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Innovation-Driven Local Economic Development: In Search of Best Practice Implementation for South Africa

Christian M. Rogerson¹

Abstract: The aim of this study is to investigate best practice implementation frameworks for the implementation of innovation-driven local economic development in South Africa. Local economic development planning is a critical aspect of the development landscape in South Africa. The most recent national framework is strongly influenced by interventions made by the Department of Science and Technology (DST) which has positioned innovation at the heart of development planning. The international experience concerning the challenges and implementation of innovation-led strategies was analysed through a literature survey. The material collected was extracted both from academic sources and from the policy works of a range of international development agencies. The results show an increasing convergence in perspectives concerning implementation frameworks around the need for a stage-based or evolutionary approach and that policies should be highly selective in terms of “entry points” or interventions. In moving forward with the South African agenda for innovation-driven local economies much can be drawn from international experience with accompanying potential benefits for the national tourism economy.

Keywords: local economic development; innovation; South Africa; implementation frameworks; tourism

JEL Classification: O2; O3

1. Introduction

Local Economic Development (LED) has emerged on a widespread international basis as a vital planning approach for upgrading local economies. (Nel & Rogerson, 2005; Blakely & Leigh, 2010; Pike et al., 2011; 2015; Rogerson & Rogerson, 2010) Globally, there has occurred an enormous burst of interventions and debates around LED planning. (Pike et al., 2006, 2014; Rogerson & Rogerson, 2010) Essentially LED strategies are place-based interventions which are premised on the viewpoint that growth and development planning must be “place aware” and take due cognizance of several different factors that can influence the potential returns of intervention. (Barca et al., 2012; Rodriguez-Pose & Wilkie, 2017; Rogerson, 2014) The rise in popularity of LED approaches is attributed by Palavacini-Corona (2012: 9) to “fundamentally as a result of what has been perceived as a failure of top-down strategies” to address local needs as well as to tackle local economic problems and challenges. In addition, the surge of LED approaches is associated with the international institutional trend towards the decentralization of powers and responsibilities from national governments to sub-national tiers of government. (Rodriguez-Pose, 2008; Rodriguez-Pose & Tijmstra, 2009) Arguably, over the past few decades the impress of globalization has recast planning towards local development as localities are compelled to adapt and react to changing global conditions that impact their development opportunities and pathways. (Pike et al., 2006; 2011; 2015; Rodriguez-Pose, 2008; Rodriguez-Pose & Wilkie, 2017)

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Within the global South, one of the most active countries for LED has been South Africa. For nearly 20 years local economic development planning has been a significant mandate of the work of South African local governments in the post-apartheid period. (Nel, 2001; Nel & Rogerson, 2005; Rogerson, 2011; Rogerson & Rogerson, 2012) In terms of guiding the role of local governments national government has introduced a succession of frameworks to support and facilitate the practice of LED. (Nel & Rogerson, 2016a) South Africa's minister with responsibility for LED stated that it "is increasingly being identified as the strategic enabler for national economic and development objectives" in particular of the country's National Development Plan. (Department of Cooperative Governance, 2016) Using various strategies and arguably with different degrees of commitment local governments have sought to improve the condition of their local economies as well as address serious issues of poverty alleviation. (Nel & Rogerson, 2005; Rogerson, 2011; 2014) Notwithstanding 20 years of planning for local economic development planning in South Africa, however, there has been an acknowledgement that beyond a few exceptional cases (mainly in large cities) LED practice has been underperforming. (Nel et al., 2009; Nel & Rogerson, 2016a) The response from national government has been to rethink and recalibrate the national framework guidelines for LED.

The most recent national framework is strongly influenced by interventions made by the country's Department of Science and Technology (DST) which in recent years has sharpened its focus on the ways in which its work and the National System of Innovation can contribute to wider development goals of the reduction of poverty, inequality and unemployment in South Africa. (Department of Science and Technology, 2018) In this regard the DST is aligning much of its work to the National Development Plan (Vision 2030) and has positioned innovation at the heart of development planning particularly for the country's most underdeveloped and poverty-stricken areas, often termed "the distressed areas" of South Africa. Within these poor areas tourism is, alongside agriculture, a key sectoral focus for development initiatives. (Nel & Rogerson, 2016b) As is shown by several investigations innovation is critical to the long-term health of the South African economy (Blankley & Booyens, 2010), including the tourism sector. (Booyens, 2012; 2016; Booyens & Rogerson, 2016a; 2016b; 2016c) During 2015 the DST released its benchmark document titled *Innovation for Local Economic Development* (ILED). The ILED strategy is DST's strategy that articulates the potential contribution of Science, Technology and Innovation (STI) in LED. ILED seeks to unlock value in local economic clusters through catalytic STI interventions, strengthen local value chains and local sectors, enhance the capacity of the innovation system to generate knowledge and innovations that can translate into socio-economic solutions required in a local economy. (Ndabeni, 2017) Essentially ILED is a framework for organising local economies around local innovation systems. It stresses the adoption of solutions that originate within the local system of innovation and constitutes a suitable approach towards sustainable and inclusive development. (Ndabeni et al., 2016) Importantly, ILED prioritizes support for marginalised localities by redirecting interventions into these localities so that innovation does not create further inequalities but instead enhances inclusion and increased well-being. (Ndabeni, 2017) ILED is influencing the latest iterations of the National Framework for Local Economic Development, the guiding framework for South African municipalities. Processes are under way to establish institutional arrangements and mechanisms to nurture innovation-driven LED, to implement innovation-driven interventions through a range of stakeholders and thereby to transform local economic development futures.

It is against this backdrop of a changing context and focus for the conduct of local economic development planning in South Africa that the object of this paper is to examine potential "best practice" implementation frameworks for operationalizing innovation-driven LED in the environment

of the global South. The South African case of LED planning is instructive because of its extended history of LED interventions such that the country is often viewed as the “learning laboratory” for LED planning in other countries in the global South. The paper undertakes a critical review of international “best practice” of the implementation of STI-led strategies and implementation frameworks with a particular focus on developing countries. The rationale is that an increasingly common trend in the making of public policy is that discussions are informed by so-termed “best practice”. This said, at the outset it must be acknowledged, following InfoDev (2010a), that the term “best practice” is contested and applied in at least two different ways in debates about policy development. First, the term is utilised to refer to results-oriented decision-making based on empirical evidence. In a second definition the emphasis is upon “successful initiatives” that make an outstanding contribution to the issue at hand. (InfoDev, 2010a, p. 10) Nevertheless, public policy and learning also can be informed by the opposite condition of ‘bad practice’ examples of the policy issue which flag policy directions that might be problematic. Overall, in this discussion a broad definition of “best practice” has been applied to capture key issues for learning from a critical review of international experience.

2. Research Methodology and Structure

A desk top literature mediated research was undertaken to scan international experience concerning the challenges and implementation of STI-led strategies. The material collected was extracted both from academic sources and from the policy works of a range of international development agencies. For this investigation the richest material was sourced from an array of reports and investigations produced for leading United Nations agencies – most notably the United Nations Industrial Development Organisation (Tubitak & UNIDO, 2011; UNIDO, 2012; 2017) as well as from The World Bank (2010) and its associated Information for Development (InfoDev) programme.

In terms of innovation debates there appears consensus that the National Systems of Innovation in developing countries “are at a nascent stage of development; and without robust frameworks for strengthening the links between NSI actors”. (Bartels & Koria-Ritin, 2009, p. 43) The World Bank has prepared a seminal guide for developing countries on innovation policy (World Bank, 2010) and through InfoDev has been a prime driver of one of the most progressive vehicles for building innovation sites to catalyse local innovation in the developing world. In recent years further impetus to extended research and policy debates around innovation systems in developing countries has been given by the global discussions on Sustainable Development Goals and a post-2015 agenda for delineating a role for STI in the global partnership for development. (ITU et al., 2015) Overall, the approach of international development agencies is informed from an explicitly policy perspective: “An effective Science, Technology and Innovation (STI) approach is indispensable for welfare as a key driver to the development and sustainable growth. The STI capabilities of the LDCs are needed to be enhanced in order to increase the quality of life, find innovative solutions to societal problems, increase the competitiveness of the nation, and foster and diffuse S & T awareness in society. Indeed, the challenges of economic development are not going to be addressed properly until science and technology issues are better integrated into the basic economic development strategies of the LDCs”. (Tubitak & UNIDO, 2011, p. 5)

The material is organised into two further sections of discussion and debate. The results and discussion is divided into two sub-sections. The first provides a high level overview of the critical issues identified in the making and implementation of STI policies in the context of developing

countries. The discussion critically dissects and triangulates academic debates about STI-led policies and of material from international development agencies which suggests directions for “best practice” (or perhaps “promising practice”) policy development and implementation for developing countries. The second sub-section is substantially informed by international writings and concentrates on one “best practice” example of implementation in terms of building an appropriate site and catalytic intervention to drive a local innovation system appropriate to the challenges of developing world countries. Specifically, the focus is on the growth of dedicated innovation centres around climate change to assist developing countries to capture opportunities for addressing the critical challenges of poverty, unemployment and inequality.

3. Results and Discussion

3.1. Reviewing International Debates

Innovation-driven growth and economic development is recognised as “no longer the prerogative of high income countries alone”. (ITU et al., 2015, p. 3) During the past decade, an expanding number of developing countries have embraced officially the innovation system approach to the formulation and application of STI policies. (World Bank, 2010; UNIDO, 2012; Cunningham & Waltring, 2015) The most important academic sources are focussed on key issues of, *inter alia*, “bridging scales” in innovation policies and of linking the “local” to other systems of innovation (regional, national) (Fromhold-Eisebith, 2007; Laranja et al., 2008), the application of STI policies in particular developing economies (Bartels & Korla-Ritin, 2009; Padilla-Perez & Gaudin, 2014; Santiago, 2015), and a new focus on governance issues in STI policies. (Arroia, 2012; Kuhlmann & Ordonez-Matamoros, 2017)

Several academic observers point to the fact that the results of the implementation of STI policies in developing countries often are “meagre” and subsequently identify a suite of barriers that governments face when designing and implementing such policies. (Padrilla-Perez & Gaudin, 2014: 749) Among key generic barriers is limited public financial support for STI activities, systemic failures within innovation systems, the absence of long-term and continuous implementation of STI policies (especially when governments are changed), lack of capacity for monitoring and evaluating policies, failure of education systems to generate sufficient human resources of the required quantity and quality, and weak coordination among public organisations. (Cunningham & Waltring, 2015) Overall, it is stressed as follows:

The problem is that more often than not, the STI policies deployed in developing countries reflect more a process of imitation of objectives and instruments than actually a strategy to address the specific problems that the country has. It is also often the case that there is a lack of alignment between the objectives, instruments and specific problems. Moreover STI policies frequently are neither at the centre of the economic development agenda nor aligned with a national development strategy. (Chaminade & Padilla-Perez, 2014, p. 2)

Furthermore, in developing world contexts of environments of poverty, inequality and limited access to health services, education and housing, this “undermines the impact of STI policies”, not least because “income and wealth inequality have a negative impact on trust between individuals and organisations which is a key factor to fostering interactions”. (Chaminade & Padilla-Perez, 2014, p. 8) Indeed, by far the most relevant and significant academic work relates to these critical international

discussions about the challenges of the design and implementation of STI policies for innovation systems in developing countries. (Chaminade et al., 2012)

Chaminade and Padilla-Perez (2014, p. 2) accord a heavy emphasis on the problems of alignment of STI policies within national economic development agendas and maintain that for much of the developing world “STI has not been a central pillar of the economic development agenda”. In particular, the effective implementation of STI policies “has been limited” such that only a handful of countries have been enabled to progressively upgrade their innovation capabilities because of “the difficulties of aligning STI objectives, policies and instruments with the context specific problems that countries face”. (Chaminade & Padilla-Perez, 2014, p. 4) As a starting point, innovation systems are understood in a broad sense using the definition of Lundvall et al. (2009) of “an open evolving and complex system that encompasses relationships within and between organisations, institutions and socio-economic structures which determine the rate and direction of innovation and competence building emanating from processes of science-based and experienced based learning”. Chaminade and Padilla-Perez (2014, pp. 5-6) highlight that this definition stresses the central importance accorded to competence building and absorptive capacity for innovations and embodies an explicit focus on institutions and socio-economic structures which are highly path-dependent and country-specific. In turn, this underscores the general neglect of the socio-economic and political context in which the system of innovation is embedded.

In moving forward in terms of “best practice” Chaminade and Padilla-Perez (2014, p. 9) advocate the adoption of “a stage-based approach” and that policies should be highly selective in terms of interventions with the critical challenge being “to decide where to invest the limited resources so as to have the larger impact, given the socio-economic and political context of a particular country”. It is stressed that innovation systems in developing countries should be considered “in an evolutionary perspective” and “as emerging innovation systems where some of its building blocks are in place but where the interactions among its elements are still in formation and thus appear fragmented”. (Chaminade & Padilla-Perez, 2014, p. 9) From the developing world perspective these authors align with the World Bank (2010) in terms of differentiating different stages of development of the system from emerging systems of innovation to fully fledged systems. It is cautioned, however, that “adopting an evolutionary perspective implies that each innovation system is unique and there is not one single ideal type of innovation system that all countries need to strive for nor one single path of development”. (Chaminade & Padilla-Perez 2014, p. 10)

The three stages or main ideal types of innovation systems in developing countries are as follows:

- Emergent innovation system characterised by low levels of technological innovation;
- Fragmented innovation system or dual innovation system denoted by medium levels of technological capabilities, and some pockets of innovation; and
- Mature innovation systems exhibiting high levels of technological capabilities and international competitiveness.

As South Africa represents a classic example of stage 2, a fragmented innovation system or dual innovation system, the focus narrows to issues pertinent to this stage. Stage 2 innovation systems are distinguished by a dual innovation system with two speeds, some clusters or regions which are highly innovative alongside other under-developed regional or local innovation systems. The pockets of innovation are embedded in “otherwise innovation systems in formation” which exhibit many of the defining characteristics of emergent innovation systems, *viz.*, large elements of informality, high

extent of social and economic inequalities, often extensive corruption and often poor linkages with universities. Overall, in such fragmented innovation systems it is contended that policy-makers in these countries “often suffer from policy fatigue”. (World Bank, 2010) For Chaminade and Padilla-Perez (2014, p. 17) the design and implementation of STI policies in these systems “may be cluster and value chain policies”. These authors argue that important capability problems need to be addressed regarding limited “soft skills” of leadership and management to complement existing technical skills re-absorption. Overall, in terms of linkages it is contended that “one of the most important challenge for STI policies is to establish linkages between pockets of dynamism and the rest of the system”. (Chaminade & Padilla-Perez, 2014, p. 17)

In addressing the fundamental questions of alignment a distinction is drawn between issues of *vertical* and *horizontal* alignment. The former relates to the fact that policy objectives and instruments must be tailored to the specific characteristics and needs of particular innovation systems, including the local socio-economic and political environment. The latter refers to the imperative that different policies be coordinated in order to achieve desired objectives of capability building and innovation. Concerning vertical alignment the focus is on objectives, instruments and specific problems of the STI system. The best practice according to Chaminade and Padilla-Perez (2014, p. 21) is that design of STI policies requires the following: “adopting a systemic perspective, tackling the system as a whole and not specific components and paying special attention to competence building and the linkages that facilitate interactive learning, both science, technology and innovation (STI) and DUI (Doing, Using, Interacting)” forms of interactive learning”. It is stressed by Jensen et al. (2007) that the STI mode of learning “is strongly linked to research, experimentation and codification knowledge” whereas the DUI mode stresses “on the job training, learning by doing and interacting with other actors”. Both are critical for innovation and require monitoring.

For developing countries the core challenges around horizontal alignment concern the fact that national development agendas often do not acknowledge STI as a central policy pillar. The key issues relate to bringing together and coordinating different state organisations for the design and implementation of STI policies. Indeed, it is argued that it is precisely because of the absence of such coordination that STI policies across the developing world are fragmented and correspondingly have disappointing impacts. A major issue is that with income and regional inequalities and capability gaps between regions there is a critical need to foster capability building in marginalised/underdeveloped regions and thereby “reduce heterogeneity”. (Chaminade & Padilla-Perez, 2014, p. 25) Overall, it is stressed that horizontal alignment is essentially about enhancing “the coordination of STI policies among different ministries and other public agencies, as well as their coordination with the overall development agenda”. (Chaminade & Padilla-Perez 2014, p. 29) In final analysis these leading international scholars reiterate the significance of a stage-based evolutionary approach as best practice for implementation of STI policies and that such policies must not be cast in stone in developing countries but instead be viewed as the output of “continuous policy experimentation”. (Chaminade & Padilla-Perez, 2014, p. 30) On this final point the academics are in accord with the views of the major international development agencies to which attention now turns.

Overall, international development agencies consider that the framework conditions for innovation in many developing countries are “particularly problematic” especially with respect to governance, education and infrastructure. (World Bank, 2010, p. 2) Indeed, the leading international agencies argue that: “LDCs are characterised by unarticulated innovation systems, lack of sufficient entrepreneurial activities and under-resourced institutions”. (Tubitak & UNIDO, 2011, p. 5) In addition, in common with the views from leading innovation scholars, it is acknowledged that “STI

policy has often been pursued independently of the broader development agenda; it is important that STI be integrated into public policy goals, giving particular focus to the nexus between STI, culture and education". (ITU et al., 2015, p. 3)

Several agencies have been extensively engaged in debates and research on how issues of STI can best be utilised to galvanize sustainable and inclusive local development in the global South. (World Bank, 2010; Cunningham & Waltring, 2015) For example, UNIDO (2017) is substantively involved in addressing economic and social inequalities through conducting "a technical cooperation programme with a focus on Science, Technology and Innovation (STI) which measures and analyses gaps in technology, and works toward decreasing them in a systematic and sustainable fashion" (UNIDO, 2017, p. 2) The primary target group for direct intervention by UNIDO is local SMMEs. (UNIDO, 2017) A UNIDO study of the landscape of innovation and innovativeness in Ghana's National System of Innovation disclosed that policy instruments are "generally unsuccessful" in overcoming barriers to innovation. (UNIDO, 2012, p. 7) As a whole the Ghana NSI was described as "fragile" with only a low density of relationships between key actors many of whom are described as "secluded". (UNIDO, 2012, p. 8) Much research by international development agencies has been undertaken on issues of enhancing local innovation and especially the strengthening or promotion of local clusters and systemic local linkages. (De Marchi et al., 2015; Naude & Nagler, 2015; Santiago, 2015) For Cunningham and Waltring (2015, p. 5) it is essential to appreciate that a local innovation system "is not inwardly focused" but inextricably connected to global markets.

The most significant and most cited work concerning the design and implementation of STI policies is the guide to innovation policy which has been produced by the World Bank (2010). Its key arguments and policy issues merit detailed attention. The volume offers a comprehensive view of innovation policy and draws an analogy in terms of policy that the role of government (all levels) should be to act as a gardener. Governments variously should support innovators by providing appropriate financial and other measures (*ie* "watering the plant"), by removing regulatory, institutional, or competitive obstacles to innovation (*ie* 'removing the weeds and pests'; and by strengthening the knowledge base through investment in education and research (*ie* 'fertilizing the soil'). In terms of the government as gardener the World Bank (2010) recommends that innovation be approached from an evolutionary perspective which is in accord with the views of leading academic writers such as Chaminade and Padilla-Perez (2014). It is suggested that with its inherent challenges and complexities that a long-term strategy for the implementation of STI policy should be informed by a philosophy of "radical gradualism" which is seen to refer "to a sequence of finely tuned small specific reforms and successful outcomes that paves the way for broader, institutional changes". (World Bank, 2010, p. 3) Of central importance for success is what the World Bank refers to as "a whole of government" approach (World Bank, 2010, p. 54) in order to enable coordination across different ministries. Equally important is the institution of monitoring processes with the OECD Oslo Manual recommended as a best practice for measurement.

It is continually stressed that putting in place an STI policy is a "daunting challenge", a conclusion reached from an analysis of advanced countries. Accordingly, the implementation of such policies in developing countries is viewed as "even more daunting" given often difficult institutional contexts, resource constraints and the absence (in many cases) of essential managerial expertise to carry out programmes. (World Bank, 2010, p. 17) Once again, it is reiterated that a long-term strategic approach is required based on a clear long-term vision for a "pragmatic innovation agenda" in order to implement necessary changes and move from effective micro- reforms to macro-reforms. (World Bank, 2010, p. 237) A step-wise approach is deemed appropriate. In terms of promoting competitive

and innovative industries or sectors the Bank's stance is that interventions by government should not be guided by an approach targeted at "picking winners" but instead towards "self-selection" or "self-discovery" through government's role in creating a dynamic and receptive climate for local innovation which requires above all adequate infrastructure and an appropriate "friendly" business environment. One aspect of that business environment that is flagged by the World Bank (2010) is the application of public procurement policies to source innovative goods and services or alternative solutions to meet the needs of communities and thus enhance public service delivery. It is argued that "innovative solutions can be promoted by using clear and robust output specifications and by setting functional or performance criteria, thereby leaving tendering companies room to propose (innovative) solutions". (World Bank., 2010, p. 126)

Geography is viewed as important in STI policy as alluded to by the World Bank (2010). Indeed, there is explicit recognition that innovation is spatially polarized and that local innovation is of special interest because innovation has its foundations in microeconomic local processes which are impacted by factors of proximity, networks, density and diversity. In particular, there is an emphasis upon proposals for "building innovative sites" or in terms of the gardening analogy "fertile sites" with good "micro-climates" for innovation. Urban areas are considered as potential locations for building innovation sites in terms of offering specific nutrients that succour innovation – most notably infrastructure. This said, the opportunities for building innovation sites outside of cities are not ignored. Among such place-focussed interventions would be in some countries the establishment of either special economic zones or clusters (often still considered the "silver bullet" according to the World Bank, 2010, p. 323) in terms of concentrations of firms in loosely designed geographic areas with complementary rather than competitive assets and which are articulated through and strengthened by networks. Of critical importance is the requirement for a "flexible, decentralized policy process" that takes regional diversity into account. (World Bank, 2010, p. 253) The advantage of a decentralized system is in envisioning new roles for sub-national tiers of government and for civil society. This would encompass the piloting of innovation initiatives as entry points at a regional or local level that emerge out of discussion and debate within civic society

3.2. Implementing an Innovation Site

The advance of climate change is acknowledged to represent one of the greatest global challenges that must be addressed in the 21st century and especially in the context of the United Nations Sustainable Development Agenda. Meeting the climate change challenge will demand both mitigation and adaptation measures with improved and new local technologies. (Sagar et al., 2009) Sagar and Bloomberg New Energy Finance (2010, p. 15) elaborate as follows: "In practical terms this will mean developing technologies for managing water stress through enhanced storage, conservation and recycling; technologies for increasing the resilience of agricultural system, including modified crops, improved cropping systems and practices, and land management; infrastructural technologies to protect against climate impacts, such as seawalls and dykes for coping with sea-level rises, floods and storm surges, or improved building technologies to increase resilience to coastal storms; and disaster management technologies such as advanced warning systems".

Globally, economies are reorienting towards a pathway of low-carbon, green growth paths through the deployment and diffusion of new technologies for climate change adaptation. (OECD, 2017) Over the past few years there has emerged a special form of business incubator which is targeted to accelerate the development, deployment and transfer of locally relevant climate technologies. Under the Climate Technology Programme (CTP) which links to InfoDev and the World Bank climate challenges are to

be reconfigured into growth opportunities for dynamic small and medium enterprises. With CTP support SMEs can assist in emissions reduction and enhance climate resiliency whilst at the same time enable developing countries to capture greater value in the innovation value chain, build competitive sectors, competitive enterprises and nurture new sources for job creation. Indeed, it is argued that with suitable “gardening” interventions by governments developing countries can create new industries based on climate technologies and craft an approach that could at the same time supply local people with basic energy and other services as well as achieve development and climate goals.

Climate change thus is framed as an economic opportunity rather than an inevitable threat with the opportunity for new innovation and investment in clean technologies which can assist in strengthening local economies, reduce climate risk as well as to advance Sustainable Development Goals. For example, in the case of Kenya 80 percent of the country’s population is currently not served by the electricity grid and thus constitutes a large potential market opportunity for innovative clean-tech solutions. In Kenya local entrepreneurs are encouraged to respond locally to these challenges and opportunities by launching new innovative wind and solar technologies that not only foster employment opportunities but also offer viable off-grid solutions to the country’s most marginalized poor communities. (InfoDev, 2010b) The CIC has emerged as the country’s major support centre for climate technology entrepreneurs by incubating 3.2 more than 100 businesses in fields that range from waste to energy solutions to local wind power and biomass technologies. (InfoDev, 2016) For other parts of the global South climate smart agriculture is another critical sector where clean technologies, including new climate-resilient crops and the making of highly efficient irrigation systems, can contribute to enterprise development, agricultural expansion, and climate change adaptation. In Ghana the local CIC encourages the country’s entrepreneurs to innovate clean technologies in a variety of sectors including agriculture, waste water treatment and off the grid renewable energy for rural communities. (InfoDev, 2016)

Under the auspices of the Information for Development the flagship catalytic activity is the design, implementation and roll out of a network of Climate Innovation Centres. The CICs are described as “entrepreneur and new venture support facilities tailor-made to respond to a country’s development challenges” by providing “holistic support that goes beyond traditional incubation”. The CIC is aimed to transform the threat of climate change into an agency for local technology innovation. (Sagar & Bloomberg New Energy Finance, 2010) At these CICs the emphasis is upon targeted support through business incubation to assist clean tech entrepreneurs launch new businesses, create employment opportunities and furnish disadvantaged communities with cleaner energy, water, food and air whilst reducing consumption of natural resources. Elements of the basket of targeted support can encompass seed-financing, specialized policy interventions, specific network linkages as well as technical facilities and business training. It is argued that such policy interventions can effectively harness “economic opportunities in developing countries through entrepreneurship and small and medium enterprise (SME) development in the climate technology sector”. Climate change targets for emissions reduction can be addressed in part by helping local SMEs to commercialize and scale innovative private sector solutions to climate change.

The focus by InfoDev for these CICs is across a number of countries in the global South. Currently seven CICs are active or planned. These locations include the Caribbean, Kenya, Ethiopia, Ghana, Morocco, Vietnam and South Africa. The CICs as locally-owned institutions are to drive innovation by evolving new models for countries in the global South to participate more effectively in clean technology sectors. These CICs are to provide a suite of services to local clean technology SMEs and climate innovators by offering also:

- Business advisory services and training to build local capacity;
- Seed financing to bridge funding gaps; and
- Policy support to promote more effective policies and sector regulations.

Overall, according to the Business Plan for the Kenya Climate Innovation Centre: “In addition to supporting promising new technologies and ventures, these centres also could provide access to finance, access to equipment and facilities, market information, policy advocacy, technical assistance, and facilitate national and international collaboration. In this way, a centre acts as a national focal point, or “one-stop-shop” to aggregate efforts in promoting the growth of locally relevant, indigenous climate innovations and to facilitate cross-border technology collaboration”. (InfoDev, 2010b, p. 12) Since its foundation in 2012 Kenya’s CIC has been described as one of Africa’s leading edge business incubators and aims to catalyse a wave of new clean technology innovation in the country. Further, it seeks to galvanize new private sector-led solutions to clean-tech growth and contribute to sustainable development objectives.

Southern Africa is one of the most vulnerable regions of the world in terms of projected climate change impacts, including for tourism development. (Pandy, 2017; Sifolo & Henama, 2017) It has been argued that the challenges associated with climate change in South Africa can offer new opportunities for local economic development. (Rogerson, 2016) The Climate Innovation Centre in South Africa (CICSA) is a strategic Green Economy Initiative of the Innovation Hub, which is a subsidiary and established by the Gauteng Provincial Government through its Department of Economic Development. (InfoDev & the Innovation Hub, 2012) The CICSA is described as “a technology and business incubator dedicated to supporting South African start-ups and small businesses operating in the green economy space by offering them access to finance, technical and business advisory facilities, information and markets”. (Climate Innovation Centre South Africa, 2016a) Through its endeavours it is anticipated that South African clean-tech entrepreneurs can be enabled to “profitably develop, commercialize and scale-up their innovative clean technology ideas and concepts, creating jobs and accelerating a greener and more inclusive economic development in the process”. (Climate Innovation Centre South Africa, 2016a)

At its launch in March 2015 the imperative was highlighted to address South Africa’s pressing environmental concerns of energy, water and waste management, and that one of the centre’s core priorities was improvement in the quality of life for township residents in Gauteng, South Africa’s economic heartland. It is stressed that CICSA will afford climate technology SMEs with access to highly flexible, stage appropriate risk capital at all stages of innovation albeit with resources concentrated in the early growth stage through grant, seed and scale-up financing. (Climate Innovation Centre South Africa, 2016b) This said, it is acknowledged that CICSA must “strike a balance between social inclusion, policy alignment, environmental impact and economic benefit”. (Climate Innovation Centre South Africa, 2016b)

4. Conclusion and Recommendations

Improved planning and implementation of LED is critical for many countries. (Blakely & Leigh, 2010; Rodriguez-Pose & Wilkie, 2017) Across many parts of the global South there is a considerable focus currently on building local economies and engaging with “place-based” LED planning. (Pike et al., 2014; Rogerson, 2014; Pike et al., 2015) The South African case of LED planning potentially might inform lessons for learning in other parts of the global South as a result of the country’s long-

established tradition of LED planning. Arguably, successful local economic development planning can contribute substantively to the achievement of South Africa's long term development goals. (Rogerson & Rogerson, 2012) As a result of policy interventions and repositioning undertaken by the country's Department of Science and Technology (2018) it is significant that innovation and the promotion of local innovation are moving to centre-stage in contemporary South African LED planning. Indeed, it has been suggested that the ILED strategy offers a cutting edge approach to re-energising LED in South Africa's marginalised areas (Ndabeni et al., 2016; Ndabeni, 2017), and potentially is a best practice approach to LED planning in other developing countries.

The task in this article was to furnish a critical overview of international debates concerning implementation frameworks and of good practice implementation for innovation-led strategies. An analysis was undertaken both of a body of academic writings and of the policy-oriented work of leading international development agencies. The results disclose an increasing convergence in the analyses and writings presented by these two different constituencies. Both academic writings and development agency perspectives stress that STI has rarely been a central focus in national development agendas and point to the critical challenges around policy alignment towards a "whole of government approach". In terms of implementation frameworks, given the acknowledgement of the resource constraints of most governments in the developing world there is consensus around the need for a stage-based or evolutionary approach. Moreover, it is stressed that STI policies should be highly selective in terms of "entry points" or interventions which seek to maximise such impacts in the socio-economic and political contexts of particular countries and regions. (Cunningham & Waltring, 2015)

In guiding policy development, there is merit in thinking of government's role as akin to a "gardener" especially in terms of fostering local "micro-climates" for innovation. In moving forward with the South African agenda of ILED for innovation-driven local economies much can be drawn from international experiences. Arguably, the question of selecting catalytic interventions is crucial and local context-specific. This said, there is considerable merit from the existing international experience in examining the case for addressing the sustainable development challenges around climate change through supporting the establishment of CICs. Among the several potential contributions of CICs is towards addressing the ramifications of climate change upon South Africa's growing tourism economy.¹ The tourism sector in South Africa therefore can be a beneficiary of the implementation of "best practice" frameworks for supporting the country's drive for innovation-driven local economic development.

6. References

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¹ See (Pandy, 2017; Pandy & Rogerson, 2018).

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