

**THE ROLE OF SCIENCE, TECHNOLOGY AND
INNOVATION IN LOCAL ECONOMIC DEVELOPMENT:
INTERNATIONAL DEBATES, SOUTH AFRICAN EVIDENCE**

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EXECUTIVE SUMMARY

In recent years Local Economic Development (LED) has received growing attention internationally, largely for its assumed potential to address localised economic and social challenges and promote local development. It has been increasingly recognised that LED represents a strategy with potential to address local development backlogs, particularly in the Global South, where traditional ‘top-down’ approaches have generally failed to catalyse significant local change. One dimension of LED is the local government variant which is styled as ‘developmental local government’ and has been actively promoted in South Africa for almost 20 years in an effort both to achieve post-apartheid socio-economic redress and to energise economic development.

Twenty-one years after South Africa’s transition to a democratic state many of the country’s development and unemployment challenges remain unresolved despite the pursuit of a range of development interventions, including LED. There is clear evidence that social and spatial inequalities remain deeply entrenched and that efforts to promote the growth of the national economy have seen little benefit accumulating to especially the more marginalised regions of the country. Within this context spatial interventions, including LED, are gaining greater prominence as key elements of the development terrain. The National Development Plan and the National Growth Path, are the two guiding national development programmes and both clearly articulate the need for spatial targeting, while a range of other interventions are being introduced or are receiving reinvigorated support. These include, inter alia, rural development initiatives, special economic zones, targeted support for inner-cities and poorer neighbourhoods, infrastructural development and assistance to small businesses, co-operatives and the informal sector.

Within the above context LED has been pursued, with varying degrees of success, for much of the existence of South Africa’s democracy. LED has been anchored on the defined principle of ‘developmental local government’ which was introduced in 1998. This means that LED is an identified mandate which local government is required to pursue to improve the economic and social well-being of communities. Arguably, across South Africa LED has come to be seen more as a local government function and less as a strategy grounded on principles of partnership and engagement with the private sector – with the possible exception of selective interventions in the larger cities. The general consensus is, however, that LED in South Africa has underperformed and that fresh ideas are required to reinvigorate the landscape of LED.

The essential context for this investigation is that under the Constitution South African local governments continue with a developmental mandate with responsibility for ensuring social and economic development. However, as is emphasized by national planning frameworks for Local Economic Development (LED) produced by the Department of Cooperative Governance and Traditional Affairs (DCOGTA) the activity of LED must go beyond local government and incorporate partnerships through the engagement of a range of different stakeholders. The starting point for this report is that a better understanding of the solutions

that originate within the local system of innovation constitutes a suitable approach towards sustainable and inclusive development. Nevertheless, two reviews of innovation in South Africa concluded that the country's innovation system so far has failed to address the national challenges of socio-economic development.

The problems surrounding socio-economic development in South Africa are particularly acute in the country's most marginalised and underdeveloped areas. South Africa's space economy manifests a pattern of uneven development with the starkest inequalities represented between the prosperity of the country's metropolitan areas and much of the Western Cape on the one hand and of South Africa's so-termed distressed areas on the other hand. National government has identified a group of 27 distressed district municipalities as priority areas for attention and intervention insofar as redressing the current uneven patterns of spatial development in South Africa. These 27 distressed municipalities incorporate nearly all of the former rural Homelands areas and cover all of Limpopo, most of KwaZulu-Natal and Eastern Cape, much of North West as well as Mpumalanga provinces. In addition, they include the West Rand District Municipality in Gauteng and parts of Northern Cape as well as Free State.

The Department of Science and Technology (DST) – requires empirical evidence to inform its entry- in the policy space of Local Economic Development (LED) in South Africa and engage in addressing the developmental issues of these distressed areas. The proposed focus for intervention by DST is to foster the role of Science, Technology and Innovation (STI) in LED and thereby to encourage the growth of vibrant robust local economies. In so doing DST would be supporting the work of the Department of Cooperative Governance and Traditional Affairs (DCOGTA) as well as the Department of Economic Development (DED) in supporting economic growth in these municipalities. It is against this backdrop that the core aim of this project is to provide a baseline of information and knowledge about STI and LED with a specific focus on these distressed municipalities as a first step towards informing LED strategies that could be STI-led in these areas.

The analysis begins in Chapter Two by addressing two key sets of issues which provide an essential framework for the study as a whole, namely a review of the conceptual underpinnings of this investigation identifying key themes and perspectives which arise from the international experience of addressing socio-economic challenges through science, technology and innovation and an overview of changing national government policy towards LED in South Africa. The key findings are as follows. Differences in innovation activities among firms and use of new technologies translate into substantial productivity gaps which in turn impact upon local economic growth prospects with disparities between more and less successful regions concerning their different levels of development and innovative activities. Faster growing regions exhibit higher levels of productivity which can be linked to more innovative activities. The challenge of harnessing STI for sustainable development requires linking it to the diverse realities that are embedded in different regional contexts. Designing a package of policies that are most likely to unlock innovation in a particular region is likely to require local information and knowledge that is available only in that region. Typically, local communities can benefit more from innovations if the latter are locally or regionally embedded. Accordingly, regional and local systems of innovation require a critical

understanding of the resource and knowledge base which form the bases of innovation which can assume a vital role in addressing socio-economic challenges for galvanizing local economic development.

Chapter Two confirms that South Africa has struggled to achieve successful local economic development initiatives on a countrywide basis and it is generally accepted that LED has been under-performing, more especially outside of the well-resourced and capacitated metropolitan areas. Beyond the country's major cities the record of achievement of LED is limited with only a small number of exceptions. What is striking about reviewing the shifting currents in national economic development frameworks for LED in South Africa is the minimal attention that is given in policy debates to issues around innovation. The country's most recent policy documents and frameworks around local economic development, which were released in 2013 and 2015 make little mention or acknowledgement of issues around innovation. Moreover, no consideration is given to the role of innovation policies towards contributing to the national objectives of launching a "more effective fight against poverty, inequality and unemployment through the development of inclusive and competitive local economies" and "to support the potential of local economies to grow and develop the national economy". The potential role for innovation in creating "robust" and "inclusive" local economies, the stated intentions of national policies since 2006, has not been brought explicitly to the forefront of the LED policy and planning agenda. Arguably, to a large extent, the potential for STI to contribute towards LED in South Africa represents a 'missed opportunity' as successive national policy documents and statement on LED have not taken up the question of STI.

In Chapter Three the objective is to analyse the findings of an audit that was undertaken of the current trajectories of Local Economic Development in the distressed areas which are the target intervention spaces as identified by DST. This analysis entailed an internet search for the collection and analysis of the directions of LED strategies or IDP documents for all South African municipalities and in particular an analysis of Gaffney's Official Yearbook on Local Government in South Africa for 2013-2015. The most striking finding is of the overwhelming dominance in LED policy and planning in the distressed areas upon tourism, agriculture and SMME promotion. In terms of tourism the analysis discloses the remarkable position that 85.2 percent of District Municipalities and 85.8 percent of Local Municipalities across the distressed areas are targeting tourism as a driver for local development. The planned expansion of tourism is viewed as popular focus because of its acknowledged potential in South Africa for poverty alleviation and its reliance on external capital sources. The pro-poor credentials of support for (mainly small-scale) agriculture (including forestry) and for SMME development are obvious factors that underpin the strength of these two focus areas of LED policy. In the case of agriculture, a total of 85.2 percent of District Municipalities and 73.8 percent of Local Municipalities across the distressed areas are concentrating upon agricultural upgrading for accelerating prospects for local development. In parallel with a heavy emphasis at national level devoted to SMME support programming, as exemplified by the establishment of a new dedicated Ministry for Small Business Development, across the distressed area as much as 74.1 percent of District Municipalities and 73.8 percent of Local Municipalities are prioritising SMME development as part of their ongoing LED initiatives.

Beyond these three leading focus areas other issues are highlighted for LED policy in distressed areas. It is shown that approximately one-third of municipalities are committed to programmes for job creation in general and support for the informal sector or cooperatives. In particular, the commitment is for supporting cooperatives as only a handful of municipalities indicate programmes for informal sector support and upgrading such as through the provision of market stalls. The extended support for cooperatives is particularly a feature of the mainly rural municipalities and often allied to agricultural development. In association with LED initiatives for boosting competitiveness a focus on investment attraction is evidenced in nearly 15 percent of municipalities. Given the laggard pace of the development by national government of guiding strategy for LED (despite nearly two decades of national government encouragement of LED), 13 percent of municipalities in distressed areas flagged the preparation of an LED strategy as a commitment in their IDP statements. Training programmes for skills upgrading was a focus of commitment across nearly 10 percent of the 161 municipalities. Of minor significance was support for infrastructure-led initiatives for promoting LED and for industrial development. In respect of STI and local economic development the outstanding finding is of the complete oversight of innovation in discussions about LED both nationally and specifically in the municipalities of the distressed areas. From the viewpoint of informing LED policy of local governments in the distressed areas there is evidently major space for new interventions around innovation.

Chapter Four gives the findings from a desktop research investigation on three themes which the DST identified as critical to innovation and correspondingly with vital implications for LED in South Africa's distressed areas. The three themes flow out of the analysis conducted in Chapter Three which identified the significance of particular sectors for local economic development in the distressed areas. In particular, the analysis highlighted the critical importance of agriculture, SMMEs and tourism for energising new development opportunities in these areas. Three sets of discussion and analysis are presented which relate respectively to the following:

- The role of STI in agriculture and rural economic development*
- The role of STI in SMME development and the function of SMMEs in national and regional systems of innovation; and*
- Innovation in the service sector with a special focus on tourism.*

In each of these sub-sections of discussion different key issues are highlighted from the international policy debates and scholarly research relating to STI and innovation. It is argued that the various sector-specific issues that are raised with respect to agriculture, SMMEs and tourism can be important for informing DST in relation to understanding and planning for STI interventions in these critical sectors for LED in South Africa's distressed areas. In final analysis, DST must enhance the contribution of innovation policies to rural development by generating relevant innovation policies for the prioritized sectors in South Africa's LED strategies. This opens up a critical role for DST in respect of the following: agricultural innovation policy for regional and local economic development; innovation policy for SMME development; and, innovation policy for tourism development. Taken together, this would raise the profile of STI as an essential component of LED and rural innovation processes in South Africa.

The disconnect between South Africa's national innovation policies and regional and local development planning is being addressed. In 2015 South Africa's Department of Science and Technology (DST), the core department with responsibility for innovation policy in the country, released a new strategy document titled Innovation for Local Economic Development (ILED) which is intended to inform the DST's involvement in the policy space of Local Economic Development (LED) with the mandate of "strengthening local systems of innovation and production, in a systemic and systematic manner". In Chapter Five the findings are reported of primary fieldwork – 26 interviews - undertaken in support of deepening the limited existing knowledge base around innovation and local development with specific reference to South Africa's marginalised regions. This chapter analyses the results of the field work across five of the district municipalities classified as part of South Africa's distressed areas. The results offer a foundation to inform strategic planning around innovation for LED in South Africa. Among its central findings are that a redefinition is needed of the place and role of STI in regional development and LED; a specific focus is required on how STI can contribute to the diversification of local and district economies and on how STI can contribute to the development of innovation-led SMMEs. Further, improved public understanding is required of STI and its contribution to LED through national flagship projects that can have a visible impact on district economies. It is argued that DST can focus its STI interventions on two strategic areas viz (1) agriculture and tourism value chains, (2) build capabilities within the district municipalities and universities in order to enhance interactions between these institutions so that universities can play a more prominent role in regional development of marginalised locales. The interventions can contribute to strengthen regional and local systems of innovation, to unlock economic opportunities and introduce broad economic change processes.

Overall, the fieldwork findings provide an empirical base for strengthening DST's mandate of "strengthening local systems of innovation and production, in a systemic and systematic manner". The limited existing knowledge base around innovation and local development with specific reference to South Africa's marginalised regions has been deepened and several specific issues highlighted to inform strategic planning around innovation for local economic development in South Africa. The results of this investigation point to a conclusion that the economic and social development of priority districts requires the deployment of STI resources and the enhancement of greatly skilled personnel whose thinking is grounded in national and regional systems of innovation. Above all the importance is shown of mapping out the workings of local innovation systems, recognising that innovations are embedded in their locality contexts, and that the innovation geography of the district municipalities underscores that STI interventions need to be tailored to the needs of each LED planning context.

It is concluded that the insights developed through this report justify the ILED approach to local and regional development. This constitutes a major shift from centralised planning approach that has been employed by the DST in the past. The empirical findings from this study stress that (1) the local economic priorities of district municipalities define the involvement of the DST in the local and district economies of the prioritised districts; (2) that the fate of each priority district economy is contingent on its 'daring capacity', its potential to start new economic activities, its ability to link its knowledge base to creativity, its potential to exploit the self-organizing capacity of the district, and the transformative potential of STI; and, (3) that the emphasis should be on unlocking the potential of local

value chains and local economic sectors. Of specific importance in this regard are agriculture and tourism value chains and that the critical role of SMMEs in distressed areas needs to be acknowledged for STI interventions.

In final analysis, this report highlights the need to ensure that innovation should not create further inequalities in South Africa. It enhances our understanding of STI in the context of poverty, inequality, and unemployment. ILED creates a model for development planning that is organised around the national systems of innovation but useful for guiding regional STI policies and for generating innovation-led LED strategies. Consequently, the empirical findings emphasise the relevance of the ILED approach and the imperative for deeper interactions between LED planning and incorporation of spatial issues in STI policy. The results of the interviews indicate a policy space for advancing the potential for inducing STI-led economic activities in the marginalised district municipalities. Indeed, as expressed in LED strategies and based on the empirical findings, our recommendation is that a major focus should be on the strategic development of agriculture and tourism value chains and that these economic sectors provide the bases for DST's systemic and catalytic STI interventions in the prioritised districts and more generally for enhancing the prospects for rural economic development across South Africa.

1. INTRODUCTION

Over the past few decades globalization has been a vital driver for reconfiguring of planning approaches towards local and regional development (Rodriguez-Pose, 2008; Pike et al., 2011). Arguably, one of the major features of globalisation is that “markets have become more pervasive and are affecting countries simultaneously across the world” (Christensen and van der Ree, 2008: 2). A significant outcome of globalization is the exposure of “even the most remote spaces to competition and forcing firms, localities and regions to react and adjust to the new economic conditions” (Pike et al., 2006: 4). Amidst circumstances of global economic turmoil, localities are compelled to find new solutions to support local competitiveness as well as to create inclusive development (ILO, 2008). Local economies are affected more than ever before “by policies and processes formed at the supranational level, such as market liberalisation, expanding global production systems and the changing terms of trade” (ILO, 2006: 2). Overall, therefore, the advance of globalisation accords Local Economic Development (LED) strategies “a bigger role to play in international development” (Rodriguez-Pose, 2008: 24). More particularly, LED “offers a means to counteract or take advantages of the forces of globalisation by maximising local potentials” (ILO, 2006: 2). For almost 20 years South African localities, with the support of national government have actively pursued LED in an effort both to achieve post-apartheid socio-economic redress and to promote economic development.

21 years after South Africa’s transition to a democratic state many of the country’s development and unemployment challenges remain unresolved despite the pursuit of a range of development interventions (including LED) and the generally modest to high economic growth levels which the country experienced until the impact of the 2008-09 financial crisis (Johnson, 2015). Clear evidence exists that social and spatial inequalities remain deeply entrenched and that efforts to promote the growth of the national economy have seen little benefit accumulating to especially the country’s marginalised regions. Within this context spatial interventions, including LED, are gaining greater prominence as key elements of the development terrain. The National Development Plan and the National Growth Path, are the two guiding national development programmes and both clearly articulate the need for spatial targeting, while a range of other interventions are being introduced or are receiving

reinvigorated support. These include, *inter alia*, rural development initiatives, special economic zones, targeted support for inner-cities and poorer neighbourhoods, infrastructural development and assistance to small businesses, co-operatives and the informal sector.

Within the above context LED has been pursued, with varying degrees of success, for much of the existence of South Africa's democracy. LED has been anchored on the defined principle of 'developmental local government' which was introduced in 1998. This means that LED is an identified mandate which local government is required to pursue to improve the economic and social well-being of communities. Rightly or wrongly, LED has come to be seen more as a local government function and less as a strategy grounded on principles of partnership and engagement with the private sector – with the possible exception of selective interventions in the larger cities (Nel and Rogerson, 2005). Over the last nearly 20 years, with varying degrees of success and commitment, most local governments have attempted to pursue the strategy and while South Africa is regarded as somewhat of world leader in terms of the development of LED policy and strategy, it would be difficult to argue that on the ground results have made a significant difference in all local communities (Rodriguez-Pose, 2008; Nel et al, 2009). A general consensus is that LED in South Africa has underperformed and that fresh ideas are required to reinvigorate the landscape of LED.

The broad context for this investigation is that local government has been allocated a developmental mandate under the Constitution with responsibility for ensuring social and economic development. Yet as is emphasized by national planning frameworks for Local Economic Development (LED) produced by DCOGTA, the lead Ministry, the activity of LED must go beyond local government and incorporate partnerships and the engagement of a range of different stakeholders. The specific frame of this study is that a better understanding of the solutions that originate within the national system of innovation constitutes a suitable approach towards sustainable and inclusive development. This said, two reviews which were undertaken of innovation in South Africa - the OECD Review and the Ministerial Review - concluded that the country's innovation system so far has failed to address the national challenges of socio-economic development.

The problems of socio-economic development in South Africa are particularly acute in the country's most marginalised and underdeveloped areas. South Africa's space economy manifests a pattern of uneven development with the starkest inequalities represented between the prosperity of the country's metropolitan areas and much of the Western Cape on the one hand and of the South Africa's so-termed distressed areas on the other hand. National government has identified a group of 27 distressed district municipalities as priority areas for attention and intervention insofar as redressing the current uneven patterns of spatial development in South Africa. These 27 distressed municipalities incorporate nearly all of the former rural Homelands areas and cover all of Limpopo, most of KwaZulu-Natal and Eastern Cape, much of North West as well as Mpumalanga provinces. In addition, they include the West Rand District Municipality in Gauteng and parts of Northern Cape as well as Free State.

The Department of Science and Technology (DST) seeks to enter the policy arena of Local Economic Development (LED) in South Africa and engage in addressing the developmental issues of these distressed areas. The focus for intervention by DST is to foster the role of Science, Technology and Innovation (STI) in LED and thereby to encouraging the growth of vibrant robust local economies. In so doing DST would be supporting the work of the Department of Cooperative Governance and Traditional Affairs (DCOGTA) as well as the Department of Economic Development (DED) in supporting economic growth in these municipalities. It is against this backdrop that the core aim of this project is to provide a baseline of information and knowledge about STI and LED with a specific focus on these distressed municipalities as a first step towards informing LED strategies that could be STI-led in these areas.

This report is organised into five further chapters of material.

- Chapter Two begins the analysis by addressing two key sets of issues which provide an essential framework for the study as a whole. First, is a review of the conceptual underpinnings of this investigation identifying key themes and perspectives which arise from the international experience of addressing socio-economic challenges

through science, technology and innovation. Second, is an overview of changing national government policy towards LED in South Africa.

- Chapter Three constitutes a narrowed focus from the international debates and macro-level analysis of policy which are undertaken in Chapter Two. The core objective in this chapter is to analyse the findings of an audit that was undertaken of the current trajectories of Local Economic Development in the distressed areas which are the target intervention spaces as identified by DST. This discussion is set against a review of the key challenges facing LED in South Africa and is a synthesis extracted from larger works which included a critical overview of a mass of academic and policy material which has been produced on LED activities in South Africa.
- Chapter Four builds upon the key findings which emerged from the national audit of LED in distressed areas. Among its major findings were about the role of agriculture, SMMEs, and tourism as potential drivers for LED across the distressed areas. Based upon a desktop analysis of international debates and available South African evidence in Chapter Four three sets of discussion and analysis are presented which relate respectively to the role of STI in agriculture and rural economic development, the role of STI in SMME development and of the function of SMMEs in national and regional systems of innovation; and innovation in the service sector with a special focus on tourism.
- Chapter Five turns back to empirical research and analyses the results of a set of critical stakeholder interviews which were undertaken across five of the district municipalities classified as part of South Africa's distressed areas. The major objective of the primary research was to begin to address the critical knowledge gap around local innovation and to use empirical evidence to document and analyse the nexus between STI and local economic development. The findings in this section seek to contribute towards the strengthening of DST's Innovation for Local Economic Development as a framework that integrates economic growth, STI policy, regional development, and spatial interdependencies. An enhanced ILED framework potentially can be a foundation for guiding the formulation of regional STI policies and innovation-led LED strategies in South Africa.
- Chapter Six provides a summary of key findings in this investigation and in particular emphasizes the implications for reframing local economic development policy and practice in South Africa by using STI-led strategies.

2. SCIENCE, TECHNOLOGY AND INNOVATION: ITS PLACE IN LOCAL ECONOMIC DEVELOPMENT POLICY AND PLANNING IN SOUTH AFRICA

2.1 INTRODUCTION

This chapter begins the analysis of science, technology and innovation (STI) and its relationship to local economic development policy and planning in contemporary South Africa. The aims in this chapter are twofold. First, is to provide an overview of the conceptual underpinnings of this investigation as a whole by identifying key themes and perspectives which arise from the international experience of addressing socio-economic challenges through science, technology and innovation. Second, is to give a synopsis of changing national government policy towards local economic development in South Africa which concludes by observing the absence of any substantive discussion about the role of innovation in LED policy processes. In terms of methodology, this chapter is based upon a desk top analysis of policy documents and critical reviews of issues around STI and LED.

2.2 ADDRESSING SOCIO-ECONOMIC CHALLENGES THROUGH SCIENCE TECHNOLOGY AND INNOVATION

In this section, material is drawn from international debates around the role of science, technology and innovation in impacting socio-economic development challenges. This issue is attracting a growing volume of international policy attention and a small volume of academic writings. The core argument is that science and technology is most effective when it is part of national systems of innovation and linked to the national development strategy. The discussion sketches the essential conceptual foundations of this study and highlights key themes and perspectives that are emerging from international debates. At the outset the concept of innovation systems is introduced as an organizing framework for this investigation.

2.2.1 Innovation Systems

The adoption of the national system of innovation as an organising framework for policy and action places science, technology and innovation (STI) at the centre of addressing major socio-economic challenges. This position is articulated by and supported through the policy positions of South Africa's Department of Arts, Culture, Science and Technology (1996), the African Union Commission (2013), Kenya's Ministry of Science and Technology (2008) and most recently reaffirmed by the Organization for Economic Cooperation and Development (OECD, 2015). In particular, innovation systems pose new questions for STI to address in contexts that vary both spatially and sectorally. Indeed, given the heterogeneity of these contexts, the challenge facing STI policy makers and researchers is to understand how innovation is organised in different contexts. By focusing on what problems are addressed by STI in these varied contexts, the roles of public, private, and NGO sectors can have more transformational effects especially at local level where the impact of STI can be more visible.

The critical importance of STI as a vehicle to promote economic growth is now widely recognised (eg Oenariso et al., 2013; OECD, 2015). Accordingly, a number of countries in both the developed and developing world continue to draw on STI to improve production and productivity in agriculture, industries, and services. However, there is widespread agreement that the outcomes of science and technology-led development interventions have varied over different geographical regions and socio-economic groups (Hirvonen, 2008). Therefore, STI has not been successful in resolving development challenges as it has contributed to the generation of both wealth and inequality (OECD, 2012). As part of the broader national policy agenda, innovation is expected to drive economic growth and address challenges of socio-economic development such as poverty and health (OECD, 2012). Therefore, it is argued that transformed national systems of innovation can be more able to address the broad challenges of development.

Arguably, a broad view of knowledge enhances the role of STI in rural development and especially so in economically marginalised communities. Again, the broad concept of knowledge economy highlights that such economy draws from a large variety of forms of

knowledge. This broad approach indicates a key role of innovation policies especially in developing countries for targeted efforts that seek to identify, recognise and mobilise the unique innovative potential of traditional knowledge. Often these forms of knowledge are marginalised in research and development (R&D) biased conceptions of how knowledge sustains innovation (Cozzens et al., 2007). Therefore, the scope of innovation policies needs to be extended beyond R&D and to incorporate local actors whose innovations are often the result of incorporating selective experiences, ideas, and beliefs (Arce, 2005). This is not to deny the role of R&D in expanding and enhancing the capacities of people, firms and institutions to assimilate knowledge and put it to productive use. What can be emphasized is that R&D needs to be more contextualised especially in the developing world where R&D is expected to address a broad range of development challenges. In the framing of R&D in this context, knowledge production needs to be strongly connected to the needs and capacities of local beneficiaries with knowledge exchange strategies that link knowledge producers with knowledge users. This also requires that steps be taken to close the gap between research undertaken by academics, work undertaken by international organisations, NGOs, civil society groups and, private business (Arce, 2005). Indeed, given that innovation occurs in various contexts, there is a need for further studies that seek to showcase the diverse environments in which innovation can be analysed and therefore improve our understanding of how innovation is organised in these varied contexts.

2.2.2 Rural vs. Agricultural Systems of Innovation

Rural systems of innovation highlight the spatial context of STI as well as the emerging forms of innovation which are establishing themselves within and between the existing innovation policies and practices (Arce, 2005). Likewise, rural systems of innovation provide a framework within which rural development can be organised. Following Hirvonen (2008) the term rural systems of innovation is preferred here rather than agricultural systems of innovation as a recognition of the wider scope that characterizes rural livelihoods and rural economy. Indeed, innovation occurs in all sectors regardless of their nature or spatial location. In particular, the strong focus on agriculture has led to less focus given to technological and other forms of knowledge upgrading in the non-farm sector of the rural economy. Yet all rural economic activities such as agriculture, food processing, textiles,

forest products, healthcare, transport, energy, information and communication technologies, water and sanitation remain important for poverty reduction and sustainability of rural areas (Hirvonen, 2008).

With the growing diversification of rural livelihood alternatives spreading into non-farm activities and the increased interconnectedness of rural areas and other spaces, a new rural economy is emerging. Consequently, contemporary thinking on innovation highlights that the nature of rural innovation capacity be reconsidered as it introduces unexplored policy design and implementation issues addressing challenges and opportunities emanating from the interconnectedness of different spheres of rural and global activity. Nonetheless, agriculture remains an important economic sector especially in rural contexts (Knickel et al., 2009).

The concept of agricultural systems of innovation evolved from the concept of national innovation system with agriculture as the sectoral level of analysis (Agwu et al., 2008). More importantly, agricultural systems of innovation can be useful in guiding and supporting the development of the agricultural sector. In particular, the focus is on how the agricultural sector can make use of new knowledge and how alternative interventions that go beyond investments in research systems can be designed (Spielman, 2005). Therefore, a distinction can be drawn between agricultural research systems and agricultural systems of innovation. Agricultural research often focuses on increasing agricultural yields. The green revolution, a consequence of agricultural research in the 1950s and 1960s, transformed agricultural yields in Asia and helped to dramatically increase food security in the region (Cozzens et al., 2007; OECD, 2012). Likewise, agricultural research has improved the efficiency of animal production systems and animal welfare as well as contributing to the development of new high value-add products.

It is observed that a sustained and dynamic approach to agricultural development has remained of great concern for STI policy makers and researchers. Past efforts have been concentrated on investment in research and development based on the consensus that the application of science and technology is responsible for the required transformation (Agwu et al., 2008). Public research and extension were projected as sole sources of innovation that

could trigger development in the agricultural sector. Farmer innovations were therefore excluded in this innovation system. Admittedly, investment in science and technology can increase knowledge but may not spur innovation culture in the whole system (Agwu et al. 2008). A more holistic and comprehensive framework is therefore needed which would enable the analysis of agricultural innovation processes, and emphasize wider stakeholder participation. This can enable a shift from strengthening research systems and knowledge transfer towards building innovation capacities for the whole agricultural systems of innovation (Rajalahti, 2009). This will also embrace not only the suppliers of science but the totality and interaction of actors involved in agricultural innovation.

According to the World Bank (2006), markets rather than production increasingly drive the directions of agricultural development. Indeed, the production, trade and consumption environment for agriculture and agricultural products is growing, dynamic and evolving in unpredictable ways. It is observed that knowledge, information, and technology are increasingly generated, diffused, and applied through private sector; the knowledge structure of the agricultural sector in many developing countries is changing markedly; and, agricultural development is increasingly taking place in a more globalized setting (World Bank 2006).

2.2.3. Entrepreneurship and Grassroots Innovations

Beyond agriculture, small medium and micro enterprises (SMMEs) have also become a focus of innovation policies, not least because of their widespread importance in economies of the global South. In particular, within the BRICS (Brazil, Russia, India, China, and South Africa) countries, SMMEs are recognised for their contribution to national economic development. In particular, the BRICS countries recognise SMMEs as a relevant platform for analysing and applying STI as well as the need to develop national capacity for creating, nurturing, and managing knowledge-based SMMEs (Arroio and Scerri, 2014). Apart from university-industry interactions, extension services can be used to provide technical assistance to help small businesses grow. Such programmes seek to develop a large population of SMMEs rather than only a few large firms. However, this requires the building of a knowledge society

that recognises both formal and informal knowledge systems as this will essentially integrate STI into the broad national development policies and national economic reform agendas.

Frugal innovations can be an attractive approach to SMME development and grassroots entrepreneurship as they create a market for private businesses. Grassroots innovation can be viewed as innovations that originate from the marginalised developing world contexts, often born out of necessity either by exploiting traditional knowledge or adapting modern technology in ways that make innovation more affordable for most people. Therefore, grassroots innovations can be an important source of solutions that meet the needs of the marginalised communities of low and middle income groups in the developing world. The goal is to develop technologies that match the needs of the marginalised and economically disadvantaged people. Such innovations typically consist of producing cheaper and simplified versions of existing sophisticated products for purchase by lower-income groups (OECD 2012). Consequently, frugal innovations can improve the living conditions and boost the welfare of those that remain economically marginalised by producing cheaper products that are more accessible to them. What can be recognised is that the majority of those that remain marginalised operate mainly from rural and informal markets.

Arguably, innovation is important at all stages of development. However, different types of innovation and varied agents play different roles at various stages (OECD, 2012). For example- in the case of India- grassroots innovations are acknowledged as a form of inclusive innovation relevant to low and middle-income households and in improving the welfare and access to business opportunities (OECD, 2012). Indeed, grassroots innovations carry immense potential for introducing technical change and wealth creation. Overall, the grassroots innovation approach emphasizes the empowerment of people to use STI to find affordable solutions that meet the needs of the disadvantaged people. Typically, grassroots innovations can be promoted for sustainable development through a network of activities and organisations generating bottom-up solutions that respond to the needs of local communities. Most importantly, grassroots innovations can be used as an opportunity to encourage marginalised communities to engage in innovation and thereby broaden the group of innovators as well as create opportunities for new entrants.

2.2.4. The Challenge of Inclusive Innovation

While innovation is recognised as an engine of economic growth, the growth processes are not necessarily of an inclusive character (OECD, 2012). At the centre of pro-growth or competitiveness approach is the generation of exports and wealth. By contrast, the social cohesion agenda puts at the core of the redistributive agenda the question of the generation of employment as well as where these job opportunities are located (Cozzens et al., 2007). It is observed that innovation policies generally respond to the competitiveness agenda. However, they can be directed to marginalised areas by focusing more on grassroots innovations. What can be highlighted is that it is at the local level where the tensions between social cohesion and competitiveness are more glaring with competitiveness approach focusing on regional agglomeration and the clustering of related activities. Policies with this focus can reinforce rural-urban differences while in pursuit of economic growth (Cozzens et al., 2007).

It is important to understand that policies that have been pursued by industrialised countries may not be particularly successful in countries of the developing world as they start at a lower level of development and face both the competitiveness agenda and the social cohesion agenda. The social cohesion agenda highlights the need for a broad conception of innovation. In this agenda, science and technology have to play a more critical role in reducing poverty and inequality. Therefore, the ‘business as usual’ trajectories of development are unsustainable because of their inadequacy to fulfil social and economic development of those that remain marginalised (ICSU, 2005). STI policy makers must confront two challenges. One is the competitiveness challenge of improving national economic performance. The other is the social cohesion agenda of sharing the benefits of economic growth more broadly (Cozzens et al., 2007). At the core of this tension is the existing concentration of STI resources towards high-tech and R&D to achieve competitiveness versus the need to spread them to achieve social cohesion. The high-tech industry approach is often associated with the scientific knowledge based economy which usually excludes traditional knowledge systems. An exclusive focus on high-tech innovations undermines the potential for innovation in other sectors. Innovation in services as well as low and medium-tech industries is partially captured in R&D and high-tech indicators. A narrow focus on R&D high-tech industries produces a skewed representation of the overall basis of economic growth and employment (Cozzens et

al., 2007). The high-tech bias of knowledge economy and its resultant framings of STI policies sustain only a narrow conception of knowledge which underpins innovation in the knowledge economy (Cozzens et al., 2007). This narrow focus on high-tech R&D makes less sense in the global South where the challenges of development are more profound and where there has been a co-evolution of wealth and poverty.

The reduction of inequality is a critical step towards achieving social inclusion. Within STI, structural inequalities are associated with the unequal distribution of STI capacities which in turn perpetuate inequalities in the distribution of STI benefits (Cozzens et al., 2007). Therefore, the social cohesion approach calls for attention to other actors that have received minimal attention in STI such as worker-innovations, user innovators, community-based innovations and innovations in the public sector (Cozzens et al., 2007). The emphasis in these innovations is the production of public goods which are more accessible to the community. The development in Mozambique of malaria treatment tea based on a local plant is one such relevant example. If successful, the tea product will require no dependence on highly qualified expertise, no dependence on imported medicine, no dependence on pharmacies, and no intellectual rights related restraints on use (Cozzens et al., 2007). The solution to the problem will provide a community gain rather than individual gain or private gain.

In final analysis it is not the availability of science and technology that matters most but the way in which STI is used to generate economic growth and to overcome underdevelopment. Aligning STI to national policy priorities such as inclusive development highlights the need to improve the weaknesses that occur in the national system of innovation. In particular, improving the livelihoods of marginalised people requires a more overt focus on economically marginalised regions especially those that are rural. This will also require increased public understanding of STI in order to increase awareness of the significance of innovation across policy fields as well as public engagement in order to increase public accountability. Consequently, this can give voice to communities that have been in the periphery of the STI enterprise (ICSU, 2005).

Building knowledge capacities for innovation at early stages can build learning capacities. These capacities can enable the absorption of technology and increase the demand for STI. They can also encourage technical change as well as the sourcing of external technical and scientific knowledge for value addition in local production processes. This may require that attention is paid to capacity building so that individuals, institutions and organisations can effectively harness STI for inclusive and sustainable development (ICSU, 2005: 34). In particular, building the capacity of local people to participate in decision-making involving STI in local economic development can be a step towards reducing representational inequalities and increased accountability. Building local institutions for STI-led development can also reduce rural-urban structural inequalities.

Apart from strengthening capacities for STI policy formulation, the need to promote a culture of innovation by facilitating appropriate innovation ecosystems for firm-based innovation and grassroots innovation is equally important. Grassroots innovations can be incorporated into formal research and other forms of creative collaboration. This may require on-going mechanisms of convening dialogues among scientists and engineers as well as a wide array of societal actors regardless of their STI capacities. The aim is to facilitate collective learning, stimulate collaborations among different actors in STI and to improve public policies that affect the country's performance of innovation (OECD, 2012). The challenge of building expertise regarding innovation in low-middle income regions is not an easy one. For example, building capacities of municipalities for innovation and their role in local economic development underlines the need for a reconsideration of the structural concerns about the organisation and distribution of STI resources and capacities.

It is against this conceptual background about the potential importance of STI policies for local development that attention moves now to South Africa. The next section provides an overview of key issues and shifts in the trajectory of policy frameworks at national government level towards local economic development planning.

2.3. SOUTH AFRICA – CHANGING NATIONAL POLICY TOWARDS LOCAL ECONOMIC DEVELOPMENT

2.3.1 Context

Within sub-Saharan Africa South Africa is identified as a pioneer and leader in local economic development (LED) planning. Since 1994 the activity of LED has been elevated from isolated local development intervention, mainly in cities, to an obligatory mandate for all local authorities in terms of the national constitution (Nel and Rogerson, 2005, 2007). Importantly, after nearly 10 years of LED being a requirement for local authorities, the national Department of Provincial and Local Government (DPLG) released in 2006 a statement of its understanding and goals for LED which provides to local authorities, for the first time, a definitive set of guidelines for their activities (DPLG, 2006a). The document offers a vision for promoting “robust and inclusive local economies, exploiting local opportunities, real potential and competitive advantages, addressing local needs and contributing to national development objectives” (DPLG, 2006a). The 2006 framework document confirms what Nel and Goldman (2006) recognised as a new ‘policy maturity’ surrounding LED in South Africa. This new policy maturity can be interpreted as providing the essential basis for a phase of consolidation in LED activities and planning. It can be argued that the period 2005-2007 marks a significant watershed in the historical development of LED in South Africa due to the finalisation and release of a raft of national policy initiatives, including the 2005 Policy Guidelines (DPLG, 2005), the 2006 National Framework Document (DPLG, 2006a) and, the 5 year Local Government Strategic Agenda and Implementation Plan which also appeared in 2006 (DPLG, 2006b) Beyond the policy activities of DPLG, the activity of LED continued to be impacted also by a number of other significant policy developments. Examples include the Accelerated and Shared Growth Initiative, the National and Industrial Policy Framework, the National Spatial Development Perspective, the Integrated Small Enterprise Development Strategy, and the Regional Industrial Development Strategy.

The national framework document for LED constitutes the guiding base for implementation of LED in the country. According to the (now former) Executive Manager for LED at the Department of Cooperative Governance and Traditional Affairs (DCOGTA) it represents “the apex document that provides a strategic steer for LED in South Africa giving a strong conceptual framework suggesting what needs to be done to stimulate LED” (Ndaba, 2012). The 2006 policy document is acknowledged by national government to have been “pivotal in changing the national emphasis on LED from being predominantly on the support of low impact local job creation schemes to a more strategic approach which focused on attracting increased investment in local economies” (DCOGTA, 2012: 7). This was to be achieved above all on the basis of four central thrusts of:

- Improving good governance, service delivery, public and market confidence in municipalities;
- Exploiting the comparative advantage and competitiveness of DMs and metropolitan municipalities.
- Enterprise support and development of business infrastructure; and
- Sustainable community investment programmes which focussed on organising communities for development and public spending.

National government considers that the 2006 framework was “an advance in thinking on local economic development, and has been influential in reshaping the approach taken by local government to LED that has been set out in integrated Development Programmes (IDPs) since 2006” (DCOGTA, 2012: 7). Overall, it was viewed the 2006 framework “lifted the level of national debate on LED and began the process of providing the LED community with a common and shared conceptual framework” (DCOGTA, 2012: 7). In addition, it was felt that LED plans integrated into IDPs “have become more strategic and more aligned to stimulate broad-based change at the local level” (DCOGTA, 2012: 7). Other benefits of the 2006 framework were acknowledged as related to “greater maturity within municipalities on LED and attitudes to delivery”, “new energy in Led coming from practitioners”, a recognition of the importance of training in developing LED capacity which was supported by new training materials and development of University curriculum on LED for training (DCOGTA, 2012: 9).

However, with the close of the period for the 2006-2011 Framework, much focus in the period 2012-2013 was given by DCOGTA to rethinking and for the preparation of a new framework. According to Ndaba (2012) the review process commenced in late 2010 (Ndaba, 2012) and culminated in July 2012 with COGTA's release of a *Draft Local Economic Development Framework* for the period 2012-2017. A year later, however, this was followed by a second document titled *The 2013-2018 National Framework for Local Economic Development*. The second document, prepared for COGTA by Econologics Africa Consulting, is currently the most recent policy statement about LED in South Africa. However, it is observed that whilst these documents have status as guiding documents and are cited in 'grey' literature significantly they have never been officially released by COGTA and do not appear on the internet. This is suggestive of a possible policy vacuum on LED from the highest echelons of national government.

This section reviews the contents and directions of these two most recent policy documents on LED in South Africa. The case for rethinking the 2006 LED framework rested on two major sets of considerations. First that the political, economic and social environment within which LED policy was functioning was in dynamic flux and with new policy developments impacting on LED the framework policy itself is constantly in need of readjustment (Ndaba, 2012). Second, despite its acknowledged successes there were areas identified as shortcomings in the workings of the 2006 framework (DCOGTA, 2012). Each of these themes is examined below.

2.3.2. The Dynamic Policy Environment

Since the preparation and release of South Africa's national LED framework in 2006 the context for the planning of LED altered markedly in several critical dimensions (Rogerson, 2008a, 2014). The 2006 framework was prepared at a time of high optimism about rising economic growth. Its authors could never have anticipated the combination of seismic international events which recently have radically impacted the conditions for LED internationally, including for LED in South African localities. Among the most significant international events have been the global financial crisis which severely affected the

prospects for LED, rising concerns about climate change and the restructuring of political groups with the emergence of BRICS. Beyond such international shifts there have been a number of critical policy turns in South Africa which also impact upon LED planning. In relation to the changing landscape of national economic development planning at least four essential themes can be identified as influencing changing LED policy in South Africa. These relate to:

- The relevance of LED within the context of new national economic development plans;
- The initiatives launched by DTI for reindustrialising the South African economy, the associated growing importance of localisation and promotion of the green economy;
- New initiatives around small business development; and
- Changing rural development directions and interventions (Rogerson, 2014)

2.3.2.1 New Economic Development Plans and the Relevance of LED Futures

During 2009 the New Growth Path was launched with its ambitious vision of creating 5 million jobs by 2020 and with a focus on a new more inclusive, labour-absorbing development path (DED, 2010). The New Growth Path document aims to address the structural ‘problems’ inherent in South Africa’s economy and to launch a set of strategies aimed at fighting against poverty, reducing inequality and addressing rural development all in the effort to create decent jobs. In many respects the NGP is South Africa’s response to both changing technological production systems and the global economic downturn which occurred from 2008.

In terms of LED planning six core principles are identified by the Department of Economic Development (DED). These are:

- Improving the labour absorption capacity of the economy both in the absolute numbers of employment opportunities created as well as in the labour intensity of economic growth;

- Rebuilding the productive capacity of the economy;
- Integrating green considerations in economic growth by decreasing the carbon emission of economic activities as well as actively identifying new opportunities in the green economy;
- Focusing on the opportunities on the African continent and supporting logistics and industrial opportunities elsewhere on the continent that can strengthen the country's own employment base and economic development;
- Enhance the coherence and linkages between sectors such as for example between new infrastructure development and extension of local manufacturing capacity; and
- Promoting partnerships between business, labour and government as critical instruments to drive the jobs goals (DED, 2012: 9).

One distinguishing element of the NGP is that it was *not* focused on the existing growth path in its search for new job creation. Natrass (2011) points out that the NGP seeks to create a 'new' more labour-absorbing path through the judicious use of government policy which entails reversal of some of the structural shifts which took place in the early 2000s, most importantly that of employment decline in the country's manufacturing sector.

As compared to the NGP's emphasis upon the 'developmental state' the National Development Plan (NDP) 2030, which was released in 2012 by the National Planning Commission (2011) reveals a more neo-liberal outlook. This is a second highly significant framework to reshape development planning in South Africa. In terms of the economy the emphasis of the NDP is upon constructing a more inclusive and more dynamic economy in which the benefits are shared more equally. The NDP builds upon, however, the key proposals of the NGP for creating new jobs by providing a supportive environment for growth and development while promoting a more labour-absorptive economy. It is disappointing however that the role of LED is scarcely mentioned in the National Development Plan although its relevance is acknowledged implicitly in the statement that for planning "it is important that a one-size-fits-all approach is not taken – government and the private sector should understand the distinct challenges and potential of different areas and respond with a location-specific approach" (National Planning Commission, 2011: 237). In the National Development Plan the most significant (and only!) statement related to LED is

that for the making of sustainable human settlements South Africa needs “municipalities that put economic development and jobs at the heart of what they do and how they function” (National Planning Commission, 2011: 254).

2.3.2.2 Reindustrialisation, Localisation, and The Green Economy

The re-industrialisation of South Africa is one of the cornerstones of the New Growth Path and has emerged as the central focus of much of the policy and interventions recently undertaken by the DTI. Since 2008 South Africa has engaged in wide-ranging set of industrial policy interventions through the Industrial Policy Action Plan (IPAP) with a framework of continuous improvements and upscaling of industrial development interventions as set out in the 2007 National Industrial Development Framework (NIPF). Among its objectives the NIPF seeks, *inter alia*, to facilitate a programme of economic diversification, ensure the long-term intensification of South Africa’s industrialisation, to encourage a labour-absorbing industrialisation path and a further intensification of industrialisation towards a knowledge economy beyond 2014.

During 2011 the DTI expressed serious concerns about the underperformance of the South African economy relative to the global economy and more particularly to the performance of other emerging economies (DTI, 2011). Until the 2008 global economic crisis the South African economy enjoyed steady and progressive growth, albeit not matched by any significant improvement in levels of unemployment. With the onset of recession and accompanying declines in production, the economy shed over a million jobs with approximately 200 000 jobs lost in the country’s manufacturing sector (DTI, 2012a: 22). In its Medium Term Strategic Plan for 2011-2014 the DTI identified both falling levels of employment and slow growth of manufacturing value as “a deep rooted structural problem” and of key concern particularly given that the manufacturing sector is regarded as one that can absorb low skilled labour (DTI, 2011). The performance of the country’s manufacturing sector was considered as especially poor when benchmarked against the economic records of China, India or Brazil. This was viewed as an outcome of “the policies these countries followed before the recession, which focused on production sectors, and significant interventions to counteract the effects of the extended recession” (DTI, 2012a: 22).

It was pointed out that the modest growth of the economy is “driven by unsustainable increases in private credit extension and consumption rather than a more sustainable growth path underpinned by the growth of production-driven sectors of the economy” (DTI, 2012a: 22). Put simply, consumption-driven sectors (such as finance, insurance or tourism) were the driving forces of South Africa’s modest economic growth performance as opposed to production-driven sectors such as agriculture, mining or manufacturing. The IPAP was identified therefore as a key pillar of the NGP (DED, 2010). It represents a range and mix of policies deemed as critical to achieve a scaled-up industrial policy and in particular for reconfiguring “a shift towards the productive side of the economy” (DTI, 2012a: 29). The first IPAP was produced in 2008 and the most current iteration is for 2014/2015 – 2016/17 (DTI, 2014). It contains a broad range of action steps and interventions in support of the goals of NIPF. Concerning the drive for reindustrialisation of South Africa two issues of special significance and potential impact for LED future planning are those relating to localisation and the green economy.

The focus on localisation is associated with changes in government procurement and of amended regulations to the Preferential Procurement Act which were effected on 7 December 2011. In harmony with the NGP’s advocacy of social partnerships to accelerate job creation, representatives of government, labour, the community constituency and business have established a localisation accord (DED, 2011a). This highlights the important role that can be played by extending local procurement in terms of government procuring South African produced goods and services for industrial development and job creation. The objective is to achieve a 75 percent target for localisation in the procurement of goods and services both by the public sector and the private sector and thus to expand significantly the value of goods and services which are secured from South African producers. It is argued that leveraging “public procurement is one of the key instruments for deployment by government in support of the productive sectors, and will be used in combination with policies on industrial finance, trade, competition, innovation and skills development” (DED, 2011a: 1).

The critical importance of strategic public procurement as “a critical instrument” is reiterated by the DTI (2012a: 33). Through the review of public procurement new regulations have been enacted which provide for specific sectors, sub-sectors and products to be classed as “designated” in terms of which all public entities (national government, provincial and local as well as state-owned enterprises) are “to ensure that the designated products procured by

them are produced locally” (DED, 2011a: 2). Furthermore, the localisation accord provides “for public entities to procure locally-manufactured products that are not on the list of designated products” (DED, 2011a: 2). The significance of designated sectors and the drive for localisation is to encourage a deepening of local supply chains with corresponding positive impacts for local industrial and economic development.

A second significant social accord is that about the Green Economy (DED, 2011b). This Green Economy Accord is a response to concerns about climate change and is viewed as the establishment of a “green partnership: to create jobs, provide a spur for industrialisation, and help to create a sustainable future” (DED, 2011b: 3). Once again this accord is a follow on from the New Growth Path’s commitment to greening and green jobs (Nattrass, 2011). It commits the social partners to building and growing the green economy and notes that “up to 300 000 jobs are possible within a decade if South Africa actively invested in the green economy” (DED, 2012a: 14). The IPAP stressed that “an ambitious programme of renewable energy generation should catalyse a significant wave of economic benefits and industrial development” (DTI, 2012a: 66). Opportunities for manufacturing development exist around the production of renewable energy plant, the manufacture of solar water heaters, recycling and biofuels production. The synergy with localisation imperatives is also made evident. It is stated that above all, “it is necessary to have a localisation strategy that uses the enormous spending on climate change induced technologies to create local industrial capacity, local jobs and local technological innovation” (DED, 2011b: 7). Indeed, in the absence of synergistic localisation initiatives the danger exists that South Africa “will bear much of the cost of greening our society without reaping an important benefit in the form of job creation” (DED, 2011b: 7). Overall, therefore, the advancement of the green economy in South Africa offers further opportunities for local production and supply chain development that must be filtered into LED planning.

2.3.2.3 Small Business Development Issues

One of the shared focus areas of the NGP and NDP is that of supporting the growth of small businesses as well as of cooperatives as a vehicle for drawing more South Africans into entrepreneurial activities and boosting job creation. Essentially this commitment in support of small enterprise development represents a continuation and re-statement of policy support that goes back to the early years of democratic change (Rogerson, 2004). The centrality of

small business development for achieving the objectives of competitive local economies and of inclusive growth is emphasized. Indeed, all national government led interventions that support the SMME economy have a powerful resonance for LED planning.

Importantly, however, it must be appreciated that different forms of intervention impact upon different kinds of SMME. The objectives of inclusive growth can be supported by pro-active interventions to support the informal economy in particular localities. In addition, the activities of the Tourism Enterprise Partnership, a support programme for tourism SMMEs, enhance the prospects for micro-enterprises and small enterprises in the tourism sector, particularly in South Africa's poorer provinces (Rogerson, 2008b). The making of business environments that are 'friendly' to small business entrepreneurs is of core concern for LED futures. The DTI and DCOGTA are engaged in a partnership to undertake 'red tape' reduction in selected municipalities across the country. This initiative aims to identify the most critical red tape issues and afford a starting point for local improvement processes, especially for the group of 'ordinary' (as opposed to dynamic) small and medium enterprises that end up paying disproportionately higher costs of compliance with administrative rules, regulations and procedures which impedes their market access. The approach of reducing local red tape thus represents a pro-active and locally-driven approach for building a better local business environment. The national roll out of this programme is a vital step in order to institutionalise the reduction of local red tape for SMMEs in order for them to take advantage of business opportunities in each locality and towards a more inclusive path for LED.

In relation to fostering the category of high growth SMMEs the importance of existing and new programmes for the development of technology stations and business incubators must be highlighted as positive catalysts for innovation and for endogenous growth. Ndabeni (2012: 5) emphasizes the significance of supporting innovation in the SMME sector "in order to ensure greater probability of (business) survival with employment being a positive consequence". Employment growth in localities can be the outcome of innovation support for improved business survival for start-up enterprises and a natural consequence of larger and innovative SMMEs expanding and graduating to larger-sized businesses. The DST has a longstanding programme for technology stations to accelerate the interaction between universities and SMMEs. These technology stations "offer technology support and advice to low technology based SMMEs in order to improve and graduate into high technology SMMEs" (Ndabeni, 2011: 7). Strengthening the responsiveness of these technology stations

in South Africa and making them more responsive to the long-term needs of SMMEs is an important intervention for supporting LED with endogenous growth through small firms.

The second element of support for high growth SMMEs and endogenous growth is of establishing business incubators which focus on economic growth, sustainable employment, technological innovation and technology transfer. There is a large body of international experience which demonstrates that given appropriate policy support small business incubators can be potential tools for LED. An important current in the development of SMME policy in South Africa is that of supporting incubators. In a recent rethink of policy support for dynamising the SMME sector and expanding government's impact upon the SMME economy, one of the key recommendations was to augment the existing infrastructure and network of support for business incubators (Osiba Research, 2011). This recommendation has been taken up and endorsed by the DTI with the launch in 2012 of the Incubation Support Programme (ISP). The linkage of this programme to LED is explicit. It is stated the DTI "initiated the Incubation Support Programme (ISP) to develop incubators and create successful enterprises with the potential to revitalise communities and strengthen local and national economies" (DTI, 2012b: 2). The ISP aims to encourage partnerships whereby large businesses assist SMMEs with skills transfer, enterprise development, supplier development and marketing opportunities with the long-term objective of graduating SMMEs "into the mainstream economy through the support provided by the incubators" (DTI, 2012b: 2).

The programme is no longer simply concentrated upon technology SMMEs as national government stresses now its role for broadening economic participation in the country by encouraging and nurturing start-up enterprises through incubators (Masutha and Rogerson, 2014a, 2014b). Its scope is envisaged to bring enterprises from the survivalist stage and informal economy and graduating them into the mainstream economy. The planned roll out of these business incubators has considerable implications for LED in localities where new incubators are established. In terms of numbers of incubators by 2013 a recent audit of national incubators reveals a total of 51 functioning incubators. This figure represents a marked growth in the numbers of South African business incubators from a total of only four in 2004, to 37 by 2011 to 51 by 2013. The majority of the 51 business incubators have been established by the public sector. Of the national total of incubators 42 or 82 percent are public sector driven through the activities of SEDA, South Africa's national small enterprise

development agency. The remaining nine incubators or 18 percent are private sector operations (Masutha and Rogerson, 2014a, 2014b). The weight of existing evidence shows that the performance of sectorally-cluster based initiatives for incubation has been mixed with some incubators performing extremely well whereas other projects have performed poorly. The potential commitment of national government is indexed by the fact that it has announced a target of establishing 250 new incubators by 2015 (Masutha and Rogerson, 2014a, 2014b).

2.3.2.4. Towards Comprehensive Rural Development

The acceleration of rural development was one of the most critical interventions proposed in the New Growth Path as a means to address the structural challenges underpinning both economic and spatial inequalities in the country (DED, 2010). It is acknowledged that rural development “is a cross cutting mandate that requires significant coordination for maximum impact” (Achary, 2011: 4). The central ministry tasked with dealing with the complex challenges around rural development is the Ministry of Rural Development and Land Reform (DRDLR) which was created in 2009. The establishment of the DRDLR is viewed a watershed for rural development in South Africa as for “the first time in its history, the country would have a ministry dedicated to the social and economic development of rural South Africa” (DRDLR, 2012a: 10). It is considered the start of a new policy and development paradigm for rural development as the post-1994 paradigm was “premised on the assumption that urban development would inevitable cascade to the rural periphery” (DRDLR, 2012b: 9).

The new National Department of Rural Development and Land Reform was given the mandate to develop a Comprehensive Rural Development Programme (CRDP) for the country. In pursuit of this mandate it is claimed that DRDLR has “embarked on developing a fresh approach to rural development” (DRDLR, 2012b: 1). The CRDP is targeted to enable “rural people to take control of their destiny, with the support from government, and thereby dealing effectively with rural poverty through the optimal use and management of natural resources” (DRDLR, 2012b: 1). The core outcomes of the CRDP are the making of “vibrant, sustainable, equitable rural communities and food security for all” and of deepening rural job creation and the creation of economic livelihoods (Swartz, 2011: 2). Key facets of this fresh approach to the challenges of South African rural development are, *inter alia*, “a co-ordinated

and integrated broadbased agrarian transformation as well as the strategic investment in economic and social infrastructure that will benefit the entire rural communities” (DRDLR, 2012b: 1). The major challenges of rural areas are considered to be poor or lack of access to socio-economic infrastructure and services, public amenities and government services coupled with lack of access to water or lack of water sources for both household and agricultural development (Achary, 2011: 3).

The role of the DRDLR is to function as an “initiator, facilitator and coordinator and catalyst in rural development interventions” (Achary, 2011: 5). Special focus is upon infrastructure provision in respect of both economic and social infrastructure. The CRDP places strong emphasis on developing new and rehabilitating existing infrastructure in rural areas (Achary, 2011: 6). Beyond transport infrastructure, this includes rural electrification, communication networks, irrigation schemes, water harvesting schemes, fencing for agriculture and storage facilities. Social infrastructural improvements are centred on sanitation, health clinics, sports and recreation, rural libraries, rehabilitation of schools, and new centres for skills development. Overall, it is made clear that the CRDP follows three phases in its mission to engineer sustainable vibrant communities (Swartz, 2011: 4). First, is an incubator phase with the main driver that of “meeting basic needs. Second, is an entrepreneurial development stage which involves the development of medium to large scale infrastructure. Third is the projected emergence of rural industrial and financial sectors which is to be driven by SMMEs (including cooperatives) and the consolidation of village markets. The significance of the unfolding CRDP for rural LED cannot be ignored. The roll out of the CRDP is occurring geographically across areas which span the majority of the most economically vulnerable local governments which are prioritised by DCOGTA and of policy interest for LED by DST.

2.3. SHORTCOMINGS OF THE 2006 LED POLICY FRAMEWORK

Beyond the imperative to adjust and update the policy framework in relation to a rapidly changing environment a second set of considerations related to a number of shortcomings which were identified in the 2006 Framework and its outcomes. The DCOGTA (2012) isolated several areas where it and the LED community generally had failed to make an impact and thereby wherein improvements might be effected in a new framework. Among the

shortcomings of LED in the period 2006-2011 that DCOGTA (2012) recognised were the following;

- That the role and importance of the private sector in LED had been understated.
- The role of DCOGTA had been ill-defined in the 2006 Framework with the consequence that the Department was reluctant “to make a sustained investment in supporting LED” (DCOGTA, 2012: 7).
- Insufficient guidance was offered on how LED should be implemented and particularly it was felt that the roles of various players within Government around LED were ill-defined and how they might be better coordinated.
- It “provided only a limited perception of evidence-based planning” and no proposals for M & E systems on assessing what did/did not work in LED.
- It offered no guidance on capacity building for LED or support for LED management issues especially for local municipalities.
- The Framework failed to adequately situate LED within broader service delivery for recognition among a host of municipal priorities.
- Limited focus upon linking LED with national job creation imperatives thus restricting its political appeal.
- Failure to convey through media the broader understanding and importance of LED.
- The scaling of LED within municipal boundaries rather than within appropriate value chains or market outreach of local economies.
- Finally, the 2006 document written by academics was viewed as too conceptual and with limited appeal for hands-on LED practitioners who found some of its terminology “alien to them” (DCOGTA 2012: 8).

2.4 NEW POLICY FRAMEWORKS FOR LOCAL ECONOMIC DEVELOPMENT PLANNING IN SOUTH AFRICA

According to Ndaba (2012) in reviewing and revising the 2006 Framework the Department adopted a consultative process during 2011-2012 on the future of LED. It adopted a bottom-up and evidence based approach (Ndaba, 2012). The output of this process emerged in the form of the tabled draft framework. It was considered that “the revised framework is a more pragmatic document than its predecessor, and provides more on how LED might be implemented and rather less on the intellectual and conceptual underpinning of LED” (DCOGTA, 2012: 8).

The document stresses that LED in South Africa is “currently underperforming” and offered a set of five strategic thrusts for support during the period 2012-2015 (DCOGTA, 2012: 26). The first thrust was to elevate the role of LED and to create more central positioning for LED in government and more clearly to isolate the role that each of the three tiers of government have to play in its delivery. Second, much emphasis was given to the role of evolving collaborative partnerships both in terms of public-public and public-private for LED which would be accompanied by dialogue between partners “without which effective LED planning and implementation is not possible” (DCOGTA, 2012: 26). The third thrust relates to enabling environments at the local level as it was argued that both metros and municipalities need to be conscious of the positive and negative impacts that they exert in shaping the environment in which business functions. It was asserted that municipalities had a role and responsibility to create and maintain a business environment that is conducive to doing business (DCOGTA, 2012: 42). Thrust four stresses that the critical issue of planning for LED must be anchored on good data and correspondingly that municipalities could do more “if they have a good empirical understanding of the local economy and if they are prepared to learn from each other and adopt good practices in LED from other parts of the country” (DCOGTA, 2012: 27).

Finally, the framework seeks to target pro-poor growth and in particular through the leveraging of public investment including procurement. Within the ambit of pro-poor growth

COGTA attaches considerable importance to the role of cooperatives “as a way of bringing economic activity to marginalised communities” (DCOGTA, 2012: 50). In this regard there was identified a need to ensure that “procurement process is inclusive and transparent and does not discriminate against the small business sector”. In addition to these five thrusts the document also identified a number of cross-cutting issues that need to be brought on board in the LED community. The first related to governance and leadership in terms of what was LED for and determining political support for LED in three tiers of government. The second related to longstanding matters of capacity and skills for LED including competence in planning, management and administration. Institutional factors relating to the positioning of LED emerge as the fourth cross-cutting issue. Finally, the theme of monitoring and evaluation was raised as needing to be brought into the mainstream of LED planning. During the second half of 2012 this draft framework was workshopped with stakeholders. However, following criticism of the document further research was commissioned as it was considered by many stakeholders that the bottom-up document was ‘out of touch’ with broader structural influences in the LED policy environment.

In October 2013 the DCOG released for comment its latest statement on LED namely the *2013-2018 National Framework for Local Economic Development* (prepared by Econologics Africa Consulting). Significantly, this document does not reflect all of the directions of the commissioned research reports which had been prepared following the 2012 workshop. Nevertheless, the 2013 document claims that it is “intended as a strategic coordination and implementation guide that provides and enhances a commonly shared understanding of LED in South Africa” (DCOGTA, 2013: 5). In addition it further sets out the ambitious claim that it was “a living policy document that draws together current global and national thinking and practice regarding Local Economic Development” (DCOGTA, 2013: 5). Its vision is that South African “Local Economies are inclusive, world-class and dynamic places and brands in which to invest, work, visit and live; and the most successful in creating wealth that is widely shared and benefitting the majority of its local people” (DCOGTA, 2013: 24). Of note is that in terms of the expanded statement of vision for investment it is envisioned that:

“Local economies are truly diverse and have a dynamic economic base comprised of labour absorbing and productive growth industries. Diversity is anchored by industries in

manufacturing, agriculture, mining, tourism, services, and new industries (green economy) subject to local area economic analysis. *Innovation of local economies is an important facet of efforts aimed at leveraging on the knowledge-based economy*” (DCOGTA, 2013: 24, my emphasis).

The five stated core objectives of the National Framework are elaborated as follows. First, is to “launch a national fight against poverty, inequality and unemployment more effectively through the development of inclusive, dynamic and competitive local economies”. Second, is to “deepen and enhance the economic importance and centrality of effectively functioning local economies in growing and developing the national economy”. Third, is to seek to evolve “greater awareness of the significance of localities, regions and metropolitan municipalities as nodes of economic growth, development and generators of national prosperity”. Four, is to “intensify support of local economies in realizing and building on their economic potential thereby achieving local economic stability, developing diverse economic and employment base and creating quality jobs for their communities”. Finally, the last objective is a commitment to “strengthen intergovernmental coordination of economic development planning and implementation, and between government and non-governmental sectors” (DCOGTA, 2013: 27).

Four policy pillars or thrusts underpin the National Policy Framework. The first relates to building a diverse economic base. It is stated that this pillar aims “to drive the modernization and diversification of local businesses to ensure that dynamic sectors are well-supported, metropolitan activities are activated, regional economic development, particularly at District level, is encouraged and regional industrial development programme is given the necessary traction” (DCOGTA, 2013: 32). The projected outcome of building a diverse economic base as pillar/thrust 1 “is to put local economies on a high productivity, high growth and labour absorbing trajectory” (DCOGTA, 2013: 32). The second pillar is that of developing learning and skilful local economies which is geared at “creating highly skilled, innovative and adaptable workforce to attract and support the long term growth of high value jobs, wealth-creating businesses and fight unemployment at local level” (DCOGTA, 2013: 32). The third pillar relates to promoting inclusive economies. It is argued that in terms of uneven

geographical development “the challenge for South Africa is to ensure that all pockets of the country benefit from overall economic performance”.

In terms of engineering a reversal of economic exclusion the National Framework document identifies six critical strategy interventions as essential. First, is that in the context of high unemployment, government needs to recognise the value of all kinds of work, including informal work and in this respect “Government needs to champion and elevate the importance of the informal economy as a key thrust of the country’s development” (DCOGTA, 2013: 33). Second, is a commitment to support for an inner city economic revitalisation programme. Third, is a parallel commitment for utilising the “underutilised resource” of township economies for future economic development and to build a township economic development programme. Four, outside of urban areas there is a focus upon “an inclusive and integrated rural economy” which would be anchored upon successful land reform, productive agriculture and an inclusive rural economic development programme (DCOGTA, 2013: 34). The final two focal areas relate to the need for LED to contribute to reducing South Africa’s chronic issues of youth unemployment and aligning with programmes for Black economic empowerment and develop “a new cadre of ‘majority shareholder empowered firms’” (DCOGTA, 2013: 34).

The fourth pillar concerns economic governance which is considered as pivotal for successful local economies. Interventions are deemed essential in respect of improving the quality and quantity of management and leadership, enhancing administrative economic development capacity, improving access to development funding/finance and to strengthen district branding. The need to improve district branding is explained as to “ensure that municipalities communicate a coherent message with whomever it engages with on matters of economic development” (DCOGTA, 2013: 35). In relation to funding for LED the National Framework acknowledges that whilst a range of funding opportunities already exist consideration should be given by national government to further new funding assistance. New proposals concern a technical assistance fund to be utilised for example for specialist capacity procurement or knowledge management, a growth fund to assist localities with demonstrated economic potential but lacking the capability to access commercial or grant funding, and a business

enabling fund to concentrate finance for capacity development targets or geographical target areas such as inner cities or townships.

Finally, the National Framework charts the organisational and institutional landscape for LED in South Africa. Of note is that at national level of government it identifies only DTI, COGTA, the Presidency, DBSA, IDC and IDT; the DST is not considered an important stakeholder. In terms of going forward with institutional arrangements the report concludes that the DTI is best placed to champion business/ enterprise development LED whereas COGTA with its mandate for cooperative governance “is strongly placed to drive the governance and intergovernmental economic planning and strategy development programme of LED across all spheres of government” (DCOGTA, 2013: 53). Overall, the report advocates the establishment of a Local Economic Development Facilitation and Monitoring Unit with the objective of serving “as an economic development organization or agency that would coordinate some strategic inputs and serve to facilitate local economic development initiatives” (DCOGTA, 2013: 53). A parallel new institutional proposal is for founding a National Local Economic Development Business Forum which would include as part of its mandate the provision of “guidance, oversight and advisory support towards the effective and successful implementation of the National Framework for Local Economic Development” (DCOGTA, 2013: 61).

2.5. SUMMARY AND CONCLUSIONS

Two sets of conclusions are offered into the relationship between science, technology and innovation and the activity of local economic development. The first set of broad conclusions relate to conceptual underpinnings and the international experience of addressing socio-economic challenges through STI. The second set of conclusions are South Africa-specific and concern the essential oversight of STI within evolving national government policy towards LED programming.

The international experience is that strong economic growth is possible in all kinds of regions. This said, the patterns of regional growth are never uniform (OECD, 2012). This is partly explained by the fact that enterprises do not engage in innovation at the same extent. Differences in innovation activities among firms and use of new technologies translate into substantial productivity gaps which in turn impact upon local economic growth (OECD, 2012). The largest disparities between more and less successful regions do not only concern their different levels of development but also concerns innovative activities. Faster growing regions exhibit higher levels of productivity which can be linked to more innovative activities. The challenge of harnessing STI for sustainable development requires linking the universal aspirations of STI to the diverse realities that are embedded in different regional contexts (ICSU, 2005). Nevertheless, it is recognised that science and technology is most effective for energising local development when it is part of national systems of innovation, relevant to national needs and global trends (Griffiths, no date).

The systems of innovation enable the analysis of innovation in diverse contexts and the generation of diverse innovation policies. However, this requires improvements in innovation policy mix and individual policy instruments (OECD, 2012). Likewise, policy messages need to take account of the diverse levels of development that occur in developing countries which are addressed by STI including typically weak institutions and administrative systems. Designing a package of policies that are most likely to unlock innovation in a particular region is likely to require local information and knowledge that is available only in that region. Typically, local communities can benefit more from innovations if the latter are locally or regionally embedded (Proost et al., 2009). Therefore, regional and local systems of innovation require a critical understanding of the resource and knowledge base which form the bases of innovation (Brunori et al., 2009). It is with this understanding that the international scholarship and debates confirm that science, technology and innovation can assume a vital role in addressing socio-economic challenges for galvanizing local economic development.

Turning to South Africa the promotion of local economic development has been of vital policy importance since the mandate of developmental local government was introduced (Rogerson, 2008a). This said, it is evident that national government has struggled to achieve

successful local economic development initiatives on a countrywide basis and it is generally accepted that LED has been under-performing, more especially outside of the well-resourced and capacitated metropolitan areas. Beyond the country's major cities the record of achievement of LED is limited with only a small number of exceptions. What is striking about reviewing the shifting currents in national economic development frameworks for LED in South Africa is the minimal attention that is given to issues around innovation. The potential role for innovation in creating "robust" and "inclusive" local economies, the stated intentions of national policies since 2006, has simply not been brought explicitly to the forefront of the LED policy and planning agenda. Nevertheless, the need for innovation necessarily has been a central underpinning of initiatives to promote enterprise clusters, creative industries and of process and product innovations in the tourism economy. In the main such practices of innovation have been impacting and further reinforcing the economic health of the country's leading urban areas.

The one domain of South African LED policy in which science, technology and innovation undoubtedly has impacted is that of small enterprise development. In terms of SMME development the successful GODISA programme of incubators was a role model for the broader adoption of this concept by the DTI and now the Department of Small Business Development (Masutha and Rogerson, 2014a, 2014b). The wide roll out of a national network of business incubators is designed to promote both entrepreneurship and more importantly an improved survival rate of start-up enterprises. This initiative potentially holds significant opportunities for addressing the socio-economic challenges of regions outside of the metropolitan areas, including for the 27 distressed municipalities.

Overall, it must be concluded that, to a large measure, the potential for STI to contribute towards LED in South Africa is a missed opportunity as successive national policy documents and statement on LED have not taken up the question of STI. The actual extent to which innovation is reflected in local development initiatives will be the central focus of research and analysis in the next chapter.

3. SOUTH AFRICA'S DISTRESSED AREAS AND LOCAL ECONOMIC DEVELOPMENT POLICY AND PLANNING

3.1. INTRODUCTION

This chapter constitutes a narrowed focus from the analysis of international debates and macro- level analysis of policy which were undertaken in the previous chapter. The core objective here is to analyse the findings of an audit that has been undertaken of the current trajectories of Local Economic Development in South Africa's distressed areas which are the target intervention spaces as identified by DST. As a context for interpreting the findings of this audit it is useful, however, to draw from previous work to provide a summary of the key strategic challenges which currently impact upon successful LED planning across South Africa, and not least in the municipalities of distressed areas.

The chapter is structured in terms of two major sections of material. The next section provides a summary of key challenges facing LED in South Africa and represents a synthesis extracted from larger works which included a critical review of a mass of academic and policy material which has been produced on LED activities in South Africa as well as findings of a series of interviews and workshops conducted with key senior LED institutional stakeholders from national government (DCOGTA, DTI), local government associations (SALGA), development finance institutions (DBSA), LED consultants and donor agencies (GIZ) active in support of LED in South Africa. The following section presents the core new findings of this report. It aims to identify and unpack key trends in LED policy and planning across the distressed areas. Methodologically, this section draws from a national audit that has been undertaken of LED policy and planning across all South African municipalities. This analysis entailed an internet search for the collection and analysis of the directions of LED strategies or IDP documents for all South African municipalities and in particular an analysis of Gaffney's Official Yearbook on Local Government in South Africa for 2013-2015 (Gaffneys, 2013). The 1600 page Gaffney's yearbook contains a profile of all 278 municipalities in South Africa; for each municipality it provides a general overview of development objectives and strategies, including information on local economic development

planning. For the 27 District Municipalities (DMs) in the distressed areas the information from Gaffneys was supplemented by additional material on LED which was obtained from an internet search. This included for certain DMs an examination of a detailed LED strategy. Finally, extensive use was made also of material sourced from the South African LED Network, the knowledge platform which serves both South African municipalities and practitioners in LED.

3.2. KEY CHALLENGES TO BE ADDRESSED FOR LOCAL ECONOMIC DEVELOPMENT IN SOUTH AFRICA, INCLUDING DISTRESSED AREAS

3.2.1 Context

Local economic development planning and policy formulation impacts upon all South Africa's 278 municipalities which include metropolitan authorities, district municipalities and local municipalities. Historically, the legislative and policy context for elevating LED to an obligatory mandate for all South African local authorities was recognized by the 1996 Constitution and subsequently consolidated in the 1998 White Paper on Local Government which established the notion of 'developmental local government' (Rogerson, 2008a). Despite the mandate for South African local authorities to undertake LED, no national government guidelines existed to assist them in pursuing LED activities until as late as 2006. Not surprisingly, therefore, one detailed investigation of the state of LED conducted in 2002 concluded that most municipal administrations were "deeply uncertain as to what LED means, what they are supposed to do and how they are supposed to organize it" (Meyer-Stamer, 2002: 3).

Further confusion as to the meaning and activity of LED arose out of the operations of the Local Economic Development Fund launched in 1999 by the responsible ministry, the Department of Provincial and Local Government (DPLG)¹ as part of national government's

¹ During 2009 the DPLG was retitled the Department of Cooperative Governance and Traditional Affairs (DCOGTA).

poverty alleviation strategy. The establishment of this fund was a catalyst for a ‘project-based’ approach to the practice of LED as municipalities were encouraged to apply to DPLG for support funding. Notwithstanding the well-meaning intentions of the LEDF its outcomes were to promote the misguided view that LED was about ‘projects’ as it encouraged a host of small projects, the majority of which imploded after the close of project funding. Assessments showed that the LEDF failed to deliver long-term sustainable LED and its legacy was to foster a practice of LED that was more akin to ‘social work’ than to building the competitive economic base of localities (Meyer-Stamer, 2002: 8). Indeed, during the period of the LEDF there was a general lack of understanding of what LED was and of the capacity to implement it, particularly at local government level (Patterson, 2008). As a consequence in terms of the evolution of policy and practice for LED in South Africa the period 2000-2005 is seen as a missed opportunity. It is viewed as distinguished most notably by the DPLG’s difficulties in consolidating national guidelines and a framework document to assist LED activities by municipal authorities (Rogerson, 2008a).

The release in 2006 by DPLG of its first definitive guidelines to local authorities for LED is seen as a major step forward. The National Framework for Local Economic Development provided a vision for creating “robust and inclusive local economies, exploiting local opportunities, real potential and competitive advantages, addressing local needs and contributing to national development objectives” (DPLG, 2006: 17). This vision has been taken forward more recently with the newer policy statements made by DCOGTA and most importantly of the 2013-2018 National Framework for Local Economic Development (DCOGTA, 2013). In terms of guidance for LED planning in the distressed areas these documents provide the overarching policy context from national government.

3.2.2. A Review of Key Challenges

Addressing the essential developmental challenges facing these areas is at the core of achieving successful LED policy in South Africa. Previous work has highlighted the existence of at least 12 key strategic challenges (Rogerson, 2010a; Rogerson and Rogerson, 2012). In this section, these are reviewed and presented as separate items, albeit it must be

made clear that many of them are interlinked and co-dependent policy considerations. Possible future DST interventions that might be STI-led necessarily should be informed by these issues at least as historical challenges that impacted upon LED policy and planning in the targeted distressed areas.

3.2.2.1 Understanding LED

It is argued that for several years ‘a battle of ideas’ has raged over the soul and meaning of LED in South Africa. The central debate has been between whether LED initiatives should have a competitive or social welfare focus. It is apparent that whilst elements of both approaches – the competitive approach vs welfare approach – are required there has been insufficient clarity or leadership given by national government to local governments in order for them to determine the appropriate balance. Moreover, whilst there is agreement on the desired outcomes of LED – such as reduced poverty and more jobs – there are considerable differences in outlook between what the role of local government should be in achieving these outcomes. One key debate is between those who believe that local government should provide a direct solution through supporting projects for job creation or others who advocate for an indirect solution through creation of an enabling environment. In the wake of conflicting signals and a historical lack of clarity of direction from national government it is thus not always clear to many smaller local authorities what their planning priorities should be and of how they should go about promoting LED. Indeed, in the absence of an unequivocal message filtering from national to local levels of government the consequence has been confusion at ground level or ‘coalface’ of LED planning as to which policy approach local authorities should emphasize. Arguably, in recent years there has been some improvement in the understanding of what LED is about at local level with a marked shift to promoting competitiveness.

3.2.2.2 Integration and cooperation between LED stakeholders

A second challenge relates to the fact that considerable overlap exists in the roles and responsibilities among key LED stakeholders in South Africa. In particular, there is considerable duplication between the activities and responsibilities of the major government line ministries, *viz.*, the DCOGTA, DTI and DED. There is a pressing need for closer cooperation between all LED stakeholders in order to avoid duplication of tasks and to establish complementary roles both for different government departments and other stakeholders. Beyond a sharper definition of roles and responsibilities, strategic integration remains another essential challenge for moving forward with LED. Nevertheless, there has been only a slow awakening to the need for an integrated approach to LED with each tier of government playing an effective role. The lack of an integrated approach to the delivery of LED remains a systematic weakness. Progress towards the national objectives for LED can be achieved only through the coordinated actions, for national government to go beyond ‘special projects’ for LED and instead to consider LED at the local level as a significant goal and objectives of policies they pursue. Further progress around intergovernmental relations about LED is required (Rogerson, 2010a).

3.2.2.3 Appropriate scaling for LED

There is a lack of awareness and understanding of the most appropriate scale for doing LED in South Africa. International experience points to the fact that the defined territory for LED should be set at a scale of a functional economic area and one that facilitates the creation of trust, cooperation and innovation between all key actors. As economic potential cross-cuts municipal or provincial boundaries, a premium is placed on the ability to capitalise on non-local relationships and understanding the role that regional, national, continental and global processes play in shaping local economies. This said, there is little in current LED policies or guidelines that deal with the matter of scale. The implied assumption in many national government guidelines is that each local area is an insular economy and that the role of LED strategy is to develop this unit. As a result local “LED officials tend to take a very literal view of ‘local’ as opposed to understanding that their local economy is organically and irrevocably

linked to the district, the province, the national economy, and indeed the global economy” (Van der Heijden, 2008:14). This sort of thinking strengthens the tendency for the introduction of small project-based interventions rather than wider spatial interventions for LED. What is required is a shift to higher-level or ‘regional’ scale for LED interventions with local interventions to be positioned within a regional framework. Many of the issues that make local LED planning limited in its successes could be addressed either by re-scaling LED or by forging more integrated and spatially relevant relationships between local, district and provincial authorities in development planning. This logical solution, however, is often undermined by the lack of communication on LED issues between adjoining municipalities, between municipalities and districts and between districts and province.

3.2.2.4 Reinvigorating the role of provinces

A significant contribution can be made by the provinces in alignment and integration of policies around LED. In terms of influencing LED, provinces have an important role to play in guiding local governments in the evolution of LED programmes through the IDP processes and in contextualising national imperatives and grounding them within the realities and specificities of each province. Provincial governments are expected to play a leading role and the key tool for guidance, coordination and alignment is the Provincial Growth and Development Strategy (PGDS), the cornerstone of which is a deep and thorough understanding of provincial endowments and assets, development potential and constraints along with the forces shaping development potential. The PGDS is a strategic document and whilst its preparation is not a legislative requirement, potentially it can assume a vital role in ensuring the effectiveness and coordinated delivery of the objectives of the developmental state, not least in its role as alignment mechanism for LED. The PGDS can furnish an essential linkage between national and local development processes and can assume a pivotal role in influencing horizontal linkages within LED ensuring that development at the sub-provincial level takes place in an integrated manner. In addition, it can ensure that development and infrastructure decisions are not limited to the perspective of a single district but instead are woven together to create a regional economic development perspective that reflects and addresses local concerns and yet links with national economic planning (Rogerson, 2010a).

3.2.2.5. Reducing the gap between LED practice in cities and small towns

It is evident that a wide gap exists in the current LED practice of larger centres and smaller towns and between large cities and poorer provinces. It remains the case that many LED initiatives in smaller centres tend to be project-based, while those in large centres are increasingly focused on creating appropriate institutional market enabling frameworks. In larger cities the application of the terminology ‘LED’ is sometimes dismissed because of its negative connotations and instead the language of ‘city development strategies’ is deployed. In large metropolitan areas the focus in LED in practice (if not in name) is on developing a more supportive and competitive business environment, institutional support for competitive sectors or clusters, business retention, and removal of red tape. Further, as the country’s larger cities and metropolitan municipalities have established effective LED networks with the private sector these have facilitated a participatory approach towards strategy development and a focus on the different roles of LED for the private sector and local government. Put simply, South Africa’s major cities are searching for ‘systemic competitiveness at local level’ (Ruecker and Trah, 2007). By contrast, in part as a legacy of apartheid, the huge infrastructure backlogs, low tax base and capacity constraints experienced by many of the weaker municipalities in distressed areas, they often seek to meet only immediate needs in terms of provisioning of basic services. Under such conditions, “the general likelihood of pursuing economic development takes a backseat” (IDC, 2009a: 3). In most smaller centres LED is mainly concentrated “on increased service delivery, extension of the social grant system, public works and SMME initiatives” (Van der Heijden, 2008: 3). A 2006 survey of LED in South African small towns revealed that despite nearly a decade of government encouragement only 48 percent of small towns had established a defined LED policy, only 56 percent had established some form of LED unit and only 12 percent have a councillor with responsibilities for LED (Nel and Rogerson, 2007). In the absence of networks and little interaction between the local authority and the private sector, the local authority interprets its role as participant, rather than facilitator for LED adopting often an ad hoc project-based approach (Sibisi, 2009). Smaller local authorities – the majority in distressed areas - as a whole place a much stronger, if not exclusive, emphasis upon ‘participation’ by marginalised communities in LED rather than by the private sector. In large measure this situation is a historical legacy of apartheid as deep divides remain between

business interests and the local authority, which are not conducive to partnering for effective LED strategies.

A critical issue in closing the gap is to recognise the limitations of a ‘one-size-fits-all’ approach and instead accept the need for a *differentiated approach* towards ‘doing’ LED (Rogerson, 2010a; Rogerson and Rogerson, 2012). A differentiated approach acknowledges that not all municipalities will ever be in a position to undertake meaningful local development planning. Many local governments in South Africa lack any meaningful tax base; others are dysfunctional including open to corruption. Further, many local governments are simply too busy to focus on economic potential due to the imperatives of addressing basic needs. As argued by the IDC (2009a: 4), issues relating to the long term sustainable economic development of communities have been “if not neglected, put on the back-burner”. In addition, in less well-resourced areas the private sector is frequently wayward and risk averse so that there is a need for the state or its agents “to excite the confidence of the private sector” (IDC, 2009a: 9).

Under certain conditions one potential vehicle for closing the gap between the practice of LED in large as opposed to smaller centres or less well-resourced areas can be through the vehicle of Local Economic Development Agencies or LEDAs (Lawrence, 2013). Although it is cautioned that the development agency approach might not be the answer to the problems facing every community” (IDC, 2009a: 11), the initial experience with LEDAs has been promising (Lawrence, 2013). The record of LEDAs confirms that “in many cases, local development is best managed and implemented through a dedicated agency, rooted in the local area with a clear mandate and accountability to the relevant sphere of government, focused and with a comprehensive agenda and strategy for development” (IDC, 2009a: 17).

3.2.2.6 Disseminating good LED practice

It is recorded that several shifts in strategic policy focus have occurred across the first decade of applied interventions and planning for LED. In many respects the shifts that have been

observed are a mirror of ‘learning by doing’ and in some cases of ‘learning from mistakes’. In further narrowing the gap in practice between larger cities and less well-resourced and capacitated municipalities (which would encompass much of the distressed areas), there is a need to create awareness and disseminate more widely information about what does and does not work in the practice of LED in South Africa. For example, it is acknowledged many efforts to support LED “have often failed as projects have not successfully involved and included local people as participants and beneficiaries – often relegating locals to “workers/labourers” rather than owners of initiatives and projects” (IDC, 2009b: 1). For the past decade, many South African observers have been highly critical of the limited outputs or successes which have been associated with LED policy (Nel and Rogerson, 2005). One factor in the limited number of ‘success-stories’ is the near complete absence of any monitoring and evaluation programmes to benchmark and gauge the performance of LED interventions. Overall, whilst there is growing consensus about what does not work in LED (such as government-led ad hoc projects) there is much less appreciation of ‘good practice’ in LED. The need exists for greater dissemination of ‘good practice’ and raising awareness of what does work in LED including a change in Local Government’s role from intervention to enablement, an increased focus on ‘soft’ infrastructure and enabling technologies rather than traditional hard infrastructure and a focus upon improving local business environments. To this list might be added the imperative for innovation to be recognised as a central facet for successful LED, not least in distressed areas.

3.2.2.7 Engaging the private sector

The legacy of local government driven LED in South Africa has been that across much of South Africa, the private sector either has been left out or chosen not to be involved. In large measure this is a consequence of the mutual suspicion that exists between public and private sectors which makes dialogue between the two groups extremely difficult (Rogerson, 2010b). Mistrust is premised on divergent ideological beliefs and correspondingly different priorities (Hadingham, 2008: 54). Essentially, the public sector believes business is anti-poor and business believes that government is welfarist and anti-profit in its outlook; both groups speak different languages (Rogerson, 2010b). Historically, private sector apathy towards local government-led LED has been further enhanced by its experience of local government

bureaucracy, red tape and unproductive ‘talk shops’ where much is promised but little of benefit to the private sector is actually produced” (Lawrence and Hadingham, 2008: 44). The inherent tensions between public and private sectors are compounded by the need to transcend the apartheid legacy of a largely white owned and controlled private sector and predominantly black public sector (Rogerson, 2010b). The core problem is a need to construct “the necessary ‘soft factors’ of cooperation – trust and social capital” which are considered essential for effective cooperation between state and non-state actors (Ruecker and Trah, 2007: 47). One important issue for greater partnership between local government and the private sector concerns ‘red tape’ or local regulatory reform. Hindson et al. (2009: 1) assert “addressing red tape is an important building block of a local economic development initiative”.

Local governments tend to concentrate overly upon aligning local planning processes with provincial and national guidelines resulting in a tendency to overlook the potential ‘quick wins’ that might arise from reforming the demand side of the local business environment (Christianson, 2008). Used at local level, the business climate survey can be an important and effective tool for stimulating and sustaining regulatory and administrative reforms (Kaufmann et al., 2008). The business climate survey can identify, reveal and prioritize “in an easy-to-understand way the regulatory and administrative bottlenecks to private sector development” (Kaufmann et al., 2008: 1). It is evident that the identification of local regulations that can and need to be reformed revolves around implementing the LED concept of partnership between local government and local business (Christianson, 2008; DPLG, 2008b). Accordingly, it has been asserted that local government “needs to engage, honestly and systematically, with its own private sector in order to work out exactly what the hurdles to local business development area, which of them can be ameliorated at a local level and then to work out a reform programme” (Christianson, 2008: 2).

3.2.2.8 Taking LED seriously

Many observers argue that LED is effectively ‘not taken seriously’ by many local governments across South Africa. Instead the function of LED is relegated to a ‘backroom

function' or minor issue on the agenda with little or no political importance. Arguably, the limited success of LED projects with a welfare focus undermined the historical credibility and significance attached to LED by local authorities. As a result of the limited perceived success of LED in South Africa the career path of LED officials is lacking in credibility with the consequence that it is associated with low level staffing and high turnover. Indeed, in many municipalities the practice of LED becomes either a 'dumping ground' for ineffective officials or only a stepping stone for competent local government personnel because of LED's constrained career prospects. Overall, it is stressed there is a lack of professionalism of LED due to its poor career prospects such that it does not attract or retain the sort of officials who might be able to combine business skills as well as public sector skills. The status accorded to the function of LED varies widely between different municipalities with implications for access to resources for staffing. Only rarely is LED positioned in its own department often operating within a wider unit such as planning, community services or associated with tourism. Usually, "the delivery of basic services is given priority over LED activities in terms of political support and access to resources" (Lawrence and Hadingham, 2008: 43). This situation is the result of a lack of understanding of the importance of LED as well as of what can be done and general pessimism around the limited successes observed in LED especially in small towns. Simply put, LED is not taken seriously in many municipalities and not given the prominence it deserves in local government.

3.2.2.9 Building LED networks and sustainable knowledge platforms

The international experience of successful LED points to a need to build expert networks and sustainable knowledge platforms in order to support competitiveness and turn local endowments into regional and national competitive advantage. Linkage of these networks "facilitates a more structured sharing of tools, documentation of good practices and development of guidelines" (Salazar-Xirinachs, 2008: v). One positive outcome is organizational or institutional learning, an essential base for strengthening LED (Ruecker and Trah, 2007: 78). The South African LED Network, founded in 2004, is one promising knowledge platform. Among its objectives, the South African LED Network, seeks to promote "discussion and exchange between the various kinds of LED practitioners to build a body of knowledge of what works when, which approaches can be used and how to mobilise

other local stakeholders to actively engage in LED processes” (Hadingham, 2008: 55). The organization is dedicated to the promotion of good practice and dialogue in local economic development, as well as connecting and networking practitioners (South African LED Network, 2008). The importance of supporting knowledge centres or platforms is to provide the foundation for high level learning and capacity building which must encompass both private sector associations as well as groups of local consultants contracted to develop LED strategies, projects and implementation plans (Ruecker and Trah, 2007). Strengthening formal sector private institutions, such as business chambers and professional associations, also is essential in order “to assist them to better define, understand and manage their mandate, and to build the necessary administrative and management capacity to do so” (Ruecker and Trah 2007: 38). Furthermore high level training of consultants is necessary as many consultant-driven strategies are desk based rather than participatory exercises; by capacitating consultants the application of participatory and inclusive LED approaches can be enabled.

3.2.2.10. LED capacity training

Since 2004 strenuous efforts have been made by several stakeholders such as the European Union and German International Development, to enhance the capacity of local government officials through an expansion of training (Patterson, 2008). Although the jury must still be out on the long-term impacts of these interventions promising signs can be discerned of positive outcomes alongside certain disappointments. The fruits of the large-scale capacity building initiative are manifest in the appearance of a more pro-active group of LED officers able and willing to conduct a dialogue with the private sector about the appropriate directions for LED. Nevertheless, in certain parts of South Africa, especially in poorer provinces, small towns and across the distressed areas, capacity gaps exist.

Limited capacities of LED staff has the consequence that many smaller “municipalities focus on compliance with statutory requirements rather than attempting to proactively manage economic opportunities that could have widespread local impact” (Lawrence and Hadingham, 2008: 45). In poorer municipalities the low skills and lack of qualified technical municipal staff results in an unhealthy, if not exclusive reliance, on consultancy-driven strategies for

LED. Across the distressed areas this is certainly the case with several LED strategies produced by the same consultancy, Urban-Econ Development Economists (see Urban-Econ Development Economists, 2015).

3.2.2.11. Funding LED

Currently, a range of funding sources for LED activities exists, including the DBSA LED Fund, national sector support from various government departments, the Municipal Infrastructure Grant, the Neighbourhood Development Partnership Grant, local government own revenue and equitable share funds; and donor funding (Patterson, 2008, Sibisi, 2009). Whilst arguments that LED is an ‘unfunded mandate’ no longer have credence, limitations remain in access to development finance, especially in distressed areas which are outside the more well-resourced metropolitan municipalities, many of which can access finance from commercial markets. Smaller municipalities struggle to access available sources of funding “due to internal capacity constraints whilst their credit rating and weak revenue base bar them from accessing standard concessional loan instruments” (DBSA, 2008: 3). The lack of networks reinforces a lack of awareness in poorer municipalities of the range of funding opportunities that are available to them. This lack of awareness is worsened by the complexity of available funding mechanisms.

3.2.2.12 Enhanced quality of municipal data for planning

A core challenge for LED policy in South Africa is to improve the quality of local data to enhance understanding of local economies and assist with LED decision-making (Rogerson, 2008a). Available and reliable local level data is essential for LED policymaking and especially for the identification of the comparative and competitive advantage of localities (Sibisi, 2009). Nevertheless, many IDPs and LED plans often rely on outdated or poor quality data. A collective responsibility exists across all levels of government (especially of Statistics South Africa) for gathering improved data that can be used for monitoring local economies

and defining competitive advantage. In the absence of good data, most municipalities are forced to use data sourced from the private sector such as Quantec or Global Insight.

3.2.2.13. Summary of Key National Challenges for LED Policy and Planning

Overall, from a review of the challenges facing LED across South Africa it must be clear that the achievement of central visions of national government around successful LED in South Africa demands the introduction of a suite of coordinated interventions among all LED stakeholders in the country. Such interventions are needed to address the above key generic challenges that have emerged out of the LED experience during the period 1994-2014. Arguably the list of key challenges relate to *inter alia*, national government clarifying the meaning of LED especially to guide small town and poorer municipalities; achieving greater integration and closer cooperation between both LED stakeholders and sector departments involved in implementing LED; appropriate scaling of LED; re-invigorating the role of provinces; narrowing the gap in LED practice between large cities and small towns or poorer municipalities; the dissemination of ‘good practice’; the greater professionalization of LED; enhancing the involvement of the private sector; building LED networks and knowledge platforms; capacity building at several levels; financing for LED and improving local economic data for planning (Rogerson, 2010a). Finally, one might add also to this list the complete neglect of innovation and of the potential of harnessing STI-led innovation for the purposes of driving LED processes and not least in the distressed areas of South Africa.

3.3. KEY TRENDS IN LED POLICY AND PLANNING IN THE DISTRESSED AREAS

In this section attention is directed to the central trends identifiable in focus areas for LED policy and planning across municipalities within the distressed areas. Four subsections of material are given. First, the distressed areas are delineated in relation to South African municipalities as a whole. Second, using LED documents and IDPs the key directions and challenges for LED policy and planning in distressed areas are described. In the third

subsection, the quantitative analysis unfolds of LED focus areas in the distressed areas. Finally, in the last subsection the observed patterns of LED policy in distressed areas are compared and analysed against a national profile for LED focus areas (cf. Nel, 2015).

3.3.1. Delineating The Distressed Areas

An analysis of the scope, geography and key features of the municipalities in the distressed areas forms the starting point for discussion.

Table 1: Distressed Areas: Number of District and Local Municipalities

	DMs	LMs	Total
Free State	1	4	5
KwaZulu-Natal	10	50	60
Eastern Cape	5	28	33
Gauteng	1	4	5
Limpopo	5	25	30
Mpumulanga	1	5	6
North West	3	15	18
Northern Cape	1	3	4
Western Cape	0	0	0
All Distressed Areas	27	134	161

Source: Authors

Table 1 provides a breakdown for South Africa’s nine provinces of the numbers of DMs and LMs that are incorporated as distressed areas. It is revealed that the number of municipalities in the distressed areas is 161 in total which represents 58 percent of all South Africa’s 278 local governments. Distressed areas are isolated in eight of South Africa’s nine provinces, the only exception is Western Cape. As the boundaries of the distressed areas incorporate most of the former rural Homelands rural challenges top the agenda especially so, as typified by

Ngaka Modiri Molema Municipality (2015) which recognises the imperative of “finding ways to improve the livelihood of rural communities”. This said, it must be made clear that the boundaries of the distressed areas also encompass certain significant urban nodes, such as Nelspruit, Richards Bay, Newcastle and Polokwane (CSIR, 2013). Most recently, with the extension from 23 to 27 districts the importance of urban centres in the distressed areas cannot be ignored. The definition of distressed areas in South Africa now incorporates the significant urban centres of Pietermaritzburg, Modimolle, Rustenburg as well as Krugersdorp, the latter once considered an integral part of the Witwatersrand metropolitan region, the economic heartland of the country. Some of these newly incorporated urban centres are experiencing the impacts of globalisation and economic restructuring with a trend towards factory closures and deindustrialisation. Others have been impacted negatively by the downturn in the country’s mining sector, especially of platinum production.

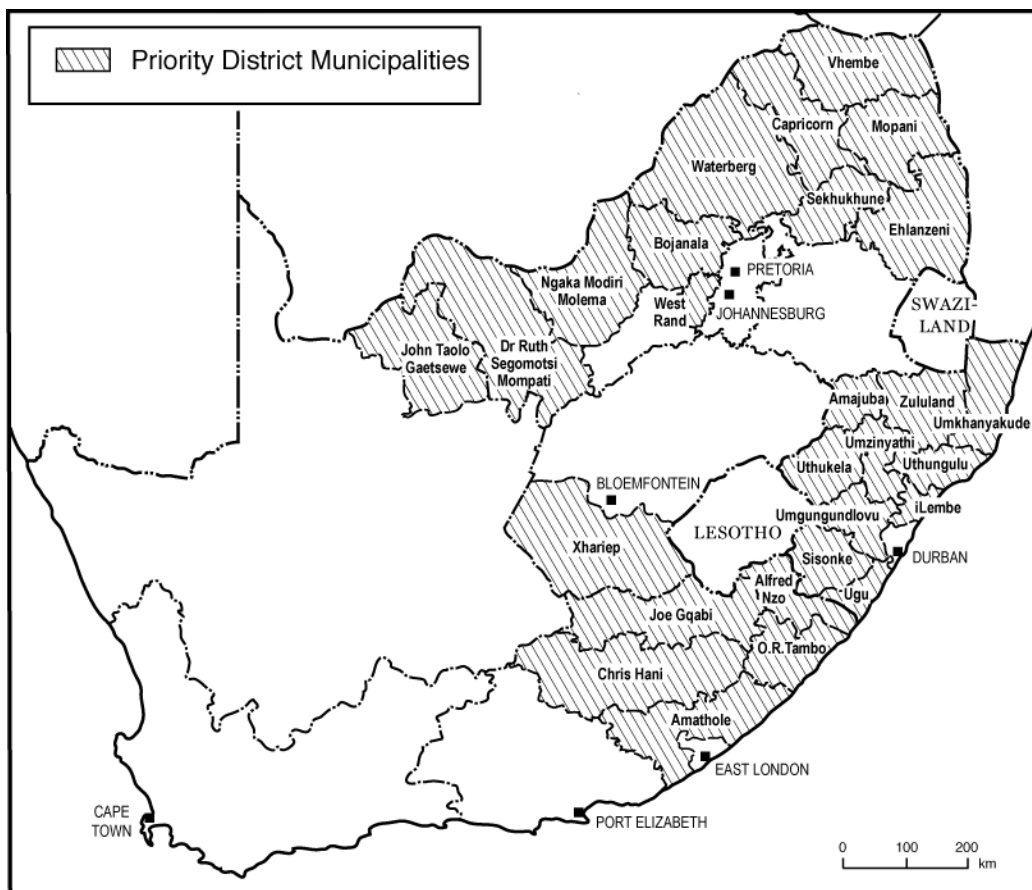


Figure 1: The 27 Priority District Municipalities which are Distressed Areas

As is shown on Figure 1 the geography of the designated distressed areas of South Africa incorporates nearly all of the former rural Homelands areas. Spatially, the distressed areas cover all of Limpopo, most of KwaZulu-Natal and Eastern Cape and much of North West. In addition, parts of Northern Cape, Mpumalanga provinces as well as Free State province and the West Rand DM of Gauteng are designated as distressed areas.

In economic terms many (if not the majority) of the mainly rural distressed districts are welfare-dependent and include the most poverty-stricken, underdeveloped and marginal zones of the country. To illustrate, the economy of the Alfred Nzo District Municipality is described as “characterized by limited formal economic activity and high dependency on the public sector for employment and social grants” (Alfred Nzo Development Agency, 2011: 9). Furthermore, its proximity to more developed urban areas in KwaZulu-Natal results in strong economic leakages as a consequence of consumer spending outside the district. Accordingly, it is not surprising that income levels are described as very low” with the majority of the population “having income that is less than R800 per month” (Alfred Nzo Development Agency, 2011: 15). The outcome is that in this district “40.4% of the population live below the poverty line” and that extreme poverty levels “imply a high dependency on social assistance in the form of grants” (Alfred Nzo Development Agency, 2011: 16) A parallel story of low incomes, high levels of poverty, reliance on public sector funding, community services, and outflow of revenue as residents and businesses source and sell their goods and services outside the District” is described for Sekhukhune District Municipality in Limpopo (Sekukhune District Municipality, 2014: 318). In common with much of rural KwaZulu-Natal the Zululand District Municipality is scarred by a combination of “high HIV/AIDS infection rates, high levels of poverty and high levels of unemployment” (Zululand District Municipality, 2003: 1). Elsewhere, the formal economy of Sisonke District Municipality is described as dominated by “low or unskilled occupations” and for those residents in employment the major sectors are those of the public sector – community services followed by agriculture (Sisonke District Municipality, 2012). Finally, the economy of Chris Hani District Municipality is described as “heavily reliant on community services” with the largest contributors to the local economy being government with 52 percent in community services (Chris Hani District Municipality, 2013: 25).

The distressed areas as a whole are denoted by huge infrastructural backlogs in respect of access to basic services such as water, sanitation and housing. Typically, in Xhariep District Municipality in Free State it is recorded that many “households still do not have access to potable water and although the quality of surface water is generally good, it is not so in towns where sewerage treatment works are poorly maintained. There has been also a large increase in the backlog of basic sanitation provision” (The South African LED Network, 2015). Another statement of distress is provided by OR Tambo District Municipality which concedes the District “faces a declining economy, high levels of poverty, underdevelopment and infrastructure backlogs as well as reliance on the government sector” (OR Tambo District Municipality, 2012: 101). National government, led by the Department of Rural Development and Land Reform, is committed to the creation of sustainable work opportunities across these distressed districts. Alongside job opportunities related to promoting small-scale agriculture and extension of the provision/maintenance of basic services, the potential of tourism is under critical scrutiny (CSIR, 2013). In particular, the search for economic drivers such as tourism must come increasingly into the spotlight as government infrastructural investment shifts from service provision towards a search for a ‘catalytic pathway’ for economic transformation of these peripheral regions (Heimann, 2013).

3.3.2. Directions and Challenges of LED Strategic Plans in Distressed Areas

The visions espoused in LED statements often relate the achievement of inclusive local development. In the urban-focussed West Rand District Municipality it is declared that the “main purpose of the WRDM within the sphere of local economic development is to facilitate and create an enabling environment for economic development, job creation, economic growth and poverty alleviation” (West Rand District Municipality, 2015). Typically, also the OR Tambo District Municipality vision is of creating “a Municipality responsive to social aspirations for an economically vibrant, healthy, sustainable community” (O.R. Tambo District Municipality, 2012: 101). The focus of many LED strategies is directed to build competitiveness and to target sectors of comparative advantage. For example, at uThungulu District Municipality in KwaZulu-Natal, “the local economic development strategy of the district focuses on its comparative advantages in the agriculture, tourism and manufacturing sectors” (uThungulu District Municipality, 2015: 3). Another recent example of building

competitiveness through LED is that stated in Chris Hani District Municipality which makes evident its goal: “Maximise the economic value and job creation potential of the District through a focus on strengthening of the comparative advantages of priority sectors and creating a distinctive competitive advantage in the timber and livestock production and processing sectors” (Chris Hani District Municipality, 2015). Another case is that of Capricorn District Municipality.

The principal goal of this Strategy is to improve the quality of life in the district through pro-poor economic growth that creates high quality jobs, generates wealth and investment, and helps ensure the district’s long term fiscal health. The strategic directions and actions will enhance the competitive position of individuals, households, businesses and the district as a whole in an ever changing global economic landscape (Capricorn District Municipality, 2008: 4).

Finally, there are somewhat unrealistic expectations expressed in certain other recent LED visions. One example is that of the third ranked economically inactive district in KwaZulu-Natal, Sisonke District Municipality (recently retitled Harry Gwala District Municipality), which aims to:

Develop and establish purpose built world class industrial and commercial facilities within the district, with the view to encourage the productive sector of the economy; and Market locally built and developed industrial and commercial facilities and special economic zones, locally and internationally, and position the district economic nodes as the preferred location for quality export oriented investment projects and mobilising and attracting such investment projects to the district (Sisonke District Municipality, 2015: 1).

Arguably, the challenges facing these municipalities in pursuing successful LED strategies reflect many of the issues which were earlier highlighted at the national level. The issue of capacity shortages for LED planning and implementation is reflected in several areas. For example in Waterberg, the District Municipality IDP bemoans the situation of “insufficient economic development personnel at local municipalities” (Waterberg District Municipality, 2014: 129). The Gamagara IDP stresses the imperative to “improve institutional capacity for LED (Gamagara Municipality, 2011: 48). Likewise, the local economic development strategy prepared for Capricorn District Municipality with support from the EU, highlights clearly that “the lack of human resource capacity within local municipalities in the district, with the exception of Polokwane Municipality continues to be a disservice in how local government

interacts and supports business in its objective to contribute to economic growth” (Capricorn District Municipality, 2008: 35). Another theme repeated across many districts is the question of funding shortages for support of LED activities. The implications of inadequate funding are starkly made clear in the IDP produced by Dr Ruth S. Mompati DM which states:

Given the functions, roles and responsibilities of the Economic Development Unit as above the staff complement is small as a result of the limited financial resources of the Municipality. The staff constraint has resulted in the Economic Development Unit having dismal impact on the economic development and growth of the District (Dr Ruth S. Mompati DM, 2011: 246).

Finally, issues of inadequate data to support appropriate LED planning are evidenced across statements made in several municipal IDPs and LED strategic plans. The dilemma of inadequate data for LED planning is highlighted among others by Sekhukhune District Municipality (2014: 291) which states simply: “It must be noted that it is very difficult to find accurate data for the local level in South Africa”.

3.3.3. Analysis of LED Policy and Planning in Distressed Areas

In this section the attention now turns to a quantitative analysis of the directions and focus areas of the 161 municipalities which are classed as within the boundaries of distressed areas. As indicated, the findings below are derived from a content analysis of accessed LED documents and IDP statements as well as summaries as given in Gaffneys (2013) and supplemented by The South African LED Network. The analysis unfolds by first presenting an analysis for the 161 districts and subsequently to highlight observed similarities and differences in a comparison of LED planning in distressed districts with the patterns observed for all South Africa’s 278 municipalities.

Table 2: Major Focus Areas of LED Policy and Planning in Distressed Areas

Focus	DM	%	LM	%	Total	%
SMMEs	20	74.1	99	73.8	119	73.9
Tourism	23	85.2	115	85.8	138	85.7
IS/Coops	8	29.6	45	33.6	53	32.9
Agriculture	23	85.2	99	73.8	122	75.8
Industry	2	7.4	6	4.5	8	5.0
Job Creation	8	29.6	48	35.8	56	34.7
LED Strategy	5	18.5	16	11.9	21	13.0
Infrastructure	2	7.4	4	3.0	6	3.7
Investment Attraction	7	25.9	17	13.0	24	14.9
Skills	4	14.8	10	7.6	14	8.7

Source: Survey

Table 2 provides a profile of the key focus areas of LED policy and planning across the 161 municipalities that are contained within the official designation of distressed areas. Table 2 seeks to offer an analysis of the most significant focus areas and to differentiate them for purposes of analysis between the 27 district municipalities and the 134 local municipalities. The most striking finding is of the overwhelming dominance in LED policy and planning in the distressed areas upon tourism, agriculture and SMME promotion. In terms of tourism the analysis discloses the remarkable position that 85.2 percent of District Municipalities and 85.8 percent of Local Municipalities across the distressed areas are targeting tourism as a driver for local development. The expansion of tourism is viewed as popular focus because of its potential for poverty alleviation. For example, in the case of Waterberg the pro-poor potential of tourism is made explicit: “There is a rich biosphere which is home to the Makapan’s Valley World Heritage Site, the natural reserve, with an abundance of birds, fauna, flora and hot springs. This is a key catalyst for the development of the tourism industry which would provide economic opportunities needed to alleviate poverty” (The South African LED Network, 2015: 2). The pro-poor credentials of support for (mainly small-scale) agriculture (including forestry) and for SMME development are obvious factors that underpin the strength of these two focus areas of LED policy. In the case of agriculture, a total of 85.2

percent of District Municipalities and 73.8 percent of Local Municipalities across the distressed areas are concentrating upon agricultural upgrading for accelerating prospects for local development. In a parallel with a heavy emphasis at national level devoted to SMME support programming, as exemplified by the establishment of a new dedicated Ministry for Small Business, across the distressed area as much as 74.1 percent of District Municipalities and 73.8 percent of Local Municipalities are prioritising SMME development as part of their ongoing LED initiatives.

Beyond the three leading focus areas Table 2 highlights the significance of other focus areas for LED policy in distressed areas. It is evident that approximately one-third of municipalities are committed to programmes for job creation in general and support for the informal sector or cooperatives. In particular, the commitment is for supporting cooperatives as only a handful of municipalities indicate programmes for informal sector support and upgrading such as through the provision of market stalls. The extended support for cooperatives is particularly a feature of the mainly rural municipalities and is often allied to agricultural development. In association with LED initiatives for boosting competitiveness a focus on investment attraction is evidenced in nearly 15 percent of municipalities. As noted earlier at the national scale the development of an LED strategy has not occurred throughout South Africa despite nearly two decades of national government encouragement of LED. It is against this backdrop that 13 percent of municipalities in distressed areas flagged the preparation of an LED strategy as a commitment in their IDP statements. Training programmes for skills upgrading was a focus of commitment across nearly 10 percent of the 161 municipalities. Of minor significance was support for infrastructure-led initiatives for promoting LED and for industrial development. Given current national government's initiatives both for widespread rollout of infrastructure projects and for support of reindustrialization, including through incentives and special economic zones, the sparse interest in these two focus areas is somewhat surprising. Finally, across certain of the distressed areas other 'niche' focus areas were occasionally identified as pillars for LED policy. These encompassed an array of initiatives in aquaculture, mining, wind farms/renewable energy, forestry, and support for partnerships, establishment of LED Forums as well as business strategy development.

Table 3: Geographical Variations in Focus Areas of LED Planning in Distressed Areas

	No. Municip.	Tourism	IS/Coops	Agriculture	SMMEs	Job Creation
Free State	5	60.0	20.0	60.0	60.0	20.0
KwaZulu-Natal	60	80.0	25.0	70.0	76.7	30.0
Eastern Cape	33	93.9	36.4	93.9	84.8	54.5
Gauteng	5	80.0	60.0	50.0	80.0	80.0
Limpopo	30	90.0	56.7	63.3	66.7	10.0
Mpumalanga	6	100	16.7	66.7	83.3	33.3
North West	18	77.8	22.2	61.1	77.8	50.0
Northern Cape	4	75.0	0	75.0	50.0	25.0
ALL	161	85.7	32.9	75.8	73.9	34.7

Source: Survey. Note: The percentages for Gauteng, Free State and Northern Cape should be understood to refer to only 1 District Municipality and the relevant local municipalities

The support for particular focus areas was not uniform across the distressed areas. Table 3 reveals geographical differences in focus areas across the eight provinces which incorporate distressed districts. Certain interesting areas of concentration are disclosed by comparing for each major focus area the share of municipalities in each province as compared to the overall pattern for distressed areas in total. These are shown on Table 3. It is evident, for example, in terms of tourism that beyond high levels of commitment across all areas the municipalities in Mpumalanga, Limpopo and Eastern Cape are ‘over-represented in tourism’ and thus strongly focussed on tourism-led LED. Equally, in terms of agriculture this is an outstanding focus in the distressed municipalities of Eastern Cape where 93.9 percent municipalities preference agriculture as local driver. For SMME development there are several provinces that appear strongly committed to this focus area including Eastern Cape, KwaZulu-Natal, North West, Mpumalanga and Gauteng. For informal sector/cooperative development support Gauteng, Limpopo and Eastern Cape are most prominent and for job creation in general Gauteng, Eastern Cape and North West are ‘over-represented’ in this focus area as compared to the

national pattern for distressed areas as a whole. Relative under-representation of certain focus areas in particular provinces also can be discerned. Most notable, perhaps, are relative under-representation of tourism in Free State and Northern Cape, of SMMEs in Free State, Northern Cape and Limpopo, and of agriculture in Gauteng, Free State, North West and Limpopo.

Table 4: Ranked Leading Focus Areas of LED Planning in Distressed Areas by Province

	Rank 1	Rank 2	Rank 3
Free State	SMMEs, Agriculture, Tourism		
KwaZulu-Natal	Tourism	SMMEs	Agriculture
Eastern Cape	Agriculture, Tourism		SMMEs
Gauteng	Tourism, SMMEs, Job Creation		
Limpopo	Tourism	SMMEs	Agriculture
Mpumalanga	Tourism	SMMEs	Agriculture
North West	Tourism, SMMEs		Agriculture
Northern Cape	Tourism, Agriculture		SMMEs

Source: Survey

Finally, in terms of geographical variation in commitment to particular focus areas for LED, Table 4 offers a summary of the three leading focus areas per province. The ranking is based on the total number of municipalities in distressed areas in each province committed to a particular focus area. This analysis re-emphasizes again the overwhelming significance attached to tourism for LED policy across the distressed areas. In all eight impacted provinces tourism is the leading sector of importance. In KwaZulu-Natal, Limpopo or Mpumalanga it is the clear focus area of choice across municipalities. In the other provinces equal importance is attached to other focus areas such as for example agriculture in the two cases of Northern Cape and Eastern Cape and of SMMEs in North West. Across the eight provinces the most common ranking is that of tourism as most significant focus area followed by SMMEs and then agriculture. The exceptional case is the province of Gauteng with its

urban focus where in its distressed municipalities agriculture is not ranked as high in importance as that of a focus on job creation.

3.3.4. Comparison of Distressed Areas with South Africa as a Whole.

This last analytical section aims to highlight any distinctive traits in respect of LED policy in the distressed areas as a whole as compared to the national profile. This particular analysis is anchored upon a comparison between the focus areas of LED policy across the 161 distressed area municipalities with a wider parallel national audit of LED policy statements in all South Africa's 278 municipalities (Nel, 2015).

Table 5: Focus Areas of LED planning for South Africa as a whole: 278 Municipalities

Rank	Focus	%
1	Tourism	87.1
2	SMMEs	71.2
3	Agriculture	68.3
4	Job Creation	32.7
5	Informal Sector/Coops	27.7
6	Investment Attraction	15.5
7	LED Strategy	10.4
8	Skills and Training	10.4
9	Mining	9.4
10	Industry	9.0
11	Infrastructure for Development	8.6
12	Poverty Relief	8.3
13	Business strategy	6.1
14	Partnerships	5.8
15	Marketing	4.3

16	Aquaculture	4.0
17	LED forums	3.6
18	Forestry	3.6
19	Retail	2.9
20	Incentives	2.9

Source: Nel, 2015

Table 5 provides the result of the audit of a national profile for all South African municipalities concerning LED policy. It lists the leading 20 focal areas for LED policy which are headed clearly by tourism, SMMEs and agriculture and followed by job creation, informal sector/coops, investment attraction, preparation of an LED strategy and support for skills and training.

Table 6: Comparison of Focus Areas: Distressed Areas vs South Africa as a whole

Focus	Distressed Areas	South Africa	Relative Focus
SMMEs	73.9	71.2	+
Tourism	85.7	87.1	-
IS/Coops	32.9	27.7	+
Agriculture	75.8	68.3	+
Industry	5.0	9.0	-
Job Creation	34.7	32.7	+
LED Strategy	13.0	10.4	+
Infrastructure	3.7	8.6	-
Investment Attraction	14.9	15.5	-
Skills	8.7	10.4	-

Source: Survey and Nel, 2015

Table 7: Ranked Leading Focus Areas of LED Planning in Distressed Areas vs South Africa as a whole.

	Rank 1	Rank 2	Rank 3
All Distressed DMs/LMs	Tourism	Agriculture	SMMEs
SOUTH AFRICA	Tourism	SMMEs	Agriculture

Source: Survey and Nel 2015

Tables 6 and 7 offer a comparison between trajectories of LED focus areas in the distressed areas as compared to the national picture. From Table 6 it is disclosed that in the distressed areas there is a relative emphasis upon agriculture, SMMEs, informal sector/cooperatives, job creation and building an LED strategy as compared to the national profile. Correspondingly, in relative terms compared to the national profile, the distressed areas tend to under-emphasize tourism, industry, investment attraction, skills training and using infrastructure as a leverage for development. On Table 7 the ranking of the most important sectors for LED policy reaffirms however the clear significance of tourism in both the distressed areas and South Africa as a whole. In light of the rural dominance of the distressed areas as a whole agriculture is the second most important focus area followed by SMMEs which is a departure from the national profile.

3.4. CONCLUSION – A SPACE FOR INNOVATION

This report for DST is targeted to offer a baseline of information concerning science, technology and innovation (STI) and its role in local economic development in South Africa as a whole and more specifically of the state of LED in the 27 district municipalities and 134 Local Municipalities that together make-up the current definition of distressed areas. In Chapter 3 the thrust of the analysis was to unpack the findings of an audit which was undertaken of the current directions of Local Economic Development in the distressed areas, the target intervention spaces which have been identified by DST. This analysis was situated

against the backcloth of a synthesis of the leading strategic challenges which presently affect successful LED planning across South Africa, including the municipalities of distressed areas.

In respect of STI and local economic development the outstanding finding is of the complete oversight of innovation in discussions about LED both nationally and specifically in the municipalities of the distressed areas. From the viewpoint of informing LED policy of local governments in the distressed areas there is evidently major space for new interventions around innovation. In the review of material which was undertaken for this report the only instances of STI-led innovation were those relating to activities of certain NGOs with projects often in remote deep rural areas. Two examples can be highlighted. First, is the application of grassroots innovation to upgrade agricultural development in Potshini within Joe Gqabi Local Municipality close to the town of Bergville. This forms part of wider initiatives which are supported by the network PROVILINNA which is an acronym for promoting local innovation in ecologically oriented agriculture and natural resource management. In this particular initiative local innovation support funds are used as vehicles for facilitating access to resources for supporting experimentation in crops and livestock by local farmers (Letty et al., 2012). Second, is the work of Saveact (one of the NGOs also involved at Potshini) in the Matatiele area around Alfred Nzo District Municipality as well as in the Joe Gqabi District Municipality in Eastern Cape. The project complements the wider Local Economic Action Partnership (LEAP) in the Eastern Cape. Specifically, it involved a participatory market system analysis in order to afford relevant economic support to poor and vulnerable groups (Kruger et al., 2010). Innovation is implicit in the strategic support interventions which are put forward for strengthening market chain system elements. Taken together these two NGO-led initiatives in support of local economic development in the Eastern Cape provide promising signals for the potential application and wider rollout for STI led initiatives in the spaces of South Africa's distressed areas.

4. SECTORAL STUDIES

This fourth chapter of the report presents the findings from a desktop research investigation on three themes which the DST identified as critical to innovation and correspondingly with vital implications for LED in South Africa's distressed areas. The three themes flow out of the analysis conducted in Chapter Three which identified the importance of particular sectors for local economic development in the distressed areas. The analysis highlighted the critical importance of agriculture, SMMEs and tourism for energising new development opportunities in these areas. In this chapter, three sets of discussion and analysis are presented which relate respectively to the following:

- The role of STI in agriculture and rural economic development
- The role of STI in SMME development and the function of SMMEs in national and regional systems of innovation; and
- Innovation in the service sector with a special focus on tourism.

Each of these three sets of discussion and analysis are presented below.

4.1 THE ROLE OF STI IN AGRICULTURE AND RURAL ECONOMIC DEVELOPMENT

4.1.1. Introduction

Historically, South Africa has invested substantially in science and technology (S&T). However, in the specific case of agriculture, the agricultural policy either has been too science-oriented or too economic-oriented with the consequence of placing minimal emphasis on the role of innovation. Consequently, the economic impact of these substantial investments has been uneven. Put differently, the national agricultural systems of innovation

have simultaneously generated wealth and inequality. More significantly, the fragmentation of the South African agricultural sector is a symptom of the fragmented national system of innovation. The agricultural system of innovation has produced commercial farmers, smallholder farmers, and subsistence farmers. It is argued, therefore that STI in South Africa must be redefined and its future reconsidered for an inclusive society, particularly the extent to which it can be a decisive agent of inclusive beneficial change. More specifically, STI must establish the extent to which it can be part of the required solutions for addressing the challenges of rural economic development.

The formulation of innovation policy based on the national innovation system approach potentially enables the formulation of agricultural innovation policy. The international best practice experience is that the role of innovation policy is to create the most appropriate conditions for innovation by evolving a range of public goods which are essential for an innovative knowledge economy (World Bank, 2012: 460). Similarly, it allows a national economy-wide perspective which makes it possible to address issues at the national and regional economy level rather than at individual sector level. Further, it must promote innovation system thinking at a sectoral level (World Bank, 2012). However, it is acknowledged that different forms of innovation require different policy instruments.

The aim in this report is to threefold. First, is to establish the links between rurality and STI or innovation for rural economic development. Put differently, the report seeks to highlight innovative interactions between STI and rural economic development issues and stress that through STI, agriculture can be fully involved in the development of sectoral systems of innovation (Dubeuf, 2014). Second, is to highlight the relevance of STI in rural industrial reorganization especially the development of agriculture in order to achieve food security, increase value-add, improve employment generating capacity of the sector, and position agriculture at the centre of rural economic transformation and local economic development. Third, is to stress how STI fits within the overall agricultural sector strategic objectives.

Given that South Africa does not utilize the full potential of the agricultural sector, the contribution of STI should be to strengthen the role of agriculture beyond production, to

increase the rate and scope of industrial growth, and encourage a more geographically balanced distribution of firm activities and their more inclusive impact on society. Indeed, agro-industrial products offer more prospects for growth than primary products. Against this backdrop, the report highlights the entry points for STI and potential drivers of innovation in the agricultural sector and stresses how innovation can be promoted in the agricultural sector. That is, how innovation can be mobilized to strengthen agriculture-led rural economic development initiatives.

It is therefore relevant to begin by identifying the development challenges facing the agricultural sector and its contribution to local economic development. First, it is contended that the problem of poverty in rural areas is mainly associated with the problem of low productivity in agriculture, that the major cause of low incomes and slow rural economic growth is the low level and slow agricultural growth and that agricultural labour is disproportionately low skilled (Gollin, 2010). Second, in its current form, subsistence agriculture is a default source of employment and a reservoir of unskilled labour. Therefore, strategic interventions are required to effect sectoral reallocation of labour from low productive subsistence agriculture (including family agriculture) into innovative and high value productive activities which offer better returns.

It must be also recognized that rural economic development has not only been hampered by agriculture alone. Poor quality institutions, lack of support institutions and the hostile rural environment often constrain other development programmes. Our focus is to highlight the circumstances in which agricultural productivity can play a central role in rural economic growth. For our purposes, to understand rural economic growth, we begin with a careful examination of the agricultural sector. The shared understanding is that the agricultural sector is an important strategic sector in rural economic development especially given its significance for the large number of rural populations that are involved in the sector. Again, given the significance of agricultural products in the consumption basket of the marginalized populations, it is unlikely that significant growth or poverty reduction can be achieved without enhancing agricultural productivity and agricultural growth (Gollin, 2010).

From European experience, it is recognized that innovative projects in rural areas must not be isolated initiatives (Esparcia, 2014). Instead, they must be part of national and global processes that seek to transform the spatial distribution of economic activities and their impact on society. In addition, they are part of territorial dynamics with different actors, often coming from different sectors and multiple levels of governance. These actors cooperate in order to generate development initiatives that are embedded in the territory. In these processes, the role of STI is to provide the bases for new development strategies and the emergence of new economic activities. That is, European evidence demonstrates that STI has its particular significance in the development of the local and regional innovation systems and can result in the generation of new activities, introduction and adaptation of new innovations based on the creation and adaptation of new knowledge, as well as the combination of tacit and explicit knowledge (Esparcia, 2014).

The discussion is organised into six subsections of material namely, agriculture and rural economic development, agricultural value chains, the relationship between agricultural engineering and agricultural development, agricultural research systems and innovation, the significance of stronger relationships between relevant departments, as well as conclusions and recommendations.

4.1.2. Agriculture and Rural Economic Development

In sub-Saharan Africa the majority of rural people derive their livelihood from agriculture and related rural economic activities. For example, in Zambia, about 97.4% of rural households are engaged in agriculture. Out of the estimated 600 000 farmers, 76% are small-scale subsistence farmers (Mucavele, 2010: 13). Agriculture remains the main source of income for rural population with 85 percent of the rural population employed in agriculture, 9 percent in services and 6 percent in industry (Mucavele, 2010: 13). For marginalised rural inhabitants, agriculture along with informal sector activities are often the only sources of livelihood. Consequently, for much of sub-Saharan Africa the most direct and effective means of raising standards of living and reducing poverty, hunger and malnutrition is through increasing the productivity and incomes of smallholder agriculture (Mucavele, 2009, 2010).

Agriculture continues to be a fundamental instrument for development and poverty reduction, especially in Africa. In particular, the achievement of food security is the first step towards sustainable rural development. Equally, rural economic growth can be more easily fostered through sustaining sufficient food production. However, the provision of technical support and increased agricultural production is insufficient by itself to achieve food security and sustainable rural economic growth across the subcontinent (Mucavele, 2009, 2010). The challenge of inclusive rural economic growth requires a better understanding of the sources and drivers of rural economic growth.

In sub-Saharan Africa, where agriculture makes up the bulk of national economies, the majority of the marginalized people rely on subsistence farming for their livelihoods. Consequently, the continent's economic transformation must include the use of STI in order to modernize agriculture and increase the productivity of subsistence farmers. One possible area for increased agro-processing industrial activity is the inclusion of marginalized rural producers in agro-industries (Republic of South Africa, 2012). That is, agro-processing can be used as a foundation for a more productive smallholder farming sub-sector (Republic of South Africa, 2012). Put differently, the development of subsistence farmers can serve multiple objectives. First subsistence farming is critically important for rural development as the majority of subsistence farmers are in rural areas. Second, high-impact innovation can transform subsistence farmers into productive high-value small-scale producers. Third, the development of production clusters can benefit family farming (IICA, 2014). At the same time, the development of agro-processing can improve farmers' incomes through the purchase of agricultural products which can improve the demand for agricultural products and employment of those who are unemployed (Watanabe et al., 2009). In particular, STI can contribute to the development of local and regional processing industries and create opportunities for value addition and value capture. Furthermore, STI can also contribute to the transformation of marginal roles that are played by local farmers in the processing industry into more significant role players. This will require the development of strong input sector such as seeds, fertilizer, crop protection, veterinary chemicals, animal feed, packaging, agricultural machinery, and post-harvest technologies.

The systems of innovation approach enables an improved understanding of the barriers that prevent marginalized farmers from reaching required economies of scale and becoming regionally, and nationally competitive. Infrastructure provision and improvement, such as electricity and irrigation, can transform agriculture in a number of ways. In particular, electricity is essential for agricultural processing and post-harvest use of agricultural products while irrigation can increase production and reduce weather risk. Indeed, it is observed noting that South Africa does not lack agricultural development enablers but it is the distribution of agricultural development infrastructure that remains a challenge. This said, the models used in respect of infrastructure development necessarily must be amenable to scalability or economies of scope.

Based on the emerging opportunities for agricultural transformation and agriculture-led rural economic development, a policy agenda can be crafted to support these emerging realities and identified systemic interventions such as developing capacity for innovation among local farmers, investing in processing facilities, creating linkages between knowledge and technology producers on the one hand and users on the other, and the integration of local producers with the established food processing sector. Agricultural innovation systems can play a critical role in this process as they are characterized by the combination of participants involved in innovation and the dynamic interactions among them (IICA, 2014). That is, agricultural innovation systems can contribute through better coordination of participants in order to generate improved capacity for innovation and correspondingly to respond to emerging opportunities or challenges. In the case of China, government interventions ensured that the challenges of exporting fresh apples were circumvented and that the country emerged as the world's leading supplier of concentrated apple juice.

The transformation of political mandates and economic development rationales into STI development policy can facilitate the development of appropriate STI interventions for regional and local economic development. For example, the innovation capabilities agenda can have broad benefits such as skills development, income-generation opportunities, and employment creation. At the core of using a sectoral approach to economic development is learning how to organize the development of a sub-sector in order to extend the approach to other agricultural sub-sectors as shown in Box 1.

Box 1: A Sectoral Approach to Develop Agro-processing Industries

The domestic informal juice production sector can be targeted as the basis for developing a locally competitive juice processing sector. With basic production and infrastructure facilities in place, the agro-processing sector can apply innovation as a basis to transition towards segmenting production for high value niche markets. For example, the soya bean sector can be used to develop a processing sector in the form of soy bean oil and to increase the dietary protein of local populations which can be consumed directly or through poultry.

Source: Authors

What can be emphasized is that innovation can be used as a deliberate strategy to develop the basis for a more labour-intensive industrial and services sectors. Moreover, the centrality of innovation in the transformation of agriculture into a viable source for agricultural growth and agriculture-led rural economic development is that the process requires the development of innovation capabilities across the whole value-chain. Indeed, agriculture has the potential to contribute to inclusive development, economic transformation, increase rural incomes, supply raw materials to support agro-processing, boost the supply of food for the growing urban areas and contribute to the expansion of goods and services in the non-farm sector.

Overall, agriculture remains a strategic development sector for rural economic development in sub-Saharan Africa. The sector demonstrates forward and backward linkages with agro-industry, services, trade and the rest of the economy (Mucavele, 2010). Greater inclusive participation of farmers in commercial agriculture through agrarian and land reforms, and expanded participation in value chains, can lead to the transformation of the rural economy and the development of agro-based private sector firms in rural areas. It is expected that with higher farm and rural incomes, agriculture can become a launch pad for a more stable rural economy. Indeed, agriculture is a source of inputs for other production activities. Almost three quarters of agricultural production is used as an input for other industries (Mucavele, 2010) such as fruit juice, starch or jams. Consequently, food and agro-industrial sectors generate incomes for skilled and unskilled labour. More importantly, land and capital remains in the locality and regions where the primary agricultural product is generated (Mucavele, 2010).

Table 7: Processing of Agricultural Products, Value-add, and Post-harvest Losses in Industrialized Countries and Developing Countries

	Industrialized Countries	Developing Countries
Agricultural products processed (%)	98	38
Value added of agricultural products processed (US\$/Tonne)	185	40
Post-harvest losses (%)	Minimal	40

Source: UNIDO, 2009

Finally, it is worth noting that developed countries utilize the full potential of the agricultural sector. As is shown in Table 7, high-income countries add nearly US\$185 of value by processing one tonne of agricultural products. By contrast, developing countries add only approximately US\$40. While 98% of agricultural products in high-income countries undergo industrial processing, barely 38% is processed in developing countries (UNIDO, 2009). This gap indicates a potential for interventions in the value chain to enhance the expansion of processed agricultural products in developing countries in general and sub-Saharan Africa in particular.

4.1.2.1. Agricultural Value Chains

The term chain implies a focus on vertical relationships between buyers and suppliers and the movement of goods and/or services from producers to consumers. It can also involve the exchange of knowledge and vertical and horizontal learning between the various actors in the value chain (Folke et al., 2010). More specifically, value chain development is an approach used by research and policy makers to guide their development interventions (Folke et al., 2010). At the centre of value chain analysis is the idea of actors connected along the chain

producing and bringing goods and services to consumers through a complex and sequenced set of activities (Folke et al., 2010: 1). The approach is useful for researchers and policy makers working in the areas of agri-business and agro-industrial value chain development programmes.

For the United Nations Industrial Development Organization (UNIDO), value chain development implies the application of a value chain approach to development interventions which aims at strengthening new links within a value chain, increasing the capabilities of target groups to improve the terms of value chain participation, and creating new value chains (Folke et al., 2010). Within value chains, upstream is where materials are transformed from a raw status into products that are marketed to consumers. While, downstream activities refer to those activities further down the chain and flows of products towards consumption. Finally, a node is the point in a value chain where products are exchanged from one actor to the next or go through a major transformation or agro-processing. Overall, value chain development is any concerted effort to improve the conditions in the value chain. Arguably, value chain interventions are focused on improving linkages along the value chains namely production, processing, and trade functions with a view to improve the functioning of the value chain or the terms of participation for the selected beneficiaries (Folke et al., 2010).

Usually, the value chain approach rotates around analyzing the structure, actors, and dynamics of value chains as well as examining the typologies and locations of chain actors, the linkages between them, and the dynamics of inclusion and exclusion (Folke et al., 2010). It can also involve understanding the structure of rewards, the functional division of labour along the value chain, its changing shape and the distribution of value-added along the value chain. Value chains are complex as they encompass activities that occur at the farm as well as in rural settlements and urban areas and are embedded in broader relationships (UNIDO, 2009). Two major forms of value chains can be differentiated on the basis of key chain drivers. One is the producer-driven value chain where profits come from scale, volume and technological advances. By contrast, the second set of buyer-driven value chains are characterized by highly competitive and globally decentralized factory systems. These often yield profits from combinations of high-value research, design, marketing, and financial services (UNIDO, 2009). By controlling these elements, retailers, designers and marketers

are able to act as strategic brokers to link overseas factories and traders with product niches and their main consumer markets (UNIDO, 2009).

While value chain analysis is useful in the development of agriculture, it has its own limitations in terms of what it can offer for inclusive agricultural development. Value chains do not explicitly show the conditions under which the marginalized people can participate in value chains. Moreover, market-oriented value chains tend to focus on improving the efficiency of the value chain with little or no focus given to improving the lives of the marginalized people. Further, value chains are often structured and governed by leading firms (UNIDO, 2009) and therefore can increase the risk of marginalization of weaker participants such as emerging farmers. Indeed, it is observed that value chain development tends to favour larger farms and processing plants which can invest in infrastructure and increase their production capacity (UNIDO, 2009). Often, value chains do not recognize potential conflicts of interest between actors or group of actors. An alternative viewpoint is that value chains occur in a socioeconomic context and are determined by the favourable conditions such as sufficient domestic development, institutional and regulatory framework, a reservoir of knowledge and human skills, economic and financial conditions, a society that is demanding innovation, and a welcoming regional and global environment (IICA, 2014: 11).

In value chains, the source of knowledge for value chain development is assumed to originate from experts. This contrasts with the situation in agricultural innovation systems where knowledge is understood to originate beyond experts alone and instead from a diversity of sources such as (expert) research centres, universities, non-government organizations (NGOs), extension systems, farmers, or a combination of all of them. Nevertheless, value chain analysis is an indispensable task which should precede any value chain intervention in the form of corrective measures, investment, improve the capacity of value chain actors to assimilate technology, and broader development opportunities. In a restricted form, value chains can be used to focus and expand the development benefits targeted marginalized populations. What we need is to apply the systems of innovation in order to identify how innovation is organized in specific value chains to make value chains both more competitive and *more inclusive*. Put differently, innovation systems can transform the development of value chains and promote *inclusive* agro-value chains which can more effectively reduce

poverty reduction. As a development approach, they can combine the effects of employment creation and food security.

4.1.2.2. The Centrality of Agricultural Engineering to Agricultural Development

The practice of agricultural engineering began with the introduction of mechanical tools such as hoe and use of watering cans for irrigation (Adewumi, 2008). The rapid development of agriculture began with the invention of the tractor. The application of scientific and engineering principles further improved the practice of agricultural engineering (Adewumi, 2008). More significantly, the process of agricultural engineering has led to reduced labour force requirements at farms, increased production levels, efficiency, product life and quality, and boosted prospects for industrialization (Adewumi, 2008). In the USA, whilst less than 5% of the population is engaged in primary agricultural activities, the sector still provides for sufficient food national consumption as well as surplus for export (Adewumi, 2008: 321). By contrast, up to 70% of Africa's population is engaged in agricultural production and yet the continent lacks food security (Adewumi, 2008).

The growth of agricultural engineering is observed as a critical driver in the developed nations, where it has transformed agricultural practices from subsistence to medium and large-scale production through mechanization (Adewumi, 2008: 321). Agricultural engineers operate at the interface between engineering and agricultural production (ECSA, 2013). They perform work related to the improvement of infrastructure, machines, and processes for agricultural production, post-harvest handling, and processes of agricultural produce (ECSA, 2013). Despite this, the central role of agricultural engineering in Africa has been overlooked including its offerings such as farm power and machinery, storage and food processing, soil and water conservation, rural electrification, and agronomics (Adewumi, 2008). The public understanding of agricultural engineering in Africa is that of a farmer or tractor mechanic (Adewumi, 2008). Indeed, the expertise of agricultural engineers who have unique skills to connect the living world of plants, soil, water, and animals with technology of engineering are required to enhance the sustainable development of agriculture (ECSA, 2013). Likewise, agricultural engineers can design, fabricate, install agricultural machines; construct farm

structures, processing and storage facilities (Mada et al., 2013). Agricultural engineers can be motivated to develop multi-purpose low powered machines to improve agricultural practices and management (Mada et al., 2013). More significantly, in the case of Nigeria it has been demonstrated that low powered and multi-purpose machines can be transformative. Back breaking suffering from farm workers using simple tools resulting in tedious and difficult work is transformed by these machines, which improve agricultural practices and transform agricultural production (Mada et al., 2013).

Currently, the majority of personnel involved in agricultural engineering extension services and technology in Africa are agriculturalists. By contrast, the mechanisation aspects of agricultural engineering extension require a high level of knowledge about engineering (Adewumi 2008). It is argued that agriculturalists do not possess sufficient engineering knowledge in order to transfer engineering technology. This situation points to the fact that the agricultural sector requires more agricultural engineers in order to catalyse its transformation from mainly subsistence farming to mechanised farming and thereby set the conditions for sustainable and industrial development.

The link between STI human resources and improved agricultural production must be acknowledged. First, the level of agricultural development can be linked to the availability of STI human resources in agriculture. Second, the low levels of technology can improve with innovations that come from joint efforts between farmers and agricultural engineers. Third, the achievement of food security and balance diet requires the significant contribution of agricultural engineers. For example, the production of maize under irrigation can increase local production. Consequently, intensification of food production can contribute to household nutrition and food security of rural households. Indeed, the international evidence from several countries, including, the United Kingdom, Saudi Arabia, France, and Thailand, confirms that food security can be accelerated and enhanced through the joint efforts of agricultural engineers and farmers (Mada et al., 2013: 51). In several countries the adoption of minimum plough depth maintained the production of profitable high yield crops (Mada et al., 2013). In the case of Saudi Arabia the country's long time water problems in arid regions were solved by joint efforts of civil and agricultural engineers.

Overall, STI can play a more prominent role in redefining and expanding the role of agriculture in high value chains such as spices and specific industrial applications such as sweeteners in certain food products and for non-food industries such perfume concentrates, oil production for soap, detergents, and cosmetics or chemical and pharmaceutical industries (Schliephake, 1988). Industrial starch production from maize and potatoes, and use of starch or modified starches as a sizing agent in the textile industry and products that can be produced from starch will favour increased agricultural production (Schliephake, 1988).

4.1.2.3. Agricultural Research Systems and Innovation

Agricultural research systems comprise of agricultural and biological sciences with genetic engineering closely associated with molecular biology. Agricultural research systems are composed of scientists, universities, scientific journals, funding agencies, research institutions, farmers, science and agricultural research policy, intellectual property regimes, private companies, and R&D institutions. It must be understood that agricultural systems of innovation are broader than the agricultural research systems and include agricultural policy, global markets, economic and fiscal policies, environmental regulations, and consumers (Vanloqueren and Baret, 2009). Agricultural systems of innovation incorporate a wide variety of actors such as research, extension and other functions that promote or implement innovation (IICA, 2014). The key participants include farmers and farmer associations, providers of inputs or technical and financial services that promote the development or adaptation of new knowledge, those who encourage exchange of knowledge and promote learning, those who engage in adding value to production and those who facilitate market access (IICA, 2014). Research and technology development organizations are an integral part of agricultural innovation systems as are public and private extension services that play a critical role in facilitating access to knowledge and capacity building (IICA, 2014). Agricultural innovation systems pay attention to the larger framework that influences S&T choices with agricultural research systems mainly serving as a selection device that influences S&T choices (Vanloqueren and Baret, 2009).

Agricultural research systems shape the agricultural S&T with science policies explicitly oriented towards growth and national competitiveness. Science policies should be sufficiently broad and include a concern about the complexity of agricultural systems. What is required is a research agenda that includes alternative technological paradigms such as agro-ecological innovations as possible agricultural practices for the future, rather than just innovations for organic agriculture (Vanloqueren and Baret, 2009). That is, agricultural research systems must acknowledge the existence of several innovation pathways (Vanloqueren and Baret, 2009). Within the current research systems agro-ecological innovations are worth the curiosity but not the real academic interest for the majority of academics. By contrast, genetic engineering is viewed as breakthrough scientific discoveries and agro-ecology as incremental innovations. What is notable is that the systems approach of agro-ecology does not fit the laboratory realms and its reductionist approach (Vanloqueren and Baret, 2009).

Within the agricultural research systems, the determinants of innovation fall into three main categories namely agricultural science policies, private sector research, and public sector research establishments as a means to transfer knowledge and technology (Vanloqueren and Baret, 2009). Overall, science and technology are at the apex of agricultural change (Vanloqueren and Baret, 2009). However, responding to new priorities of inclusive innovations requires a fundamental shift in agricultural knowledge and transformations in agricultural systems (Vanloqueren and Baret, 2009). That is, agricultural production needs to increasingly use knowledge (tacit and explicit) intensively as an instrument of innovation. Similarly, the success of agri-business depends on the introduction of more sustainable production systems, being competitive and efficient in agricultural operations especially value addition, and the introduction of new agricultural products through research and development (Mucavele, 2009, 2010). Progressive changes can be effected through increased production of crops, increased number of farmers using improved farm inputs, increased adoption of crop production, and adoption of storage technologies by smallholder farmers.

The increased recognition of the complexity of innovation has made cooperation for innovation less straightforward (World Bank, 2012). The weakening of public research and extension organisations and wider recognition of the complexity of innovation processes are creating opportunities for farmer organisations to develop and diffuse innovations. Farmers

who belong to organizations are participating more effectively in innovation networks and value chains (World Bank, 2012). Therefore, there is a need to build innovation capabilities in farmer organizations. Such interventions to build organizational capabilities would encompass the building of individual and collective capabilities (World Bank, 2012).

4.1.2.4. Stronger Relationships Between Relevant Departments

Innovation in agriculture needs to be positioned as a national strategy. Consequently, in the case of South Africa strong relationships between Department of Science and Technology, Department of Agriculture Forestry and Fisheries, Department of Rural Development and Land Reform, and Department of Cooperative Governance and Traditional Affairs must be fostered in order to:

- Redefine particular goals of R&D;
- Create stronger linkages between agricultural science strategies and other non-food industries such as the chemical and pharmaceutical industries; and
- Support enhanced synergies between innovation and local economic development.

These departmental interactions can be useful in for example, determining breeding industrial plants and their impact on improving the performance of conventional products to expand the range of products that can be produced from agricultural raw materials. Biotechnology is capable of breeding protein enriched grains, producing disease resistant, frost resistant, and drought tolerant plants and redirecting agricultural production to precise industrial applications (Schliephake, 1988).

Arguably, innovation-led interactions between DST, DAFF, COGTA, and DRDLR can enhance the intersections between STI policy and agricultural policy as well as the development of inclusive innovation systems. The making of inclusive innovation systems can increase local production of goods and services that can improve the well-being of rural populations and more broadly the health and nutrition of marginalized population. South Africa with a large number of marginalized households concentrated in the country's distressed areas necessarily must pay more attention to creating capabilities for new

innovations and inclusive sustainable development, and elevate marginalized rural producers into more valued members of society.

It is worth reiterating that policy makers continuously learn through interaction and engagement with other actors about how policies can influence the system and what changes are required. For new ideas to be embodied in policies, it is critical to demonstrate that those ideas provide a solution to a real problem. Often the job for policy makers ends when policy is written down and made official, yet stating the policy is only the starting point for change. When different stakeholders understand the need for policy change, have invested in it, and stand to benefit from it, there is greater likelihood that stakeholders will implement the policy. A more inclusive policy-making process makes it more likely that the policy will be implemented.

4.1.3. Conclusions - Agriculture

At the outset of addressing issues of inclusive development it must be appreciated that an important factor that increases the probability of being poor includes the accident of birth and its geography, in particular. being born in a marginalized community. In South Africa, these marginalized communities are concentrated in the nation's 27 priority districts and the situation in these geographic areas tends to be self-reinforcing, and create lock-in situations of path dependency. To address lock-in and path dependence requires as a starting point that innovative projects in rural areas must not be isolated initiatives (Esparcia, 2014). Instead, they should be embedded as part of national and global processes that are targeted to transform innovation systems and thereby to create more inclusive forms of development. Of necessity, therefore South Africa's STI must constantly be re-evaluated and in particular to reflect the extent to which it can be a decisive agent of inclusive change.

It has been argued, however, that in terms of the attainment of inclusive development goals South Africa does not utilize the full potential of its agricultural sector and that the current sources of agricultural growth are inadequate. Therefore, one vital role of STI should be that

of contributing to supporting the competitiveness of the agricultural sector and of strengthening agriculture's role in increasing the rate and scope of industrial growth. It was highlighted that the agro-processing industry should be considered also for its critical potential role in agricultural and rural economic development and for energising inclusive development. Indeed, it might be contended that agro-industrial products offer more prospects for growth and inclusivity than primary products.

For marginalized populations it is evidenced that food production has specific significance (Gollin, 2010). The sheer size of the agricultural sector in rural areas suggests that innovations in agriculture can have a large aggregate effect on rural inhabitants. Indeed, the introduction of innovation potentially can transform agricultural development, improve the well-being of rural producers, and enhance food security, and make sustainable use of natural resources such as land, and water.. This said, it is argued that such innovation should be accompanied by improved public understanding of the considerable potential offered by the overlooked activity of agricultural engineering. Further, it is emphasized that farmers who belong to organizations participate more effectively in innovation networks and value chains (World Bank, 2012). This suggests that specific policy attention should be paid to building innovation capabilities in farmer organisations. Overall, through innovation DAFF can be engaged in the development of sectoral systems of innovation and in redefining national STI priorities to support agriculture. In addition, increased interactions between DST and other relevant departments can promote innovation system thinking at both sectoral and territorial levels.

In final analysis, DST must enhance the contribution of innovation policies to rural development by generating relevant innovation policies for the prioritized sectors in South Africa's LED strategies. Building upon the findings from this report and our previous reports this suggests a critical role for DST in respect of the following: agricultural innovation policy for regional and local economic development; innovation policy for SMME development; and, innovation policy for tourism development. Taken together, this would raise the profile of STI as an essential component of LED and rural innovation processes in South Africa.

4.2. THE ROLE OF STI IN SMME DEVELOPMENT AND THE FUNCTION OF SMMEs IN THE NATIONAL AND REGIONAL SYSTEMS OF INNOVATION

4.2.1 Introduction

Small medium and micro enterprises (SMMEs) account for the majority of businesses and the highest proportion of employment in developing countries. It is recorded that they produce 25% of OECD exports and 35% of Asian exports (OECD, 1997 cited in Subrahmanya, 2005: 269). To remain internationally and locally competitive, small firms must remain market-oriented and offer goods and services that are of international quality. Accordingly, competition can be a source of innovation where small firms search for strategies to acquire capabilities that are rare and difficult to imitate and can enable them to achieve higher performance in global markets (Vargas, 2015). SMMEs remain a critical focus for local and regional development especially in light of uneven spatial development that results in marginalised communities in many parts of the developing world. A key question facing STI policy makers is what are the underlying factors that impact upon the productivity of SMMEs? Given that innovation has been identified as an important factor of economic development and growth, the question is how can small firms achieve greater innovation, growth and employment? These questions remain critically important especially because of the size of SMME economies and that the majority of these enterprises function beyond reliance on the generation of science, technology and innovation (STI) for innovation, growth and employment expansion.

It is evident that neo-liberal market-oriented policies often do not benefit economically marginalised rural producers in peripheral or remote regions. Policies to promote exports and foreign direct investment have not proved to be the robust growth engines for economically marginalised regions. Nevertheless, there has been an increasing recognition among policy makers and academics about the critical importance of STI for inclusive and sustainable economic growth. Typically, economic growth requires the promotion of STI policies and the development of proper instruments for innovation as well as systemic interventions which aim at strengthening both national and regional systems of innovation. The increasing

acknowledgement of the role of STI in SMME development and of the function of SMMEs in regional systems of innovation has not been accompanied so far by the generation of new regional innovation policies at least in Africa. This said, it is acknowledged that currently policy makers are more open to empirical evidence supporting a central role for STI policies in achieving sustainable economic growth (Padilla-Perez and Gaudin, 2014).

The development of SMMEs can contribute to the sustainable development of the national and regional economies (Uddin, 2006; Forsman, 2011; Anggadwita and Mustafid, 2014; Herliana, 2014; Kaspina et al., 2014). Within the national system of innovation (NSI), SMMEs provide a vehicle for the implementation of S&T results through productive activities with real benefits to the economy. In addition, within the NSI, innovative small firms can have access to knowledge and technology produced by the universities. These arrangements enhance the relevance of universities to local and regional SMME economies. Indeed, one aim of innovation strategies must be to strengthen the innovation activities of small firms.

It is against this background that the aim in this section is to examine the role of STI in SMME development and the function of SMMEs in NSI and regional economic development. More specifically, in this discussion the objective of STI policies is to strengthen the innovation activities of SMMEs by paying attention to the main determinants of innovation in small firms. The analysis is contextualised within its STI research environment of South Africa which must be recognised as markedly different to that of research environments in the developed world. In South Africa it is observed that research on both SMMEs research and LED largely has overlooked the advances and debates taking place in innovation literature. Overall, therefore, the context for this discussion is the function of SMMEs in the development of NSI and more specifically the function of SMMEs in the development of regional systems of innovation and in the making of regional STI policies.

4.2.2. Definitions and Context

In the international experience there is no accepted definition of SMMEs; instead there are country-specific definitions. The DTI in South Africa defines SMMEs in terms of the number of employees that are employed in the enterprise as shown in Table 1 below. This employment based definition exhibits parallels to that used in defining SMMEs in the United Kingdom.

Table 8: Categorisation of SMMEs

Number of Employees	Category of SMME
0	Survivalist and informal (Mainly owner operated; South African Category Only)
1-9	Micro
10-49	Small
50-100 (Except for the mining, electricity, manufacturing and construction sub-sectors where the employment ceiling is 200 employees)	Medium

Note: Adapted from Subrahmanya, 2005; Republic of South Africa, 1997

It is evident that the term ‘SMME’ is applied to describe a diverse range of activities that vary in size, sector, ownership structure, and formality (Anggadwita and Mustafid, 2014). The most distinctive aspect of the South African categorisation of SMMEs relates to the bottom element of survivalist informal enterprise. In South Africa, survivalist informal enterprises relate to a set of activities undertaken primarily by unemployed black people who are unable to find regular employment in the formal job market (Ndabeni, 2005). Within this group of enterprises the income generated is less than the minimum income standard or the poverty line, little capital is invested, skills training is minimal and there are scant prospects for opportunities for upward growth into a viable small business enterprise (Republic of South Africa, 1997; Ndabeni, 2013). This group of enterprises is seen as ‘pre-entrepreneurial’ and consists of hawkers, vendors, and subsistence farmers (Republic of South Africa,

1997). The category of micro enterprises are very small enterprises often involving the owner, some family members and at most hire one to four employees (Rogerson, 2004). This group of businesses frequently lack the trappings of formality in terms of licences or formal premises. Moreover, whilst micro entrepreneurs often have only rudimentary business skills or training, many of them, though not all, are assumed that they can make the transition into viable formal small businesses (Rogerson, 2004).

The group of 'small enterprises' refers to those businesses that employ less than 50 employees (Republic of South Africa, 1997). Most often they outgrow direct supervision of the owner-entrepreneur and require a secondary co-ordinating mechanism in the form of professional management. For small enterprises to grow into medium-scale enterprises requires the accumulation of resources and appropriate incentives for enterprise expansion. The final category of medium enterprises has a maximum number of 100 employees (except for the mining, electricity, manufacturing and construction sub-sectors where the employment ceiling is 200 employees) (Republic of South Africa, 1997). Although medium enterprises are still managed by the owner, the management structure tends to be more complex. Often the decentralisation of power to an additional management layer and the division of labour is the difference between small and medium-sized enterprises. Put together, the categories of small and medium enterprise (SME) constitutes the formal SMME sector (Nobanda, 1998; Rogerson, 2004).

Since 1994 the promotion of SMME development has been one of the most important threads of national government policy development. Essentially, a pro-SMME policy is anchored on three core arguments. First, that SMMEs enhance competition and entrepreneurship and thus have external benefits on economy-wide efficiency, innovation and aggregate productivity. Second, that SMMEs are claimed to be generally more productive than large firms, albeit financial market and other institutional failures impede SME development. Finally, that SMME expansion boosts employment more so than large firms because of their more labour-intensive nature. From such a perspective, specific policy interventions can be justified for government support for the SMME economy.

Overall, it has been demonstrated that SMMEs play an increasingly significant role in providing access to jobs for many people who have not had the opportunity to work and participate in the economy (Rogerson, 2004). Accordingly, the expansion of SMME activities can create significant positive benefits for labour absorption in South Africa, not least because capital is scarce and labour is abundant. With the necessary assistance certain SMME enterprises can improve their profitability substantially, thereby creating scope for expansion and create more job opportunities. The high rates of poverty and unemployment in rural South Africa emphasize that the stimulation of SMME activities needs to be linked to interventions targeted at poverty reduction, employment creation, and broader rural development.. In post-apartheid South Africa SMMEs are acknowledged for their significant role regarding the achievement of social (poverty alleviation), economic (employment creation, increased incomes, economic growth), and political (black economic empowerment) objectives (Republic of South Africa, 1998; Philip, 2001).

What must be recognized clearly is that the category of SMMEs represents a very heterogeneous group of enterprises (Ndabeni, 2013). Indeed, the category of SMMEs can encompass a range of different types of enterprises and operations in an array of different business locations. The enterprises can be urban or rural in location and can include a wide variety of firms from village handicraft makers or small machine shops on the one hand to sophisticated computer software firms on the other hand. SMMEs function with varying levels of skills and operate in different markets and social environments. This research recognises the complexity of the SMME economy as a whole and of the need for policy differentiation, including in respect of innovation policies.

In this investigation the term small firms is applied as an analytical category. The use of the term is not intended to obscure the internal heterogeneity of industrial firms or service firms. Indeed, the diversity of innovations in small firms is associated with a range of different sources of technical change and varying degrees of capabilities and interactions that occur in varied industrial and service contexts. The rich diversity of firms, innovation patterns, and policy contexts highlights that innovation policies aimed at supporting innovation and the development of small firms should be informed by this context of differentiation and thus avoid a ‘one size fits all’ set of policy guidelines. The complexity for STI policy makers is

that *inter alia*: (a) policy interventions are sometimes required at multiple and overlapping scales; (b) the notion of a representative firm is problematic; (c) firms operate in networks which are larger than the firm, and that (d) competencies for technical change and growth do not reside in individual firms but instead are distributed throughout the network of actors and relationships (Radosevic, 1999; Laranja et al., 2008). Finally, from international experience it must be acknowledged that the reconstitution of SMMEs as agents of technical change requires the reconfiguring of the character of networks in which enterprises are embodied as well as the restructuring of the technological and sectoral composition of SMMEs with emphasis to be put on adaptation rather than just upon learning (Laranja et al. 2008).

4.2.3. Innovation and Innovation Systems

Innovation can be defined as the introduction to the practice of enterprises of a new or significantly improved solution for the product (goods and services), process, marketing, or organisation (Lesakova, 2014: 75). That is, innovation can be an activity, research, development, or engineering practice aimed at developing practical applications or context of new knowledge or new ways of applying science and technology (Herliana, 2015). Arguably it must be acknowledged that innovation must be considered as an interactive process which is based on communication and knowledge exchange (Padilla-Perez and Gaudin, 2014). Over time organisations and individuals improve their ways of interacting, and develop relationships (Padilla-Perez and Gaudin, 2014). The national system of innovation (NSI) is defined as encompassing relationships both within and between organisations, institutions and socio-economic structures which determine the rate and direction of innovation and technological capacity building (Lundvall et al, 2009 cited in Padilla-Perez and Gaudin, 2014: 750).

Innovation systems (IS) are made up of several components - private enterprises, universities, research centres and government - the relationships among them and institutions. Only when organisations are linked to each other on a national scale in the innovation process can we talk about a true *national* system of innovation (Radosevic, 1999: 303). It must be appreciated that the concept of IS does not mean necessarily that there is a structure designed

and built in a formal and conscious manner; nor does it mean that the system components work in a joint, coordinated and coherent form (Padilla-Perez and Gaudin, 2014: 750). International innovation scholarship research particularly in the developing world context is highlighting the role of informal innovation and of a broadened perspective on grassroots innovation in the informal economy (Cozzens and Sutz, 2012; Abrol and Gupta, 2014; Bhaduri, 2014; Harris, 2014; Links et al., 2014; Manyati, 2014). As a phrase, innovation system conveys an understanding of concepts and perspectives or a systems approach of innovation in a broad sense that encompasses innovation, diffusion, and learning processes (Herliana, 2015). At the epistemological (theory of knowledge) level, innovation systems refers to a systems approach, an economic outlook which relates to science and technology, innovation and diffusion, research and development (R&D), and the role of science and technology (Herliana, 2015). Thus, it is recognised that innovation systems include the system of science and technology.

What the concept of IS emphasizes is the interaction among the actors in the innovation process (Padilla-Perez and Gaudin, 2014). Further, IS stresses that the interaction of the set of individuals, organisations, and institutions determine their overall innovative performance (Padilla-Perez and Gaudin, 2014: 750). Within the IS, different actors are expected to perform varied functions. The role of government is to create a conducive environment for innovative industries as well as enact policies and institutions that support STI activities, including funding (Padilla-Perez and Gaudin, 2014; Herliana, 2015). Universities are expected to disseminate knowledge and technology, generate constructive values that can form the bases of for developing creative enterprises including inputs on the development of innovation policies aimed at evolving more competitive national and regional economies (Herliana, 2015). Private sector businesses, entrepreneurs, and investors are expected to create goods and services and new markets that can absorb the goods and services as well as to generate create jobs that can absorb workers, including those who can utilise conceptual skills in the process of innovation. As the essence of innovation is the implementation of innovation into practice (Lesakova, 2014) policy makers critically must identify the barriers that hinder innovation activities in SMMEs. Among the challenges facing SMMEs are lack of research capacity, weak innovation infrastructure and financial problems which mitigate them from financing innovations, especially of technological innovations.

It can be argued from a review of international innovation scholarship that in relation to SMME development, 'size matters'. Large enterprises have the highest proportion of innovation activities. For policy makers, especially in light of resource insufficiencies, they can identify small innovative firms with strong growth prospects to fund their expansion and innovation activities as well extend the available innovation infrastructure such as innovation centres or regional innovation centres and more importantly extend STI networks to STI marginalised SMMEs.

In the SMME sector, innovation activities tend to be primarily undertaken by firms motivated by competition, necessity to develop and implement new technologies, to make production more effective, to penetrate new markets or react to changes in the business environment (Lesakova, 2012 cited in Lesakova, 2014). Whilst there is a growing role of innovation for SMMEs, there remains a low degree of awareness about the actual impact of innovation on SMME development and competitiveness. That is, there is still a low awareness about the level of existing and required creativity (defined as the ability to come up with new thoughts, ideas and a unique way of combining thought, processes) to create an innovation. It is argued that being creative means seeing ideas or objects in a different context, either by recognising their inherent potential to be used in a different way or by putting unconnected ideas together to create something completely new (Lesakova, 2014: 78). This logic can be used to innovate new products, new processes, new markets, and new strategies in order to remain ahead of competition. It is argued that developing an innovative environment for innovative SMMEs demands an STI leadership that can appropriately contextualise SMME development within the STI and NSI (Ndabeni, 2013).

It is revealed that small firms undertake innovation in varied forms. For example, the group of process innovative enterprises implement innovative elements in production, management, marketing and other business processes (Kaspina et al., 2014). By contrast, product innovative enterprises are engaged in issuing new products and services which are in great demand on the market (Kaspina et al., 2014). One critical component of innovation is continual technological improvements and adaptation to increasing variety of users, which can lead to the adoption of innovation by a variety of users in various contexts (Uddin, 2006). Several SMMEs follow 'reverse engineering' as a technique in order to acquire

technical know-how in order to modify an existing base product or technology which is unpatented or when the patent has expired (Uddin, 2006). Reverse engineering is a process of learning to understand an existing product or technology by observation and analysis. It requires opening the product and after identifying the possible scope of modification the evolution of a modified product or technology to meet local needs which serve a better purpose and render greater satisfaction to the customer (Uddin, 2006: 276). Reverse engineering is targeted at developing capabilities to understand a specific technology, then use the experience in modifying and developing new technologies through innovative process to suite the customer's needs (Uddin, 2006: 276). For example, basic wood material can be altered by using plastic in order to reduce the cost of production and increase productivity and improves the efficiency and performance of the new technology.

4.2.4. Determinants of Innovation in Small Firms

Innovation studies have tended to emphasise the roles of scientific knowledge and accorded limited attention to the role of tacit knowledge in the innovation processes that occur within the small firms. Such an analysis requires an understanding of the foundations of tacit knowledge, how it is acquired and transferred and how it is utilised in the innovation process. Among others, the work of Koskinen and Vanharanta (2002) highlights that tacit knowledge can play an important role especially in the initial stages of innovation and small firm development. Further, knowledge and learning are important aspects of innovation and firms learn in various forms- learning by doing, learning by experimenting, learning by using, learning by interacting, and learning by searching. Overall, knowledge and capabilities are critical determinants of innovation albeit their uneven availability and accessibility.

The international record shows that the way small firms create knowledge, accumulate capabilities, and innovate vary significantly (Silvestre and Neto, 2014). Knowledge flows are activated through interaction in both formal and informal settings where both explicit and tacit knowledge circulate. Technological capabilities can be referred to as the ability to utilize technological knowledge efficiently, create new technologies and develop new products and processes (Silvestre and Neto, 2014: 271). However, high levels of informality and rent-

seeking behaviour (focus on trading as opposed to innovation) can become barriers for technology diffusion (Silvestre and Neto, 2014). At a firm level the main systemic defect is the weak technology creation capability of enterprises.

A useful distinction can be drawn between technology development and technology diffusion as these require different capabilities. Learning is an important part of technology development such as learning by doing and learning by searching. By contrast, technology diffusion refers to the process by which an innovation is communicated through certain channels over time among members of a social system (Rogers, 1995 cited in Silvestre and Neto, 2014). A new technology can contribute to economic growth only if the new technology becomes widely diffused and used (Silvestre and Neto, 2014: 274).

It has been recognised that geographic proximity is an important determinant for the circulation of knowledge through interaction among a plurality of diverse social and economic actors. In particular, the transmission of tacit knowledge is best accomplished through face-to-face interactions among partners who already share basic similarities. Essentially, tacit knowledge represents knowledge that is based on experience of individuals. It resides in social relations, highly context and history dependent. It can be transferred by internalisation (action learning) and by socialisation (informal face to face interaction and imitation) (Koskinen and Vanharanta, 2002). Action learning refers to a process through which participants learn with and from each other by mutual support, advice and questioning. This happens as they work on real issues or practical problem. Action learning uses explicit knowledge that can be gained from books and journals with tacit knowledge gained from experience and subjects both forms of knowledge to critical questioning and reflection. It is argued that people cannot take advantage of new knowledge unless they have a so-termed 'social software' that connects with the knowledge that has been acquired earlier. The capability of human beings to utilise newly acquired information in the solution of a problem depends largely on prior knowledge (Koskinen and Vanharanta, 2002). When the performance of the task is perceived as being problematic, the individual is not able to make sense of it directly with his/her current stock of knowledge (Koskinen and Vanharanta, 2002: 58). Indeed, geographic proximity and social interaction play a key role in diffusion of tacit knowledge and innovation. In building innovation capabilities among the local firm requires

the examination of the circulation of knowledge through interactions and distinguishing between explicit and tacit knowledge.

Accumulation of knowledge is an important determinant of innovation. However, low levels of existing knowledge within an enterprise can slow down the internalization and exploitation of external knowledge for innovation (Forsman, 2011). Equally important, the capability of problem-solving largely depends on the richness of the existing knowledge structure (Lyles and Schwenk, 1992 cited in Koskinen and Vanharanta, 2002). For example, engineers often use models developed from earlier situations to solve a problem. Thus, face-to-face interactions allow engineers to share tacit knowledge in the execution of engineering projects. The base of organisational knowledge emerges out of the process of exchange, evaluation and integration of knowledge. Thus, the knowledge of an organisation consists of knowledge shared by members within the organisation. Both the variety and depth of know-how are especially important in solving technological problems (Koskinen and Vanharanta, 2002). It is argued that people can utilise the knowledge of techniques, methods and designs that work in certain ways with certain consequences even when they cannot tell why (Koskinen and Vanharanta, 2002). Thus, it is suggested that tacit knowledge equals practical know-how (Koskinen and Vanharanta, 2002: 58). Knowing how to find and apply relevant knowledge efficiently is more practical than trying to master large amounts of knowledge (Koskinen and Vanharanta, 2002).

Against this backcloth the persisting questions of what are the underlying factors behind the productivity of SMMEs and how can firms achieve greater innovation are broader than what tacit knowledge can offer. These questions remain critically important because of the size and geographical position of SMMEs in national economies. The majority of SMMEs operate outside of the globalised economy that relies on the production of STI as the bases of knowledge intensive sectors that generate increased innovation, growth and employment. Patents and R&D outputs are generally recognised as a reflection of the level of firms' innovation (Akcomak and Ter Weel, 2009 cited in Qiao, Ju, and Fung, 2014). Typically, R&D staff are associated with a positive effect on innovation and SMME development (Qiao et al., 2014). Consequently, investments in R&D are encouraged as vital for innovation and higher growth in the SMME economy. This said, there is a tendency is to ignore the equally

important role of tacit knowledge that occurs in small firms. Indeed, an emphasis on R&D should not be accompanied by a downgrading in the significance of or overlooking the role of tacit knowledge as if the two are mutually exclusive.

In a comparative international analysis of technological innovations in small enterprises in Bangalore and Northeast England Subrahmanya (2005) observes that radical product innovation emerged from internal factors whilst incremental product innovation are mainly the result of external factors. Focusing on Bangalore SMMEs, it was highlighted that low R&D intensity in small firms was a reflection of India's low level of technology innovation and of the lack of a technical background of entrepreneurs. Put differently, the level of development of a region in terms of its educational and technological infrastructure can significantly influence how technological innovations occur within firms in that region. In Germany interdependencies are identified between the existing technology infrastructure and innovation activities that occur across various regions (Blind and Grupp, 1999). Within regions the private knowledge base of firms that exist is often supplemented by the public knowledge that is generated by knowledge-producing institutions that are situated in the region. Regional specialisation of firms therefore evolves out from knowledge accumulation and its regional effects. Debates exist around the diverse knowledge and resource bases of regions as sources of regional innovation. It is contended that the regional dimension of the innovation process can be significant because tacit knowledge is stored in people and institutions remains less mobile than capital and can be applied as a determinant of local specialisation.

The international experience points to a conclusion that there is no size effect on regional innovation as both small and large regions can be innovative and realise economies of scale. Nevertheless, it is observed from developed countries that regions with higher population densities and STI infrastructure with public infrastructure spilling over to private infrastructure tend to be the most innovative. The reason why some regions may exhibit richer natural resources but remain poor is because they lack related fields of activities. For example North Rhine-Westphalia (NRW) region (in Germany) is strong in chemical and pharmaceutical industries because of the concentration there of these industries and that local universities are strong in technology fields of organic chemistry, new materials and

biotechnology. In addition, there are large public laboratories in computing, biotechnology, new materials, food processing, and nuclear technology (Blind and Grupp, 1999). These areas of speciality also provide strong potential for spillovers. By contrast, Baden-Wuerttemberg is not strong in either electronics and information technologies or in technology fields of organic chemistry, new materials and biotechnology but instead exhibits particular strengths in vehicles, machinery and space technology (Blind and Grupp, 1999).

The impact of STI infrastructure on local and regional development is evidently not always uniform. For example, it has been disclosed that polytechnics tend to support small companies within their region whilst universities and other research labs transfer knowledge more effectively to larger companies with no regional priority (Blind and Grupp, 1999). In order to gain better insight for understanding regional disparities greater attention must be given to geographical variations in innovation intensity. It is revealed that individual or self-effort remains the major source of innovation with most (formal) firms engaged in innovation activities often on an informal basis. The informal settings make up a network of human relationships and often determine what knowledge the actors can access. Membership of these informal knowledge networks is determined by the abilities of individuals in groups to trade practical valuable knowledge (Koskinen and Vanharanta, 2002). Overall, informal groupings evolve among individuals seeking to solve a particular problem or pursuing a commonly held objective. Given the limited access to external sources of knowledge, the future prospects of small firms depend largely on the scope and subject of own R&D. Participation in networks of industry association can have a further positive effect on innovation and the performance of SMMEs.

The innovations that emanate from individual or self-efforts are mostly incremental in nature and product-oriented (Subrahmanya, 2005). Radical innovators who have developed new products have emerged due to their self-motivation and evolved new products due to their individual efforts with internal technological capabilities the primary source of their innovations. It is observed that small firms have often developed new products without having any formal R&D units within the enterprise. This points to the fact that the effort to innovate should be inherent in every small firm. Overall, the international experience confirms that innovation has a positive effect on development of SMMEs (Qiao et al., 2014).

In particular, product innovations often are carried out as a form of growth strategy. For example, in the case of Bangalore and Northeast England, new product development enabled local enterprises to capture international export markets which enabled enterprise growth both in terms of employment and investment (Subrahmanya, 2005: 275). It is highlighted that incremental innovators were largely engaged in changing product designs. These innovators were mainly compelled by self-driven efforts and customer needs and were carried out with customer support or independently or on the basis of ideas obtained from scientific journals or visiting exhibitions (Subrahmanya, 2005). External support was obtained mostly from large firms that were customers as government support was not significant in the documented cases of both Northeast England and Bangalore, India (Subrahmanya, 2005). In these cases large enterprises determine the direction and trends of incremental innovations (Subrahmanya, 2005). Typically, the development of large-scale industries can have a major impact on the growth of small firms and their innovations as a considerable number of SMMEs receive their technology support from large firms or suppliers (Subrahmanya, 2005: 275).

4.2.5 Transforming Rationales into STI Proximity Policies in a Multi-level Setting

The task in this section is to translate insights that have been generated in this analysis into implications for regional STI policies. Put differently, this section contributes to the development of regional STI policies particularly to strengthen innovation activities of small firms at a regional level and to enhance the bases for regional knowledge economies. The term rationale in this section is used to articulate assumptions about the nature of the system within which an intervention is to be made (Laranja et al., 2008). Our interest in this section is on the suitability of such rationales for regional STI policies.

The use of the phrase multi-level settings acknowledges that generally, STI development has entered an era where STI policies are increasingly being designed and implemented at the supra- and sub-national levels. Consequently, the phrase ‘multi-level settings’ is used to acknowledge the complexity of generating regional STI policies in South Africa. South Africa is a unitary state within which regional economic development policies are impacted

by the provinces whilst the actual implementation of LED policies, including SMME development, as an aspect LED planning resides with local governments. This said, as is the case with other countries, regional and local political jurisdictions do not always coincide with functional geographical socio-economic space within which relevant institutions and interactional learning occurs (Laranja et al., 2008).

The question to be addressed is how do STI policy makers translate (regional economic) rationales into regional STI policies? Further, how do they transform S&T systems into systems of innovation in a multi-level setting and multi-sectoral settings? The intention is to extract 'rationales' which can clarify the role of regional STI policies and inform specific policy instruments to address the challenges of spatial inequalities. The potential impact of regional STI policies can be to transform marginalised regions from recipients of economic processes to agents of territorial and economic change. Such a shift necessitates a clear understanding of social contexts in order to design regional STI policies that are context-specific and sensitive to local path-dependencies. Indeed, the rationale for regional STI policy intervention must be understood as broader than simply that of overcoming market failures (Laranja et al., 2008). Regional STI policies should be crafted to benefit a wide range of SMME beneficiaries, especially those in economically marginalised contexts in order to combat social exclusion and wealth concentration (Silvestre and Neto, 2014). That is, STI regional policy should be viewed within its regional development context where the dynamics of the territory must determine the nature of the STI policy support that is required. Nevertheless, current regional SMME scholarship in Africa has largely failed to reflect advances in the innovation literature.

Innovation policy often is associated with pressures for results rather than with economic theories. Several observers, however, point out that rationales justify the need for an intervention and outline the social, political, economic logic through which a policy intervention will lead to the expected outcomes (Laranja et al., 2008). For example, we can illustrate a link between an economic policy rationale and STI policy choice. That is, economic rationales are taken up and interpreted in the process of STI policy development. Uncovering the (economic) theory behind the STI policy choice can improve understanding of STI policy development and can be a revealing moment for STI policy analysts.

Local and regional economic growth requires the promotion of innovation and development of proper tools for innovation and systemic interventions should be aimed at enhancing national and regional systems of innovation. These interventions must represent core priorities for SMME innovation policies and regional STI policies targeted at raising the innovation and competitiveness of SMME economy as well as that of marginalised regions in ways that can strengthen the performance of the national economy. This said, it must be noted that the educational and technological infrastructure of a region exerts a significant influence on the technological innovations that occur within the firm with higher levels of technological infrastructure facilitating greater technological innovations. Arguably, the achievement of sustainable regional economic development will be reliant upon the healthy development of SMME economies. Within the systems of innovation, innovative firms (by accessing knowledge and technology and influencing the production of knowledge and development of relevant technologies) small firms can enhance the relationships between universities and SMME economies and make universities more relevant to the local and regional economies. International evidence points to a relationship between the existence of internal R&D and the ability to innovate. Those SMMEs that do not have in-house R&D but remain innovative tend to have collaborative mechanisms that enable them to access external support (Subrahmanya, 2005). This suggests that policy support for technological innovations in SMMEs can be applied in three different ways, namely funding collaborative research programmes, providing research grants and facilitating technology transfer and in-house innovations (Subrahmanya, 2005). Research grants can be used to support those SMMEs with research capabilities but lack resources. By contrast, SMMEs that lack research capabilities can make use of technology development and technology transfer services. The experience of India demonstrates that governments can be more active in technology transfer than in building capabilities for in-house R&D and technology innovations.

It must be acknowledged that small and large firms can assume complementary roles in the process of technical change (Edwards et al., 2005). In particular, this is so if it is recognised that they are better at different types of innovations and given that innovation processes and innovation capabilities are increasingly distributed across multiple actors (Edwards et al., 2005). Accordingly, strengthening linkages between small firms and large enterprises can

have certain advantages for the innovation system as a whole. Small firms retain their advantage of better face to face interactions which are enablers of utilising tacit knowledge. By contrast, greater availability of specialised instruments and researchers in large firms brings to larger enterprises distinct advantages in the development and fine-tuning of new products. Further, larger enterprises have better lines of communication with government and knowledge producers about relevant regulations and latest techniques of production and greater capability of financing innovation projects.

Finally, small innovative firms with strong growth prospects can be identified for government funding and expansion purposes. Support for their innovation activities requires the extension of available innovation infrastructure, most notably of innovation centres or regional innovation centres and the extension of STI networks into marginalised regions. Further, it must also be acknowledged that higher levels of innovation will demand improvements in the quality of interactions between all system actors, namely small firms, research institutions, large enterprises, policy makers,-in order for the establishment and consolidation of effective networks and partnerships.

4.2.6. The Challenge of Grassroots Innovation and the Informal Economy

As was pointed out earlier the developing world context poses different challenges for innovation support to those which for example have been examined in developed world contexts. Much of scholarship on innovation in Africa – and South Africa in particular has followed global trends and focussed on urban areas and the formal sector of enterprises (Links et al., 2014: 179). Research has therefore primarily emphasized and celebrated the contributions and actions of formal innovators such as regulated and registered actors in the NSI.

Only recently, has attention been diverted to focus more clearly on the informal economy and upon the role of poor and informal operators in innovation activities. This broadening of the research canvas in South Africa is part of an international trend to acknowledge the actual or

potential significance of what is variously styled as grassroots innovation, bottom of the pyramid innovation, below the radar innovation or innovation by the poor for the poor (Cozzens and Sutz, 2012). As argued by Links et al. (2014: 178) these often quite different forms of innovation which occur in the informal economy “generally focus on the innovation activities of the poorer members of society” among whom the primary objective is an imperative “to solve local problems and challenges and thereby improve their livelihoods and standards of living”. Importantly, it must be recognised that innovations in the informal economy” are often carried out by unregistered and unregulated enterprises” and typically “are usually not part of any large programmes supported by actors within the national system of innovation (NSI) or other actors engaged in traditional R & D activities, and the innovation arrangements are informal” (Links et al., 2014: 175).

The informal economy is the largest component of the SMME economy as a whole and especially so in rural areas of Africa. A critical challenge for STI policy makers in the developing world is their preparedness and commitment to integrate traditional or grassroots innovations into national development and innovation planning. The existence of informal technologies is often due to local demand and locally felt needs with innovations emanating from local resources. Examples of such grassroots innovations can be tracked in the works of Abrol and Gupta (2014) for India, Manyati (2014) for Zimbabwe, Harris (2014) for Kenya and Links et al. (2014) for South Africa. Modifications are often as a result of interactions between farmers (users of innovation) and fabricators (innovators). Such innovations or technologies often exist in rural areas but are in need of modernization, improved product quality and productivity, which can increase opportunities for rural employment. Overall, addressing the challenges of innovation in the informal economy and its articulation with local and regional development processes is a critical future policy issue.

4.2.7 Conclusions - SMMEs

The goal in this section has been to analyse the role of STI in SMME development and the function of SMMEs in NSI and regional development. The discussion has underscored the differentiated nature of SMMEs throughout and that in terms of policy development that no

one size fits all approach can be considered in relation to the complexities inherent in development of the SMME economy. The analysis has drawn from international experiences as well as the limited local research base around SMMEs and innovation.

It has been argued that STI policies often are associated with a neo-liberal economic approach which favours neutral and horizontal policies (Padilla-Perez and Gaudin, 2014). Further, it was revealed that STI policy support tends to disregard that on a regional level as there is no uniform economic structure or uniform R&D landscape. Consequently, regions with greater concentrations of R&D capabilities generate greater economic returns (Laranja et al., 2008). By concentrating policy attention to these regions, the actions of innovation policy makers can increase regional disparities. STI policies often ignore regional disparities and their relevance to impoverished socio-economic environments is often assumed rather than articulated explicitly. It was evidenced that regional STI policies are not common practice in Africa and little recognised for addressing disparities within the national borders of countries. African countries have not designed sub-national STI policies that might take into account the needs and capabilities that occur within regions. Usually, systemic interventions should be aimed at improving the performance of regional economies as well the regional and national systems of innovation.

For SMMEs at central question is what are the underlying factors that impact on productivity and how can regional firms achieve greater innovation and thereby enhance local and regional economic development? It was argued that R&D activities are not the only determinants of technological progress in small firms. In fact, R&D is a contextual activity which is embedded in specific spatial and organisational contexts and tends to be embedded in such contexts. Overall, what influences R&D and the level of innovation is the level of technological infrastructure that exists in a particular country or region as well as the level of demand conditions and the business environment that is conducive to technological innovations in the small enterprise economy. It was pointed out, however that the impact of STI infrastructure on regional development is not uniform

With self-effort being the major source of innovation and external agencies including government agencies being minimal, informal innovations tend to dominate the SMME

innovation landscape. Put differently, given the limited access to external sources of knowledge, the future prospects of small firms and the economic development of some regions depend largely on the scope and subject of own R&D. This leads once again to the policy oversight concerning grassroots innovations and of their potential role as a lever for local and regional development. With the continued expansion of informal economies in the marginalised rural areas of South Africa, it must be concluded that SMME policies and innovation policies need to be re-evaluated and re-cast to recognise the significance of informal innovations for enhancing prospects for local and regional development.

4.3 INNOVATION IN SERVICES WITH A SPECIAL FOCUS ON TOURISM

4.3.1. Introduction

The specific focus in this section is the role of innovation in services and its implications for local development. The issue of the innovation in services is particularly significant in policy terms for South Africa as the National Innovation System (NIS) approach is focused mainly on technological innovation and public R&D which obscures important issues such as the role of innovation-generating activities other than R&D especially in the services sector. It can be argued that there is an imperative to focus specifically on services and its critical importance to innovation and local development in the 27 distressed district municipalities.

Overall, the task in this discussion on innovation in services is to explore the nature of innovation in services and in particular within the critically important tourism sector. According to the Minister of Tourism for South Africa, tourism “is one of our gems” and an under-acknowledged sector” in respect of its critical contributions to national and local development (Hanekom, 2015). Hanekom (2015) points out that its contribution to the national economy over the past 20 years has escalated substantially with estimates of a 9 percent contribution to GDP, 610 000 direct jobs and a further 1.4 million indirect jobs attributed to the sector. Indeed, since 1994 tourism has outgrown in significance several other sectors and in a telling observation it is stated “more people are employed in tourism than in

mining; we tend to ignore that” (Hanekom, 2015: 23). Further justification for a specific focus on innovation in tourism derives from our findings which were presented in the second report that the majority of local governments in South Africa’s distressed areas currently target the tourism sector as a driver for local economic development planning.

The analysis is structured in terms of three further sections of material. The next section provides a review of relevant literature with a focus on the importance of innovation for competitiveness in knowledge-based economies (KBEs), and in particular delineates considerations for defining and measuring innovation in services. The third section turns to interrogate issues concerning the importance of innovation specifically for the tourism sector. The final section builds upon the limited material concerning innovation in services and tourism for South Africa by drawing upon and summarising the major findings of a recently completed study on innovation in tourism firms in the Western Cape (Booyens, 2005)².

4.3.2. Innovation in Services

It is observed that the economies of most advanced countries are evolving into knowledge-based economies (Fagerberg et al., 2012). A distinctive trait of knowledge-based economies is the occurrence of high levels of innovation. Within the context of globalisation, innovation is considered integral to the competitiveness and long-term economic performance of individual firms, cities and nations (Porter, 2008; Fagerberg, 2013).

New economic growth theories stress the importance of knowledge, regarded as a factor of production, for long-term productivity, growth and economic performance (Fagerberg et al., 2012; Fagerberg, 2013). Within this context, innovation is viewed as central to creating new knowledge and enhancing competition (Porter, 2008; Barcet, 2010; Fagerberg, 2013). Consequently, competitiveness depends on the capacity of firms to innovate continuously by creating new products and/ services or upgrading existing ones. Therefore, it is argued that

² It should be noted that sections 3 and 4 represent a summary of the work of Booyens (2015) and parts currently submitted for publication by Booyens and Rogerson (2015).

there is a strong, mostly positive, reciprocal and mutually reinforcing relationship between innovation and competitiveness (Baumol, 2002; Porter, 2008). In other words, the threat posed by competitors encourages firms to be more innovative which increases market share, lowers production costs and reduces prices. This, in turn, enhances competition in a given sector which stimulates further innovation. Therefore, both mechanisms of innovation and competition contribute to productivity and growth across an economy.

Service sectors are regarded as central to knowledge-based economies. In recent decades, services have contributed substantially to value-added in advanced economies, up to 80% in some cases (Tether, 2005; Gallouj and Djellal, 2010). Nevertheless, classical economic theory, with its focus on manufacturing and technological progress, regards the economic performance of services as deficient (Gallouj and Djellal, 2010). Traditionally, innovation has been associated with manufacturing activities, while services were assumed to be innovation laggards, technologically backward, or non-productive (Gallouj and Djellal, 2010; Fagerberg, 2013). Within the techno-scientific paradigm service enterprises were regarded only as good imitators or reactors to industrial innovation (Howells, 2000).

In recent years this somewhat negative view of the role of innovation in services has been tempered by the appearance of a growing stream of research which demonstrates the widespread occurrence of innovation in service enterprises. It is argued that whilst innovation in services is mostly non-technological, there is mounting evidence also of technological and intensive innovation in services (Gallouj and Djellal, 2010) as services are becoming more knowledge-, capital- and technology-intensive. The innovation potential of knowledge-intensive services linked to ICTs, has received considerable recognition (Forsman and Rantanen, 2011). In important contributions Sundbo (1997) and Decelle (2006) maintain that the significance of innovation has been underestimated in service activities. Moreover, as compared to the sector of manufacturing in which radical innovations are vital to enterprise competitiveness, innovations in services are often “secondary and capital-scarce” which results in them being often excluded from the scope of government interest and policy intervention (Decelle, 2006).

Despite the growing economic importance of services, there is only limited attention accorded in innovation literature and policy debates to the subject of innovation in services (Hjalager, 2002, 2010; Fagerberg, 2013). Sundbo (1997: 433) observes that scholarship concerning “innovation in services is sparse”. In a seminal paper Sundbo (1997: 451) contends that the innovation concept which has been substantially studied with respect to manufacturing activities is applicable to services as it is evidenced that “innovation takes place in service firms”. In addition, theories of innovation evolved from studies of the manufacturing sector potentially also can be applied to services.

Overall, within existing literature three approaches to understanding the nature of innovation in services are identified. These are (1) the assimilation, (2) service-oriented and (3) synthesis approaches (Sundbo, 1997; Drejer, 2004; de Vries, 2006; Camison and Monfort-Mir, 2012). The assimilation (or technologist) approach regards innovation in services as essentially the same as that occurring in industry. Therefore, the approach views services from a manufacturing perspective and focuses on innovations that are technological and adopted. The second service-oriented (or demarcation) approach regards service innovation as distinctly different from innovation in industry. This approach focuses on non-technological forms of innovation, whilst not disregarding the technological dimension, and applies Schumpeter’s broad and open definition of innovation. Finally, the synthesis (or convergence) approach seeks analytical integration in understanding innovation in both goods and services, based on the observation that the boundary between goods and services is becoming increasingly less clear. This particular approach forwards that innovation in services is not distinctly different from innovation in industry, and takes technological as well as non-technological innovations into account. Nevertheless, there are neglected aspects of innovation (prominent in services) which will enrich the understanding of innovation in manufacturing (Tether, 2005). Various authors argue in favour of the synthesis approach (Decelle, 2006; de Vries, 2006; Sundbo et al., 2007; Sundbo and Toivonen, 2011; Pivcevic and Pranicevic, 2012; Krizaj et al., 2014). Indeed, Tether (2005) contends that there are no unique patterns of innovation in services which excludes services from the taxonomy of innovation developed by Schumpeter. Forsman and Rantanen (2011) disclose that the types of innovations which are implemented by small and medium sized manufacturing and service firms are similar.

In terms of defining the nature of innovation in services an appropriate start point is Schumpeter's theory of innovation and the classic notion of creative destruction whereby the markets for old products and process are destroyed in order to create new ones (Fagerberg, 2013). In Schumpeter's view the essence of innovation is the creation of 'newness'. Newness should then be transformed into something meaningful, in the form of a product or service with market value, to be considered an innovation (de Miranda et al., 2009). Schumpeter recognised that innovation can take on various forms and be either novel or incremental (Hall and Williams, 2008). The category of *novel* (or radical) innovation involves the introduction of new developments to a market or economy. Innovation can also be adaptive (i.e. innovations that are new to individual firms) and incremental. *Incremental* innovation refers to small improvements which add value to a product or a service. Porter (1998: 2008) indicates that whilst much innovation is mundane and incremental, it can have a cumulative impact on economic upgrading across an economy. Several authors observe that incremental innovation can cumulatively lead to radical changes and impact on long-term economic change (Sundbo and Toivonen, 2011; Fagerberg, 2013).

In broad terms, innovation refers to the creation of new products, services, processes and organisation methods, or the capturing of new markets (or adaptations of those that exist), based on new knowledge (Gault, 2011). According to the Oslo Manual produced by the OECD (2005), innovations need to be new to the enterprise albeit they do not necessarily have to be new to the market. The Oslo Manual makes provision for product, process, organisational and marketing innovations based on the work of Schumpeter. This typology with its definitions allows for a broad range of activities to be classified as innovation and which can be applied to innovation in services.

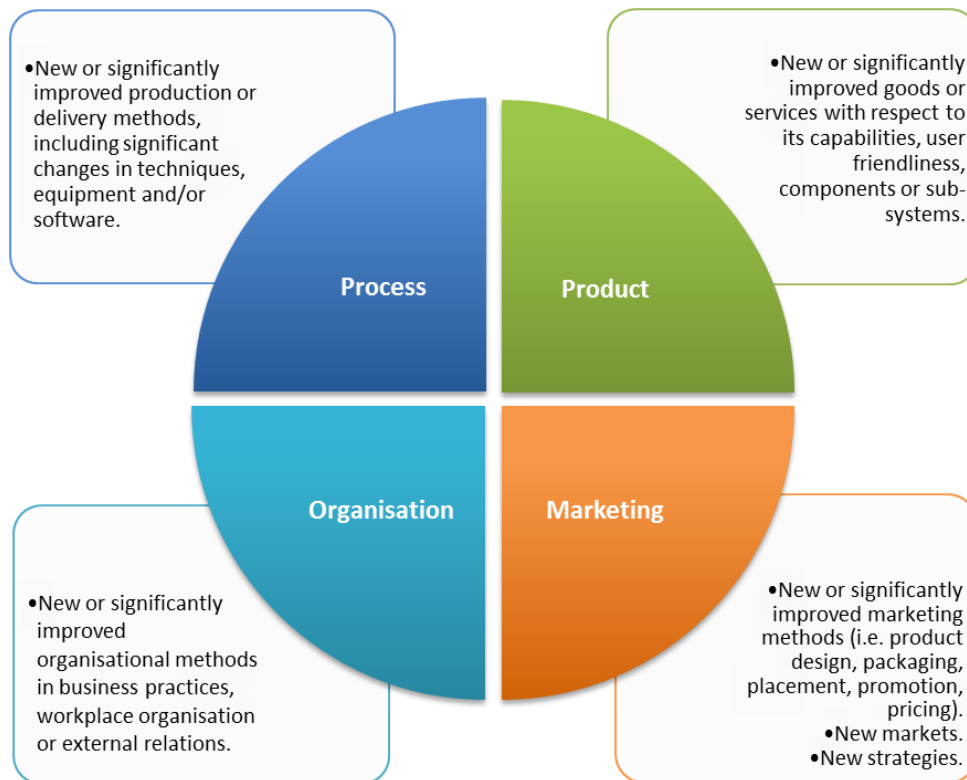


Figure 2: Oslo Manual innovation typology

(Source: Booyens, 2015)

Figure 2 provides a schematic representation of the Oslo Manual innovation typology which differentiates four sets of innovations all of which can be found in services. First are product innovations which in the context of service consist of new services or new combinations of existing services (OECD, 2005). Examples might include new insurance or banking services sold as products or new packaging of service products which might include a number of value adding services in the package. Second, are marketing innovations which relate to new or significantly improved marketing methods and strategies, as well as the penetration of new markets (OECD, 2005). Improvements also pertain to changes in product or service design, packaging, placement, promotion and pricing. Examples of marketing innovations include inter alia new e-marketing channels, cooperative marketing initiatives, and expansion into new markets. Third, organisational or management innovations, which are non-technological innovations, are common in services (Fagerberg, 2013). This category incorporates new or significantly improved organisational or business practices (OECD, 2005) such as new and improved strategies, training or forms of internal and external collaboration. Finally, process

innovations represent new or significantly improved production or delivery methods, techniques, equipment and/ software (OECD, 2005). Process innovations are technological in nature and often take the form of ICT systems in services (Hjalager, 2010). The integration of systems is an outstanding feature of systems innovation. Illustrations would be new or improved computerised management systems for stocktaking, reservations, operations, maintenance, financial management or client relations.

The existing literature on innovation in services is mainly anchored on research undertaken in the global North with few exceptions (see Carlisle et al., 2013). Key issues in the experience of the global North highlight several distinctive features about the nature of innovation in services. First, it is made clear that services are intangible in character and service innovations cannot always be systematically reproduced in other environments (Booyens, 2015). In addition, services are often produced and consumed simultaneously which makes it difficult to measure innovation in services (Hall and Williams, 2008). Second, is the nature and balance between technological and non-technological innovation in services. It is evidenced that the role of ICTs plays a central, but not exclusive, role in innovation in the service sector (Cavlek et al., 2012; Hjalager, 2014). Linked to ICTs, innovation in services can be technological and include product and process innovation. This said, most innovation in service industries tends to be product (or service) innovations instead of process innovations (Sundbo, 1997). Of critical importance is the need to acknowledge the vital and distinctive contribution of non-technological innovation in services (Fagerberg, 2013). Non-technological innovation would include incremental improvements on existing products and processes, and changes in product design, marketing, business practices and workplace organisation (OECD, 2005).

A third distinctive facet of innovation in services is that in many cases, service innovations are *incremental* instead of radical (Sundbo, 1997; Alsos et al., 2014; Clausen and Madsen, 2014). Some academic observers point to the ‘reverse product life-cycle theory’ which suggests that incremental process innovations are needed to improve the efficiency of services, whereas radical innovations improve the quality (Booyens, 2015). Four, is the essentially overlapping nature of innovation in services. It is pointed out that it is often difficult to distinguish between product and process innovations in services as these

frequently overlap (Hall and Williams, 2008; Alsos et al., 2014). A fifth feature of service innovation is the non-linear nature of innovation in the sector and the incompatibility of the conventional linear model of innovation, which involves R&D, production and sale without any feedback loops. The linear view of innovation involves fundamental research, applied research, technological development, the development of products or processes, marketing and distribution. This approach, however, is not applicable to innovation in services which is not necessarily technological in nature and neither is it driven by formal R&D. In services open innovation is important in the context networked knowledge access for innovation outside of a firm's boundaries with service firms less reliant on formal R&D for innovation (Fuglsang et al., 2011; Sundbo and Toivonen, 2011). In the context of open innovation, firms use internal and external ideas when innovating, as well as internal and external paths to the market. Fuglsang et al. (2011) describes innovation in services firms as an open process which draws from various knowledge sources and external linkages. Open source software is one example of open innovation.

Overall, the nature of innovation in services is generally an unsystematic, collective process which in many cases is not been formalised (Sundbo et al., 2007). In addition, within the context of the global South with the dominance of informality and informal economic activities it is suggested that a broadened definition of innovation in services is warranted (Fagerberg et al., 2009; Fagerberg, 2013). Importantly, innovation should not be regarded only as associated with high technology rather it should be interpreted as a continuous process of creating new or improved product and processes (Fagerberg et al., 2009). Both radical and incremental innovation should accordingly be considered and more attention drawn to non-technological kinds of innovation as seen in service industries. Although many of these outcomes may be less glamorous than high-tech breakthroughs it is made clear that their cumulative social and economic impacts may be significant (Fagerberg et al., 2009).

4.3.3. Innovation in Tourism

Innovation is regarded as significant for the tourism sector and especially so for the competitiveness of tourism enterprises and tourism destinations. As a consumption-based service sector tourism can be regarded as a knowledge-based in certain respects. For

contemporary tourism and hospitality firms Iplik et al. (2014) maintain that innovation is a 'critical issue'. Among others Halkier et al. (2014) point out the critical importance for both well-established and would be tourism destinations to be innovative in order to enhance their attractiveness in the increasingly competitive tourism economy. Booyens (2012) asserts that globalisation necessitates competition which is particularly strong in the tourism sector and in an ever-changing and dynamic tourism business environment "firms and destinations can only maintain their competitiveness by constantly adapting to customer needs, responding to the product offerings of competitors and adopting new technologies". Accordingly, tourism enterprises and tourism destinations are under pressure "to innovate constantly in order to stay ahead" (Booyens, 2012: 112).

Several authors now argue that competition is particularly strong in tourism, and that as a consequence innovation is essential for the competitiveness of the sector (Hall and Williams, 2008; Alsos et al., 2014; Clausen and Madsen, 2014; Iplik et al., 2014; Thomas and Wood, 2014; Williams, 2014). Certain authors maintain that innovation takes place widely in tourism (Hall and Williams, 2008; Alsos et al., 2014; Hoarau and Kline, 2014; Williams 2014) whereas others point to a perception that the tourism sector is not particularly innovative (Decelle, 2006; Weiermair, 2006; Hjalager, 2010). Arguably, science and technology has played a major role in terms of innovation in the tourism sector. In a classic article Hjalager (2015: 3) identifies 100 innovations that happened outside the tourism sector "but nevertheless had decisive impacts on tourism". Among these are the passport, elevator, sunglasses, ski technology, the credit card, the Schengen agreement and micro-blogging. It is stressed there is a need for the theoretical and conceptual strengthening of the notion of innovation in tourism, as well as for further measurement and analysis of innovation in tourism (Hjalager, 2010; Camison and Monfort-Mir, 2012; Rodriguez et al., 2014; Williams, 2014). Certain observers suggest there are 'hidden' innovations in tourism, and accordingly a need for detailed examinations of the different types of innovation in tourism (Camison and Monfort-Mir, 2012; Williams, 2014).

Overall, it is contended that innovation is imperative for tourism firms to stay ahead of their competitors (Hall and Page, 2014; Iplik et al., 2014). Among others Mei et al (2012), Hjalager (2013), Thomas and Wood (2014) and Zach et al. (2015) all stress that innovation of

tourism products and services is a driving force for competitiveness and success both for tourism enterprises and destinations. Creativity is significant for tourism firms and the implementation of creative ideas “ultimately leads to innovation” (Teoderescu et al., 2015: 36). This said creativity differs from innovation in tourism. As Decelle (2006) points out creativity relates to the production of new ideas, approaches and inventions whereas innovation corresponds to the application of new and creative ideas and the actual implementation of inventions. It is contended, however, that tourism enterprises need to be creative “in order to be competitive as satisfying the ever increasingly demanding consumers has become even more difficult than before” (Teoderescu et al., 2015: 36). Several scholars alert us that research on understanding the innovative behaviour of tourism companies remains limited (Sundbo et al., 2006; Teoderescu et al., 2015). Arguably, as a whole, research concerning innovation in tourism is sparse even though this field of inquiry is beginning to attract attention (Hjalager, 2010; Thomas et al., 2011; Hjalager, 2014; Rodriguez et al., 2014; Thomas and Wood, 2014; Williams, 2014).

The findings of existing research on innovation in tourism are aligned to many of those relating to the nature of innovation in services as a whole. For example, it is argued that innovation in tourism is usually incremental, deriving from everyday practices and interaction and only rarely from formalized internal research and development (Hjalager, 2002; Decelle, 2006). Although novel innovations are reportedly present in tourism (Pizam, 2007; Hjalager, 2010; Williams, 2014); certain authors are sceptical about the value of tourism innovations and maintain that tourism innovations, for the most part, are simple imitations or marginal improvements to enhance the emotional value of tourism experiences (Decelle, 2006; Weiermair, 2006). It is argued that the quality of such tourism experiences is intangible and perceived, and therefore subjective. This implies the existence of a large amount of risk and uncertainty about customer value. Incremental innovation (i.e. improved ways of doing things) is prevalent in tourism and linked to the concept of economic upgrading (Dwyer and Edwards, 2009; Clausen and Madsen, 2014; Williams, 2014). Nevertheless, it is argued that strategic incrementalism, whereby tourism firms modify their business strategies, is significant for the competitiveness of tourism firms.

In understanding and defining tourism innovation it is stated there has been limited theorising about such innovation in tourism (Camison and Monfort-Mir, 2012; Alsos et al., 2014; Williams, 2014). Nevertheless, it is contended that as the Schumpeterian concept of innovation is broad enough to encompass innovation in services that conventional innovation concepts, theories and tools can be applied and adapted to tourism in the context of what was described as the synthesis approach. Indeed, several analysts deem this approach as 'appropriate' for defining and measuring innovation in tourism (Jacob et al., 2003, 2010; Pivcevic and Pranicevic, 2012; Alsos et al., 2014; Clausen and Madsen, 2014). Hall and Williams (2008), Hjalager (2010), Jacob et al. (2003), and Sundbo et al. (2007) observe that product, process, marketing and organisational innovations, as per Schumpeter, are identifiable in tourism. In addition, the Oslo Manual innovation typology can be applied to understand innovation in tourism (cf. Williams, 2014).

The Oslo Manual delineates four types of innovation, namely product (or service), process, organisational and marketing innovations, which can be applied to tourism. First is the category of product innovations which are defined as new products or services, new combinations of existing products, or the exploitation of a new resource. Broadly, examples include new or improved services (including customisation); physical structures; or the introduction of niche tourism products (cf. Hjalager, 2010; Rogerson, 2011). Second, the category of process innovations include new or improved processes to raise the performance of operations, often incorporating ICTs and aimed at enhancing efficiency, productivity and flow of operations. Hjalager (2010) suggests that ICT is the backbone of many process innovations in tourism. Examples include new or improved computerised systems (for stocktaking, reservations, advertising, operations or maintenance) and other technologies which are used by hotels, tour operators, reservation offices, transport providers, and airports. Third, are organisational (or management) innovations which represent new and improved management methods or business models; forms of internal and external collaboration (i.e. strategic alliances); agent relationships; health, safety and training procedures; ways of managing risk; and, methods for organising routines and procedures. Fourth are marketing innovations which include the implementation of new or significantly improved marketing methods such as significant changes in product design, product placement, product promotion, or pricing not previously used by the firm. Examples of marketing innovations include new or improved approaches to markets, collaborative marketing initiatives;

marketing strategies; marketing channels such as e-marketing and online booking; and branding initiatives. Finally, the category of environmental innovation is an addition and extension to the Oslo Manual typology. An environmental innovation can be defined as: “A new or significantly improved product (good or service), process, organizational method or marketing method that creates environmental benefits compared to alternatives” (Eurostat 2008:12). In the context of tourism, environmental innovation involves the introduction of practices to ensure energy efficiency; reduce waste; save water; reduce greenhouse gas emissions; and contribute to nature conservation.

In terms of the research on types of innovation in tourism, evidence exists of product (or service), process (or technological), marketing, organisational (or management), and environmental innovations in tourism (Jacob et al., 2003; Sundbo et al., 2007; Pivcevic and Pranicevic, 2012). The main research strands concerning innovation in tourism include the use and diffusion of Information and Communication Technologies (ICTs) in tourism; as well as environmentally-friendly practices, and innovation-orientated management in hotels. First, travel is regarded as the largest on-line business in the world and it is argued that ICTs drives innovation in tourism (Fernandez et al., 2011; Cavlek et al., 2012). The application of ICTs, as an example of innovation in tourism, attracts much literature (Orfila-Sintes et al., 2005; Aldebert et al., 2011; Fernandez et al., 2011; Thomas et al., 2011; Camison and Monfort-Mir, 2012; Cavlek et al., 2012; Anwar et al., 2013; Pardo et al., 2013; Sorensen and Sundbo, 2014; Berné et al., 2015). Illustrations include the incorporation of new media technologies in advertising; online reservation and booking system; online distribution and marketing; the use of Global Positioning System technologies; and, systems of various kinds. Second, issues of ‘green growth’, the environmental impact of tourism, responsible practices by tourism firms are receiving mounting research attention (Orfila-Sintes et al., 2005; Jacob et al., 2010; Tajeddini, 2010; Paraskevopoulou et al., 2012; Tigu et al., 2013; Hall and Page, 2014). Accommodation establishments reportedly introduce environmental innovations on a regular basis (Fraj et al., 2015; Orfila-Sintes et al., 2005; Jacob et al., 2010). It is disclosed that hotel groups appear to be more dynamic than smaller and independent hotels in terms of the adoption of environmental innovations (Fraj et al., 2015; Jacob et al., 2010; Paraskevopoulou et al., 2012; Tigu et al., 2013). Third, innovation and competitiveness is associated with the strategic management of tourism firms. Tajeddini (2010) suggests that there is a relationship between corporate entrepreneurship and innovation. This is confirmed by Fraj et al. (2015),

Kearney et al. (2014), Martinez-Lopez and Vargas-Sanchez (2013) and Park et al. (2014) who point out innovation-orientation is a significant component of strategic management in hotels.

Several observers confirm there has been an increase in the number of innovative tourism firms in recent years, as well as the formation of new tourist destinations which has led to increased competitiveness (Pizam, 2007; Camison and Monfort-Mir, 2012; Alsos et al., 2014; Hoarau and Kline, 2014; Ronningen and Lien, 2014). That said, not all sub-sectors and activities in the tourism sector can be regarded as knowledge-intensive; neither do all tourism firms use knowledge effectively for their economic success (Hall and Williams, 2008). Firm-size, professionalism and entrepreneurship in tourism firms are viewed as critical for innovation in tourism firms (Sundbo et al., 2007; Thomas et al., 2011; Tigu et al., 2013; Ahmad et al., 2014; Clausen and Madsen, 2014). Large tourism firms, in particular multi-national groups, are considered the main innovators (Sundbo et al., 2007; Tigu et al., 2013; Ronningen and Lien, 2014). Nevertheless, innovation appears to be of particular importance for the survival of small firms in tourism (Brouder and Eriksson, 2013; Alsos and Clausen, 2014). Small tourism firms appear to have low levels of knowledge-intensity, and typically do not have the strategic direction or the resources to innovate (Hall and Williams, 2008; Paraskevopoulou et al., 2012; Martinez-Lopez and Vargas-Sanchez, 2013; Kearney et al., 2014; Park et al., 2014).

It is argued that innovation-orientation often stems from the management approach of a firm, and tourism firms typically need better knowledge and innovation-orientated management practices to achieve a competitive advantage (Hall and Williams, 2008; Alsos et al., 2014; Clausen and Madsen, 2014; Thomas and Wood, 2014). Undoubtedly, innovation in tourism has important management implications for tourism firms. Often innovation is driven from within the firm as a result of a deliberate strategy for competitiveness in large and small firms alike (Furseth and Cuthbertson, 2014; Hall and Page, 2014; Iplik et al., 2014). Among others Fuglsang et al. (2011) and Hall and Williams (2008) maintain that the strategic innovation paradigm emphasises firm-level strategy as a central determinant which drives innovation in tourism firms. In addition, collaboration and networking are stressed as critical enablers for innovation. For energising innovation there is growing evidence of the importance of access

to *external knowledge* for innovation by tourism enterprises and in particular of the significance of external networks. This finding marks a distinctive characteristic of innovation in tourism as compared to trajectories of innovation in other sectors, including other services (Williams and Shaw, 2011; Brouder and Eriksson, 2013; Thomas and Wood, 2014). It suggests that whilst clusters and local networks can assist in enhancing innovation of greater importance in tourism is the role of external knowledge and networks for enhancing innovation and competitiveness in tourism enterprises (Sundo et al. 2007; Brouder and Eriksson, 2013; Thomas and Wood, 2014)

Among others Booyens (2015) argues that *innovation systems* are critical for enhancing and supporting innovation in tourism. At the level of destinations Halkier et al (2014) highlight that collaboration, cooperation and networking are essential between local governments, local education and research institutions, tourism support institutions and private enterprises in order to foster tourism innovation. This said, at destination level functioning tourism innovation systems have been documented only rarely with the best evidence coming from Scandinavia (Hjalager, 2010; Brouder and Eriksson, 2013). A number of scholars even question whether innovation systems exist at all in tourism (Booyens, 2015). In one of the most influential investigations Sundbo et al (2007) caution that in services as a whole innovation systems are weak, albeit further investigations are needed to confirm this assessment in respect of the tourism sector.

4.3.4. South African Perspectives

Over the past two decades the contribution of services to the South African economy has increased significantly. With structural economic change the rise of services has been remarkable. By 2012, the contribution of services to national GDP amounted to 70% as compared to about 55% during the 1950s (Booyens, 2015). In addition, the service sector alongside a growth in output, has also become a major generator of employment (Manyeka, 2014). Nevertheless, with a decline in mining and the march of deindustrialisation the share of services in South Africa's economy has reached the point that it is viewed as atypical for a middle-income country (Kahn and Hounwanou, 2008). Over the past 20 years the growth in

tourism, has contributed to the acceleration towards a service-based economy in South Africa.

It is against this background that Booyens (2012: 124) maintains “it is time to put innovation on the table as a new focus area for tourism research and policy development in South Africa”. This said, notwithstanding the considerable growth of tourism scholarship in South Africa over the past decade “innovation in tourism has received little attention in local academic and policy debates” (Booyens, 2012: 113). This knowledge deficit is regrettable as it is forwarded that “innovation is required to enhance the growth and competitiveness of tourism firms and the South African economy, and that a better understanding of innovation is essential to ensure evidence-based policymaking” (Booyens, 2012: 113).

Table 9: Innovation indicators (2010-2012)

Firms with innovation activity*	59.6%
Firms with upgrading only	27.6%
Firms with no innovation or upgrading	12.8%
Total	100%

Innovation in the service sector of South Africa is limited to scattered information which is provided in the South African Innovation survey (HSRC & DST, 2009, 2011). The only empirical evidence concerning innovation in the tourism sector of South Africa is from Booyens (2015) investigation of tourism innovation in the Western Cape which spanned a total of 156 tourism firms surveyed about their innovation activities during the period 2010 to 2012. Among this study's key findings an analysis was undertaken of innovation activity in terms of the introduction of new or improved products, process or business practices introduced to the market during the reference period of 2010-2012. It is observed that 59.6% of the tourism firms surveyed can be considered as innovative firms (Table 9). The investigation distinguishes between firms with innovation activity and upgrading activity. Upgrading activity is evident in 27.6% of firms surveyed. This means that most tourism firms implement small changes or upgrades rather than introduce new or significant changes to existing products, processes and business practices. Of the firms surveyed, only 12.8% report no innovation or upgrading activities.

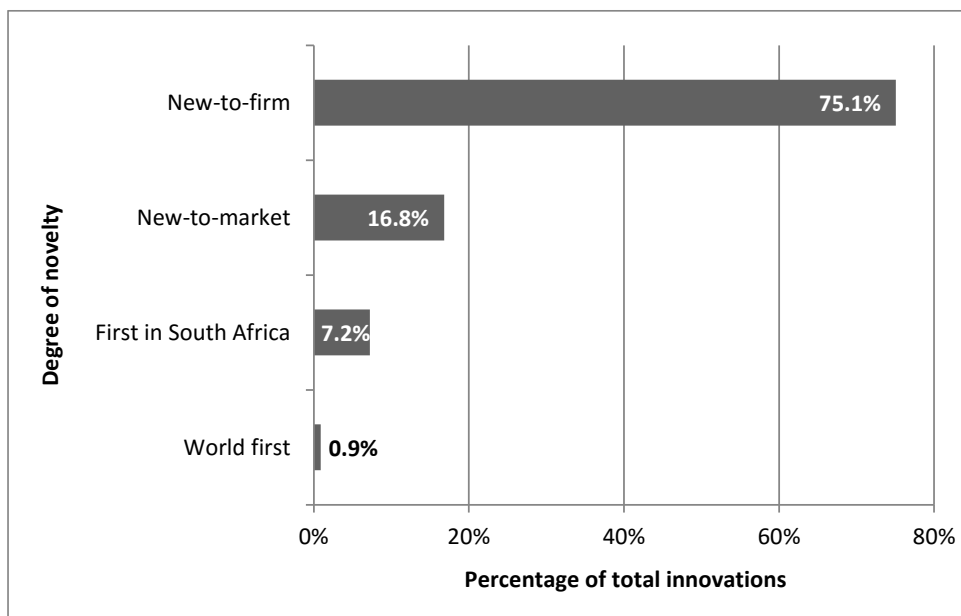
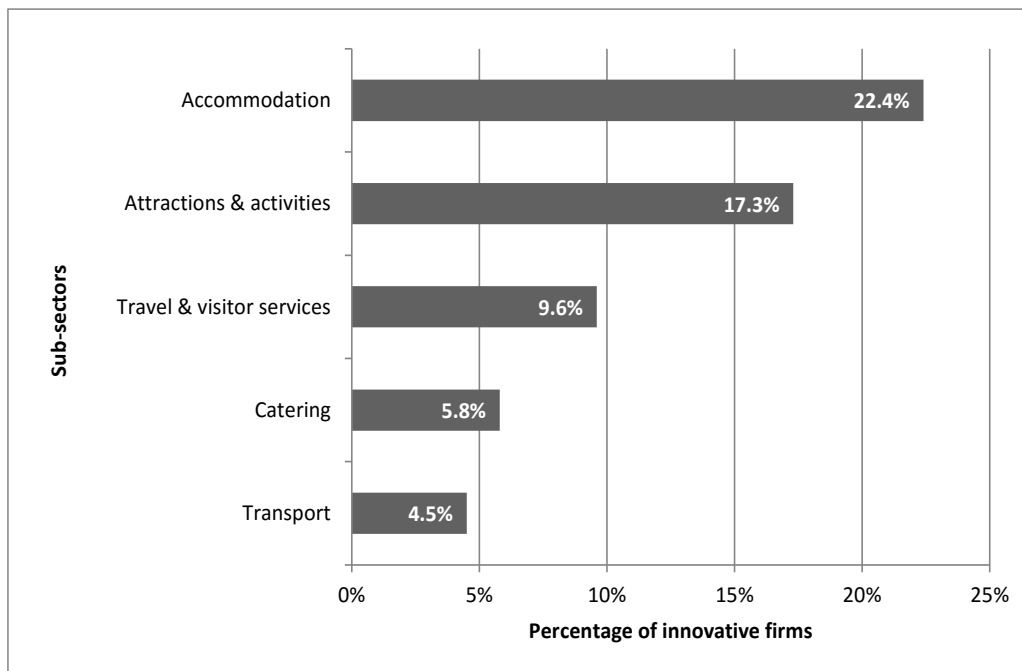


Figure 3: The degree of novelty of tourism innovations

In considering innovation activities, it is important to understand the degree of novelty *vis-à-vis* innovations, in particular whether such innovations are only 'new-to-firm'; or also 'new-

to-market’, ‘new to a country’ or a ‘world first’. In cases where innovations have already been implemented by other firms in a market, such innovations are new-to-firm (cf. OECD, 2005). The new-to-firm category is the lowest level of novelty recognised by the Oslo Manual (cf. Gault, 2011). Innovations which have a higher degree of novelty include new-to-market innovations, that is when a firm is first to introduce an innovation to a particular market, or when a firm is first to introduce an innovation domestically or internationally (cf. OECD, 2005). In the Western Cape investigation approximately a quarter of total innovations (24.9%) by tourism firms can be considered as truly novel with 16.8% of innovations being new-to-market, 7.2% first in South Africa and 0.9% first in the world (Figure 3). Conversely, three-quarters of innovations are new-to-firm only, and can therefore be regarded as principally incremental rather than novel.

Figure 4 presents a breakdown of innovation propensity by tourism sub-sector, in other words the number of firms with innovation activity per sub-sector. It is evident that sub-sectoral differences exist in relation to innovation propensity. Figure 4 discloses that the accommodation sub-sector has the largest proportion of innovative firms (22.4%). This is



followed by the attractions and activities (17.3%), travel and visitors services (9.6%), catering (5.8%) and transport (4.5%) sub-sectors.

Figure 4: Innovative firms by tourism sub-sector

Overall, the Western Cape research revealed that innovation propensity increases with firm-size (Booyens, 2015). Large tourism firms are observed to be more innovative than small firms. It was revealed that whilst all large firms had innovative activity, only 47.7% of small firms had new or improved innovations which is lower than the overall innovation rate of 59.6%. This trend is even more pronounced in terms of novel innovation (i.e. new-to-market, first in South Africa and first in the world). Of large firms, 66.7% introduced novel innovations, while only 11.4% of micro and 16.3% of small firms did so. Financial constraints emerged as the most significant barrier to innovation in relation to innovation by firm-size. This said, whilst both the groups of large and small firms stated financial constraints as the most important barrier to innovation, this innovation barrier is more pronounced for small firms than large firms, especially groups, who generally have more resources for innovation purposes (Booyens, 2015).

Table 10: Examples of main innovations per type

Product innovations

New or significantly improved:

- Tours, tourism activities and attractions, incl. culture-based or nature-based experiences, exhibitions, and festivals.
- Hotel and accommodation establishments.
- Major upgrades to facilities, incl. structural improvements.
- Restaurants, and food and beverage offerings, for example food and beer/wine pairings at breweries and wineries.
- Bundled products or expanded product offerings which include more services and functionality.

Marketing innovations

New or significantly improved:

- Use of e-marketing and uptake of social media.
 - Change in marketing strategy.
 - Entrance of new markets or penetration of existing ones.
-

-
- Formation of strategic alliances for marketing purposes.
 - Vertical integration or product bundling done primarily for marketing purposes.
-

Environmental innovations

New or significantly improved:

- Energy saving measures.
 - Waste management.
 - Water saving measures.
 - Other: green building, conservation practices, and reduction of greenhouse gas emissions and/ or carbon footprint.
-

Organisational innovations

New or significantly improved:

- Name changes, rebranding, decisions to franchise, corporate restructuring or change in ownership.
 - Strategic alliances and partnerships which includes new partners, accreditations to ensure access to global collaborative marketing initiatives, and joint ventures.
 - Changes in business, operational and administrative processes such as the use of new analytical tools or adoption of new business models, and practices to enhance turn-around times and efficiency.
 - Training, as well as health and safety practices.
-

Process innovations

New or significantly improved:

- Web-based tour operating systems, agent e-portals or other online platforms.
 - Technological processes for resource management.
 - Sophisticated integrated management systems.
 - Central reservation, online booking and customised ticketing systems.
 - Yield and revenue management systems which integrates bookings and scheduling.
-

Source: Adapted after Booyens, 2015

In terms of types of innovations, the results revealed the most common forms as product followed by marketing, environmental and organisational innovations. Process innovations

were the least implemented. Examining each of the categories in more detail, the caveat must be made that many innovations overlap and therefore span more than one type of innovation (cf. OECD, 2005). This said, the Booyens (2015) study reveals product innovation as the category with the most innovation activity. Product innovations comprise the introduction of a new or significantly improved product (or service) to the market. Tourism product innovations typically consist of new or significantly improved accommodation offerings, tours, activities and attractions (Table 10). Tourism product innovations also include major upgrades to facilities in hotels, restaurants, exhibition centres or museums, and attractions.

Firms with marketing innovations are those with new or significantly improved marketing practices. The increased use of e-marketing and the uptake of social media are prevalent marketing innovations by small and large firms alike. It should, however, be stressed that such behaviour by tourism firms is highly incremental. One example of a change in marketing strategy, linked to organisational change, is the entrance into new markets which for Western Cape firms included a focus on India, Brazil, Japan and China. Examples of strategic alliances formed primarily for marketing purposes includes collaborative marketing initiatives and using new marketing channels or agents to market a firm in a foreign market. The bundling of products, linked to marketing and enabled through systems (process) innovation, is also observed. For instance, an airline selling travel packages which includes car rental, hotel accommodation or attraction bookings.

The identification of environmental innovation as a prevalent form of innovation in tourism is a key finding of the Western Cape research (Booyens, 2015). Environmentally-friendly practices by tourism firms are regarded as innovation if they were new or significantly improved during the reference period. Such innovation predominantly consist of energy saving, waste management, and water saving measures. Energy saving measures include the use of solar panels and geysers, heat pumps, gas, water saving lights and wind turbines. Waste management practices consist of recycling, the safe disposal of hazardous waste, dry toilet systems and bio-digesters. Water saving measures include grey water systems, the use of rain water tanks, and methods to minimise water usage. In addition, certain firms are actively engaged in nature conservation and maintaining biodiversity (Booyens 2015).

Organisational innovation entails a wide variety of changes in organisational practices and procedures. Strategic alliances are an important form of organisational innovation. The main purpose of alliances is strategic positioning in order to strengthen a firm's prospects and enhance its competitiveness. Strategic alliances of various kinds are identified. Examples are buying into a franchise or new licencing agreements, forming new partnerships for marketing and business expansion purposes, penetrating new markets, and new shareholding agreements and major changes in management (i.e. change of holding company) which results in restructuring and significant organisational changes. Partnerships of various kinds, such as linking up with experts or international firms (or organisations) as sources of knowledge, are also identified.

Although the category of process innovations constitutes a relatively small portion of total innovations (8.3%), these represent significant examples of technological innovation in tourism. In most cases, process innovations consist of an application of ICT-based technologies in the form of tourism products, as well as marketing, organisational and environment practices. Process innovations, typically, are enablers for other types of innovations and rarely are stand-alone. ICT-based systems innovation, as a form of process innovation, is an outstanding form of novel process innovation as identified in this study. Systems innovation mostly occurs at the head offices of groups, especially hotel and transport groups. One reason for this is that large groups usually have the resources to develop custom-made systems. The complexity of operations in groups also justifies systems innovation. Integration of systems is an outstanding feature of systems innovation.



Figure 5: Determinants for innovation in tourism model

In terms of the determinants or drivers for innovation the Booyens (2015) research uses qualitative responses to disclose four sets of drivers as shown on Figure 5. The key drivers based on responses by respondents are that innovation is important for competitiveness, performance and survival. In the case of strategic direction as the main determinant for innovation, owners and managers reported that innovation is a deliberate part of their business or corporate strategy. They argued that ‘being innovative’ is concerned with how a firm views itself and what others have come to expect of it. Many firms stress that they want to ‘be the best’ in their field or seen as ‘market leaders’. Innovating for strategic purposes is competitiveness-driven with a focus on business growth, enhancing a firm’s market position, and ensuring the upkeep of standards and expectations. Enhancing efficiency and productivity towards improving profitability is a core innovation determinant. Though linked to competitiveness, the main driver in this case is performance enhancement with the focus on remaining financially viable and profitable. Important considerations for enhancing efficiency and productivity are costs reduction, optimising operations, increasing visitor numbers, maximising or generating additional revenue, and looking for ways to ‘do things better’ which forms the basis for innovation. In such cases, innovation tends to be more incremental. Some firms who have implemented environmentally-friendly practices highlighted that they have done so primarily in order to reduce costs and to enhance efficiency.

The survival determinant is a driver of necessity. Where this is observed, firms tend to be reactive respondents to change often led by competing firms. In other words these tourism enterprises innovate in order to survive, to compensate for poor or remote locations, or not to be ‘left behind’. Responses to technological change and changes in customer behaviour, preferences and expectations (i.e. response to market demand) are significant considerations in this regard. Finally, the driver of utilitarianism is associated with firms who implemented social or environmental innovations. Such enterprises introduce innovations because of utilitarian motives with ethical underpinnings. In other words, they implement new or

improved product, processes or procedures as a result of being conscious and passionate about social and/or environmental issues, and wanting ‘to make a difference’ or to do what they consider to be ‘right’.

The Western Cape study pointed to the geographical unevenness of innovation among tourism firms. The investigation disclosed the highest propensity for innovation in urban rather than rural areas with the largest amount of innovation occurring in tourism firms based in Cape Town, Winelands and the Garden Route. Organisational innovations were most strongly evidenced in urban areas where large tourism firms were based. By contrast marketing innovations were observed amongst both large and small firms and in large urban as well as small town localities. A critical finding about the geographical dimensions of innovation concerns the importance of access to external knowledge for the introduction of novel innovations. In respect of innovation networks the study disclosed “the absence of functioning tourism innovation systems in the region with the exception of a few small and isolated local innovation networks” (Booyens, 2015: 280).

4.3.5. Conclusions - Tourism

The above analysis opens up for DST a host of questions about innovation in the service sector in general and around the critically important tourism sector in particular. Conventionally, issues of innovation are inseparable from science and technology. In the rising service sector, however, alongside technological innovation one must acknowledge the vital role played by non-technological innovations. It is evident that many service innovations are non-technological and include incremental improvements on existing products and processes, changes in product design, marketing or business practices. In looking therefore at innovation in services different frameworks or lenses for investigation and understanding must be considered.

In the case of tourism the importance of innovation for the competitiveness of firms and destinations cannot be underestimated in particular with the march of globalisation and new competition for consumers. Research is growing internationally on issues pertaining to innovation in tourism but still is a relatively unexplored phenomenon. Significantly, most existing research around tourism and innovation is anchored in experiences of the global North. In the global South only a handful of investigations have been undertaken to interrogate the nature and importance of innovation for tourism and local development. In South Africa STI policies essentially ignore tourism despite the sector's vital importance for national economic development and of the critical significance of innovation for the economic health of tourism. Undoubtedly there is a great need to expand the evidence base around innovation and South Africa's tourism economy, in particular to inform policy around innovation and tourism in the country. The existing limited base of work signals that innovation is a widespread phenomenon in the tourism sector, albeit differences must be recognised in terms of the nature of innovation, its geography and key drivers. In final analysis it must be conceded that further research is urgently required to unpack the role of innovation in South Africa's vital service sector, most especially in tourism.

5. FIELDWORK

5.1 INTRODUCTION

With the expansion of knowledge-based economies there is international recognition that economic progress is less reliant on traditional resources of capital and labour for wealth creation and instead is driven increasingly by new knowledge, innovation and technological change (Herstad et al., 2014; Varis et al., 2014). As one recent observer argues "innovation has been a key driver of the cumulative increases in productivity growth in industrial countries and is driven by technological change, investment in physical capital and the growth of human skills" (Oyelaran-Oyeyinka, 2014: 483). From the turn of the century innovation studies were given considerable prominence as science and technology were seen

as a means to uplift and move people out of poverty in support of the Millennium Development Goals (Hart et al., 2013). In the ‘age of innovation’ Kourtit, Nijkamp and Stimson (2011) highlight the emergence of new paradigms which are inspired by Schumpeterian thinking with its emphasis on innovation as a main driving factor for long-term economic growth.

Across the global North one aspect of the changing face and orientation of local and regional development policies is the increased attention which is given to innovation (Shearmur and Bonnet, 2011; Stephens et al., 2013). Feldman and Choi (2015) argue that policies to promote innovation (and entrepreneurship) within geographically defined concentrations have become an increasingly important development strategy particularly in North America and the European Union. Among others De la Mothe and Paquet (2012) document the growing interest in local and regional systems of innovation. Arguably, therefore, in recent years innovation has become a critical parameter for contemporary regional and local development policy. What is termed the ‘neo-innovation policy’ essentially takes for granted “that the fate of a region or place is contingent on its daring capacity, its potential to start new activities, its ability to link its knowledge basis to creativity, and its smart public policy (ie., by exploiting the self-organizing capacity of an area)” (Kourtit et al., 2011: 128).

For peripheral regions, particularly those in the global South, it is disclosed that innovation (and creativity) is a key factor in stimulating economic catch-up and growth (Fu, 2011; Stephens et al., 2013; Varis et al., 2014; Fitjar and Rodríguez-Pose, 2015). Much contemporary work on innovation and regional and local development is informed by the premise that certain regional and local dynamics are conducive to innovation enhancement. In turn, this is the driver for interventions to support regional and local innovation policies in search of catalysing local economic development (Shearmur and Bonnet, 2011). The South African National System of Innovation (NSI) must be understood as “quite young” and in terms of state policy is aimed at engineering a decisive break from the economic structures inherited from apartheid (Scerri, 2013). Nevertheless, in South African debates about regional and local development policy issues of innovation rarely are discussed. The OECD (2008) observes that the role of regions in fostering economic growth is a relatively new concept in

South Africa which has notably remained absent from strategic documents aimed at economic growth.

The country's most recent policy documents and frameworks around local economic development, which were released in 2013 and 2015 (Department of Cooperative Governance and Traditional Affairs, 2013, 2015), make little mention or acknowledgement of issues around innovation. Moreover, no consideration is given to the role of innovation policies towards contributing to the national objectives of launching a "more effective fight against poverty, inequality and unemployment through the development of inclusive and competitive local economies" and "to support the potential of local economies to grow and develop the national economy" (Department of Cooperative Governance and Traditional Affairs, 2015: 14). There are promising signs, however, that this disconnect between South Africa's national innovation policies and those around regional and local development planning is being addressed. In 2015 South Africa's Department of Science and Technology (DST), the core department with responsibility for innovation policy in the country, released a new strategy document titled *Innovation for Local Economic Development* (ILED) which is intended to inform the DST's involvement in the policy space of Local Economic Development (LED) with the mandate of "strengthening local systems of innovation and production, in a systemic and systematic manner". It is against this backcloth that primary fieldwork was undertaken in support of deepening the limited existing knowledge base around innovation and local development with specific reference to South Africa's marginalised regions. The objective in Chapter Five DST is to present the findings of the field work as a base to inform strategic planning around innovation for local economic development in South Africa.

5.2. AIMS

The nature of the fieldwork was guided by the DST's vision and mission as well as the objectives of ILED. First, the DST vision relates to 'increased well-being and prosperity through science, technology and innovation' (DST, 2015). Second, DST's mission is to provide leadership, an enabling environment, and resources for science, technology and

innovation in support of South Africa's development. Third, the ILED's objectives seek to contribute towards inclusive development by strengthening local systems of innovation and production that can support the creation of sustainable employment creation, generation of wealth and elimination of poverty (DST, 2015). Further, the objectives of ILED seek to build local knowledge infrastructure, local innovation spaces and human capacity to harness local innovation; unlock economic value through systemic catalytic interventions; promote an inclusive science, technology and innovation landscape; ensure inclusion of economically marginalised communities in the knowledge economy; and, expand the resource base for local innovation (DST, 2015). Overall, whilst there is an emerging consensus internationally that innovation is the key driving force behind economic growth, improved standards of living, and regional development Acs and Varga (2008) stress that there is a need to understand the interconnections that govern local innovation.

The key objective of this chapter is to begin to address this critical knowledge gap and to use empirical evidence in order to document and analyse the nexus between STI and local economic development. In addition, the findings in this report seek to contribute towards the strengthening of ILED as a framework that integrates economic growth, STI policy, regional development, and spatial interdependencies. An enhanced ILED framework potentially can be a foundation for guiding the formulation of regional STI policies and innovation-led LED strategies in South Africa. The main gap that we seek to address is that which has been essentially opened by neoclassical economics in assuming a non-spatial framework towards the analysis of economic problems (Acs and Varga, 2008). Arguably, as economic activities are not evenly distributed across space a rethinking of our conceptual stance is required. Indeed, the strength of national economies is built upon the strength and vibrancy of regional economies which in turn are anchored upon the existence of strong local economies. It is acknowledged also that important elements of innovation are *regional* rather than national in scope (Krugman, 1995 cited by Acs and Varga, 2008).

Accordingly this study introduces two elements into the South African LED policy narratives. First, is a strong spatial element for the formulation of STI policies and second that STI considerations need to be integral elements in the formulation of LED strategies. To some extent therefore the report challenges the traditional role of *national* systems of

innovation (Acs and Varga, 2008). This said, the research cannot be considered as a comprehensive survey of the role of STI in LED. Rather it seeks to open up policy debates and spaces around innovation and LED by providing insights into why economically marginalised district municipalities in South Africa remain backward with innovation activities sparsely distributed in these areas.

5.3. FIELD WORK METHODOLOGY

In determining our case study methodology, the main consideration was the appropriateness of the study to its innovation context. At the outset, it must be acknowledged that many propositions that seek to strength national systems of innovation have a tendency of overlooking the regional realities in their approach. The foundations of these propositions often have been grounded on the influence of neoclassical economic policy which often takes a non-spatial approach in its analysis of economic challenges. The unintended consequences of policies that emanate from this approach have often been to exacerbate both wealth and regional disparities. The focus on nation states often disregards or overlooks the diverse knowledge and resource bases of various regions. It is argued in this investigation that the spatial dimension of innovation process is significant because the tacit knowledge found in various regions remains less mobile than capital and therefore provides the critical determinants of regional specialisation and innovation.

In pursuing the fieldwork we were informed by an understanding that the solutions to the local problems of economic development should be embedded in local contexts. Accordingly, our initial approach was to recognise a number of challenges that occur in the select case study areas. Three particular issues were deemed as critical. The first relates to varied spaces of social exclusion in the local territories and of the need for inclusive development. The second consideration was how STI could be utilised to serve the objective of social inclusion and highlight the importance of local systems of innovation in inclusive development. Finally, the fieldwork was grounded in the need to generate a deeper empirical understanding of how the district economies are structured, what are the development planning constraints of these district municipalities and of the roles of different actors in the innovation systems of

these district municipalities including the role of the institutions of higher learning in regional and local economic development.

The methodology applied in this study is termed that of local innovation and production systems or LIPS (Cassiolato and Lastres, 2015). The LIPS approach was evolved as a methodology to enable research informed by innovation systems to carry out empirical surveys, case studies, and policy evaluations. The approach is influenced by the concept of innovation systems and stresses the importance of learning, linkages, interactions and competence building. The methodology allows making use of systemic tools provided by the innovation systems approach in a specific geographic area. This has advantages for analytical and policy-making purposes and enhances new conceptual, analytical and policy approaches – based on the interaction between and among researchers, policy-makers, entrepreneurs and other agents.

The six key elements of LIPS are as follows, *inter alia*:

- To establish the territorial boundaries of the investigation albeit recognise that the territory can be part of a broader system (sectoral, regional, national and global);
- To focus on the local production system in a particular territory;
- To address each production system within its local, regional, national and international contexts;
- To emphasize that knowledge results from interactive learning processes;
- To focus on understanding how knowledge as a main source of sustainable competitiveness is acquired, used and diffused; and
- To recognise that the dynamics and support requirements of firms are specific and may be quite different even if situated in the same locality.

The LIPS methodology pays specific attention to the following critical dimensions:

- *Territory*: The key argument advanced in this study is the need to contextualise the study within its geography. In particular, the study is viewed within the district

systems of innovation. The territorial dimension takes into account the context in which innovation occurs, and comprises the physical space as well as the broad economic, social, cultural (symbolic and cognitive), political, urban and rural environment.

- *Diversity of activities and economic, political and social actors:* One of the critical aspects of the study relates to our acknowledgement of the diversity of activities, actors, and institutions involved in the planning and implementation of LED in the district municipalities (DMs).
- *Tacit knowledge:* The study pays specific attention to non-codified, locally-specific knowledge that develops over time as a result of territorial proximity and/or cultural, social, and commercial identities.
- *Interactive innovation and learning:* Building collective knowledge through interactions and exchange is central to the analysis. In this approach, learning occurs through interactions and practical observations with relevant actors. The interactive process seeks to reduce misunderstanding and the imposition of certain forms of understanding.
- *Governance:* This relates to where different ways of coordination among actors influence the process of decision-making and the shaping of social innovations.
- *Degree of embeddedness:* This relates to the degree of commitment and articulation of local actors.

Overall, it is contended that the LIPS methodology offers the opportunity to capture the specificities of production structures and acknowledge the importance of mobilizing knowledge and capabilities for sustainable local economic development. It also provides signposts which can be relevant for improving the development of innovation policies that seek to contribute to the reduction of regional inequalities and exclusion. The overall aim is to create possibilities for redirecting policy efforts to specific territories and to the interactions among actors in ways that encourage learning, innovation and competence building processes.

5.4 RESEARCH PROCESS

In accord with DST objectives for supporting district municipalities in South Africa's distressed areas the interviews were pursued in five selected district municipalities. The selection of the five district municipalities for the fieldwork was undertaken in consultation with DST based upon a total of 27 district municipalities that currently constitute South Africa's distressed areas.

Although the five case studies were selected to include both urban and rural areas the major focus was upon rural areas which constitute the largest spaces of despair and marginalization. The five selected case studies were drawn from KwaZulu-Natal, Eastern Cape and Mpumalanga Provinces which together contain 16 of South Africa's 27 District Municipalities in the distressed areas. The selected DM case studies were:

- uMkhanyakude and Harry Gwala in KwaZulu-Natal;
- OR Tambo and Alfred Nzo in Eastern Cape; and
- eHlanzeni in Mpumalanga.

Two DMs were selected as case studies from KwaZulu-Natal (KZN) and two from the Eastern Cape. In KZN uMkhanyakude and Harry Gwala (former Sisonke DM) were visited. The location of uMkhanyakude DM, particularly its proximity to Mozambique and Swaziland and to Durban, was of interest to the researchers. The case study provided insights in terms of the forms of interactions and the boundaries of the local system of innovation that occurs in the territory. The Harry Gwala DM is one of the most economically challenged DM in KwaZulu-Natal and shares territorial boundaries with Alfred Nzo DM in the Eastern Cape. Within the Eastern Cape, the case study of O. R. Tambo DM was justified as it is the second largest DM in respect of numbers of LMs across the country's distressed municipalities. The OR Tambo DM is an exporter of mainly unskilled migrant labour and has been severely affected by the downturn in the country's mining sector. The choice of Alfred Nzo DM was influenced by the increasing focus given to this DM by the National Department of Rural Development and Land Reform. Furthermore, Alfred Nzo shares territorial boundaries with KZN Province. This particular case study illustrates that the local system of innovation does not conform to the territorial boundaries but operates within a regional context. The choice for eHlanzeni DM in Mpumalanga was influenced by considerations of incorporating urban

development into the research focus whilst recognising that this DM has large rural spaces of marginalisation. Overall, the five case studies provide empirical observations in this study and highlight specific areas for systemic interventions and insights on how STI policies can be redirected to the distressed DMs.

The field work case studies were undertaken between October and December 2015. In total 21 in-depth stakeholder interviews were obtained (see Appendix A). The research generated empirical evidence of the relationship between innovation and LED planning and points to several interventions that are required in LED planning particularly in the prioritised district municipalities. The interviews were conducted with LED directors, LED managers, CEOs and managers of development agencies. Visits and interviews were also conducted with local innovators. In all instances the interviews and visits were undertaken within an understanding that all those who participated in this study are important actors in LED planning and the national systems of innovation. Of note is that in line with DST objectives fieldworkers included five postgraduate students undertaking innovation studies who engaged with the case studies and were mentored in this project as part of capacity building. A list of the students involved in this project is provided in Appendix B.

5.5 KEY FINDINGS

The objective in this section is to analyse the empirical results of this study. The analysis is informed by three broad aims *viz.*, (1) a better understanding of the district systems of innovation in terms of innovation actors and innovation networks, (2), a deeper understanding of the STI-led development planning challenges of district municipalities, and (3) the empirical basis of recommendations for DST's involvement in the development of district systems of innovation and transformation of the district economies.

5.5.1 Innovation Systems of Priority Districts

The priority district municipalities are increasingly gaining considerable attention from both academics and policy makers as a territorial focus for targeted development. However, there

has been minimal attention given to issues surrounding the strengthening of district innovation systems and their impacts on economic growth. That is, not enough has been undertaken to improve the functionality of district innovation systems and in turn the performance of district economies. The objective in this section is to describe the district innovation systems of priority districts particularly in terms of the actors and their understanding of innovation and LED or the interplay between innovation and LED. This analysis demonstrates the importance of integrating conceptual specifications (innovation systems) and empirical realities (territorial realities) in describing the district innovation systems (Li, 2009). In this study, the priority district municipalities are treated as distinct units of analysis. Indeed, district municipalities are administrative and economic units with specific boundaries and have powers to formulate economic and social development policies. Therefore, they constitute an appropriate level for analysing innovation activities and innovation performance of sub-national territories.

The typology of district innovation systems is based on the assumption that there is no universal model of district innovation system that fits every regional or district context. The specific socio-economic, cultural, and technical context plays an important role in the definition of regional or district innovation systems (Hajek et al., 2014). Each district municipality has its tacit knowledge and social capital such as history, geography, and culture that is locally embedded and influences evolutionary processes of innovation in the district. Again, each district municipality constitutes an innovation system and in turn is an important element of provincial and national systems of innovation. Indeed, each district innovation system is locally embedded in its economic activities such as agriculture, tourism and local SMMEs. It is observed, however, that the majority of SMMEs in the case studies are informal sector enterprises. The district industry specific innovation environment is a significant determinant of innovation efficiency.

The main reference point for LED planning in district municipalities is COGTA and at provincial levels are the departments of local government. In the district innovation system and more specifically in the generation of LED strategies and implementation of LED strategies, the district municipalities play multiple roles of coordinator of local networks, facilitator, contributor, planner, integrator, influencer, and implementer (Nystrom et al., 2014).

In describing the district innovation systems attention is focussed on actors and their networks because firms do not innovate in isolation. Equally, innovations occurring at district municipalities cannot be viewed as outcomes of isolated efforts. Firms must consider ideas from external sources for the development of their innovations. Innovation systems are characterised, embodied and shaped by their actors and their networks (Nystrom et al., 2014). The boundaries of their networks and activities define the boundaries of the district innovation system. More specifically, the district innovation systems are characterised by heterogeneous actors such as the local and regional offices of the national and provincial departments, NGOs (such as Isibaya), science councils (such as the Agricultural Research Council or CSIR), national financing institutions (such as Industrial Development Corporation), local municipalities, business chambers, traditional authorities, local development agencies or as in the case of eHlanzeni an economic advisory council which acts as a think tank for the district municipality on LED planning, and private consulting firms.

The diversity of actors demonstrates the rich political, cultural, economic, and geographic spread that defines the nature and the boundaries of the district innovation systems. The innovation networks of the district innovation systems are more diverse than the usual definition of innovation networks which often identifies universities, research centres and business companies as the main actors (Corsaro et al., 2012). However, their situation still reflects a lack of effective formal and informal cooperation among specific actors such as investors, researchers, and public institutions that produce knowledge, and consumers (Hajek et al., 2014).

Innovation networks lead to new understandings, the construction of new meanings and new technologies, broaden perspectives and form the bases for group problem solving (Corsaro et al., 2012). Indeed, innovation actors bring their knowledge bases, capabilities and complementary competencies to the innovation networks (Corsaro et al., 2012). However, in the case study areas the diversity of actors does not directly translate into the strength of the district innovation system. The diverse innovation actors do not seem to contribute to the development of broader STI knowledge bases. It is not clear what innovations are created through their interactions and what knowledge is transferred or created as the final LED

strategies usually are prepared by private consultants who rely on the terms of reference that are often generated by district municipalities. That is, the innovation networks engaged in the LED process seem to legitimise the process rather than generate a more innovative process or improve the innovation system.

It must be acknowledged that the actors that are found in the innovation systems of the district municipalities seek to contribute to poverty reduction and employment creation through various initiatives. However, they do not seem to view the district economy as a system of innovation. Consequently, their actions do not seem to influence improvements in the district systems of innovation. This may be due to their low levels of understanding of the potential contribution of STI in the development of district systems of innovation. In their activities, the issue of improving the performance of the district economy is tacitly embedded in their activities. What remains missing is an explicit intention that seeks to improve the district economy by enhancing the innovation performance of the district as a system of innovation. The lack of a functional system of innovation can be seen as responsible for the under-performance of the district economies and the widening gap in regional innovation performance. In addition, the low levels of innovation diversity in the district innovation systems mirror their low levels of development.

As context it was observed across all the five case studies that job creation is in general a main focus of the DMs. At a sectoral level, all the priority district innovation systems are characterised by specific productive sectors of agriculture, tourism and SMMEs. First, the strong commitment to SMME development can be viewed as a platform for endogenous and more inclusive economic development and through which STI activities potentially can be organised. Currently, the SMME sector is characterised by high levels of informal entrepreneurial activities and low levels of knowledge intensive entrepreneurial firms. The lack of innovation and knowledge-intensive entrepreneurial activities deprive the district economies of economic benefits such as economic and employment growth (Hajek et al., 2014: 205). Second, the focus on agriculture highlights possibilities for strengthening agricultural systems of innovation and the development of value chains. Finally, the strong focus on tourism can be the basis for encouraging innovations in the services sector and thereby emphasise the broad contextual aspects which surround innovation. With their focus

on tourism, agriculture and SMMEs these five select case studies thus typify the issues and focus areas for LED that have been identified in this project across the distressed areas as a whole. However, while district municipalities adopt a sectoral approach in the development of their economies, they have not adopted the sectoral systems of innovation as a conceptual framework which can guide the development of their economies and their innovation systems.

Table 11: Identified Sub-sectors Per District Municipality

District Municipality	Priority Sub-sectors
Harry Gwala	Milk and cattle farming and maize
UMkhanyakude	Cultural and heritage sites, revival of cotton sector and its value chains, generation of biomass from sugar cane, glass blowing from used glass, industrial applications of pineapple including use of pineapples in the manufacture of relevant pharmaceutical products
O. R. Tambo District Municipality	Cultural and heritage sites, ocean economy, maize, fruit, vegetables, piggery, some agricultural processing albeit at a subsistence level
Alfred Nzo District Municipality	Ocean economy, cultural and heritage sites, goats, peaches, maize albeit not at a commercial scale
eHlanzeni District Municipality	Maize, mining, forestry, and manufacturing

As shown in Table 11, with the exception of uMkhanyakude, most district municipalities did not articulate clearly the potential role of innovation in the development of the district economies. What can be recognised is that the tacit knowledge associated with the development of the identified sectors is locally embedded and mainly accessible through physical interactions.

The ability of knowledge application and exploitation is closely linked to the innovation performance of firms (Hajek et al., 2014). In particular, the socio-economic context of the district innovation systems is characterised by poor application and exploitation of scientific knowledge as well as poor transfer of technology and scientific knowledge. This situation is exacerbated by the absence of a local innovation support system in the district municipalities. In turn, this situation affects negatively the performance of the innovation systems in the priority districts.

Overall, the district LED planners and more generally the district innovation actors do not demonstrate a significant depth of understanding of the interplay between STI and LED planning. Consequently, at present, STI is not integrated in the development of LED strategies. Thus, in the priority districts as a whole the contribution of STI to LED and growth remains a missed opportunity.

5.5.2 Challenges of LED Planning and Innovation in District Municipalities

It was disclosed that all five of the district municipalities in this study have LED strategies. In shaping LED strategies several actors are influential. These include business chambers, traditional chiefs, government departments such as Department of Agriculture Forestry and Fisheries, Department of Trade and Industry, Department of Public Works through Expanded Public Works Programme, Department of Social Development, Development Agencies, Industrial Development Corporation, and local municipalities. Most notable is the dominance of government departments and by extension the domination of national government thinking in LED planning. This said, whilst government departments dominate the LED forum, the

actual process of generating the LED strategies is undertaken by private consultants and consulting firms. It was revealed in the interviews that the LED strategies are generated usually by service providers as the municipalities do not have in-house capacity to undertake and review LED strategies. In the process of generating LED strategies these service providers rely on various sources of knowledge such as desktop research, policy documents, and inputs from local stakeholders such as various government departments.

The revealed lack of capabilities and resources to generate relevant empirical data for LED planning and to identify local innovations critical for LED is an important weakness of district LED planning across the distressed areas. As a consequence, the dominant approach to planning LED does not seem always to recognise the specific local resource bases of district municipalities or of specific local innovations that already exist at local municipalities. For example, the interviews revealed that at Noqekwane in Port St Johns in the Eastern Cape Province a local innovation that uses fresh fruit to manufacture jam (see Plate 1) is not highlighted in the LED strategy of the municipality. This is despite the potential of this project to provide the basis for agro-processing and rural industrial development in Port St Johns. This development planning gap in the local LED strategy underscores a weakness of district municipalities regarding the critical contribution of innovation in LED planning.

Plate1: Local Innovation in Jam Manufacturing



In the interviews the respondents for the district municipalities described the following as the dominant sectors in their district economies;

- Agriculture
- Tourism
- Forestry
- Mining
- SMMEs

Agriculture is pointed out as the dominant sector in all the case study district municipalities. A strong link is made between agriculture and local/district food security. While there is glaring potential for agriculture in rural areas as shown in Plates 2 and 3 the lack of infrastructure, such as running water, forces emerging farmers to turn to use more expensive technologies such as diesel engines to access water for irrigation (see Plate 4).

Plate 2: A Rural Area in Port St Johns



Plate 3: A Green Maize Farm in Port St Johns



Plate 4: A Diesel Engine Used By An Emerging Green Maize Farmer in Port St

Johns



Nevertheless, agriculture remains a potential source of growth in rural South Africa and the potential to contribute to rural economic transformation, increase rural incomes, supply raw materials to support agro-processing, and contribute to the expansion of goods and services in the non-farm sector. What remains lacking is a profound appreciation of the role of agriculture in driving rural industrialisation in the marginalised regions.

Table 12: Processing of Agricultural Products, Value-add, and Post-harvest Losses in Industrialized Countries and Developing Countries

	Industrialized Countries	Developing Countries
Agricultural products processed (%)	98	38
Value added of agricultural products processed (US\$/Tonne)	185	40
Post-harvest losses (%)	Minimal	40

Source: UNIDO, 2009

As is shown in Table 12, the minimal appreciation of the potential for agriculture to be a driver for rural industrialisation is a symptom of the broader global picture of limited agro-processing taking place in developing countries. A critical finding of this research reflects this broad picture. The interviews disclosed that there is minimal attention currently paid to the development of agricultural value chains in these distressed areas. Therefore, the application of innovation in the transformation of the role of agriculture in rural economic development will require the expansion of innovation capabilities along the entire agricultural value-chain.

Across the five district municipalities it was revealed by interviewees that the use of the term SMMEs does not refer to economic sectors but instead to the size of the economic activities undertaken in district municipalities. In the case study district municipalities it was disclosed that there is a lack of appreciation about the function of SMMEs in the national and regional systems of innovation. At its most basic level, the activity of SMME development is equated with assisting SMMEs to fill-in forms for funding. In all the district municipalities, there is little small-scale manufacturing that is undertaken in local economies. This is evidenced by the lack of locally manufactured products.

The lack of visible locally manufactured products is a weakness of district economies. The case of Harry Gwala is illustrative. Harry Gwala is one of the economically poor performing district municipalities in KwaZulu-Natal but produces 35% of milk consumed in the province and 15% nationally through Clover. Nevertheless, the district municipality does not use this resource base to nurture the development of a milk processing industry which could create more local job opportunities through the development of the whole milk and milk processing value chains. Similarly, the interviews revealed that in Port St Johns a group of women manufacture jam from fresh fruits. However, their product is not visible in the local market. Further, an emerging pig farmer in Mthatha, through the assistance of the National Development Agency of the Department of Social Development, has managed to establish what seems to be a successful small and emerging pig farming activity (see Plate 5). Furthermore, as highlighted in Plate 6, in this cooperative, pigs waste is collected into a septic tank and used for the production of organic manure.

Plate 5: A Piggery Farm in Mthatha



Plate 6: Collected Pigs' Waste Which is Later Used as Organic Manure



At Port St Johns an emerging pig farmer grows and sells pigs in Mthatha (a visibly growing secondary city) market. However, neither the local municipalities of King Sabata Dalindyebo and Port St Johns nor the district municipality seem to have plans to incorporate these local initiatives into LED strategies in order to foster a locally embedded pork sector or pork value chain industry in the localities or in the district. Again, as highlighted in Plates 7 and 8, a co-operative in Mthatha produces liquid fertiliser and organic compost from waste food and waste paper. Once more, this is a missed local development opportunity as there is no local initiative to build upon this creativity in order to develop this initiative as a value chain.

Plate 7: Liquid Fertiliser From Waste Material



Plate 8: Organic Compost From Waste Material



An instructive case was revealed in the maize processing plant at Mqanduli, an initiative of the Eastern Cape Rural Development Agency, which produces maize meal from locally produced maize (see Plate 9). This initiative aims to encourage the local production of maize and correspondingly to create demand for locally produced maize. The interviews disclosed

that there is a need here for STI intervention as 40% of the maize ingredients currently go to waste in the actual processing of maize. Consequently, nutrients necessarily are added into the maize meal in order for it to become nutritious again. This situation stands in sharp contrast to a small family maize processing plant in Lusikisiki where the processing of maize does not reduce the nutritional value of the maize and the little waste from processing of the maize is packaged as animal feed. As is shown in Plate 10, the Lusikisiki maize processing plant encourages people to bring their own maize which is processed into maize meal at a low cost. This said there is no LED initiative that seeks to use this potentially successful initiative in order to maximise the maize value chain in the locality.

Plate 9: Maize Milling Factory at Mqanduli



Plate 10: Small Maize Milling Firm in Lusikisiki



In respect of tourism the research disclosed minimal efforts to maximise the potential of potential tourism assets or to develop rural tourism value chains. In particular, in the KwaZulu-Natal and Eastern Cape case studies it was evident that all the district municipalities have potential tourism assets which are not developed or branded. Moreover, there is limited understanding of the potential for seeking to build and maximise rural tourism value chains. This is another critical arena that requires STI intervention and which must be founded upon an improved base of knowledge about the dynamics of local tourism economies.

The challenges of LED planning necessarily are inseparable from the challenges of human resource development in the DMs. The interviews confirmed that district municipalities have specific human resource development needs, more especially in respect of LED planning and implementation. Their human resource needs relate to the development of skills that can enable LED directors, LED managers, and LED officers to analyse the district and local

economies, to view district economies in the larger context of the national and regional systems of innovation, and to enable them to generate and review LED strategies in ways that make these LED strategies more embedded in their local, regional, national, and global systems of innovation. These goals are not served currently by the existing model of outsourcing LED planning to service providers.

5.5.3 The Role of Knowledge

Knowledge plays an important role in development and innovation. An important link can be made between productive activities and innovation. In the rural DMs that were scrutinised production activities remain sparsely dispersed within the local environments with innovations mainly characterised by ‘learning by doing’. Thus self-effort remains the major source of innovation in the district municipalities.

The informal settings in district municipalities make up a network of human relationships which often determine what knowledge the actors can access (cf. Koskinen and Vanharanta, 2002). Although human resources create knowledge, actual productivity depends on the stock of available knowledge (Acs and Varga, 2008). New technological knowledge is central to technological innovation and in transforming technological knowledge into economically significant products and processes. In the marginalised district municipalities this valuable form of knowledge is often in a tacit form and its accessibility is bounded by geographic proximity as well as by the extent of the interactions among the actors in the local system of innovation.

One of the limitations facing individuals and firms in South Africa’s rural district municipalities is their limited access to external sources of knowledge. Therefore, enhancing their participation with external actors within the systems of innovation can have a positive effect on their innovation performance. STI can be a source of innovation where it enables individuals and firms to acquire capabilities that are rare and difficult to imitate and can enable them to achieve higher performance in national and global markets. It was revealed

that strengthening regional STI capabilities and paying attention to knowledge generation, technology transfer and absorption; and extending and building technical infrastructure to support knowledge capture and knowledge dissemination including tacit knowledge can be a relevant regional STI policy initiative. That is, increasing investments for spatially targeted regional STI policies can increase regional knowledge and its innovation potential for regions, enhance regional spatial specialisation, and enhance national and global competitiveness.

The proximity to universities potentially is an important issue for the development of priority districts in South Africa. Umkhanyakude, Harry Gwala, and Alfred Nzo District Municipalities do not have universities in their immediate vicinity. Nevertheless, the Alfred Nzo District Municipality has been able to access LED related training from the University of Johannesburg and Walter Sisulu University. The eHlanzeni District enjoys the advantage of the new Mpumalanga University in its surroundings while the O. R. Tambo District Municipality has Walter Sisulu University, Mthatha Campus, in its proximity. Overall, it was revealed in the interviews that there are minimal interactions between the district municipalities and universities. Of critical significance is that there is no relationship between proximity to university and involvement of universities in LED planning of the district municipalities. Put differently, it is disappointing to record that universities do not seem to play a prominent role in the regional and LED planning of district municipalities and their economies.

5.5.4 LED Planning Strengths and Weaknesses in Priority Districts

The interviews point to a number of strengths and weaknesses within the district municipalities. The strengths can provide the potential bases for building more contextually embedded district economies. The identified strengths include the following:

- The existence of local economic development agencies with eHlanzeni District Municipality having an Economic Advisory Council;

- The assets of coastal areas (in Alfred Nzo District Municipality, O. R. Tambo District Municipality, and uMkhanyakude District Municipality) and their potential for the development of inclusive ocean economies;
- The existence of local innovations with potential to provide bases for more productive local economies and potential for STI interventions; and
- The identification of economic sectors such as agriculture, tourism, forestry, and mining, albeit the lack of emphasis on processing of raw materials. A particular reference can be made of uMkhanyakude District Municipality where an important link has been made between the existence of biomass from sugar cane and the potential to generate energy from this resource rather than burn it as is current practice.

Notwithstanding these strengths, several weaknesses were revealed in the interview research. These weaknesses must be addressed if LED in these district municipalities is to play a prominent role in the economic transformation of marginalised regions. The central weaknesses identified in the research interviews were as follows:

- The status and related understanding of the critical importance of LED in the overall development of district municipalities needs to be revisited;
- The critical importance and deeper understanding of STI in LED is largely missing;
- There is lack of evidence in terms of efforts to develop local innovations and to make the link between local innovations and LED strategies;
- Lack of LED planning skills is a major weakness in the district municipalities. Lack of skills to generate and review LED strategies has caused the district municipalities to rely on outside service providers who do not always have a deeper knowledge of the district and local economies;
- Political interference by political office bearers who often have personal interests in LED projects. This situation makes it difficult for LED directors and LED managers to execute their work professionally;
- Lack of development planning skills particularly to maximise the local impact of potential agriculture and tourism value chains;
- Lack of capabilities and capacity in development agencies to implement high impact LED projects; and

- Lack of understanding of how markets can work for the poor.

5.6. RECOMMENDATIONS

The above analysis provides empirical evidence for the recommendations that are advanced in this study. Several key interventions are required urgently in order to strengthen the district innovation systems and to ensure that the district municipalities can assume a more prominent role in regional economic development and in the national systems of innovation. The recommendations emphasize the need to strengthen the capabilities of LED planners to recognise the transformation potential of STI. This could result in the redistribution of innovation activities which are currently concentrated in the more developed regional systems of innovation of Gauteng and Western Cape.

Building on the foundations of ILED which redefines the place and role of STI in LED, twelve potential focus areas for intervention are recommended based upon the findings of this research. In reviewing the recommendations below it is acknowledged that several of them are beyond the remit of DST. They are listed, however, as they are critical for LED planning and LED success in distressed areas.

- Strengthen the capabilities of LED planners to improve their understanding of the functions of STI in LED planning, to recognise the interplay between STI and LED planning and to undertake STI-led LED planning;
- Recognise existing local innovations as entry points for knowledge and technology transfer;
- Strengthen policy development and policy analysis skills of LED planners in ways that build technical capabilities useful in understanding the interplay between economic policy and STI strategy in order to transform the district economies, encourage new SMME economic activities to diversify the district economies, and form locally embedded bases of industrial development;

- Strengthen the capacity of local innovation actors to improve their innovation interactions and to broaden their innovation networks to include universities, industries and industry associations;
- Strengthen the capabilities of district municipalities to apply STI in the development of agriculture and tourism value chain;
- Build an STI infrastructure that is critical for the development of district innovation systems;
- Strengthen the capacity of local development agencies in order to enhance the performance of district innovation systems;
- The need to elevate LED and its recognition as a critical directorate within the district municipalities;
- Local municipalities need to play a more prominent role in the generation and implementation of district LED strategies;
- Training of political office bearers on economic development;
- The need to resolve land claims and access to land required for LED;
- Improve public understanding of STI and its contribution to LED through national flagship projects that can have a visible impact on district economies and more importantly on sustainable poverty reduction, job creation and improvement of the quality of life in the district municipalities.

Overall, it is stressed that the DST's focus should be upon strengthening the district systems of innovation. The STI interventions can be targeted to two strategic areas, *viz.* (1) agriculture and tourism value chains, (2) build capabilities within the district municipalities to apply STI in the LED planning to unlock economic development opportunities and introduce broad economic change processes.

5.7 SUMMARY

The central task in Chapter Five was to provide a strengthened knowledge base to extend DST's involvement in the policy space of Local Economic Development. In particular, the fieldwork provided an empirical foundation for contributing towards DST's mandate of

“strengthening district innovation systems in a systemic and systematic manner”. It is argued that through the 26 interviews conducted in this phase of the project that the limited existing knowledge base around innovation and local development with specific reference to South Africa’s marginalised regions has been deepened. In addition, several specific issues are identified to inform strategic planning around innovation for local economic development in South Africa.

The results of this investigation point to a conclusion that the economic and social development of priority districts requires the strengthening of capabilities among LED planners, and the deployment of STI resources in the district municipalities. What emerges from this research is that innovations are embedded in their local contexts and that the innovation geography of the district municipalities underscores that STI interventions need to be tailored to the needs of each LED planning context and within a spatial hierarchy of economies. Indeed, the insights developed through this report justify the ILED approach to local and regional development which is a major shift from central planning approach that has been employed by the DST in the past.

The empirical findings from this study stress the following: (1) the local economic priorities of district municipalities define the involvement of the DST in the economies and innovation systems of the prioritised districts; (2) that the fate of each priority district economy is contingent on its daring capacity, its potential to start new economic activities, its ability to link its knowledge basis to creativity, its potential to exploit the self-organizing capacity of the district, and the transformative potential of STI (cf. Kourtit et al., 2011); and, (3) that the emphasis should be on unlocking the potential of local value chains and local economic sectors. Of specific importance in this regard are agriculture and tourism value chains. In addition, the critical role of SMMEs in distressed areas needs to be acknowledged for STI interventions.

In final analysis, this chapter highlights the need to ensure that innovation should not create further inequalities in South Africa. Indeed, it enhances our understanding of STI in the context of poverty, inequality, and unemployment. ILED creates a model for development

planning that is organised around the national systems of innovation and is equally useful for guiding regional STI policies and for generating innovation-led LED strategies. Consequently, the empirical findings emphasise the ILED approach and the imperative for deeper interactions between LED planning and incorporation of spatial issues in STI policy. The results of the interviews indicate a policy space for advancing the potential for inducing STI-led economic activities in the marginalised district municipalities. Indeed, as expressed in LED strategies and based on our empirical findings, our recommendation is that a major focus should be on (1) strengthening the district innovation systems by building capacities for STI-led LED planning and (2) the strategic development of agriculture and tourism value chains. These are critical platforms which can provide the bases for DST's systemic and catalytic STI interventions in the prioritised districts.

6. CONCLUSIONS

In recent years, Local Economic Development has attracted growing attention internationally, largely for its assumed potential to address localised economic and social challenges and promote local development. LED has been increasingly recognised as a strategy with potential to address local development backlogs, particularly in the Global South, where traditional ‘top-down’ approaches generally have failed to catalyse significant local change (Rodriguez-Pose, 2008; Barca et al., 2012; Rodriguez-Pose and Palavicini-Corona, 2013). Key in this recognition is the significant attention which LED, or more specifically a local government variant of LED, which is referred to as ‘developmental local government’. Such an LED approach parallels long established trends of city economic development, particularly in North America.

6.1. Contextual Background for the Report

Over the last nearly 20 years, with varying degrees of success and commitment, most local governments in South Africa have attempted to pursue LED strategies which mainly are driven by local governments under the mandate of the local development state. Whilst South Africa is regarded as somewhat of world leader in terms of the development of LED policy and strategy, it would be difficult to argue that on-ground results have made a significant difference in all local communities. Issues ranging from limited finance, to shortage of skilled staff, failure to work with the private sector and the pursuit of what tend to be social rather than economic projects have been widely reported on as contributing to the lacklustre outcomes of the strategy (Rogerson, 2010a; Rogerson and Rogerson, 2012). The recent fate of LED in many parts of South Africa has not been assisted by a combination of worsening issues of corruption and poor governance in many local governments, South Africa’s chronic power shortages, and chronic drought conditions.

One of the long-standing debates in the country has been the question about whether LED should be a ‘pro-market’ strategy or a ‘pro-poor’ intervention or perhaps both (Nel and Rogerson, 2005). Lack of clarity about this issue and lack of a uniform central state policy in

this regard, with different government departments variously supporting either option, has impacted negatively on local understanding, delivery and outcomes by local governments, which are regarded as the key agents of LED delivery.

National government now acknowledges the limited success which LED has achieved and the need to strive for the more comprehensive and effective implementation of LED within localities. It is in the context of responding to limited success achieved to date and the need to address persistent socio-economic backlogs that this report is grounded. An important starting point is that the activity of LED in South Africa must go beyond local government and incorporate partnerships and the engagement of a range of different stakeholders. The Department of Science and Technology (DST) aims to enter the policy arena of Local Economic Development (LED) in South Africa and engage in addressing the developmental issues of the country's peripheral distressed areas. DST's focus for intervention is to nurture the role of STI in LED and thereby to encouraging the growth of vibrant robust local economies. In so doing DST would be supporting the work of the Department of Cooperative Governance and Traditional Affairs (DCOGTA) as well as the Department of Economic Development (DED) in supporting economic growth in these municipalities.

It is against this backcloth that the central task of this project has been to develop a baseline of information and knowledge about STI and LED with a specific focus on distressed municipalities as a first step towards informing LED strategies that might be STI-led in these areas. This concluding chapter of the report provides a summary of the major arguments and findings of this project.

6.2. Key Arguments and Findings

In Chapter Two the analysis began by addressing two key sets of issues which provide an essential framework for the study as a whole, namely a review of the conceptual underpinnings of this investigation identifying key themes and perspectives which arise from the international experience of addressing socio-economic challenges through science, technology and innovation and an overview of changing national government policy towards

LED in South Africa. The key findings are as follows. Differences in innovation activities among firms and use of new technologies translate into substantial productivity gaps which in turn impact upon local economic growth prospects with disparities between more and less successful regions concerning their different levels of development and innovative activities. Faster growing regions exhibit higher levels of productivity which can be linked to more innovative activities. The challenge of harnessing STI for sustainable development requires linking it to the diverse realities that are embedded in different regional contexts. Designing a package of policies that are most likely to unlock innovation in a particular region is likely to require local information and knowledge that is available only in that region. Typically, local communities can benefit more from innovations if the latter are locally or regionally embedded. Accordingly, regional and local systems of innovation require a critical understanding of the resource and knowledge base which form the bases of innovation which can assume a vital role in addressing socio-economic challenges for galvanizing local economic development.

Chapter Two confirmed that South Africa has struggled to achieve successful local economic development initiatives on a countrywide basis and it is generally accepted that LED has been under-performing, more especially outside of the well-resourced and capacitated metropolitan areas. Beyond the country's major cities the record of achievement of LED is limited with only a small number of exceptions. What is striking about reviewing the shifting currents in national economic development frameworks for LED in South Africa is the minimal attention that is given in policy debates to issues around innovation. The country's most recent policy documents and frameworks around local economic development, which were released in 2013 and 2015 make little mention or acknowledgement of issues around innovation. Moreover, no consideration is given to the role of innovation policies towards contributing to the national objectives of launching a "more effective fight against poverty, inequality and unemployment through the development of inclusive and competitive local economies" and "to support the potential of local economies to grow and develop the national economy". The potential role for innovation in creating "robust" and "inclusive" local economies, the stated intentions of national policies since 2006, has not been brought explicitly to the forefront of the LED policy and planning agenda. Arguably, to a large extent, the potential for STI to contribute towards LED in South Africa represents a 'missed opportunity' as successive national policy documents and statement on LED have not taken up the question of STI.

In Chapter Three the objective was to analyse the findings of an audit that was undertaken of the current trajectories of Local Economic Development in the distressed areas which are the target intervention spaces as identified by DST. This analysis entailed an internet search for the collection and analysis of the directions of LED strategies or IDP documents for all South African municipalities and in particular an analysis of Gaffney's Official Yearbook on Local Government in South Africa for 2013-2015. The most striking finding is of the overwhelming dominance in LED policy and planning in the distressed areas upon tourism, agriculture and SMME promotion. In terms of tourism the analysis discloses the remarkable position that 85.2 percent of District Municipalities and 85.8 percent of Local Municipalities across the distressed areas are targeting tourism as a driver for local development. The planned expansion of tourism is viewed as popular focus because of its acknowledged potential in South Africa for poverty alleviation and its reliance on external capital sources. The pro-poor credentials of support for (mainly small-scale) agriculture (including forestry) and for SMME development are obvious factors that underpin the strength of these two focus areas of LED policy. In the case of agriculture, a total of 85.2 percent of District Municipalities and 73.8 percent of Local Municipalities across the distressed areas are concentrating upon agricultural upgrading for accelerating prospects for local development. In a parallel with a heavy emphasis at national level devoted to SMME support programming, as exemplified by the establishment of a new dedicated Ministry for Small Business, across the distressed area as much as 74.1 percent of District Municipalities and 73.8 percent of Local Municipalities are prioritising SMME development as part of their ongoing LED initiatives.

Beyond these three leading focus areas other issues are highlighted for LED policy in distressed areas. It is shown that approximately one-third of municipalities are committed to programmes for job creation in general and support for the informal sector or cooperatives. In particular, the commitment is for supporting cooperatives as only a handful of municipalities indicate programmes for informal sector support and upgrading such as through the provision of market stalls. The extended support for cooperatives is particularly a feature of the mainly rural municipalities and often allied to agricultural development. In association with LED initiatives for boosting competitiveness a focus on investment attraction is evidenced in nearly 15 percent of municipalities. Given the laggard pace of the development by national government of guiding strategy for LED (despite nearly two decades of national government

encouragement of LED), 13 percent of municipalities in distressed areas flagged the preparation of an LED strategy as a commitment in their IDP statements. Training programmes for skills upgrading was a focus of commitment across nearly 10 percent of the 161 municipalities. Of minor significance was support for infrastructure-led initiatives for promoting LED and for industrial development. In respect of STI and local economic development the outstanding finding is of the complete oversight of innovation in discussions about LED both nationally and specifically in the municipalities of the distressed areas. From the viewpoint of informing LED policy of local governments in the distressed areas there is evidently major space for new interventions around innovation.

Chapter Four offers the findings from a desktop research investigation on three themes which the DST identified as critical to innovation and correspondingly with vital implications for LED in South Africa's distressed areas. The three themes logically flowed out of the analysis conducted in Chapter Three which identified the significance of particular sectors for local economic development in the distressed areas. In particular, the analysis highlighted the critical importance of agriculture, SMMEs and tourism for energising new development opportunities in these areas. Three sets of discussion and analysis are presented which relate respectively to the following:

- The role of STI in agriculture and rural economic development
- The role of STI in SMME development and the function of SMMEs in national and regional systems of innovation; and
- Innovation in the service sector with a special focus on tourism.

In each of these sub-sections of discussion different key issues were highlighted from the international policy debates and scholarly research relating to STI and innovation. It was stressed that the various sector-specific issues that are raised with respect to agriculture, SMMEs and tourism can be important for informing DST in relation to understanding and planning for STI interventions in these critical sectors for LED in South Africa's distressed areas. In final analysis, it is recommended that DST must enhance the contribution of innovation policies to rural development by generating relevant innovation policies for the

prioritized sectors in South Africa's LED strategies. This opens up a critical role for DST in respect of the following: agricultural innovation policy for regional and local economic development; innovation policy for SMME development; and, innovation policy for tourism development. Policy advances across these three critical issues would raise the profile of STI as an essential component of LED and rural innovation processes in South Africa. The disconnect between South Africa's national innovation policies and regional and local development planning seemingly is evidently under scrutiny by national government. being addressed. In 2015 South Africa's DST, the core department with responsibility for innovation policy in the country, released a new strategy document titled *Innovation for Local Economic Development (ILED)* which is intended to inform the DST's involvement in the policy space of Local Economic Development (LED) with the mandate of "strengthening local systems of innovation and production, in a systemic and systematic manner".

In Chapter Five the findings were reported of primary fieldwork – 26 interviews - undertaken in support of deepening the limited existing knowledge base around innovation and local development with specific reference to South Africa's marginalised regions. This chapter analysed the results of the field work across five of the district municipalities classified as part of South Africa's distressed areas. Together the results offer a foundation to inform strategic planning around innovation for LED in South Africa. Among its central findings are that a redefinition is needed of the place and role of STI in regional development and LED; a specific focus is required on how STI can contribute to the diversification of local and district economies and on how STI can contribute to the development of innovation-led SMMEs. Further, improved public understanding is required of STI and its contribution to LED through national flagship projects that can have a visible impact on district economies. It is argued that DST can focus its STI interventions on two strategic areas *viz.* (1) agriculture and tourism value chains, (2) build capabilities within the district municipalities and universities in order to enhance interactions between these institutions so that universities can play a more prominent role in regional development of marginalised locales. The interventions can contribute to strengthen regional and local systems of innovation, to unlock economic opportunities and introduce broad economic change processes.

Overall, the fieldwork findings provide an empirical base for strengthening DST's mandate of "strengthening local systems of innovation and production, in a systemic and systematic manner". The limited existing knowledge base around innovation and local development with specific reference to South Africa's marginalised regions has been deepened and several specific issues highlighted to inform strategic planning around innovation for local economic development in South Africa. The results of this investigation point to a conclusion that the economic and social development of priority districts requires the deployment of STI resources and the enhancement of greatly skilled personnel whose thinking is grounded in national and regional systems of innovation. Above all the importance is shown of mapping out the workings of local innovation systems, recognising that innovations are embedded in their locality contexts, and that the innovation geography of the district municipalities underscores that STI interventions need to be tailored to the needs of each LED planning context.

It is concluded that the findings and policy insights presented in this report justify the new ILED approach to local and regional development. This approach marks a radical change from centralised planning approach to innovation that has been employed by the DST in the past. The empirical findings from this study stress that (1) the local economic priorities of district municipalities must define the involvement of the DST in the local and district economies of the prioritised districts; (2) that the fate of each priority district economy is contingent on its 'daring capacity', its potential to start new economic activities, its ability to link its knowledge base to creativity, its potential to exploit the self-organizing capacity of the district, and the transformative potential of STI; and, (3) that the emphasis should be on unlocking the potential of local value chains and local economic sectors. Of specific importance in this regard are understanding and interventions around agriculture and tourism value chains and recognition that the critical role of SMMEs in distressed areas needs to be acknowledged for STI interventions.

In final analysis, this report highlights the need to ensure that innovation should not create further inequalities in South Africa. It enhances our understanding of STI in the context of poverty, inequality, and unemployment. ILED creates a model for development planning that is organised around the national systems of innovation but useful for guiding regional STI policies and for generating innovation-led LED strategies. Consequently, the empirical findings emphasise the relevance of the ILED approach and the imperative for deeper

interactions between LED planning and incorporation of spatial issues in STI policy. The results of the interviews indicate a policy space for advancing the potential for inducing STI-led economic activities in the marginalised district municipalities. Indeed, as expressed in LED strategies and based on the empirical findings, our recommendation is that a major focus should be on the strategic development of agriculture and tourism value chains and that these economic sectors provide the bases for DST's systemic and catalytic STI interventions in the prioritised districts and more generally for enhancing the prospects for rural economic development across South Africa.

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Appendix 1: List of Interview Respondents

Andrews, K., Manager, Umtiza Farmers Corporation, East London, Eastern Cape.

Buso, Siyakubonga, LED Director, O. R. Tambo District Municipality, Mthatha, Eastern Cape.

Bhengu, Khosi, LED Officer, uMkhanyakude District Municipality, Hluhluwe, KwaZulu-Natal

Director, Agri-park, Mthatha, Eastern Cape.

Director, Eastern Cape Appropriate Technology Unit, Mthatha, Eastern Cape.

Gwanya, Thozamile, Chief Executive Officer, Eastern Cape Rural Development Agency, East London, Eastern Cape.

Kennedy, Maize Milling Factory, Mqanduli, Eastern Cape.

Mangena, M., Innovation Broker, East London Industrial Development Zone, East London, Eastern Cape.

Matashe, Nontlahla, Manager, Adam Kok Farms, Underberg, KZN.

Mbiko, Vuyiseka, LED Officer, Alfred Nzo District Municipality, Mount Ayliff, Eastern Cape.

Mpati, Lungie, Project Manager, Amele Recycling Project, Ncambedlana, Mthatha, Eastern Cape.

Nakin, Motebang, Marine Biologist, Walter Sisulu University, Mthatha Campus, Eastern Cape.

Ncoyini, Alfred Nzamela, Pig Farmer, Port St Johns, Eastern Cape.

Ngqaimbana, Bonani, Local Economic Development Agency, Harry Gwala District Municipality, Ixopo, KwaZulu-Natal.

Ntlantsana, Emerging Farmer, Port St Johns, Eastern Cape

Nontobeko, LED Director, eHlanzeni District Municipality, Mbhombhela, Nelspruit, Mpumalanga.

Noqekwane Jam Cooperative, Innovation in jam production, Noqekwane, Port St Johns

Ntlabathi, Vuyisile, NAFCOC, Mthatha, Eastern Cape

Ogle, LED Director, Greater Kokstad Local Municipality, KwaZulu-Natal

Ssekibuule, Henry, Chief Policy Analyst, O.R. Tambo District Municipality.

Socikwa, Madodana, Member of the Mayoral Committee Responsible for LED, O. R. Tambo District Municipality, Mthatha.

Sofika, Michael, Zamukulungisa Piggery Farming Coop, Rosedale Trust Farm, Mthatha, Eastern Cape.

Songca, Lusindiso, Managing Director, Innovation in Maize Processing, Lusikisiki, Eastern Cape.

White, Tim, Director, iSpaza, Innovation in Business Development, Walter Sisulu University, East London Campus, Eastern Cape.

Ziphethe, LED Director, Mhlontlo Local Municipality, Qumbu, Eastern Cape.

Zungula, Mncedisi, Chief Executive Officer, Ntinga O. R. Tambo Development Agency, Mthatha, Eastern Cape.

Appendix 2: Names of M-Tech Students Who Participated in the Fieldwork

Nothando Dlamini

Mlungisi Professor Lukhele

Sibusiso Mpungose

Sigfried Tivhana

Lebo Toona