

A Living Laboratory Proposition for Revitalising Regional Australia

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ABSTRACT

A strong Small and Medium Enterprises (SMEs) sector is said to underpin a competitive advantage of the Australian regions that are struggling to grow the economy, distribute the growth fairly, and in the process not degrade the environment. The concept of Regional Innovation Systems that draws on industrial cluster theory has gained currency as an umbrella framework for enabling the SMEs sector. However, there are significant gaps between research and innovation of such 'one-size-fits-all' approach. This paper responds to this gap and proposes a Living Laboratory – an open multi-disciplinary and multi-stakeholder action research platform where innovations can be co-created, tested, and evaluated in the every-day environment of SME – as a way to strengthen the SMEs sector in regional Australia.

Keywords: *collaborations and networking, information technology, innovation, small and medium sized enterprises, stakeholders*

A Living Laboratory Proposition for Revitalising Regional Australia

Australian regions are grappling with economic, environmental and social challenges associated with the 'two-speed' economy. According to the recent State of the Regions Report, 67 regions in the country are no longer converging towards equality in terms of income, labour utilisation rates and economic prosperity, but are rapidly diverging (Australian Local Government Association 2011). There is a need for concerted efforts from government agencies, business and community stakeholders to deliver a quality of life and opportunity to regions (defined here as non-capital cities) that is at parity with that experienced in the nation's capital cities. It is often argued that the small and medium enterprises [SMEs] sector plays a critical role in maintaining socio-economic as well as environmental well-being (Asheim, Smith & Oughton 2011; Murta, Gero, Kuruppu, & Mukheibir 2012). SMEs generally operate in challenging circumstances with limited access to investment capital and with uncertain availability of essential resources such as human and social capital. These challenges are heightened in regional areas. In this regard, the concept of Regional Innovation Systems (RIS) that draws on industrial cluster theory has gained currency as an umbrella framework for enabling advancement of the SMEs sector. RIS explicitly recognises complex interdependencies and interactions between various stakeholders in the region present during the innovation process (Doloreux 2002). The concept has found its way into policy discussions in Australia at a time where a need to capitalise on regional competitive advantage has been increasingly recognised (Department of Innovation, Industry, Science and Research 2011a). However, there are significant gaps in the RIS research, particularly in terms of the value of such a 'one-size-fits-all' approach to innovation that does not necessarily accommodate contextual variables that affect SMEs (Rice 2011).

This paper responds to this gap and proposes a Living Laboratory (Living-Lab) as a method for strengthening the SMEs sector in regional Australia. A Living-Lab is an open multi-disciplinary and multi-stakeholder action research platform where information and communications technologies (ICT) mediated innovations can be co-created, tested, and evaluated in the every-day environment of SMEs. The paper begins with a brief overview of the SMEs sector in Australia. Following this, the concept of

regional innovation system and its theoretical underpinnings are outlined. The rationale for using a Living-Lab as an action research method to foster SMEs driven regional innovation is discussed next. The paper ends with a contention that the potential of Living-Lab to enable the SMEs sector in regional Australia is too significant to ignore for regional revitalisation.

SMALL AND MEDIUM ENTERPRISES (SMEs) SECTOR IN AUSTRALIA

Once considered to be vestiges of the traditional sector to be overwhelmed by the processes of modernisation (Humphrey & Schmitz 1996), SMEs have become one of the main targets of policies aimed at creating growth and employment around the world (Organisation for Economic Cooperation and Development 2012). There is no universally agreed definition of SMEs and the nature of SMEs varies from family enterprises, i.e. owned within the family to lifestyle businesses i.e. independent with little aspiration to grow into large enterprise. The Australian Bureau of Statistics (2002) categorises enterprises that employ 5 or more people, but less than 20 people as a ‘small’ and those that employ 20 or more people, but less than 200 people as ‘medium’. Based on this premise, businesses that employ between 5 and 199 people are considered to be SMEs for the purpose of this paper.

FIGURE 1 HERE

SMEs have become an integral part of the economic, environmental and social fabric in Australia. There are over two million SMEs across twenty different industrial sectors (Figure 1) ranging from accommodation and food services to wholesale trade (Australian Bureau of Statistics 2012). In terms of aggregate numbers, SMEs amount to 99.7% of actively trading businesses in the country which provided employment for 70.5% of the of total private sector employment in 2009–10 or nearly 4.8 million people (Department of Innovation, Industry, Science and Research 2011a).

Nearly one-third (32.4%) of SMEs in the country operate in the regional areas (Department of Innovation, Industry, Science and Research 2011a). These enterprises are the major sources of prosperity and employment opportunities forming the backbone of regional sustainable development

(Department of Transport and Regional Services 2003). Although, thriving SMEs sector is significant for the broader regional sustainable development aspirations of the country, the recent indicators suggest that the growth-engine might have stalled, a fact masked by rising terms of trade (Agarwal & Green 2011 p. 79; Cutler 2008 p. 49). For example, court liquidations of SMEs rose by 7.7% and voluntary liquidations were up by 10.1% in 2011 fiscal year when compared to 2010 (KordaMentha 2011). In addition to the pressures relating to management of cash flow (CPA Australia 2012), SMEs are also not harnessing the relationships with various stakeholders (Spence, Schmidpeter & Habisch 2003). Because of having greater access to research and development resources, large enterprises are more likely to generate innovation than SMEs in Australia (Roos, Fernstrom & Gupta 2005). Overcoming these deficiencies and remaining competitive necessitates SMEs to improve innovative capacity by exploiting the potential of ICT in order to foster collaboration and networking with their stakeholders (Chung & Tibben 2006; Wiesner, McDonald & Banham 2007; Australian Communication and Media Authority 2008). It is in this context that the concept of regional innovation systems is discussed as a way forward to improve operating environment for SMEs.

REGIONAL INNOVATION SYSTEMS (RIS)

Innovation comprises two parts, a) generation of an idea or invention, and b) the conversion of that invention into useful applications, argues Roberts (2007), who equates innovation with the harnessing of a discovery: Innovation = Invention + Exploitation (p. 36). A key to the innovative process is the operating platform that optimises collaboration and networking opportunities (Bougrain & Haudeville 2002; Sawang & Matthews 2010) amongst public, private and third sector organisations. The Australian Department of Innovation, Industry, Science and Research (2011) depicts an innovation system is about people, the knowledge, technology, infrastructure and cultures they have created or learned, who they work with, and what new ideas they are experimenting with (p. 11). Although the concept of innovation systems is relatively new in the policy arena, there is evidence of increasing interest in innovation systems in Australia.

The Department of Industry, Innovation, Science, and Research (2009) published a white paper called *Powering Ideas: An Innovation Agenda for the 21st Century*. This document was primarily focused on measures to renew and expand Australia's publicly-funded research and innovation capabilities in order to yield higher returns. The first volume of a series of the reports titled *Australian Innovation System Report 2010* published by the Department of Industry, Innovation, Science, and Research (2011) acknowledged that Australia was consistently underperforming on most measures of collaboration and networking. The report identified that a large proportion of Australian businesses i.e. 84% had no collaborative arrangements in 2006-07. The second volume of the series *Australian Innovation System Report 2011* (Department of Industry, Innovation, Science, and Research 2011b) compared Australia's investment in intangible innovation capacity e.g. skills development, design and organisational improvements with that of Organisation for Economic Cooperation and Development [OECD] countries. The report revealed that Australia is more likely to adopt existing technology embodied in tangible machinery and equipment, than to invest in our own intangible capabilities that foster innovations.

Given the reliance of Australian economy on the SMEs sector and inequality amongst 67 regions in terms of socioeconomic progress (Australian Local Government Association 2011), the innovation related documents discussed above point to the fact that the focus of enterprises on intangible capabilities i.e. collaboration and networking at the regional scale is more likely to make the innovation work for the regions. Rice (2011) asserts that innovation is created by entrepreneurs and firms creating new knowledge, and combining existing knowledge in new ways. It is sustained by two main drivers: one driver is contextual and external to the firm; the other is embodied in the firm and its operational and knowledge system (p. 20). Cooke (2001) and Doloreux (2002) consider regional innovation system (RIS) as open social systems suggesting that innovations are often the outcomes of intangible relationships amongst various stakeholders or 'communities of practice' (Wenger 2002). While RIS draws from the grounds of economic geography, industrial clusters, industrial districts, innovative milieux, and national innovation systems (Asheim, Smith & Oughton 2011), the theoretical

underpinnings of industrial cluster has gained currency as an umbrella framework for enabling the SMEs sector (Organisation for Economic Cooperation and Development 2011).

Clusters are defined not just by their elements – the business and workers that comprise them – but by the connections among the enterprises that form them (Rosenfield 1997). Inspired by the SMEs cluster-oriented economic growth of the regions e.g. Third Italy (Asheim 2000) and Silicon Valley (Fountain 1998), countries around the world have been seeking to duplicate cluster success despite a certain level of cluster fatigue in academic and policy arenas (Martin & Sunley 2003). Motoyama (2008) argued that collaborative as well as competitive natures of SMEs clusters foster regional growth by, a) increasing the productivity, b) driving the direction and pace of innovation, and c) stimulating the formation of new enterprises. This is consistent with Porter (1998) who highlighted the role of intangible asset e.g. building and maintaining relationships within SMEs and between SMEs as necessary ingredient of innovative and successful of SMEs.

Exploring mechanisms through which SMEs clusters and relevant stakeholders exchange information, innovation, and capital flows can reveal ways for policy-makers to remove bottlenecks and improve flows within RIS. Brown et al. (2005) explored some of the fundamental features of industries that have successfully “turbocharged” mutual benefits through networking activities and conceptualised them on a spectrum of engagement from coordination through cooperation to collaboration. While economic geographers (Martin & Sunley 2003; Smith 2012) have limited their research into industry clusters to like and related businesses co-locating in geographic proximity to each other, Brown et al. (2010) take a broader approach and developed a “resource based view” of industry clusters in regional areas. These clusters tend to become a part of an interdependent network in order to influence the flow of resources in their favour.

Regions provide the building blocks for national economic performance hence a regional approach to innovation can deliver national benefit. Planning for regional areas thus needs to foster innovation capabilities, increase entrepreneurial acuity and enhance the capacity for sustainable growth. However, as the challenges and capacities for each region are different, there is a need for contextually relevant

approaches. This challenge presents a critical and complex undertaking for regional communities, industry and government. It is therefore important for policy-makers and planners of RIS to sufficiently recognise the variety in innovation potential within and between regions and do not prescribe 'one-size-fits-all' approach (Organisation for Economic Cooperation and Development 2011). Nonetheless, there are significant gaps between research and innovation in Australia in this regard. This paper responds to this gap and proposes a Living-Lab as a way to strengthen the SMEs sector in regional Australia.

LIVING LABORATORY (Living-Lab)

Regional economic districts, clusters or networks provide distinct innovation advantage in the era of globalisation and integration. As the innovation process involves the generation or adoption, and application or adaptation of new products, processes or systems by organisations, it follows that the capacity of SMEs to derive benefits from innovation will be affected by the factors impacting upon these innovation processes. Nurturing higher levels of social capital e.g. collaboration and networking, trust-based culture, and knowledge-sharing ultimately results in innovation and success of SMEs (Zeleny 2001). However, the increasing ubiquity of information and communication technologies (ICT) in the business environment means that SMEs clusters are no longer confined by place (Porter 2000), and instead are increasingly becoming virtual (Malakauskite & Navickas 2009). While ICT enabled innovation has the potential to enhance competitive edge by networking enterprises, the dynamics of this process are complex, involving the effective integration of stakeholders, organisational processes and extensive planning (Roberts 2007). In this context, the authors propose a Living-Lab as an action research method to understand and explore the way ICT enables the capabilities of SMEs to increase socioeconomic contributions and decrease environmental externalities by: facilitating the communication between buyers and sellers in a regional or global marketplace; fostering social capital with the relevant stakeholders; and encouraging rapid diffusion of ideas and knowledge necessary for innovation for regional sustainable development.

The fundamental idea behind a Living-Lab is that, users of the technological innovations have the opportunity to engage co-creatively in the innovation processes instead of being passive recipients of the outcomes of innovative activity (Eriksson 2006). Users can represent public and private sectors and civil society stakeholders. Depending on their specific needs, users are engaged in cooperation, coordination or collaboration through the use of network and ICT. Living-Labs are therefore a common ground where the needs of a particular ‘communities of practice’ intersect. Living-Labs have become an emerging worldwide phenomenon transforming the way innovations in a networked society are adopted, adapted, and applied – no longer within the confined space of laboratories but in the boundless field of human activities and interactions.

TABLE 1 HERE

Although European countries were amongst the first to embrace this phenomenon in order to promote innovation on a societal basis and bolster regional growth in struggling regional areas as a part of the ‘Lisbon Strategy’ (Følstad 2008), the utility of Living-Labs have been equally important in other nations outside the Europe. For instance, comparison of outputs of two Living-Labs in Hungary and South Africa (Table 1) indicates that innovative application of ICT such as Geographic Information System and Short Messaging Services can enhance the competence of SMEs. Since affordable and instantaneous communications is a necessary condition for harnessing relationships with stakeholders, the core value of ICT is in the enabling of communications between SMEs and the relevant stakeholders that would otherwise be cumbersome, expensive, or time consuming (Resnick 2001).

This paper contends that the potential of ICT exists in its capacity as a driver of equity for the regions – relative to the metropolitan areas. The significance of this proposition applies not so much to innovation in the sense of high performing new products, but in the contextual understanding of the circumstances in which stakeholder(s) operate and whether or not ICT mediated solutions can match the changing needs of stakeholders in a particular region. This may necessitate new models of governance, collaborative enterprise (social enterprise, social ventures and social innovation) and ICT

enabled new business and social engagement models that leverage assets across private, public and not-for-profit sectors. This paper therefore proposes a framework in order to bring an understanding about the processes and socioeconomic dynamics which lead to the initiation and subsequent management of Living-Lab as a platform for RIS.

A Proposed Framework

The starting point for this methodological framework is to understand and utilise appropriate research paradigms for successful research design and its implementation. Living-Labs present opportunities for regions to use action research to take advantage of emerging technologies, particularly new ICT in an increasingly networked society (Castells 2000). Action research is where the research process seeks to describe, interpret and explain existing and emerging phenomenon whilst desiring to change them for the better societal good (Avison et al. 1999). It is also an ideal research method for assessing ICT-enabled innovation as the primary aim of the action research is to combine intervention in real-world settings with theoretical enhancement. The principles of action research (Creswell 2005) match with the underpinnings of Living-Labs (Bergvall-Kareborn et al. 2009) and this accord has methodological implications for the purpose of this proposition in terms of the way Living-Labs are conceived and managed.

TABLE 2 HERE

Drawing on the methodological implications described in Table 2, this paper proposes that the ontological stance of Living-Lab as an action research method makes an assumption that SMEs and relevant stakeholders are willing to be a part of RIS. The proposed framework envisages RIS in three phases, namely; pre-intervention, intervention and post-intervention. The pre-intervention phase feeds on the operating environment of SMEs, particularly in terms of the needs, interests and goals of the stakeholders. The intervention phase itself comprises six stages of Continuous Improvement and Innovation (CII) processes (Clark et al. 2009) namely; i) Situational analysis, ii) Impact analysis, iii) Action design, iv) Action implementation, v) Performance assessment, vi) Creation and synthesis.

The post intervention phase evaluates the Living Laboratory by assessing the outputs, outcomes and offshoots.

FIGURE 2 HERE

The intervention process of CI&I enable the conception, management and actual innovation within the Living-Lab with a constant feedback from the stakeholders (Timms & Clark 2007). The six stages of the intervention phase are described below.

Stage 1 – Situational analysis

This is a most important step of the innovation process. It draws on the local, regional, national, and global context and assesses the actual needs for innovation as well as garners commitment from the stakeholders. The purpose and the scope of the intervention must be agreed upon by all stakeholders.

Stage 2 – Impact Analysis

Stakeholders must have a clear vision of the innovation process and the likely impact at the end of the intervention. The impact analysis enables stakeholders to gain a collective understanding of the investment in innovation and subsequent returns on it.

Step 3 – Action Design

This stage draws on the assessment of pre-intervention situation e.g. survey or other means of data collection in order to shape the planning and design of appropriate actions plans.

Step 4 – Action Implementation

At this stage, performance indicators are agreed upon by relevant stakeholders in order to implement monitor and evaluate the progress. A continuous feedback loop based on these indicators determines the way action plans are implemented and progresses made.

Step 5 – Performance Assessment

This stage involves action on the monitoring and evaluation of the progress. Consequently, continuous modifications and adjustments are incorporated as the stakeholders discover what

worked and did not. It involves using the techniques such as the Strength, Weakness, Opportunities, and Threats (SWOT) analysis.

Step 6 – Creation & Synthesis

This is the last stage of intervention which involves systematic review and the consensus amongst stakeholders regarding new action step. This is also transition between the completion of one task and the beginning of the other.

The primary purpose of the Living-Lab methodological framework outlined above is to develop integrated ICT-based tools for enterprise management, innovative service delivery, and investment in infrastructure. This systematic approach (Chung 2002; Asheim & Coenen 2006) will engage local stakeholders in generating knowledge and tools to co-create communities of interest capable of developing solutions to regional shortages. In addition, the approach allows for the co-creating, prototyping, validating and refining of complex solutions in the context of regional SME sector in a medium to long-term timeframe (van der Valt et al. 2009) in regions. This framework provides a structure for enterprises, activities and projects at the regional scale to allow for outcomes to be delivered incrementally, whilst building towards a transformational change. The framework has been successfully utilised in Australia at the Queensland State Government Department of Employment, Economic Development and Innovation (Timms & Clark 2008).

CONCLUDING REMARKS

This paper began by highlighting the significance of the SMEs sector in Australia and its challenges in fulfilling sustainable development aspirations in Australia. Drawing on industrial clusters theory, the concept of regional innovation system was reviewed as an overarching framework for enabling the SMEs sector. Taken together, existing research revealed that Australian SME need to focus on innovation if they are to retain competitive advantage (Burgelman, Christensen, & Wheelwright 2008). However, despite the fact that the SMEs sector has invested more than 5 billion dollars in research and development (SME Association of Australia 2011), the innovative capacity of SMEs remains limited (Chung & Tibben 2006). Innovation is often equated with exploitation of the

invention, implying the creation of new technology or new products and encompasses new business approaches, processes and activities. This paper introduced the characteristics of an emerging research methodology for ICT-mediated innovation and proposed a Living-Lab framework to foster innovation amongst SMEs. This paper hypothesised that ICT tools are effective in driving critical information dissemination and behavioural change within SMEs networks and that ICT-mediated collaboration is the key to innovation. As demonstrated by examples in Hungary and South Africa, the core of Living-Lab enables identification of factors that facilitate SMEs clusters and to support enhanced productivity of SMEs. There is considerable diversity across regional Australia, leading to differences in levels of service provision and in the local impacts of economic shocks and changing policy environments. The proposed framework is built on an innovative, cross-sectoral approach to local and regional economic, environmental and social development using a Living-Lab. It is expected that the framework enables the operationalization and empirical assessment of the broader social and cultural contexts of regional sustainable development driven by SMEs and how these enterprises can be mobilised to construct advantage for localities and regions by seeding innovation.

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TABLES AND FIGURES

Table 1: Comparison of ICT mediated outputs of two Living-Labs

	SEKHUKHUNE Living-Lab (South Africa)	HOMOKHÁTI Living-Lab (Hungary)
<i>Institution</i>	CSIR/Meraka Institute	University of Szeged
<i>Objective</i>	To create an impact on operational excellence of SMEs	To build a sustainable Farm-Market Linkages for SMEs
<i>Focus</i>	Incubation mechanisms to support business operation	Value chain of greenhouse based vegetable production and consumption
<i>Output</i>	GIS based collaborative procurement and logistics with functionalities like customer registration, order tracking and processing and business analytics	SMS based collaboration amongst producer association (mediator), farmers (producer) and supermarkets (consumer) for efficient effective transactions
<i>Source</i>	Christian Merz et al. (2010)	Bilicki et al. (2010)

Table 2: Principles of Living-Labs vs. Action Research

<i>Living-Lab Principles</i>	<i>Action Research Principles</i>	<i>Methodological Implications for Living-Lab</i>
Continuity	Collaboration	Build trust and agree on joint goals
Empowerment	Sharing research outcomes	Treat every stakeholders as partners
Openness	A plan of action	Involve stakeholders in all phases
Realism	A practical focus	Assess/tackle real societal problems/needs
Relation to Academia	Researcher's own practices	Consider academia as a catalyst stakeholder
Spontaneity	Dynamic process	Incorporate stakeholders' feedback/reaction
<i>Bergvall-Kareborn et al. (2009)</i>	<i>Creswell (2005)</i>	<i>Authors</i>

Figure 1: Quantity of SME by sector at the end of financial year 2007-08 (Australian Bureau of Statistics 2012)

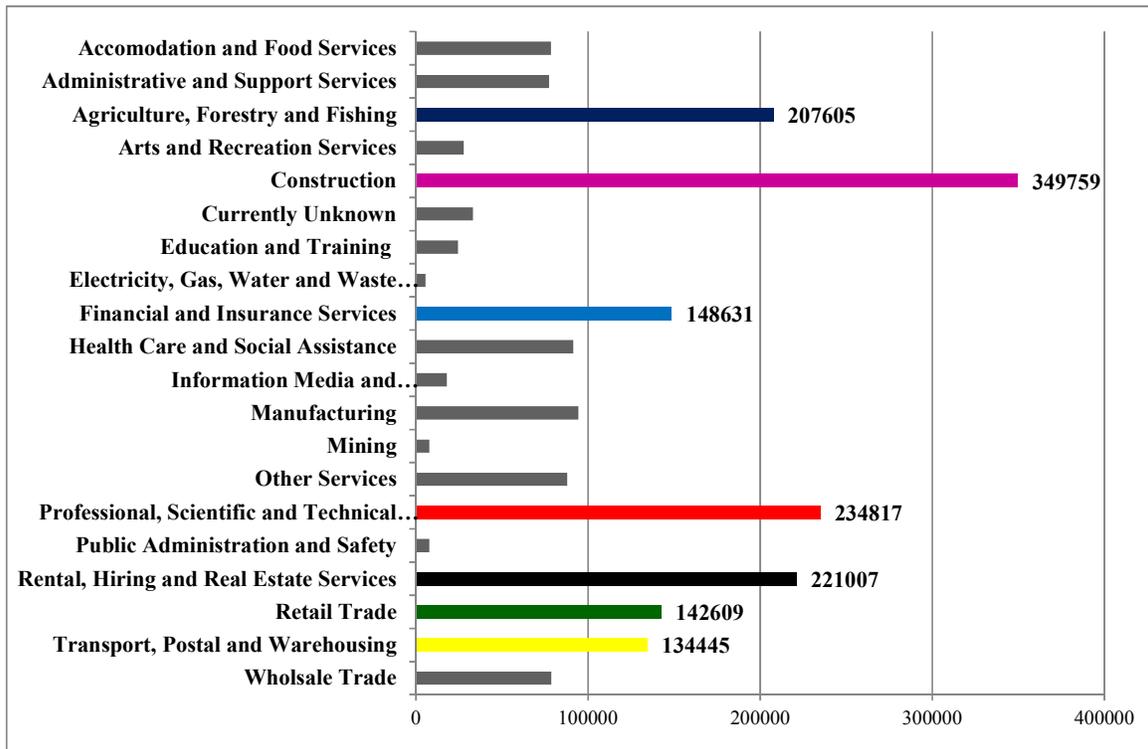


Figure 2: A Living-Lab Analytical Framework for SMEs

