which resumed production in late 2006. The new owners believe that the Koffiefontein mine will continue to yield diamonds for another 10-15 years, mainly because the cost structure of Petra Diamonds is significantly lower than that of DBCM (Mainwaring 2006). In the absence of any meaningful diversification of the local economy, however, the prospects for the town’s long-term survival and sustainability are dim.

In the event of future mine closures, almost all LEAPs expect increased unemployment and a decreased population size due to emigration, with a resulting decrease in the general quality of life. Approximately 63% of municipal officials were of the opinion that it would not be worthwhile staying in Koffiefontein if mining operations were discontinued. Fifty-eight percent of the business sector, 59% of the mining employees and 41% of the residential sector were of the same opinion (Pelzer et al., 2005). Members of the business sector also expressed concern about the likelihood that a rapidly declining population would lead to a decrease in purchasing power and property values. The erosion of the consumer base would also lead to a decrease in income for the business sector and eventually to the downsizing of many businesses in town. Approximately 53% of surveyed businesses indicated that they were either entirely or very dependent on the mine or mine employees for an income. This confirms that horizontal diversification of the local economy is minimal and that the local population is thus very vulnerable in the event of a drastic impact such as mine closure. Mine closures will also inevitably lead to a downsizing of mine-related and mine-dependent businesses and inevitably to increased unemployment. This will result in a decrease in municipal revenue and an erosion of the municipality’s ability to render services.

Demographic data gathered at the time of the SAA revealed much about the vulnerability of the local population to socio-economic impacts triggered by mine closure. Eight percent of male heads of households in Koffiefontein were above 65 years of age, while 19% of female heads of households were above 65 years. As many as 17% of all Koffiefontein households were headed by pensioners. Only 20% of the population of employment age had jobs, and 32% of the town’s population was living in poverty, despite the fact that the mine and supporting businesses employed a large number of the local residents (Pelzer et al., 2005).

During previous mine closures, increased unemployment resulted in a drastic rise in poverty levels with serious implications for people’s health—particularly for vulnerable groups like the elderly, women, and children (Attewell, Botha & Brand 2003). Mine closure also increased the vulnerability of groups such as women, children, the elderly and HIV/Aids-affected households due to the loss of income and social services. Safety nets for these groups should therefore be established either by government or by the mining company. Persistently high unemployment increases social disaffection such as crime, violent crime, alcoholism, child abuse, female abuse, and family violence and breakdown (Attewell, Botha & Brand 2003). High levels of alcoholism, unemployment and poverty are also breeding grounds for the spread of the HIV/Aids virus, similar to what is happening elsewhere in the Free State Province and the country.

Despite the downsizing in recent years, formal employment opportunities in the Koffiefontein area are still largely limited to the mine, mine-related business, retail, the local municipal council and the civil service (Pelzer et al., 2005). The challenge for Koffiefontein is to ensure that, upon final closure of the mine, even to the community are maximized while benefits are optimized. Mining is such a pervasive part of life in Koffiefontein that any proposed termination of mining activities is likely to produce extensive social and economic impacts. The gathering of relevant social and economic information on a continuous basis is thus crucial to ensuring that socio-economic impacts are managed prudently. In order to manage the impacts of mine closure, stakeholders must have a social knowledge of the strengths, weaknesses and development opportunities embedded in the socio-economic environment. This calls for continuous information capturing of current and changing dynamics and opportunities through collaborative efforts of all LEAPs. The primary agent responsible for facilitating a diversified economy is the local municipality. Therefore, the chapter now turns to a more detailed assessment of local government and particularly of human capacity at this level.

THE MUNICIPALITY AS GOVEMING STRUCTURE

In South Africa, the lower division of the democratically elected government structure is the local municipality. According to the 16th Amendment to the Constitution, the objectives of local government are “to provide democratic and accountable government for local communities; to ensure the provision of services to communities in a sustainable manner; to promote social and economic development; to promote a safe and healthy environment; and to encourage the involvement of communities and community organisations in the manner of local government” (SA Government 2010). It is explicitly stated that a municipality must “structure and manage its administration and budgeting and planning processes to give priority to the basic needs of the community, and to promote the social and economic development of the community” (emphasises added) (SA Government 2010).

In the Local Government: Municipal Systems Act 32 of 2000 (Government Gazette 2000), an entire chapter is devoted to the Integrated Development Plan (IDP). This chapter stipulates the content of an IDP as well as the process for planning, drafting, adopting and reviewing IDPs. The Act clearly states that it is the responsibility of the municipality to draft a development plan that will foster local economic development (LEDE). The question must then be raised as to whether the necessary capacity exists in local municipalities.

In addition to formulating, the elected council members are also responsible for local services such as electricity, water and infrastructure. However, they are often not properly trained in how to carry out local government’s mandate and obligations. In order to enhance competence at the local level, government provides various training programmes and grants for the capacity building of council members (Standing Committee on Appropriations 2010). The Development Bank of Southern Africa (DBSA), one of the agents of capacity building, has also committed itself to supporting municipalities in order to measure the impact of development finance in South Africa. According to the DBSA (2001), its mission is achieved through the delivery of:

- Funding: capacity-building funding through grants.
- Expertise: mobilization and deployment of technical and financial experts for infrastructure project implementation.
- Development facilitation: technical support and sharing of knowledge.
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The Standing Committee on Appropriations (2010) however, alludes to the fact that municipalities lack planning capacity. The South African Local Government Association (SALGA) (2003) echoes a similar sentiment by stating that it is necessary to address the poor skills base, lack of career-path opportunities, lack of skills development programmes, and under-investment in technical, management and leadership skills in municipalities. A lack of capacity in the local government level means that poorly developed and implemented IDPs. In turn, hinder the creation and implementation of initiatives towards a more diversified economy and places the long-term sustainability of any single-resource town in jeopardy.

**SUPPORT FOR COMPILING THE INTEGRATED DEVELOPMENT PLAN (IDP)**

Small-town municipal councils face many challenges, including lack of management skills. Innovative thinking regarding economic development and diversification of the town’s economy is often not a high priority, since there are many other crises to address. Most of these towns face major challenges in providing the basic infrastructure to the community; it is therefore understandable that the IDP does not always address the priority that it deserves. In 1993, the Educational Training Unit (ETU) suggested a five-stage approach to compiling an IDP (ETU 1993). The proposed approach is shown in Table 3.

Table 3: Summary of the IDP approach suggested by ETU (1993)

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<th>Stage</th>
<th>Activity</th>
<th>Means of participation</th>
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<td>1. Analysis</td>
<td>Information is collected on existing conditions within the municipality. The analysis focuses on the types and causes of problems faced by people in the area.</td>
<td>Community meetings organized by the ward councilor; public hearings; stakeholder meetings; surveys and workshops; gathering information on local people’s experiences of the problems.</td>
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<td>2. Strategies</td>
<td>The municipal council develops an action plan.</td>
<td>Municipal council meetings; workshops with stakeholders; public hearings.</td>
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<tr>
<td>3. Implementation</td>
<td>After assessing that the objectives set out in Phase 1 have been met, the development plan must be implemented.</td>
<td>Municipal council meetings; workshops with stakeholders.</td>
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<tr>
<td>4. Monitoring and evaluation</td>
<td>The project is monitored.</td>
<td>Municipal council meetings; workshops with stakeholders.</td>
</tr>
<tr>
<td>5. Approval</td>
<td>The IDP is presented to the municipal council for consideration and adoption. The council may reject or amend the public comment.</td>
<td>Municipal council meetings; workshops with stakeholders.</td>
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**MUNICIPALITIES AS LEARNING ORGANISATIONS**

In addition to the requirements mentioned in the previous section, there are also specialized training programmes available for municipal managers involved in development planning. In 2010, SALGA and the South African LED Network (2009) presented an essential series of courses addressing eight different areas related to IDPs. However, we have been unable to find any evidence that these programmes were repeated in 2010. This may be because the sponsored programmes failed to deliver the expected outcomes (Standing Committee on Appropriations 2010).

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TOWARDS A SOCIO-TECHNICAL APPROACH (STA) TO LOCAL ECONOMIC DEVELOPMENT

Theoretical Principles:

One of the major breakthroughs in learning organizations has been the use of mental models. Models are used in various domains, an emergent model, for example, describes the objection pursued by an enterprise (Selman, 1980). Wilson (1990) defines a model as "the explicit interpretation of one's understanding of a situation or merely one's idea about that situation. It can be expressed in mathematics, symbols or words, but is essentially a description of entities, processes or attributes and the relationships between them." Caro (1972) defines a model as an abstract representation of reality that excludes much of the world's infinite detail. Models are used for the following purposes: to describe reality, to explain the past and present, and to predict and control the future (McNamara, 1990). It is impossible for people to "carry all the information" of an organisation in their heads (Senge, 1990), and therefore models assist people to record what they know (to explain the past and present) and to take action accordingly (predict and control the future).

One way of capturing and storing the models within an organisation is a repository. A repository is defined by Van Weel et al. (2000) as "a central storage system for models from various sources represented in various formats." The value of this tool is that information is stored in only one location, simplifying access to the information and improving its reliability. Using well-developed software to manage the repository results in benefits such as lower costs (since information is captured only once) and time saved on searching and remodelling existing information. Based on the concept of systems thinking (Figure 1), the focus of the STA approach is to store "what we know" in a single storage space (repository) and to use this information during decision-making.

As shown in Figure 1, there are three main sources of information that are stored in the repository: this repository assists in decision-making, strategic planning and the compilation of DPs. The information should (as well as the models that encapsulate the information) be captured in the repository (illustrated on the left hand side of Figure 1).

Demographic and socio-economic profiles of the affected community and current and previous development initiatives of the specific single-resource town. Information from the core industry such as the mining industry (if available). Examples from other single-resource towns that successfully managed to stimulate economic diversity. This enables the completion of an inventory of best practices and lessons learned.

In addition to the different sources of information, there are also different modelling concepts (Figure 1) that provide guidelines for capturing information into the repository. These guidelines should specify what information should be captured and how it should be captured. One such model is the hierarchical cube, which is used by the Living Lab researchers (McNair, 2000) (Figure 2). The Living Lab approach represents a research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real-life contexts (McNair, 2000). This approach differs from the six perspectives that stimulate innovative information gathering: user involvement, service creation, infrastructure, governance, innovation outcome and methods and tools. Each perspective is represented on one face of the Rubik's cube, and each face of the cube is divided further. The three rows of each face facilitate interoperability by representing the different developmental phases of a Living Lab including setup, sustainability and scalability. The different aspects of a Living Lab are reflected in the cube's three columns, i.e. the organisational, technological and contextual issues (Kleiner, 2008). As an alternative, Zachman's (1981) framework allows for different perspectives by describing any object (an enterprise, a department, a value chain, a town, etc) in terms of six different descriptions or abstractions (Zachman, 1981): what, how, when, who, where and why (Figure 3). Each of these descriptions can be viewed from a different perspective (row), depending on the level of modelling. At the highest level, where the scope of the task is defined, the focus is on the planning of strategies. The requirements defined at the highest level are implemented in physical applications on the lower levels. In a single-resource town, this lower level could consist of software used to extract information from the repository for decision-making.

Figure 1. An STA approach for the sense of existing information.
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- setup
- sustainability
- scalability

- organisational issues
- contextual issues
- technological issues

- governance
- service creation
- infrastructure

- innovation outcomes
- user involvement
- methods & tools

Source: Moberg, Klein, & Kloes 2008
Figure 2. The Living Lab Reimagination Cube

Table 1: An illustrative description

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<td>2010</td>
<td>Innovation 1</td>
<td>Positive</td>
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<tr>
<td>2011</td>
<td>Innovation 2</td>
<td>Negative</td>
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<td>2012</td>
<td>Innovation 3</td>
<td>Neutral</td>
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Figure 3. An illustrative description
APPLICATION OF THE SOCIO-TECHNICAL APPROACH (STA): THE CASE OF MINE CLOSURE AT KOFFIEVFONTEIN

Koffiehoven is a municipality of the Letseng Local Municipality. In its Municipal Transversal Strategy (Letsheng Municipality 2016), the municipality allocated an amount of R350 000 for the development of an LED strategy and implementation plan (including a Tourism Development Plan) and a further R350 000 for the establishment of a functional municipal LED forum. Other LED focal areas of the municipality are a coordinated SMME development plan, the registration of SMMEs as cooperatives, the establishment of a reviewed organigram, a training plan, a revised Spatial Development Framework, a community management plan and a youth development strategy.

The LED plan contained in the Municipal Transversal Strategy includes the towns of Koffiehoven (the municipal head office), Jacobshof, Luckhoff, Oppermannsdorp and Permatburg. Considering the survey data regarding the current status of Koffiehoven (presented in Section 4), it is imperative that the Letseng Local Municipality realises the urgency of the situation in Koffiehoven. Diversification is urgently needed in order to make the town sustainable after final mine closure in the next ten to twenty years. An STA, as suggested in Section 6 would enable the town to make informed decisions based on information from different sources. One of the modelling concepts, such as the Zachman Framework at the Living Labs Humanisation Cube, could be used as a guideline for capturing information in the repository (Figure 4). For illustrative reasons, it is assumed that the DDP team in the case study described below used the Zachman Framework and therefore focused on the six descriptions of what, how, where, who, when and why as a guideline for capturing information in the repository.

According to the suggested STA approach, the first source of data to be included in the repository is Petra Diamonds. By law, mine industries must continuously provide feedback on data related to the impact of the mine on both the environment and the town’s development. The Mineral and Petroleum Resources Development Act (38 of 2002), for instance, regulates the process by which a mining right is granted and stipulates that an application for a mining right must also contain a Social and Labour Plan. Such plans should include information about the social and economic background of the area in which the mine operates: the key economic activities of the area and the aspect that mining operations would have on the affected community. The Act further states that the closure of a mining operation is “a process which must start at the commencement of the operation and continue throughout the life of the operation” (Peber, et al., 2005:6). It is therefore explicitly recognised that minerals are non-renewable natural resources, and that preparing for mine closures is an inevitable and continuous responsibility of the holder of a mining right as Koffiehoven’s case Petra Diamonds.

In order to maximise the usefulness of the information captured in the repository and to conduct comparative studies from the different sources, it is important that the DDP team specify the information that needs to be captured from the different sources. Using the Zachman descriptions, the DP team formed consensus on questions such as: What are the demographic trends in the affected area, and what is driving these trends? How are these demographic trends impacting the socio-economic and financial sustainability of the business sector and the municipality? Where will inhabitants of Koffiehoven relocate to in the case of mine closures? Who are the community members that are most likely to leave the town? When is the mining operation at Koffiehoven likely to be terminated permanently?

The second source of information for the repository is the town itself. The local municipality already has data about the current economic and socio-demographic status of the Koffiehoven community. Again, using the Zachman Framework as a guideline, the DDP team should respond to questions such as: What processes and factors are hampering economic development in the town? What initiatives are currently driving the town’s economic development? How was vertical economic diversification previously promoted in Koffiehoven? What are the latest processes that have an impact on the economic sustainability of Koffiehoven? Who are the most vulnerable members of the Koffiehoven community? Why did previous attempts at economic diversification not have lasting results?

![Figure 4. STA applied to the Koffiehoven case study.](image)
Rethinking Sustainability of Small Towns

All the information should be captured in a single repository and updated continuously to enable the LED to make informed decisions about the type of development that will promote sustainability. The development of front-end data mining or decision-support software is necessary to allow this information to be used in the creation and management of IDPs. Once the information is captured within the repository, the models should be provided and explained to decision makers so that they can understand the impact of mine closures and compare the town’s current situation with similar scenarios elsewhere. The IDP management team should have the information necessary to make informed decisions and answer the following questions: How does the socio-economic profile of Koffiefontein differ from the profiles of other single-resource towns that have successfully diversified? Compared with these other towns, what are the strengths and weaknesses of Koffiefontein as it moves towards diversification?

CONCLUSION

This chapter has proposed a socio-technical approach (STA) underpinned by continuous information capturing. This approach enables the IDP management team in single-resource towns to have the information necessary to promote economic diversification. Utilizing a systems-thinking approach, it was argued that single-resource towns are learning organizations that could benefit by drawing on existing information about the town itself, its core industry and other single-resource towns that have successfully diversified. Although an introduction to the STA concept was presented, it could be further refined and developed. Future research could develop the decision-support software that would assist single-resource teams in the decision-making process. Given the limited capacity constraints in municipalities, additional research into issues of human-computer interaction (HCI) is also necessary. If towns such as Koffiefontein follow the suggested approach outlined in this chapter, they will be better able to successfully diversify their economies and avoid, or at best significantly mitigate, the economic collapse that too often results from mine closure.

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