Intermediaries and learning in sustainability-oriented urban transitions: a transdisciplinary case study from Stellenbosch Municipality

By

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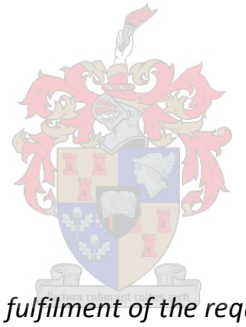

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Declaration

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Abstract

This thesis explores the role of intermediaries and learning in sustainability transitions at the urban scale and deploys a particular transitions perspective in a transdisciplinary case study of the Rector-Executive Mayor Forum in Stellenbosch, a major town in Stellenbosch Municipality in the Western Cape Province of South Africa.

The Rector-Executive Mayor Forum is an evolving governance arrangement between Stellenbosch University and Stellenbosch Municipality and demonstrates a joint response to various development- and sustainability-related challenges in the greater Stellenbosch region. A transdisciplinary methodology shaped a period of extensive embedded research as the researcher participated in the Rector-Executive Mayor Forum and its substructures, the Infrastructure Innovation Committee and the Integrated Planning Committee. The case study tracks the progression of the IIC and the IPC between August 2013 and April 2015.

The perspective on sustainability transitions framing this research is formulated around the strategic centrality of cities and stresses the importance of the conceptual notions of space, intermediaries and learning therein. The concept of space refers to the geography of sustainability transition and the necessity for transition efforts to be deployed at the urban scale. The concept of intermediaries points to the appropriate structuring of governance arrangements to support socio-technical transitions. Finally, the recognition of learning stresses the importance of transformative social learning processes in orienting sustainability transitions. Overall, a comprehensive analysis of the sustainability transitions literature with special reference to space, intermediaries and learning motivates a more detailed exploration of intermediation and learning processes in particular and therefore advances a framework of urban learning to enhance this perspective. The conceptual framework of urban learning combines transition management, the Learning City and Assemblages approaches.

The sustainability transitions perspective and the accompanying framework of urban learning is used to analyse the development of the Infrastructure Innovation Committee and Integrated Planning Committee's guiding strategic documents. The outcome of this research investigation is the development of a unique sustainability transitions perspective that is complemented by a comprehensive framework of urban learning. Through the transdisciplinary case study in Stellenbosch, this is shown to be helpful in a attaining a deeper understanding of the particularities of how urban transitions unfold and how these might be stimulated, facilitated or steered towards sustainability.

Opsomming

Die doel van hierdie tesis is om ondersoek in te stel na die rol van tussengangers en onderrig in volhoubare oorgang op ‘n stedelike skaal en ontplooi veral ‘n oorgangsperspektief binne ‘n transdissiplinêre gevallestudie van die Rektor-Uitvoerende-Burgermeestersforum in die Stellenbosch Munisipaliteit in die Wes-Kaapprovinsie van Suid-Afrika.

Die Rektor-Uitvoerende-Burgermeestersforum is ‘n ontwikkelende bestuursooreenkoms aangegaan tussen die Universiteit van Stellenbosch en Stellenbosch Munisipaliteit en demonstreer ‘n gesamentlike reaksie op verskeie ontwikkelings- en volhoubaarheidsverwante uitdagings binne die groter Stellenbosch-streek. ‘n Transdissiplinêre metodologie het vorm gegee aan ‘n tydperk van uitgebreide en vasgelegde navorsing deur die navorser se deelname aan die Rektor-Uitvoerende-Burgermeestersforum en die betrokke substrukture, die Infrastruktuur-Innovasiekomitee en die Geïntegreerde-Beplanningskomitee. Die gevallestudie volg die vordering van die IIK en die GBK binne die tydperk van Augustus 2013 en April 2015.

Die perspektief op volhoubare oorgang wat die raamwerk van hierdie navorsing vorm, is geformuleer rondom die strategiese sentraliteit van stede en beklemtoon die belangrikheid van konseptuele idee’s van ruimte, tussengangers en onderrig binne hierdie raamwerk. Die konsep van ruimte verwys na die geografie van volhoubare oorang en die noodsaaklikheid vir oorgangspogings om ontplooi te word op die stedelike skaal. Die konsep van tussengangers verwys na die gepaste strukturering van bestuursreëlinge om sosiotegniese oorgang te ondersteun. Laastens beklemtoon die erkenning van onderrig die belangrikheid van transformerende sosiale leerprosesse in die oriëntering van volhoubare oorgang. In die geheel motiveer ‘n omvattende analise van die volhoubare-oorgangsliteratuur, met spesifieke verwysing na ruimte, tussengangers en onderrig, ‘n meer gedetailleerde verkenning van spesifiek intermediasie en leerprosesse met die gevolg dat dit ‘n raamwerk van stedelike onderrig bevorder om hierdie perspektief te bevorder. Die konseptuele raamwerk van stedelike onderrig is ‘n kombinasie van oordragsbestuur, die *Learning City*-benadering, asook samevoegings-/versamelingsbenaderings.

Die perspektief op volhoubare oordrag en die gepaardgaande raamwerk van stedelike onderrig word gebruik om die ontwikkeling van die Infrastruktuur-Innovasiekomitee en die Geïntegreerde-Beplanningskomitee se strategiese voorligtingsdokumente te analiseer. Die uitkoms van hierdie navorsingsondersoek handel oor die ontwikkeling van ‘n eiesoortige volhoubaarheidsoordragsperspektief wat deur ‘n omvattende raamwerk van stedelike onderrig aangevul word. Deur die transdissiplinêre gevallestudie op Stellenbosch, blyk dit nuttig te wees om ‘n beter begrip te verkry van hoe stedelike oordrag in die besonder ontvou en hoe dit gestimuleer, gefasiliteer of in die rigting van volhoubaarheid gestuur kan word.

Acknowledgements

This thesis marks the end of three years of study at the Sustainability Institute. Looking back over this time, I reflect with gratitude, and marvel at all I have learnt, the richness of my experiences and the outstanding people I have met. Thank you to the SI staff, lecturers and fellow students for encouraging, challenging and inspiring me during this time. The biggest thanks must go to my supervisor and academic mentor, Prof Mark Swilling, for guiding and investing in me. I feel privileged to be connected to this place and community of people.

This extensive period of research was made possible, in part, by the financial assistance of bursaries from the National Research Foundation in 2014 and the Harry Crossley Scholarship in 2015. At a time when students across the country at South Africa's tertiary institutions are tackling issues of accessibility and transformation, I am grateful that I have been able to complete a Master's degree at Stellenbosch University with the opportunities this affords me in developing my career as an aspiring African urbanist.

At the same time as working towards an academic qualification, I was also fortunate to gain experience in a real life setting working alongside municipal officials and university researchers as they engaged within the Rector-Executive Mayor Forum. Sincere thanks must also go to all participants who contributed to the research project, especially the members of the Infrastructure Innovation Committee and the Integrated Planning Committee.

This accomplishment would not have been possible without the support from my family and friends. Thank you to my parents, Julie and David, for supporting my personal and educational development and to my brother, Kevin, for being my lifelong best friend. Thank you also to my close friends, in Stellenbosch, Cape Town, and across the world for supporting me so generously along the way.

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List of Acronyms and Abbreviations

ANT	Actor Network Theory
BER	Bureau for Economic Research
CBD	Central Business District
CFO	Chief Financial Officer
CIMS	Capital Investment Management System
CNdV	Africa Landscape Architecture
CoJ	City of Johannesberg
CS	Complex systems
ES	Evolutionary systems
FP	Financial Plan
GDPR	Gross Domestic Product Real
ICSC	International Centre for Sustainable Cities
IDP	Integrated Development Plan
IIC	Infrastructure Innovation Committee
IPC	Integrated Planning Committee
IS	Innovation Systems
LED	Local Economic Development
MAYCO	Mayoral Committee
MDGs	Millennium Development Goals
MLP	Multi Level Perspective
MSA	Municipal Services Act
MSDF	Municipal Spatial Development Framework
OECD	Organisation for Economic Cooperation and Development
PDG	Palmer Development Group
PLUS	Partners for Long-Term Urban Sustainability
REMF	Rector-Executive Mayor Forum
SAG	Strategic Analysis Group
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
SEMF	Stellenbosch Environmental Management Framework

SI	Sustainability Institute
SID	Stellenbosch Innovation District
SIP	Strategic Infrastructure Plan
SITT	Strategic Infrastructure Task Team
SM	Stellenbosch Municipality
SPL	School of Public Leadership
SSC	Shaping Stellenbosch Campaign
SSDF	Stellenbosch Spatial Development Framework
STOD	Sustainable Transit Oriented Development
SU	Stellenbosch University
TD	Transdisciplinary research
TM	Transition Management
TOD	Transit Oriented Development
TOR	Terms of Reference
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WCEDP	Western Cape Economic Development Partnership
WCIF	Western Cape Infrastructure Framework

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Chapter 1: **Introduction to the research**

Looking into the urban future requires urban practitioners to think radically differently about how human societies are organised in relation to both the socio-technical systems that conduct and shape our production and consumption patterns, and the natural world in which socio-economic systems are embedded and rely upon.

Sustainable development remains a vague, ambiguous and contested notion. However, what is broadly accepted is that deep-seated transformation is required in order to address the 'wicked' problems that hinder the realisation of dignified, equitable lives and livelihoods across the globe, and compromise the resilience of natural systems (Mebratu, 1998).

As cities are the focus of population and economic growth, they are increasingly acknowledged as the localities where the reconfiguration of our socio-technical and socio-ecological systems should take place (Hodson, Marvin, Robinson & Swilling, 2012). As of 2007, cities are home to the majority of the global population, and where approximately 75% of global resource consumption occurs (Hodson *et al.*, 2012). However, as "unique spaces that connect a wide range of actors, networks, infrastructures, resource flows, cultures, social processes, and histories, within specific biophysical, ecological, and political contexts", cities offer significant potential in finding ways to reconcile economic growth, human wellbeing and the sustainable resource use (Hodson *et al.*, 2012:789).

Thinking about change in cities also requires exploring how such systemic change could be structured, in what settings it is focused and under what conditions it takes place. This is because sustainability-oriented urban transformation does not occur simply because it is desired (Smith, Stirling & Berkhout, 2005). Rather transitions are made possible by the existence of conducive institutional spaces where suitable combinations of actors can negotiate and engage in coordinated strategies to transform urban socio-technical systems towards sustainability. The field of sustainability transitions offers a range of frameworks through which to understand large scale societal transformation, and coordinate or facilitate transition efforts and activities (Van den Bergh, Truffer & Kallis, 2011). Generating richer insights about sustainability transitions at the urban scale is pertinent especially since the urban arena is a relatively recent context for socio-technical transitions research.

For the African continent, the rapid transition to a predominantly urban population has vast implications for the way we think and act in our cities (Parnell & Pieterse, 2014). With unique urban challenges, finding pathways towards sustainability in towns and cities across the continent presents a critical task for urban practitioners. This research is an exploration of one such complex urban system in transition. It presents a transdisciplinary researcher's personal account of various transformation processes in Stellenbosch Municipality, in the Western Cape Province of South Africa. The outcome of this research investigation is the development of a unique sustainability transitions perspective that is complemented by a comprehensive

framework of urban learning. Through the transdisciplinary case study in Stellenbosch, this is shown to be helpful in a attaining a deeper understanding of the particularities of how urban transitions unfold and how these might be stimulated, facilitated or steered towards sustainability

1.1. Contextualising the research

Stellenbosch Municipality (SM) aims to position itself as a leading and innovative African city-region. Although it is a relatively small municipality, with a population of about 180,000 (Stellenbosch Municipality, 2015a), it is faced with a host of developmental and urban sustainability challenges, experienced predominantly in the town of Stellenbosch, the municipality's largest urban node. These include substantial infrastructure backlogs due to long-term under-funding and insufficient provision for future demand, and ad-hoc spatial development which entrenches spatial exclusion and economic disparity. This complex, and seemingly intractable, dynamic hinders the municipality's mandate of delivering sufficient and equitable basic services and enabling inclusive local economic development. Realisation of an ecologically and economically sound development trajectory for the region is hindered by a lack of internal strategic coordination and long-term integrated planning. Historically, this is evident in the lack of coordination with private sector, civil society and research institutions, particularly with Stellenbosch University (SU), an internationally renowned research institution around which the local economy is anchored.

It is within this context that a set of relationships has opened up over the last decade and culminated in a unique governance arrangement between the university and municipality. The Rector-Executive Mayor Forum (REMF), set up in 2005, has resulted in two recent sub-committees—the Integrated Planning Committee (IPC) and the Infrastructure Innovation Committee (IIC). Constituting municipal officials and political representatives, select private sector players, and university researchers and administrators, the IIC and IPC represent the coming-together of a diverse array of stakeholders, with distinctive objectives and visions for the future, in an effort to jointly tackle the region's development and sustainability challenges.

Guided by a transdisciplinary research methodology, this research is the culmination of 21 months of intensive engagement, observation and participation as an embedded researcher in this unique and ongoing governance arrangement. It was characterised by an unprecedented and sustained level of access and involvement on the part of the researcher in an established and stable research environment. In this way, it served as an invaluable opportunity to investigate how this governance arrangement might offer potential insights to how sustainability transition activities are initiated and structured thus enabling stakeholders to collaboratively recognise, articulate and address their distinct or shared challenges. This is investigated in two major recent outputs from the REMF that, if implemented, are set to completely transform the future developmental trajectory of the region. These include the draft Stellenbosch Spatial Development Framework (SSDF) produced by the IPC and the Stellenbosch Quo Vadis document produced by the IIC. Together, these documents reflect the outcome of nearly five years of debate and engagement between the

institutions, particularly around issues of sustainability, infrastructure development and spatial planning. They provide the basis for a large-scale program of collaboration, innovative design and urban experimentation in Stellenbosch over the coming years. Such initiatives include possible targeted urban interventions in inter-related systems connected to the wider Western Cape region, including transport and mobility, water, sanitation and sustainable waste management, energy and integrated human settlements.

As important as the strategic contents and possible outcomes of these documents are, the process by which they have been produced is perhaps more so, and provide unique insight into the emergence of urban experimentation for sustainable development in the region. The process has resulted in unprecedented cooperation between different departments within Stellenbosch Municipality, and encouraged more meaningful integrated planning between the SU and SM.

Capturing this process requires recognising two important aspects of the involvement by stakeholders within the IIC and IPC. Firstly, the overarching research engagement illuminates the underlying realisation on the part of a few key municipal officials, that, on their own and for a host of reasons, they continue to be unsuccessful in effecting their desired systemic transformation. Secondly, the engagement shows the readiness with which academic researchers, versed in transdisciplinary modes of research, have partnered with municipal officials to participate in this intermediation space. Municipal administrators have utilised this collaboration as a way of activating pertinent resources and capabilities outside of their jurisdiction. For researchers, this space has opened up novel research opportunities for real-world problems to become the focus of applied sustainability research. Thus, the facilitation of collaborative governance in SM by key researchers and students has made possible the demand of sustainability science: allowing real-world problems to become the drivers for transdisciplinary research and learning.

1.2. Background and motivation

Through my learning journey at the Sustainability Institute (SI), studying sustainable development, I became aware of the centrality of cities in the global sustainability movement. As an aspiring urban researcher, I developed a keen interest in exploring the capacity and enabling conditions required for the transformation of urban systems, particularly for those in Africa. Essentially, the question that began forming in my mind was, *what does it take to make cities, particularly those in the Global South, more sustainable*? The notion of *urbanism*, its inextricable connection to urban infrastructures, described as *socio-technical systems*, and the *governance* of such systems in sustainability-oriented transitions were empowering concepts in the emergence and formulation of this research inquiry.

Urbanism and 'the city'

I developed a keen interest in how the everyday experiences of urban dwellers, embedded in the infrastructural form of an urban system, are conceptualised in the discourse of urban sustainability. Different modalities of urbanism shed light on the defining factors or characteristics "that make that particular place

and moment what it is" (Swilling & Annecke, 2012:106). The wide array of conceptions of urbanism provide metaphoric or conceptual lenses through which we understand the explicit planning and spontaneous emergence of the urban form and its social fabric. Such forms of urbanism include slum urbanism, splintered, green, inclusive and liveable urbanism (Swilling & Annecke, 2012). These present 'ways of seeing' in the urban space, assist in making sense of, and distinguishing between, confusing urban realities and ultimately constitute our understanding of 'the city'.

Infrastructure and socio-technical systems

Conceptions of urbanism thus enhance our understanding of the factors that give rise to particular urban forms (Swilling & Annecke, 2012). Aspiring to understand 'the city' from the lived experiences of urban dwellers necessitates comprehending particular systems of networked and informal infrastructure since "infrastructure, through its configuration, dictates how individuals negotiate their daily lives" (Hyman, 2010:1). These networked infrastructures are the manifestation of complex interactions between arrangements of social, ecological, economic, technological and institutional structures (Hyman, 2010). They enable the functionality of cities by conveying resources for the delivery of basic services and the fulfilment of human needs. In this way, particular configurations of infrastructure give rise to unique modalities of urbanism. Conversely, urbanism can be approached as sets of values which are manifested in specific forms of infrastructure which in turn, shape the urban form. A consideration of urbanism sensitises urban practitioners and researchers to the socio-material conditions that give rise to, and shape, distinct urban realities.

Understanding cities as socio-technical systems recognises the interdependencies between technical configurations of infrastructure and related socio-economic dynamics. Pursuing socio-technical transitions emphasises interventions that facilitate the transformation of both the technological and socio-economic aspects of urban systems towards sustainability. Infrastructure thus comes to the fore as a potentially powerful point of intervention in the transformation of urban systems (Swilling, Robinson, Marvin & Hodson, 2011; Swilling, Robinson, Marvin, Hodson & Hajer, 2013)

The governance of socio-technical transitions

As opposed to being merely the spontaneous outcome of dynamic urban interactions, socio-technical transitions require focused facilitation (Swilling *et al.*, 2011). The comprehensive literature around sustainability transitions offers various macro perspectives on large scale societal transformation. However, transitions need to be accounted for at multiple levels, often most tangibly and powerfully at the scale of the city.

Steering urban development trajectories towards sustainability-oriented visions and objectives necessitates the cultivation and deployment of suitable knowledge, capacity and capabilities at the urban scale (Swilling *et al.*, 2011). Following this, (re)shaping cities, understood as socio-technical systems, demands a

consideration of the governance conditions within which these changes might occur. Swilling and Annecke (2012:xiii) explain that sustainability transitions necessitate "deep structural changes that will require extensive interventions by capable developmental states, active commitments by progressive business coalitions and a mobilised civil society rooted in experiments that demonstrate in practice what the future might look like". Governance arrangements that go beyond conventional practices and focus on more meaningful cross-sector collaboration thus become a crucial focus in shaping urban socio-technical transitions (Pahl-Wostl, 2002; Van de Kerkhof & Wieczorek, 2005; Backstrand, 2006; Garmendia & Stagl, 2010; Nevens, Frantzeskaki, Gorissen & Loorbach, 2013; Freeth & Annecke, 2014).

There is significant evidence to suggest that cities across the world are experimenting with governance arrangements which include wider ranges of actors from business and civil society in order to address matters such as climate change, food and energy security amongst others (Khan, 2013; Bulkeley, Harriet, Broto, Vanesa Castan, Maassen, 2014; Voytenko, McCormick, Evans & Schliwa, 2015). This is motivated by that fact that traditional boundaries of policy making and urban planning often stand in the way of solving interconnected problems, as embodied by the global polycrisis (Tàbara, Cazorla, Maestu, Massarutto, Meerganz, *et al.*, 2005; Kranz, Patel & Ridder, 2006; Ansell & Gash, 2008; Nevens *et al.*, 2013). An exploration of governance experiments is vital as it brings to light the mechanisms, settings, relationships, actors and resources responsible for effecting urban transitions.

Smith *et al.* (2005) discuss the governance of socio-technical transitions, with particular focus on the role of agency and capacity of transition actors. They suggest that system change is "enacted through the coordination and steering of many actors and resources, whether these are intended or emergent features of transformation processes" (Smith *et al.*, 2005:1492). This framework of regime transformation asserts the importance of the *articulation* of pressures bearing upon a particular system, and the *adaptive capacity* available to the regime. Adaptive capacity is a function of resources and coordination within a particular transition context. It describes the availability of resources required for effective regime transformation as well as the extent to which responses to system pressures are coherently coordinated (Smith *et al.*, 2005). More simply, adaptive capacity refers to the ability of a particular system to contend with change in a proactive and logical manner. This concept, and the framework developed by Smith *et al.* (2005) have been instrumental in framing how the governance of sustainability transitions might be analysed and have served as a key concept in orienting this research.

The concepts of urban sustainability, urbanism, socio-technical systems and governance have served as foundational concepts which have framed my exploration in a real-world research context. As a point of entry, they justified a research interest in the possible intersections between intermediaries and learning in urban transitions, and urbanism and the governance of socio-technical transitions. However, as much as these concepts were useful in the orientation of the research, contributions from real-world experiences in Stellenbosch Municipality were far more significant in shaping its focus.

1.3. **Refining the topic**

With the exploration of urban transitions as my firmly established research interest, I established myself in my local urban context as both an academic researcher and an active citizen. I sought out opportunities in Stellenbosch where I might be able to gain exposure and experience during the course of the Postgraduate Diploma in Sustainable Development Planning and Management at the SI in 2013. Further motivation for embedding myself within this local urban system was the appeal of the transdisciplinary research approach.

The evolution of this research topic has been shaped by a methodology which is inherently iterative, reflective and informed by real-world problems. Unlike conventional research processes, a transdisciplinary methodology, detailed in Chapter 2, removed the obligation of having an explicit or fixed research problem from the onset. Instead, embedding myself as a researcher became the primary objective of the research. Thus, concurrent to a comprehensive literature analysis process, and through careful listening and observation enabled by trust- and relationship-building, I was able to articulate an understanding of what was going on in this real-world context and develop a unique research angle. Identifying this research angle was not a straightforward process and required me to distinguish my own research agenda from the purpose of the wider collaboration, as explained across Chapter 5 and Chapter 6.

As an intern between March and November 2013, I assisted the Stellenbosch Innovation District (SID) (see innovationdistricts.org) team in growing the organisation's network and local presence, most significantly through a number of workshops and events. This internship was beneficial for three reasons. Firstly, SID's vision of Stellenbosch becoming a Smart Test Town by 2030 helped me become more familiar with the smart city discourse. Smart cities focus primarily on the role of ICTs as the enablers of urban development where connectivity, efficiency and innovation are prized (Luque-Ayala & Marvin, 2015). This experience challenged me to think about what kinds of urbanism smart city technologies and interventions might result in. More particularly, I wondered what the implications might be for cities in Africa, for which poverty, informality and weak governance systems are typically defining characteristics (Parnell & Pieterse, 2014). Secondly, the SID's vision of building an 'innovation ecosystem' in the Stellenbosch region exposed me to the connection between innovation systems and urban development. I began to consider and research the role of innovation in urban transitions—the evolution of this research undertaking has its roots in this initial exploration of innovation and innovation systems in cities. Finally, involvement with the SID was useful in building connections with municipal officials, business people and civil society representatives in Stellenbosch.

During the latter half of 2013, I was invited by Prof Swilling, to participate in two other concurrent governance initiatives unfolding in Stellenbosch Municipality. These were the SSDF process driven by the IPC and the Strategic Infrastructure Task Team (SITT), now called the IIC. What quickly became apparent through participation in these processes was the magnitude of Stellenbosch's urban sustainability challenges. Yet what was also quite apparent was the potential offered by novel governance arrangements like these in supporting officials to address challenges more effectively.

Having recognised these interconnected processes as possible research opportunities drawing together a host of urban research topics, I set about establishing a research exploration around the role of innovation in urban transitions. Innovation is a common for these three processes—the SID and both REMF sub-committees—in that they have each explicitly adopted innovative approaches to addressing pertinent local challenges. Moreover, innovation is a prominent component of the respective initiatives, certainly to an extent inspired and justified by Stellenbosch Municipality's Mayor championing the municipality's vision of becoming the Innovation Capital of South Africa (Stellenbosch Municipality, 2014a).

Following the initial broader exploration and given my capacity as a researcher, the REMF collaboration and its two subcommittees, the IIC and IPC, were selected as the sites for transdisciplinary research engagement.

My experience with the REMF subcommittees shifted the research from exploring innovation systems, to the role of infrastructure in socio-technical systems and finally to the role of intermediaries and learning in urban transitions. The UNEP City Level Decoupling Report was integral in this redirection since the findings assert "the importance of intermediaries as dominant agents for change...as well as the fact that social processes and dynamics need to be understood and integrated into any assessment of urban infrastructure interventions" (Swilling *et al.*, 2013:3). The role of intermediaries in sustainability-oriented urban socio-technical transitions resonated strongly with what had been observed with regards to the innovative and experimental governance approaches of the IPC and IIC under the REMF arrangement. Participants within these committees often lamented a 'lack of capacity'— at some point it became apparent to me that this this was a recurring theme and one that threaded through many diverse conversations and interactions. This realisation shifted the focus from the reconfiguration of infrastructure and socio-technical transitions, to the role of intermediaries in sustainability transition processes thereby considering the social processes and dynamics referred to in the UNEP City Level Decoupling Report. This was further motivation to give explicit attention to learning processes in relation to intermediaries, with initial research findings positing transformative learning as a crucial component of sustainability-oriented transition processes (Selby, 2007).

1.4. Research question and objectives

Reaching a research question and objectives was not a straightforward task; it took many months of exploration and reflection, of continually asking myself, 'what is going on here?' A transdisciplinary approach removed the obligation of entering this real-world context with a coherent, pre-defined and fixed problem statement. Instead, it cultivated in me a spirit of openness and attentiveness to the context in which I immersed myself. From the perspective of an embedded researcher, this helped me to build a rich understanding of the dynamics of this intermediation space, and the broader environment in which the REMF sub-committees are located.

1.4.1. From a shared problem statement to a unique research question

As trivial as it may seem, it was a breakthrough when I came to realise that it was not my task as a researcher to fix this dysfunctional urban system with its massive infrastructure backlogs and clashing development forces—this was the responsibility of municipal officials; their 'problem'. 'My problem' was understanding and capturing the actual process of engagement which these stakeholders entered into, jointly shaped and operated within—the intermediation space and learning processes which the IIC and IPC under the REMF came to represent. Simply put, a focused examination of the collaboration process translated into tracking the evolution of a set of unfolding relationships within a unique institutional and urban setting which served as a space for intermediation and transformative learning processes.

My research question and objectives were shaped by a problem statement formulated by the IIC and used as a foundation for both the sub-structures of the REMF. Facilitated by the transdisciplinary research environment, the multiple participants in the REMF were able to reach a shared understanding of the various infrastructure- and development-related impediments to fulfilling the municipality's service delivery mandate. This is captured by the following problem statement, generated by the SITT in 2012, and adopted by the IIC in November 2013 as its basis for continued discussions around infrastructure and development in the region:

> "The current state of affairs relating to infrastructure in the Stellenbosch municipal area is that the existing landfill is full, sewage treatment plants have reached capacity, key components of the existing road infrastructure are failing and due for upgrading, water supply over the long-term is not secure and energy supplies are becoming increasingly expensive and are effectively capped until 2014/15 (or later). Therefore Stellenbosch cannot function properly and day to day management is under threat. Furthermore, there is a real risk that development applications cannot be approved in Stellenbosch because the required infrastructure to support future development is inadequate" (IIC, 2014a).

The IIC's Founding Document and the Quo Vadis Document recognise some of the contributing factors that gave rise to this significant and complex urban development dynamic (IIC, 2014a).

> At the time of the generation of this problem statement in 2012, the causes of this problem could be summed up as follows:
>
> - Insufficient capital spending over many years has resulted in a backlog of more than R1 billion required to address the backlog;
> - Relative to what is needed to overcome the backlog, current capital budgets for Engineering per annum are inadequate – current 2014/ 2015 Engineering capital budget is around R230 million;

- Due to lack of capacity and other restrictions, under-spending of existing budgets is the norm thus reinforcing and increasing the backlog though current (2014) expenditure has improved markedly;
- Limits to borrowing capacity, especially in light of the limited size of the tax base (30 000 accounts of which only a third can easily afford the rates) and expanding number of informal structures and indigent households;
- Inefficient use of and limitations to existing resources and staff, partly related to organisational development, skills issues and critical vacancies, but also due to low morale;
- Dependence on conventional technologies that have become increasingly expensive to operate and to extend without adequate knowledge of alternatives;
- The absence of a clear-cut spatial development framework that defines future development priorities.

This problem statement presents a brief and predominantly technical perspective on the significant and complex infrastructure and development challenges faced by Stellenbosch Municipality. Similarly, the listed reasons for these problems are relatively simplistic in that they focus on technical, policy and monetary factors primarily related to infrastructure development and provision. In my view, this problem statement does realistically capture the extensive and debilitating infrastructure problems facing the municipality as well as point to the deeper issue of a lack of adaptive capacity within Stellenbosch Municipality.

Embedded within this intermediation space, I was able to develop a research question and objectives informed by, and located within, the infrastructure and development related challenges that the IIC and IPC were tackling. It became evident that a multiplicity of research strategies could be pursued, building upon the joint problem statement outlined above, many of which could address the technical realities relating to the choice of infrastructure technologies, as one such example. Given my interests, personal, academic and research capabilities as a social scientist interested in relationships and partnerships for sustainability, I chose not to conduct research aimed to deliver technical solutions to their problems, but rather to investigate the *process* in which the stakeholders within the REMF subcommittees were implicated.

Smith *et al.*'s (2012) framework of socio-technical transitions served as a bridge between the identified problem of a lack of capacity to initiate a sustainability transition in SM and my focus on a process-oriented research question. Smith *et al.* (2012:1492) suggest that "in the long-run, the particular form and direction of regime transformation, and the associated modes of governance, will depend on the *transition context*: a function of the availability of *resources* and how they are *coordinated*", (my emphasis). Thus, it follows that the transition context is a function of adaptive capacity. My focus on the process aimed to better understand this particular transition context in terms of how stakeholders went about accessing suitable knowledge, resources and partnerships and then in what manner these activities were coordinated within the

intermediation space made possible by the REMF and its sub-structures. Since 'adaptive capacity' is an often indeterminable factor, difficult to quantify and measure (Pelling & High, 2005; Engle, 2011), developing a richer understanding of this transition context in terms of resources and coordination, necessitated examining the process of learning and intermediation that is facilitated.

1.4.2. Research question and objectives

Faced with seemingly insurmountable urban development challenges, particularly around the provision and planning of infrastructure services in Stellenbosch Municipality in the Western Cape, a few key officials within the municipality have come to the realisation over the last few years that amongst themselves, and with the limitations of this local municipality, they have been, and will continue to be, unable to coordinate sufficient adaptive and innovative responses required to overcome these obstacles.

This shared awareness of the imperative for meaningful transformation in how they manage the urban system for which they are responsible, has resulted in an openness to establishing and participating in a collaboration with Stellenbosch University, through the REMF and its two-committees, the IIC and IPC. It is also indicative of an absence of effective spaces for strategic, critical and creative engagement within the current configuration of their organisation. Additionally it points to insufficient adaptive capacity to contend with socio-technical, political and environmental pressures bearing down on the urban system for which they are responsible. Thus, participation in these sub-structures offers stakeholders from Stellenbosch University and Stellenbosch Municipality opportunities to interact in a space of intermediation that activates, coordinates and sustains particular combinations of resources and capabilities that would otherwise not be possible.

The REMF and in particular the IIC and IPC, represents a coming-together of researchers aligned with a transdisciplinary methodology and municipal officials seeking alternate and additional knowledge and resources in a fluid and constantly evolving governance arrangement.

In pursuit of urban socio-technical transitions, how is it that urban actors learn, particularly as they engage within a facilitated 'learning agora', supported by transdisciplinary research efforts that serve to enrich their understandings in way that reinforce multi-level learning processes?

In answering this question, the primary objective of this research is to:

- Contribute to the literature on urban learning and socio-technical transitions by building a case for the role of cities, intermediaries and learning therein, from a transdisciplinary research engagement in Stellenbosch Municipality.

This will necessitate a secondary objective to:

- Become an embedded researcher, immersing myself in an innovative governance arrangement between Stellenbosch University and Stellenbosch Municipality.

Further detail is elucidated in the following sub-objectives:

- Demonstrate the contributions of the transdisciplinary research methodology for advancing sustainability science (Chapter 2: Research Design and Methodology).
- Demonstrate how cities are at the centre of the drive towards sustainability together with the importance of learning and collaboration in the governance of urban socio-technical transitions (Chapter 3: Literature Analysis Part 1: Sustainability, Cities and Transitions).
- Interrogate the recognition of cities, intermediaries and learning in the urban sustainability and socio-technical transitions literature and build a complementary framework of urban learning (Chapter 4: Literature Analysis Part 2: Towards a conceptual framework of learning in transitions).
- Situate Stellenbosch Municipality within a wider regional, provincial, national and international context in terms of its particular development and sustainability challenges (Chapter 5: An introduction to Stellenbosch Municipality).
- Develop a comprehensive case study narrative of the *transition context* that demonstrates how the REMF and in particular its two sub-committees evolved during the period August 2013 – April 2015 (Chapter 6: Case study narrative: REMF transition context).
- Analyse the particularities of the collaborative process within the *transition context* as a hybrid space of intermediation and learning (Chapter 6: Case study narrative: REMF transition context).

1.5. Introduction to the research design and methodology

In light of the dynamic research environment, the research design intended to provide sufficient structure as well as flexibility. The transdisciplinary approach enabled such an iterative, reflexive, recursive and adaptable process.

Issues related to the contributions of transdisciplinary research to sustainability science, the multiple roles, identities and responsibilities of the researcher, a detailed presentation of the respective methodological tools, as well as the interdependencies between insights about intermediation and learning with the research's methodological underpinnings, will be further elaborated on in Chapter 2. What follows in an outline of the transdisciplinary research design, the principles underpinning this approach and a brief explanation of the process that was followed in this research.

1.5.1. Motivation for a transdisciplinary research design

Transdisciplinary research was identified as the most suitable research design given the complex nature of the research context and uncertainty around a joint understanding of the research problem.

As explained by Hirsch Hardorn *et al.*, "knowledge about a societally relevant problem field is uncertain, when the concrete nature of problems is disputed, and when there is a great deal at stake for those concerned by

the problems and involved in investigating them" (Hadorn, Biber-Klemm, Grossenbacher-Mansuy, Hoffmann-Riem, Joye, *et al.*, 2008:37). All three factors are true in this case.

Regeer and Bunders (2009:11) describe how "unstructured problems require a common learning process between different social actors". The authors explain that the transdisciplinary research approach "induces new relations between actors and thereby attempts to structure developments in science and technology in favourable directions so that it might better complement present-day problems" (Regeer & Bunders, 2009:22).

For this reason, transdisciplinary research is "consistent with the idea of an intrinsic interwovenness or co-evolution of science and society" (Regeer & Bunders, 2009:28). The responsibility of solving unstructured problems does not lie with one particular domain but rather out of the co-production of knowledge in an attempt to build capacity in society. Scientific and societal domains actively seek the best way of structuring and managing complex change process in pursuit of socially robust knowledge as well as reliable scientific knowledge (Regeer & Bunders, 2009). In essence, transdisciplinary research is not employed to induce or extract research-oriented outcomes. Rather it represents a mode of applied research and collaboration more sensitive to the necessity for diverse stakeholders to jointly make sense of and address their challenges.

1.5.2. Principles of transdisciplinary research informing the research design

Pohl, Hadorn and der Wissenschaften Schweiz (2007) depict four key principles of transdisciplinary research which inform the research design. Each principle is pertinent in that informed the way in which relationships and networks were fostered in the research process. The principles are helpful in understanding how shared learning and knowledge creation were fostered in the REMF's sub-committees and their wider networks.

The first principle of transdisciplinary research—"elaborating knowledge of immediate social relevance" (Pohl *et al.*, 2007:6)—is about coming to terms with complexity by considering the knowledge relevant to practice-oriented problem-solving. It is "necessary to find out what kind of systems perceptions underlies a project, what normative targets it has set itself, and what potential societal transformation it aims towards(Pohl *et al.*, 2007:6). Explained below are the three types of transdisciplinary knowledge.

- *Systems knowledge* corresponds to knowledge about the current state or the problem situation.
- *Target knowledge* refers to the desired future states.
- *Transformation knowledge* depicts the manner in which transitions to the target state is achieved.

Although all three types of transdisciplinary knowledge were generated through this research, explicit attention was given to the process-oriented research objective which aimed at generating transformative knowledge by focusing on the dynamics and conditions of complex change processes unfolding in SM.

The final three principles of transdisciplinary research are "achieving effectiveness through contextualisation" by developing knowledge which is embedded in scientific and real-world contexts;

"achieving integration through open encounters" by being cognisant of one's own perspectives within a space of engagement amongst varied stakeholders; and finally "developing reflexivity through recursiveness" by ensuring space for project iterations, refinements or adjustments (Regeer & Bunders, 2009:6). Entering into an already established transdisciplinary research engagement was advantageous in that I was quickly able to identify these principles in action in the manner in which researchers engaged with stakeholders in the space of intermediation created by the REMF.

The REMF does not strictly or formally follow the various stages of transdisciplinary research as outlined by Pohl *et al.* (2007). Instead, on reflection, it becomes apparent how the REMF sub-committees iteratively and recursively moved through the process of problem identification and structuring, problem analysis and bringing results to fruition (Pohl *et al.*, 2007).The same can be said about my own research within this wider process—whilst the principles and stages of transdisciplinary research provided a foundation upon which I based my engagement as an embedded researcher, it was only on looking back that I could distinguish particular instances or periods of time where different kinds of transdisciplinary work was being done or specific transdisciplinary knowledge generated. This reflexive methodology will be further elaborated in Chapter 2.

1.5.3. The transdisciplinary research process: an overview

Transdisciplinary research serves as an umbrella term for a broad range of methods and tools. In this case, an appropriate mix of qualitative strategies were employed to generate the required systems knowledge, target knowledge and, most importantly, transformation knowledge required to address the various research objectives.

The research approach began with a comprehensive literature search in order to develop a unique perspective on sustainability transitions focusing on space, intermediaries and learning as the core concepts. In the language of transdisciplinary research, this constituted the exploration of a relevant component of existing external systems knowledge. This was then grounded in a specific real-world context in Stellenbosch Municipality. Systems knowledge was generated in getting to grips with the urban system under exploration and in particular, the two REMF sub-committees. Developing the Quo Vadis document and working towards a draft SSDF was indicative of the creation of invaluable target knowledge—this emergent, internal shared vision of preferred future urban development is unprecedented in SM.

In a period of intense engagement between August 2013 and April 2015, I actively took part in the REMF's subcommittees, more specifically in the IPC's SSDF process as well as the closely related IIC (See Appendix D: Research engagements 2013 – 2015). Operating as a participant observer, I became a member of the core SSDF team and took on the responsibility of coordinating the IIC. Fulfilling integral functions, these roles allowed me multiple perspectives from which to reflect on the unfolding initiatives. This engagement has seen me attend over 90 events including outings, workshops, formal and informal meetings, and semi-

structured interviews (see Appendix D). During this time, I had the opportunity to engage informally with the wide network of stakeholders associated with these processes as well as conduct 10 semi-structured interviews with core members, see Table 1.1. This was fruitful in building a network of connections and a comprehensive understanding of the context. Assisting in a sustained, part-time capacity and developing professional relationships afforded me direct access to key role players as well as sometimes sensitive or restricted information.

Table 1.1: Semi-structured Interviews 2014

Name	**Organisation**	**Date**
Mark Swilling	SU	17-Feb-2014
Andre van Niekerk	SM	12-Mar-2014
Bernabe de la Bat	SM	05-May-2014
Johan Basson	Pvt	27-May-2014
Basil Davidson	SM	28-May-2014
Robert Davids	RAINN	28-May-2014
Saliem Haider	SM	02-Jun-2014
Dawid Botha	SM	04-Jun-2014
Marius Wust	SM	18-Jul-2014
Schalk Opperman	SU	29-Oct-2014
Blake Robinson	SI	24-Nov-2014

After a 21-month period of immersion and data collection, insights were synthesised with the conceptual framework to produce a case study, which captured the research journey and presented findings from the exploration of intermediaries and learning. Case study research constituted the overarching framework for the collation of information and insights given its congruence with transdisciplinarity and given that its draws from a variety of supporting tools and methods. Acknowledging the need for a dynamic approach to each component of the overarching case study was necessary. In practice, this pluralistic methodological approach made use of participant observation, ethnographic and narrative research and semi-structured interviews.

1.6. **Significance of the study**

The research's significance is considered in terms of its contribution to the literature on urban transitions and urban sustainability (Hodson & Marvin, 2010; McCormick, Anderberg, Coenen & Neij, 2013), the emerging field of transdisciplinary research in a Southern African context (Muhar, Visser & Van Breda, 2013; Swilling, 2014a), and also in terms of its impact on efforts to cultivate collaborative governance in a local municipal context (Swilling, Simone & Khan, 2003; Khan, 2013). In this way, both theoretical and practical, context-specific and generalised contributions are evident.

Developing a conceptual framework from which to explore the role of intermediaries and learning in urban transitions, as outlined in Chapter 4, and employing this in an applied case study in Chapter 6, endeavours to advance and enrich the field of sustainability transitions studies.

Locating this research in the context of urban sustainability is significant given the prominence of cities in uncovering pathways towards more sustainable development. Furthermore, it is unique in that it endeavours to connect a conceptual framework anchored by the role of intermediaries and learning in urban transitions, to an urban context where studies of this nature are not conventionally carried out. This proposition is justified by Hodson and Marvin's (2009, 2010) research around cities shaping socio-technological transitions, which identifies potential further research into purposive transition processes and the role of strategic intermediaries in ordinary, smaller- and medium-sized cities, particularly in the global south—Stellenbosch Municipality presents one such opportunity.

Beyond these conceptual contributions, this research is especially pertinent in the context of the Global South, and in particular southern Africa where Swilling *et al.* (2015) explain that "the focus of future development strategies, therefore, must be on the need for greater articulations between local initiatives and diverse social groupings across the urban system as a whole in order to mesh together increasingly complex patterns of survival, development and governance into a larger more coherent urban form premised on its own organic identities rather than contrived attempts to imitate urban modernities from other contexts". It is the intention of this research to articulate such a focus on uncovering and cultivating alternative development strategies in a southern African context, based on more collaborative and resilient governance arrangements and grounded in the particularities of a unique urban system.

Embracing a transdisciplinary approach, the research gives expression to a spirit of knowledge co-creation, in which the development of robust social and scientific knowledge hopes to benefit a diverse societal stakeholder group as well as contribute meaningfully to the field of transdisciplinary research in Southern Africa. As Muhar *et al.* (2013:122) demonstrate, sustainability and the challenges of the polycrisis present an opportunity for re-orienting and transforming academic research and learning. Addressing complex sustainability problems demands a shift from a 'science for society' approach to 'science with society' (Muhar *et al.*, 2013; Swilling, 2014a). This necessarily requires a shift in the role of universities and research

institutions—they must recognise their societal responsibility and play a leading role in tackling complex, intractable and 'wicked' sustainability challenges (Muhar *et al.*, 2013:128). As part of a wider transdisciplinary collaboration, this research project begins to demonstrate in practice how a mode of researching grounded in the ethos of 'science with society' takes form. This is pertinent in advocating for transdisciplinary research as a strategy to address challenges of the polycrisis in a way that delivers value to academic and societal stakeholders. In this case, from an academic or scientific perspective, this research depicts a methodological approach that contributes to redefining and extending transdisciplinary research in a South African context. It is therefore significant in exploring ways of conducting transdisciplinary research without societal stakeholders being invited into explicit, formal research projects but rather researchers basing active engagements in real-world contexts on core principles of transdisciplinarity.

A final consideration of this research's significance is in terms of its possible practical contribution to the context under exploration. A shared, real-world problem statement emerged from a sustained process of facilitated collaboration and was then translated into a scientific problem statement and research objectives. The practical significance of this research might be assessed in terms of any tangible and material outcomes for the town of Stellenbosch and the wider municipality (represented by the Quo Vadis document and the draft SSDF), coupled with qualitative shifts in perception regarding values of sustainable urban development within the REMF stakeholder network.

1.7. Limitations

In line with the qualitative nature of transdisciplinary research, limitations related to the role of the researcher must be addressed at the onset. As Yin (2011:13) explains, "in most situations the researcher unavoidably serves as a research instrument because important real-world phenomena...cannot be measured by external instruments but only can be revealed by making inferences about observed behaviours and by talking to people". Swilling (2014a:4) describes how transdisciplinary research "creates for the researcher a complex mode of double participation—as both 'participating insider' and as 'observer stranger'". As a researcher and student participant actively co-producing and articulating the case study narrative, it was necessary to negotiate the dynamic interplay between the variety of roles that were called for by participation in the IIC and IPC processes. The element of subjectivity is acknowledged in case study approaches to knowledge generation, but informed by Flyvbjerg (2006:224), "it is the only route to knowledge—noisy, fallible and biased though it be". For this reason, the following chapter is dedicated to reflecting and critiquing my journey as a transdisciplinary researcher to confront and reflect on the ways in which I personally shaped and interpreted this research process. It was in the same spirit that I chose to write this thesis in the first person as a way of recognising, from the onset, the subjectivity of my role in this unfolding narrative.

1.8. **Thesis outline**

Following this introductory chapter which has given a background to the study, identified the research problem and objectives, provided a short overview of the research design and highlighted its significance and limitations, the research will be presented in a further six chapters.

Chapter 2: explores the dynamics of a transdisciplinary research methodology and brings to light the challenges and advantages that come with engaging in a real-world context as a researcher. This chapter is significant in that I attempt to 'write myself into the story', reflecting on the ways in which my presence and pro-active participation as a young, female researcher had an influence on the manner in which my research, and the wider processes, unfolded.

Chapter 3: comprises the first component of the literature analysis and demonstrates three key arguments; firstly, that cities are critical sites for the development of pathways towards sustainable development, secondly, that a consideration of governance is imperative, and thirdly, that transformative social learning is important for orienting transition activities towards sustainability.

Using this as a foundation, the second component of the literature analysis in Chapter 4 develops a perspective on sustainability transitions that takes space, intermediaries and learning into account. It explores how each formulation of sustainability transitions—innovation systems, the multilevel perspective, transition management and evolutionary systems perspectives—incorporates, if at all, a consideration of space, intermediaries and learning. Thereafter, three orientations to urban learning are explored as part of a framework of urban learning.

Chapter 5 serves to situate the case study narrative by giving an overview of the context in which the research process unfolded. Chapter 6 follows with a detailed narrative of the case study which captures the processes from November 2013 to March 2015. This analysis is interwoven with an analysis of the case study, using the conceptual framework of urban learning to better understand the emergence of the REMF and the progression of the IIC and IPC.

Conclusions are drawn in Chapter 7.

Chapter 2: **Research Design and Methodology**

It was with great zeal that I embraced a transdisciplinary approach in this research project. The two years which I operated as an embedded researcher in SM were instrumental in demonstrating the suitability of transdisciplinary collaborations as ways of building knowledge and skills required to address sustainability challenges. This is located within a wider shifting research landscape in sustainability science that promotes knowledge production that attempts to solve real-world problems through a "context specific negotiation of knowledge" (Wickson, Carew & Russell, 2006:1046). Furthermore, problem-oriented knowledge generation must also be responsive to the needs and values of societies whilst supporting life-sustaining natural systems (Kauffman & Arico, 2014). The experience was also significant in how it cultivated various research-oriented skills in a practical setting as well as a reflexivity that allowed me to recognise and critique my own role as a researcher, and thus the methodology I embodied.

This chapter begins by situating transdisciplinary research within the field of sustainability science and expands on the role of transdisciplinary research in the shifting science-policy domain. It then explains how transdisciplinary research supported the creation of spaces of intermediation as part of the REMF collaboration. It will deconstruct the particular research approach in terms of my roles and activities as researcher, and the process that culminated in this Transdisciplinary Case Study. Finally, each element of the methodological toolkit will be analysed, from Literature Analysis to Narrative and Ethnographic Research, Participant Observation and Semi-structured Interviews.

2.1.**Sustainability Science and transdisciplinary research**

The recent emergence of the distinctive domain of sustainability science is indicative of the shifting demands on knowledge production and responds to the complexity of sustainability challenges (Burns, Audouin & Weaver, 2006; Hadorn, Bradley, Pohl, Rist & Wiesmann, 2006; Jahn, 2008; Regeer, Hoes, van Amstel-van Saane, Caron-Flinterman & Bunders, 2009; Kajikawa, Tacoa & Yamaguchi, 2014; Kauffman & Arico, 2014). Kajikawa *et al.* (2014) describe sustainability science as a rapidly expanding and diversifying field implicating many disparate scientific disciplines and integrating diverse knowledge, skills and tools. As such, it has immense potential for steering society towards a sustainability transition (Wickson *et al.*, 2006; Kajikawa *et al.*, 2014). The distinctive mandate for sustainability science therefore, is developing knowledge that is "user-inspired and, at its best, provides solutions to real-world problems encountered for the needs of a sustainability transition" (Kates 2010 in Kauffman & Arico 2014: 413). Burns *et al.* (2006:380) offer a definition of sustainability science as "research that produces knowledge that is immediately useful for policy and management. It therefore has a goal of integrating science and technology with other sources of knowledge to inform problem-solving decisions. This requires operating within a 'knowledge system' comprising networks of linked actors broadly classified as producers and users of knowledge. In other words, both the

problem to be solved and the knowledge needed to solve it are defined collaboratively in the conduct of sustainability science".

Burns *et al*. (2006:380) identify the defining features of sustainability science as:

- Use-defined basic research;
- Located at the interface between human society and its sustaining natural environment;
- Focused on the resilience of complex social-ecological systems;
- Including Transdisciplinary approaches to understanding system complexity and resilience;
- Acknowledging the validity of multiple epistemologies, extending beyond the objectivity of science to include the subjectivity of alternative knowledge systems; and
- Emphasizing learning and adaptation.

Many authors demonstrate the manner in which transdisciplinary approaches support the demands on sustainability science. Burns *et al.* (2006:381) argue that "transdisciplinarity, in the form in which it is incorporated into sustainability science, promotes effectiveness in joint problem identification and solution by scientific, societal, economic, political and other stakeholders". Kajikawa *et al.* (2014:432) emphasise how sustainability science must take place in the real-world and so "we have no alternative but to engage society in collaboration and to attempt change in an environment that requires transdisciplinary practices". From a political or policy perspective, "sustainability science, with its problem-focused and solutions-oriented transdisciplinary approach, provides a useful tool, methodology and basis for dealing with interconnected problems and integrating knowledge from all disciplines to develop this new global (sustainability) agenda" (Kauffman & Arico 2014:413). Transdisciplinary methodology is suitably aligned with sustainability science, simply as a strategy for socially- and scientifically-robust knowledge co-production with society (Maasen & Lieven, 2006; Hadorn *et al.*, 2008; Regeer & Bunders, 2009; Swilling, 2014a).

Wickson *et al.* (2006), through a synthesis of transdisciplinary research literature, identify three core characteristics of the transdisciplinary approach. Firstly, transdisciplinary research has a *problem focus* with the explicit intention of finding solutions to complex and multi-dimensional problems that primarily involve an interface of human and natural systems. Secondly, an *evolving methodology* means that there is no single prescribed methodology and that a researcher's chosen method "continues to evolve in an iterative relationship with the research" (Wickson *et al*., 2006:1051). C*ollaboration* is described as the third core feature of transdisciplinary research. This provides a 'reality check' for research processes and outcomes as it intentionally involves stakeholders in the definition of problems and the processes and resources used to analyse and resolve them (Wickson *et al.*, 2006).

An alternative perspective offered by Pohl, Rist, Zimmermann, Fry, Gurung, *et al.* (2010) identifies four key features—the focus on socially relevant issues, the transcendence and integration of disciplinary paradigms, an emphasis on participatory research and the search for a unity of knowledge between disciplines. It appears that the field of transdisciplinarity will not reach a unifying definition but rather a structured plurality of

definitions sensitive to the particular perspectives of practitioners (Pohl *et al.*, 2010). Regeer and Bunder's (2009:42) definition of transdisciplinarity captures this inherent diversity by explaining that "transdisciplinarity is an umbrella term for all kinds of efforts towards reflexive co-evolution of science, technology and society. It creates interfaces between science and society to address challenges, by generating knowledge and solutions for unstructured problems".

Collaboration and multi-stakeholder participation processes are integral to transdisciplinarity (Burns *et al.*, 2006; Wickson *et al.*, 2006; Kajikawa *et al.*, 2014; Kauffman & Arico, 2014; Polk, 2014; Schneider & Rist, 2014). The integration of stakeholder knowledge, skills, and resources must be produced "through collaborations among disciplines and actors within and outside the academy in robust participatory and iterative processes that recognise policies and proposed solutions as experiments and that foster societal as well as scientific learning and advancement" (Kauffman & Arico, 2014:417).

This emphasis on broad participation has notable implications for the science-policy-society interface, which Kauffman and Arico (2014) argue needs to be strengthened. From a science-policy perspective, "policy-makers and implementing agencies play a critical role in promoting sustainable development, but are often isolated from essential sources of knowledge necessary to do so prudently and effectively. The transdisciplinary approach of sustainability science can assist in bridging these divides" (Burns *et al.*, 2006:384). In terms of the interface with society and the negotiation of sustainability visions and pathways in disparate communities, dialogue between scientific communities and wider stakeholder groups, such as business, politicians and society, is crucial for a common process of problem identification and resolution (Burns *et al.*, 2006).

Collaboration and stakeholder participation are punted as necessary means by which to strengthen the science-policy-society interface and to generate robust sustainability science. However, facilitating such collaborative processes and achieving outcomes that contribute to societal problem solving for sustainability is not without its challenges. Similarly, 'participation' is often employed simplistically when in fact, what it means is often difficult to negotiate in complex and contentious circumstances (Elzinga, 2008; Stauffacher, Flüeler, Krütli & Scholz, 2008). Instead, emphasis must be placed on a dynamic, pragmatic and nuanced understanding of participation and an involvement of stakeholders that accounts for the diverse goals and demands of particular stages in engagement processes (Arnstein, 1969; Stauffacher *et al.*, 2008).

Polk (2014) provides an evaluation of the claim regarding the inherent positive relationship between transdisciplinary research and societal problem solving for sustainability, as presented in the literature. "In transdisciplinary research, in-depth participation of stakeholders and the integration of relevant knowledge from both practice and research in real-world problem contexts produce socially robust results that contribute to solving sustainability-related problems" (Polk, 2014:442).

Three key underlying assumptions are identified (Polk, 2014):

- firstly, that participation by a variety of affected stakeholders is seen as a way to contend with the contested and complex nature of societal problems;
- secondly, that this complexity requires the inclusion of a broad base of knowledge, expertise and perspectives;
- and thirdly, that the closeness and entitlement of academic and non-academic actors to the process is viewed as a way of ensuring scientific rigour and practical legitimacy and applicability of outcomes.

Polk's (2014) findings are critical in highlighting that in-depth participation and the integration of relevant knowledge grounded in real-world problem contexts might not necessarily lead to socially robust, legitimate results that contribute to societal problem solving for sustainability. More specifically, these factors alone might not be sufficient for ensuring socially robust systems-, target- and transformation-knowledge "in a form that is substantively and temporally compatible with formal policy organisations and processes" (Polk, 2014:448).

The difficulty in achieving such robust transdisciplinary knowledge is connected to three major barriers. The first is the lack of institutional support and appropriate structures for transdisciplinary activities (Polk, 2014). Regarding the setting for transdisciplinary approaches, these "require new rules and norms that merge both academic and practice-based requirements and mandates. Political organisations have specific mandates, regulations and procedures while scientific institutions work from within the confines of peer review, career trajectories and the demands of research funders. Transdisciplinary processes and approaches are not easily mapped onto such divergent spheres" (Polk, 2014:449). Polk (2014) identifies the other two challenges as insufficient participation from stakeholders or practitioners and unbalanced problem ownership.

Polk (2014) suggests that to overcome these distinctive challenges, transdisciplinary approaches must create a space where science and policy can meet and interact on equal terms. Polk (2014) suggests that this hybrid space must exist alongside, but not entirely separate from, the formal confines of disciplinary, administrative and political cultures. Instead, these meeting places need to be highly embedded within both spheres in order to enable actors to break the boundaries between diverse knowledge and expertise (Polk, 2014). These sites of interaction are critical for producing necessary participation and knowledge integration which can more effectively bridge the gap between science and policy spheres (Polk, 2014).

As Polk's (2014) first barrier suggests, the challenge for transdisciplinary research remains more than creating actionable or socially robust knowledge in the hybrid space, but how to ensure that co-produced knowledge is still compatible with institutional structures and decision-making processes (Polk, 2014). Operating as a transdisciplinary researcher is about facilitating the creation of such institutional settings where engagement and collaboration allows opportunities for diverse knowledge integration and problem solving. Considering the institutional settings for transdisciplinary activities is a core component of unpacking this methodological approach.

Within these institutional spaces of intermediation, transdisciplinarity is about joint problem solving and mutual learning as part of a social learning process (Scholz, Mieg & Oswald, 2000; Reyers, Roux, Cowling, Ginsburg, Nel, *et al.*, 2010; Schneider & Rist, 2014). The generation of the three types of transdisciplinary knowledge "takes place within an interactive learning process, involving discussion and negotiation, and leading to a common knowledge base which may fulfil scientific standards (validity), demands of the political and administrative systems (policy relevance) but also social robustness (societal relevance)" (Schauppenlehner-Kloyber & Penker, 2015:59).

Such an interactive and holistic learning process is about the personal development of stakeholders in the form of the reflexivity, questioning and possible integration of underlying assumptions, knowledge, goals and values (Wittmayer & Schäpke, 2014). Recognising the connection between thought and action, it is clear that "to break deeply entrenched unsustainable patterns (assumptions, behaviours and values) demands a new kind of thinking inspired by powerful learning processes that simultaneously lead to individual and collaborative action and transformation" (Wals & van der Leij, 2007:17).

Pohl *et al.* (2010:270) offer the concept of an interactive and permeable learning agora with the transdisciplinary approach creating an in-between space "in which the boundaries are provisionally blurred". It is within the agora that according to Wittmayer and Schäpke (2014:485) "science and society address real-world problems, generate knowledge, formulate solutions and pilot actions for a more sustainable future". This aligns with Polk's (2014) recommendation that transdisciplinary spaces of intermediation need to find a balance between being embedded in and suspended from formal structures. Pohl *et al.* (2010:270) continue to explain how interaction with the agora contributed to learning processes: "the resulting 'messiness' of 'divided identities' is the necessary condition for engaging with 'others' and ultimately helping to reshape the involved groups' perceptions, behaviour and agendas that occur as a function of their interaction". The purpose of this messiness is summarised by Wittmayer and Schäpke (2013:485): "overall, these spaces are characterised by the co-construction of social reality by their participants—common futures, lived reality, social identities and roles are all negotiated within them".

This hybrid space is thus simultaneously embedded within and insulated from these distinctive spheres and the challenge for transdisciplinary research becomes more than creating actionable or socially robust knowledge therein, but how to ensure that this co-produced knowledge is compatible with institutional structures and decision-making processes (Polk, 2014).

2.2. **Transdisciplinary research at SU and the REMF as a space of intermediation**

Polk's (2014) notion of a hybrid space, and Pohl *et al.*'s (2010) 'learning agora,' in which stakeholders from science, policy and society can meet and interact on (ideally) mutual terms resonates strongly with the REMF. The REMF was set up in 2005, by the then Rector, Prof Chris Brink, as an initiative aimed to position Stellenbosch as an internationally renowned university-town. Underpinning this goal was a commitment to

transdisciplinarity and the recognition by the Rector, supported by a number of key figures within the university, that shifting demands on universities necessitate the creation of innovative engagements with society. It has evolved into a formalised experiment in transdisciplinary research and a unique governance arrangement between these two institutions. The REMF sub-structures, and indeed the overarching collaboration between SU and SM, are the outcome of a consistent, tedious and painstaking decade of relationship building and agenda setting, in both formal and informal contexts, between key officials in both institutions. However, as is the nature of institutions, high ranking political and administrative positions have shifted—people have entered and exited the system, with varying involvement in and sentiment towards the REMF partnership. This has presented numerous challenges in retaining a culture of collaboration between the university and municipality through the REMF. Fortunately, the long-standing position and tenacity of a few university researchers from the School of Public Leadership (SPL), has been instrumental in sustaining this effort and securing the participation of student researchers, such as myself, as animators of the transdisciplinary research process. A growing attitude of openness and acceptance towards these students within the IIC and IPC has allowed more students to enter into, contribute to and move fluidly through the processes. In my view, this embodied a tacit, shared recognition of the importance of fresh ideas and diverse perspectives within a space of collaboration that has, largely, been unencumbered by conventional power structures that might dilute the interaction between student researchers and stakeholders. It demonstrated a progressiveness of thinking amongst stakeholders as well as the more realistic demand for additional support. The various iterations in this messy, slow, political and incremental unfolding process will be described in Chapter 6. However from a methodological standpoint, it is important to emphasis and unpack its transdisciplinary underpinnings.

At no point has the REMF been framed as a research endeavour driven and owned by the university and so a transdisciplinary methodology has not been explicit or neatly pursued. The initiative is operated in a manner which attempts to emulate this joint responsibility—meetings are scheduled monthly and alternate between being hosted in university or municipal chambers and chaired by either the Rector or the Executive Mayor. This shared responsibility has set a precedent for a similar attitude in initiatives borne from the REMF, such as the IIC and IPC. As REMF is recognised at the highest level of both SU and SM, this has implications (both problematic and advantageous) for the positioning and legitimacy of its sub-committees. Its recognition, is heavily reliant upon the reputation, rank and credibility of the key officials that have driven the REMF over the last decade. This has required discerning and pragmatic facilitation and speaks to the unique demands on transdisciplinary researchers within spaces of intermediation and learning such as this.

Polk's (2014) recommendation for a hybrid space responds to core challenges to transdisciplinary activities, namely insufficient participation from stakeholders, unbalanced problem ownership and lack of institutional support structures. There is evidence to suggest that the REMF space of intermediation has, to some extent, assisted in addressing these common obstacles in transdisciplinary research, a joint problem statement

around which both university and municipality representatives agree, is a key example of this. The positioning of the REMF between the two institutions as a joint collaboration around pertinent issues in the region contributes towards generating shared understanding and ownership of the problems since each have a vested interest in overcoming them. Similarly, buy-in and support from the highest levels of management in the university and the municipality has supported the participation of officials from the respective institutions; although the converse has also shown to be true.

In terms of the barriers to institutional support, the REMF, the IIC and IPC have not operated in a vacuum. Feedback processes have been built into the various committees' supporting documents (IIC, 2014b) and emphasis is placed on how to sustain a consistent and transparent communication strategy. Especially since the end of 2013, their focus has linked closely to the municipality's policy landscape and stakeholders remain attentive to how they might disseminate emergent strategic thinking to their networks, and embed it into their institutional roles.

2.3. Deconstructing the research process

The previous section situated my 21 months of engagement in the REMF sub-committees, and illustrated how I was invited into an already established engagement. This meant that I bypassed any potential obstacles in initiating and organising a group of stakeholders. I was also able to develop my own position and skills as a transdisciplinary researcher, guided by the example and mentorship of my study leader and other experienced academics and researchers.

What follows is a retrospective deconstruction of my research process. It is organized into three themes: how I entered, explored and exited the research field, therein transforming a real-world problem into a legitimate research question; how each of the phases of transdisciplinary research were addressed through this process; and the roles and activities which I embraced and resultant challenges I faced.

One cannot reach conclusions about facilitating urban transformation without also reflecting on transdisciplinarity as the organising principle of this space of intermediation and learning.

2.3.1. Entering, exploring and exiting the research environment

> "Engagement will always come at a price. The key is how reflexive researchers will be in analysing their own practices and mistakes as they navigate ever-changing scripts, stagings and performances as they learn to use transdisciplinary methodologies and methods" (Swilling 2013:18).

Assessing my research process retrospectively, I am able to parallel Pohl *et al.*'s (2007) transdisciplinary research framework with how I entered (identified and structured a research problem), explored (analysed this problem) and exited this research environment (in order to bring results to fruition). This is linked to the emergence and progression of the interconnected IIC and IPC engagements. However, once again, the

distinction between the municipality's 'problems' and my unique process-oriented research focus must be emphasised. Both were iterative and evolving—as my experience with the IIC and IPC unfolded, so did the framing of my research problem and thus began the cycle of moving through problem exploration to bringing results to fruition in the form of a thesis, a conference publication, multiple conference presentations, a possible journal article submission and a feedback report aimed at the IIC and IPC. This process by no means ended; I had to 'draw a line in the sand', effectively demarcating the portion of the process that would be captured in my case study narrative and analysis. Below is a rough and retrospective outline of my process. I account for how I showed initiative in facilitating this process as well as being aided by external forces.

The completion, or more realistically, the mere existence of this research, can be attributed only in part to the researcher's efforts to advance the initiative. Fortuitous timing, serendipitous encounters and unexpected happenings were far more significant in shaping its evolution. To begin with, the identification of a suitable research setting was made possible by an invitation by my study leader, Prof Swilling, who recognised my research interests (the governance of socio-technical urban transitions) as somewhat congruent with the work of the REMF, of which he continues to be a part. Reflecting on the last two years, my research was as much about being in the right place at the right time (with an openness to questions and conversations), as the application and analysis of academic concepts.

The invitation by Prof Swilling to observe and participate was significant, as it secured a degree of access and a sustained involvement that I would have found difficult to attain on my own. This invitation was advantageous in that it granted me some social capital, in terms of my credibility and capabilities, which I could leverage in developing my position in the evolving process. As Yin (2011) emphasises, gaining access is a process opposed to an event and depends on managing an ongoing set of relationships and networks. Equally important is planning an exit strategy. I was cognisant of this need from the onset and increasingly concerned with it as I became further embedded in the processes.

I was invited into the REMF during the latter half of 2013 when the REMF's SITT was being re-established as the IIC, and the IPC was initiating discussions on how to structure the formulation of the SSDF. An initial period of exploration began in August 2013 when I sat in on the first few informal discussions about the SSDF between officials in the planning department at the municipality and the research and facilitation team from the SI. The first IIC meeting I attended was a few months later in November 2013. I spent the last few months of 2013 and the first quarter of 2014 familiarising myself with the environment I was trying to embed myself in whilst simultaneously deepening my understanding of the corresponding urban sustainability and transitions literature.

I wanted to get as close to the actors and the action as I could so that I might see for myself what was really going on. One aspect of my engagement strategy for the entire research experience, but especially this period of exploration and immersion, was, quite bluntly, to 'make myself indispensable'. As a researcher, I did not approach my task as one requiring me to extract knowledge from a particular environment in order to answer

some predetermined problem or objective. Instead, I committed to becoming embedded in an environment, attempting to understand and articulate real-world problems in an authentic way.

In order to embed myself as a researcher, I needed to provide some incentive for stakeholders to allow me to be privy to both formal and informal processes. So, I found ways to be useful to the stakeholders within the IIC and IPC; for which the ultimate aim was to identify how my research might contribute to understanding or solving a problem in reality. This strategy saw me agreeing to coordinate IIC meetings: to send emails, schedule meeting dates, set agendas, take minutes and a host of other administrative tasks. It was apparent, right from the onset, that these processes would not move forward unless someone was responsible for these tedious and often menial tasks since all the participants were unable to do so themselves given their formal responsibilities. For the IPC, I committed to be part of the SSDF coordinating team and helped with all aspects, creative, strategic and administrative, of the Shaping Stellenbosch Campaign (SSC) and the Strategic Analysis Group (SAG). Over the next few months, I spent a large portion of my time participating in these committees—preparing for, attending and often assisting in meetings and workshops, observing other municipal events (like IDP meetings and LED functions) which I thought relevant as well as conducting semi-structured interviews with participants. Throughout, I took every opportunity to have as many diverse conversations as possible; some planned and strategic, most spontaneous but each one an invaluable encounter that shaped how I navigated the environment in which I was becoming increasingly embedded. This is most evident in how my understanding of my research problem and various objectives evolved. In practical terms, this meant that the kind of questions I was asking of participants, in informal conversations and semi-structured interviews, were not static or completely standardised but corresponded to the line of inquiry I was pursuing at any particular stage of the wider emergent process. Realising that often the most insightful conversations were informal ones, I made a point to take up the invitation for spontaneous and then regular post-meeting drinks at a restaurant in Stellenbosch, with a core group from the IIC. Through these conversations I was able to follow up on things which I had noticed in meetings or felt that I had misunderstood. I also uncovered more sensitive or personal information which afforded me a richer understanding of formal processes, interactions and decisions.

It was only towards the end of 2014 that I had distilled a tentative research problem which I felt sufficiently captured the essence of the challenges in reality. This involved articulating and ratifying my understanding of the problem of a lack of adaptive capacity, as faced by actors in the REMF collaboration space, and then translating this into a scientific research question and research objectives. A lack of capacity within the municipality was a thread throughout IIC discussions in particular, evident, for example, in the inability to eliminate the infrastructure backlog of R2 billion or expressed in or frustrated attitudes of officials in manoeuvring within restrictive institutional regulations (Davies, 2013). Within this vast and complex institutional context, discerning feasible and relevant research objectives was challenging. Jahn (2008:5) explains that, “this translation of a problem from its meaning in an everyday context into a scientifically valid

research question means defining the goals of research in such a way that their contribution to practical solutions of a societal problem is narrow enough to be useful. At the same time, this process of defining research goals in a manner useful for everyday life points to the structures deemed essential that need to be examined, thus providing researchers with their object of scientific investigation in the first place". This resonates with how I came to realise that it was not the task of my research to 'solve' this lack of capacity apparent in the massive infrastructure backlog and the range of other development obstacles in SM. A narrower exploration of the process that representatives from the university and municipality entered into, sharpened my research activities and highlighted ways in which it could be both academically and socially applicable.

In the same way that I had particular ideas about what I might encounter in the research field, I structured my research timeline around specific time expectations with the view to completing the thesis at the end of 2014. However, I soon came to realise that one cannot control such emergent processes, nor impose my own convenient timeframe and neat deadlines on real-world processes. I continued my involvement in the IIC and IPC into 2015 justified by the fact that I wanted to reach particular milestones and be able to communicate these in the thesis—the completion of the draft SSDF was this moving target. To some extent as well, my participation has become instrumental in the achievement of this deadline as I had essentially become an important stakeholder in the process. However, as binding 2015 deadlines loomed, I had to plan my exit from these processes to focus on completing the thesis. Once again, events beyond my control helped to round off this research experience relatively neatly which reduced my administrative responsibilities considerably. The IIC reached a point towards the end of 2014 where there was a dip in momentum after a productive year of important internal foundational work. The necessity for strategic discussions about the committee's future direction became clear in early 2015 and IIC meetings were suspended in April to allow these conversations to take place. At this point, the planning department also needed to finalise the IPC's SSDF for submission to council. This was set against the wider institutional backdrop where the sudden death of Rector Prof Russel Botman in late 2014 essentially closed the chapter on the REMF as it had operated under his leadership at the university. The resulting dynamic saw the collaborative efforts lessening in intensity and this made it easier for me to step back from the process and disentangle myself from the practicalities of embedded research. Also confident that the committee would be revived in subsequent months, I was able to distance myself without a sense that the collaborative effort had failed.

The remainder of the research process was an intense period of reflection and writing. In terms of assessing the role of transdisciplinary research shaping this process, Wickson's (2006) three characteristics of transdisciplinarity were particularly useful coupled with Pohl *et al.*'s (2007) stages of transdisciplinarity. Wickson (2006) describes transdisciplinary research as firstly, being concerned with socially relevant problems—this was indeed the case for the REMF collaboration. The issues of infrastructure backlogs, housing shortages and environmental degradation could not be more pressing in a pressured urban system

such as Stellenbosch. Similarly, the issue of a lack of adaptive capacity is not one limited to Stellenbosch Municipality. Through various interactions with local government officials at the City of Cape Town, Ethekwini Municipality, City of Johannesberg, to name a few, I was able to corroborate this assertion. Secondly, intensive participation was a core feature of the REMF and its sub-structures. Inextricably linked to learning processes, the depth, quality and nature of participation is worth considering. Processes of engagement can be arranged in substantially different ways: building on Arnstein's (1969) ladder of participation and decision making, Wiek (2007) provides four levels of participation in transdisciplinary research shown in Table 2.1.

Table 2.1 Level of actors and interactions in transdisciplinary research (Wiek, 2007)

	Form of interaction	Effect / purpose of interaction	Setting
Level 4	Joint decision making	"Responsibilisation of all actors involved": Strategic agents are an integral part of joint research (deeply implication in joint knowledge production)	e.g. interactive workshops, consensus conferences, collaborative planning, cooperative discussions
Level 3	Collaborative research	"Joint research and mutual learning": not only exchange but joint generation of (new) knowledge on base of both expertise	
Level 2	Mutual one-way information	"Mutual learning": bi- or multidirectional relations to exchange relevant information between scientists and local experts	e.g. expert hearings, focus or advisory groups, information panels
Level 1	One-way interaction	"learning": relevant information from one side to the other (science to practice and / or practice to science)	

Each level of participation is identifiable, often concurrent or simultaneous, at different points throughout the REMF collaboration. The extent to which this space of intermediation allowed for participation at level 3 and 4 will be explored further in Chapter 6. The third feature of transdisciplinary research, namely, an evolving methodology is also true for this research endeavour, as was outlined in the iterative manner in which I moved through the different stages of transdisciplinary research, at each point discerning the most appropriate modes of engagement.

2.3.2. Roles and activities of the transdisciplinary researcher

Structuring a learning agora requires an epistemological, methodological and conceptual framework that goes beyond disciplinary science (Schauppenlehner-Kloyber & Penker, 2015). This is true for the role of the researcher too. The roles, competences and challenges distinguish this mode of engagement from conventional disciplinary avenues.

The roles and activities offered by Wittmayer and Schäpke (2014) and Pohl *et al.* (2010) offer a vocabulary with which to navigate and critique the tensions and potentials of new research activities and roles in transdisciplinary research. Further, they serve as pointers for dealing with the often divided identity of researchers within the blurred boundaries of the learning agora. And "as process-oriented sustainability science has multiple facets and serves a diversity of aims, the activities and roles of researchers must necessarily be plural and multi-faceted—they must go beyond being purely reflective scientists" (Wittmayer & Schäpke, 2014:493).

Bunders and Regeer (2009: 45) describe a transdisciplinary researcher as one who partakes, facilitates and analyses a transdisciplinary process. Wittmayer and Schäpke (2014) propose that the overarching aim of transdisciplinary researchers is the creation and maintenance of spaces for social learning. I feel confident in describing my engagement as having embodied, to varying degrees, the transdisciplinary roles elucidated above. Under the guidance of Prof Swilling, I made sense of my transdisciplinary research role as one part of a wider research team facilitating and animating a 'prepared environment' into which diverse stakeholders could enter and collaborate. Besides this research agenda, I was an active participant in a real-world process, tentative yet willing to offer my personal perspective and unique contributions. Further, motivated to produce socially and academically legitimate research that made useful contributions to both arenas, it was important to take an analytical stance to critique and reflect on the REMF collaboration.

A useful distinction in orienting my own role as a transdisciplinary researcher at the science-policy interface is between 'knowledge-first' and 'process-oriented' approaches. The former views researchers as knowledge providers and the latter as "establishing, facilitating and participating in mechanisms of dialogues for change" (Miller 2014 in Wittmayer & Schäpke, 2014:484). Detailed in Table 2.1., Wiek's (2007) levels of participation resonate here, with researchers operating in process-oriented activities aligning more closely with higher levels of participation and collaboration. The explicit focus on transformation knowledge signals a focus on the dynamics of a deliberatively interactive engagement process.

Particularly in process-oriented research such as this, the changing demands on researchers in creating, maintaining and guiding spaces for learning and knowledge co-production are especially pertinent (Wittmayer & Schäpke 2013). Both Pohl *et al*. (2010) and Wittmayer and Schäpke (2013) build their frameworks from these key issues facing researchers in knowledge co-production and its intensive action-oriented activities. For Pohl *et al.* (2010), *power*, *integration* and *sustainability* are the three challenges that researchers' roles contend with through appropriate combinations and employments of researchers as *reflective scientist*, *intermediary* and *facilitator*. Wittmayer and Schäpke's (2013) framework is broader with activities and roles addressing four core issues of *ownership*, *sustainability*, *power* and *action*, by operating as *reflective scientist*, *process facilitator*, *knowledge broker*, *change agent* and / or *self-reflexive scientist* (Wittmayer & Schäpke 2013).

As a student researcher in the IIC and IPC, I took on a host of responsibilities that positioned me as a prominent actor within the committees. I identify the basis of my various roles and function, as that of both the reflective and self-reflexive scientist. Pursuing a transdisciplinary methodology pushed me to embody the analytical and interpretive lens of a scientific researcher whilst building an awareness of my own positionality and normativity. Researcher reflexivity is understood as the capacity of the researcher to "acknowledge how their own experiences and contexts inform the process and outcomes of inquiry" (Etherington, 2004:31). It is critical as " it is by this means that we co-create multi-faceted and many-layered stories that honour the messiness and complexity of human life and enable us to create meaning out of our experience" (Etherington, 2004:28). As an illustration, as a reflective scientist, I pursued questions like 'how can transition management be used to understand the REMF?' Operating as a self-reflexive scientist I tried to see myself as part of this dynamic, considering for example 'how are my personal ideas about the IIC's future shaping the direction of the conversation in this meeting?' Operating as an embedded researcher moving between these different roles, it was inevitable that I internalised the process to a certain degree. I noticed my own vested interest in the process—breakthroughs were celebrated and I lamented about various institutional blockages. It was also important that I recognised my own values underpinning my participation. For example, in the SSDF process I was able to distil my own personal aspirations for a sustainable development trajectory for the region. Being aware of these positions helped me to navigate the process and manage my inputs accordingly.

Within the IIC I operated predominantly as a process facilitator, responsible for scheduling, facilitating and reporting on meetings. As the coordinator of the committee, I became the primary point of contact for participants and external stakeholders and in many respects, the crucial linkage keeping the entire initiative active. Complementing this largely administrative role was the more strategic role of knowledge broker with which I was able to mediate between different perspectives or opinions. As a change agent, I also offered my own opinions and perspectives about how the group might address a particular challenge; the same can also be said about my engagement within the IPC. For the SSDF process under the IPC, I operated mostly as change agent and process facilitator—I was an active member of the core team, helping to coordinate the Shaping Stellenbosch Campaign, the SAG engagement as well as making contributions the draft SSDF document.

Analysing my own research practice also requires a consideration of its practical and ethical implications. Acting as a change agent, process facilitator or knowledge broker, and responding to the core issue of a lack of internal capacity, resulted in capacity and dependency issues. Operating as an embedded researcher led me to becoming an indispensable component of the initiative. In essence, I pried open spaces as I positioned myself by taking on various roles in the IIC and IPC. I was faced with the ethical and practical tension of having created dependencies between my role and the very existence of the initiatives. This became especially prominent as I tried to disentangle myself in order to write my thesis. Although not fully resolved, the

acknowledgement from within the IIC in particular, of the need for a dedicated administrative or support position, was helpful in coming to terms with the nature of my participation.

2.4. The Transdisciplinary Case Study

Case study research is defined by Levy (2008:2) as "an attempt to understand and interpret a spatially and temporally bounded set of events" using the most appropriate tools for the inquiry. It "arises out of the desire to understand complex social problems whilst allowing researchers to retain the holistic and meaningful characteristics of real life events" (Yin, 2003:2). Scholz and Tietje (2002) depict the case study approach as an empirical inquiry that investigates a contemporary problem within its real-life context. Understanding the problem and its solution requires integrating a myriad of mutually dependent pieces of evidence that are likely to be gathered at least partially by personal observation.

The entanglement between the context and the phenomenon under investigation necessitates a research strategy that aspires for holism by accommodating a full variety of evidence, beyond what is available in other approaches (Yin, 2003). Case study research is the preferred method when 'how' or 'why' questions are posed and contemporary phenomena within real life contexts are in focus (Yin, 2011). Eisenhart (1989) explains that case study research is a strategy which focuses on understanding the dynamics present within a single setting and that is able to account for numerous levels of analysis. It allows for a deeper interrogation of a context and a more nuanced understanding thereof for the purpose of demonstration and learning (Scholz & Tietje, 2002; Flyvbjerg, 2006; Yin, 2011; Associate for African Planning Schools, 2012). Building on the situatedness of the researcher, "case studies are an in-depth multi-faceted exploration of a single social phenomenon" (Mukhija, 2010: 418). They are especially suitable for developing new understanding and knowledge with reference to novel institutional arrangements, organisation and communities (Associate for African Planning Schools, 2012). Case study research is most appropriate where strategies for finding solutions to ill-defined, underlying problems are unclear, often the case in in complex African urban realities (Scholz, Lang, Wiek, Walter & Stauffacher, 2006; Associate for African Planning Schools, 2012).

Yin's (2003) *Case Study Research Design and Methods* was instrumental in structuring this case study as that of an embedded single-case. Figure 2.1 illustrates the conceptual distinction between the Holistic and Embedded Case Study and either single-case or multiple-case designs. The Embedded Case Study provided the framework within which to present and analyse the experience of immersive exploration and qualitative investigation. Figure 2.2 demonstrates how an embedded case study approach is applied in this research.

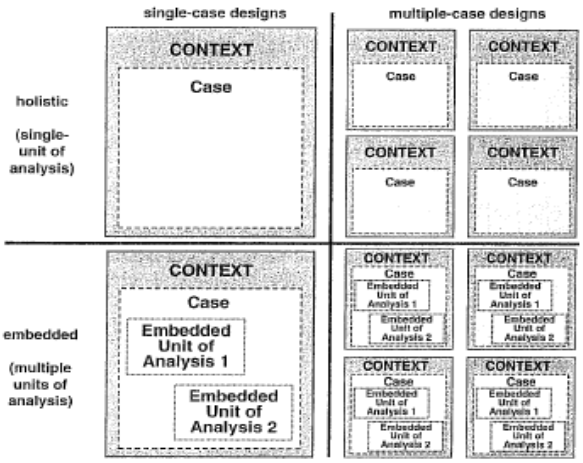

Figure 2.1: Basic types of designs for Case Studies (Yin, 2003)

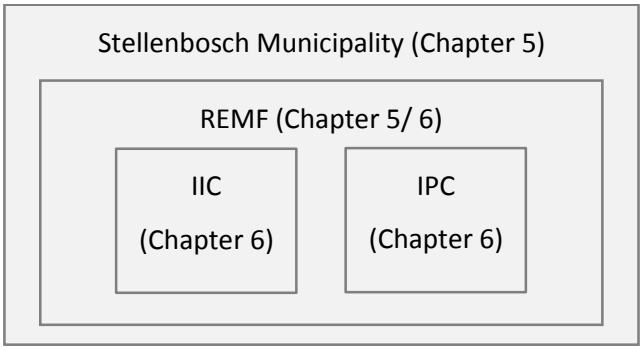

Figure 2.2: Embedded Case Study

A nested relationship between the broad and narrow levels of analysis reflects the complex dynamics of the urban context under investigation. This collection of narratives will constitute the REMF as the overarching unit of analysis with the narrow level as its sub-committees the IIC and IPC. Each transformation process required a unique combination of methodological tools since "the choice of method should clearly depend on the problem under study and its circumstances" (Flyvbjerg, 2011:226). Within the range of case study typologies, the case of intermediaries and learning in these urban transition processes in Stellenbosch, is tentatively identified as an inductive case study. According to Levy (2008:4) "its aim is to describe, explain, interpret and / or understand a single case as an end in itself rather than as a vehicle for developing broader theoretical generalisations". There is benefit to be gained from a single case study since "formal generalisation is widely overvalued as a source of scientific development, while 'the power of the good example is underestimated'" (Flyvbjerg 2001:77 in Associate of African Planning Schools, 2012).

2.4.1. Literature Analysis

A literature analysis provided a comprehensive foundation for the inquiry. Developing this conceptual framework comprised a prominent focus of my research. "Single case study researchers try to address the concern of internal validity by immersing in the literature, adding depth and detail and richness to their

narratives and by subdividing single cases into multiple observations" (Mukhija, 2010:419). For this study, a conceptual literature analysis was employed with the aim to synthesise areas of sustainability literature and thus contribute to a greater understanding of the research problem. A broad range of literature was acquired through informal, primary and secondary channels using structured search terms around central themes (Mouton, 2001; Clough & Nutbrown, 2012). The literature analysis was continually reviewed, informed by the experiential learning within the transformation processes.

The following themes and search terms were central to the literature analyse and were employed in varying combinations across a broad range of databases and journals.

Themes and search terms:

- Transitions
- Transition theory
- Sustainability
- Sustainable development
- Sustainability transitions
- Urbanisation
- Urbanism
- Sociotechnical transitions
- Urban transitions
- Urban governance
- Intermediaries
- Learning
- Sustainability learning

2.4.2. **Methodological 'toolkit'**

A single, embedded case study provides the methodological framework, where a comprehensive literature analysis and the methodological 'toolkit' operated as research instruments for its construction. In this qualitative research, I unavoidably served as the primary research instrument by locating myself in a real-world setting that was fluid in time and space (Yin, 2011). Using my discretion, I aimed for methodological consistency in developing a set of methodological tools and employing these in appropriate combinations. By "combining several lines of sight, researchers obtain a better, more substantive picture of reality" (Bruce & Berg, 2001:4). Bruce and Berg (2001:4) explain that "each method thus reveals slightly different facets of the same symbolic reality; every method is a different line of sight directed towards the same point, observing social and symbolic reality".

Theron and Saunders (2012) suggest an appropriate plurality of social research methods. Reflexive research methods such as ethnographic and narrative research helped to focus attention on my own agency as a researcher.

Narratives typically approach the complexities and contradictions of real life with 'thick' or rich descriptions. They are employed as a means of capturing observations obtained through semi-structured interviews and participant observation. In this case, the presentation of findings in Chapter 6 will take the form of interweaving narratives of how the REMF, IPC and IIC unfolded. Formulating the narrative was seen as an end in itself—the ability to craft a narrative comprising 'thick' descriptions which illuminate the dynamics and complexities of real life processes would be useful in and of itself. Even so, the narrative approach attempted to remain open and not rigid or prescriptive. Flyvbjerg (2011:238) explains that an open case study narrative enables it to mean different things to different people and "readers will have to discover their own path of truth inside the case". Narrative research opened an avenue through which to recognise my own agency and position by building the narrative around my own personal experiences. As a process that attempts to describe and interpret social expressions between groups and people ethnographic research was helpful in building the narrative from the vantage point of an embedded researcher observing and interpreting opinions, behaviour and interactions (Yin, 2011). Participant observation was the primary mode through which I gathered information. This strategy required emulating a balance between participation and observation in my intimate involvement in the REMF's subcommittees (Yin, 2011). My experiences and reflections were thoroughly documented in a series of fieldwork notebooks. Semi-structured interviews complemented participant observation as another tool for gathering qualitative information. I also engaged in content analysis of grey material in acquiring and dissecting documentation, such as meeting minutes, reports, items for council, speech transcripts and media releases, which enhanced my understanding of the institutional environment.

2.5. **Chapter Conclusion**

This chapter served as a reflection on the process of embedded research as I endeavoured to animate a transdisciplinary research methodology in my involvement in the REMF and its subcommittees. Beginning with an exploration of the demands of sustainability science, transdisciplinary research was presented as an approach to research engagement that is responsive to the necessity for socially and scientifically knowledge and the ever increasing complexity of ensuring the wellbeing of life-supporting socio-ecological systems. The commitment to transdisciplinary research at SU was illustrated as supportive of the joint collaboration between SU and SM and the REMF was likened to a 'learning agora' as a hybrid space between the institutions. The concept of a 'learning agora' will be revisited in Chapter 6 as the process of collaboration is unpacked. Next, the chapter deconstructed my personal research process in terms of how I entered, explored and exited the research engagement together with the roles and activities that I undertook throughout. Finally, the concept of a transdisciplinary case study was introduced together with the particular research

methods employed in constructing it. What follows in Chapter 3 and Chapter 4 is a comprehensive literature analysis which builds the conceptual framework which will be used to interpret the case study narrative contextualised in Chapter 5 and analysed Chapter 6.

Chapter 3: Literature Analysis Part 1: Sustainability, Cities and Transitions

This chapter will begin by outlining the sustainability imperative from a global perspective. Evidence demonstrating the centrality of cities will be located within in this global agenda. The prominence of cities is considered first in terms of the challenges they pose in terms of the reinforcing urban trends of urbanisation and population growth, and second in terms of the resultant shifts in global governance dynamics. As much as cities pose significant challenges to moving towards more sustainable development trajectories, they also operate as sites of opportunity and innovation.

This section will argue three core points. First, that cities are spatial localities in which sustainability-oriented transition efforts must be deployed. Secondly, interventions to reconfigure cities as socio-technical systems require strategic facilitation and therefore transition activities must account for innovative approaches to governance and collaboration. Thirdly, orienting transition efforts towards favourable sustainability goals requires integrating social learning processes.

3.1. The sustainability imperative

The concept of sustainable development is highly contested and has experienced significance fragmentation over the last few decades, since the publication of The Brundtland Report in 1987. In the 1980s, amid growing concern in the Global North for environmental integrity, the WCED published this report to address the deleterious practices of unabated modernisation and development (Sneddon, Howarth & Norgaard, 2006).

The publication came to signify a "watershed in thinking of environment, development and governance" (Sneddon *et al.*, 2006:253) though it is "neither the starting point nor the possible end of the concept of sustainable development". Instead it must be understood as a turning point in the global development discourse (Mebratu, 1998:496). The realisation was that the levels of production and consumption entrenched by industrialisation were jeopardising environmental wellbeing (Mebratu, 1998; Hattingh, 1999). The Brundtland Report states that "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, Khalid, Agnelli, Al-Athel, Chidzero, *et al.*, 1987). Moreover, it "issued a bold call to recalibrate institutional mechanisms at global, national and local levels to promote economic development" whilst ensuring planetary survival (Sneddon *et al.*, 2006:254). This was informed by the concerns of 'limits to growth' articulated in the Global North and the crisis of poverty alleviation and growing inequality in the Global South (Swilling & Annecke, 2012:26). 'Sustainable development' emerged as the unifying principle reconciling a desire to protect the environment, while still maintaining goals for economic development and human wellbeing.

The emergence of a multiplicity of overlapping, conflicting perspectives on sustainable development has made it increasingly problematic to employ (Mebratu, 1998; Sneddon *et al.*, 2006). Nonetheless,

Meadowcroft (2005:300) illustrates the value of this plurality since the term sustainable development "was designed as a normative point of reference for environmental and development policy making" and "like other political concepts—such as 'liberty', 'democracy' and 'justice'—it helps to frame and focus debate, while being open to constant interrogation and re-interpretation".

Swilling and Annecke (2012) identify seven global issues—eco-system degradation, global warming, oil peak, inequality, urban poverty, food security and material flows—around which the mainstream literature on (un)sustainable development have evolved . These trends "combine to conjure up a picture of a highly unequal urbanised world, dependent on rapidly degrading eco-system services, with looming threats triggered by climate change, high oil prices and food insecurities" (Swilling & Annecke, 2012:28).

The global polycrisis (as conceptualised by Morin, 1999) will fundamentally rewire our modern civilisation; its current formation is wholly unsustainable. This is demonstrated in transgressions of various planetary boundaries—the Planetary Boundaries framework defines a 'safe operating space' within which human societies can develop and thrive (Steffen, Richardson, Rockstrom, Cornell, Fetzer, *et al.*, 2015). These planetary boundaries demarcate the limits within which humanity can engage in a safe and just manner with the natural environment. These limits must be respected to ensure a world that is ecologically resilient and that sustains a prosperous and growing population. Recent revisions indicate that four of the nine planetary boundaries have been crossed as a result of human activity thus increasing the risk that the Earth System might be driven into a far less hospitable state, further threatening socio-ecological systems across the globe (Steffen *et al.*, 2015). As much as this updated framework paints a sober picture about the vitality of the Earth System, it is powerful in advocating for widespread systemic and transformative interventions of a socio-technical nature.

3.2. **Centrality of cities**

Cities and metropolitan regions comprise the world's most complex nexus of social, political, economic and ecological systems (ICLEI, 2014). Supporting a growing proportion of a burgeoning global population, cities have considerable ramifications for resource consumption and supporting infrastructure- and ecological-systems. Shifting global governance dynamics, driven by these reinforcing urban trends have transformed the manner in which cities can respond to the myriad challenges related to urbanisation and populations growth. As such, cities pose the greatest challenges in realising, whilst offering immense opportunities in achieving, a more just and sustainable development trajectory. Transition activities must be established at the urban scale since "cities are at the point of intersection between the nature of the global economy, the environmental crisis and the second urbanisation wave" (Swilling *et al.*, 2011:1).

3.2.1. Urban sustainability challenges

Following Swilling and Annecke's (2012) identification of the dual trends of the *second information wave* and *informational economic globalisation*, pervasive transformation is underway and the future is predominantly an urban one. Compounding the challenge of a just transition towards a more harmonious world, is the fact that more than two thirds of the global population will reside in urban centres and the projected total population will reach 9 billion people by 2050 (Swilling *et al.*, 2011; United Nations, 2014). If fertility rates show only minor decreases, population growth and urban expansion are projected to add 2.5 billion people to the world's urban population by 2050 (United Nations, 2014). This urban expansion will not see the creation of more mega-cities but rather an increase in smaller cities of less than a million people "a rich, global patchwork of smaller cities of around a million people or less" (Swilling & Annecke 2012:111). The fastest growing urban agglomerations are medium-sized cities and cities with less than 1 million inhabitants located in Asia and Africa (United Nations, 2014). Significantly, close to half of this growing urban population reside in relatively small settlements of less than 500 000 inhabitants (United Nations, 2014), one of which is Stellenbosch.

Africa has the fastest urbanisation rate compared to all other regions (Pieterse, 2011). By 2050 Africa's urban population is expected to comprise 21 per cent of the world's urban population (Cartwright, 2015). Trends in urbanisation and population growth need to be grounded in urban realities since "Africa's dramatic demographic transition is a profoundly spatial story" (Pieterse, 2014:1). The continent, already 40% urbanised, has 414 million urbanites—more city dwellers than in Europe, Australasia, North and South America; an additional 800 million people will be added to the continent's urban population (Swilling *et al.*, 2011). This is significant, considering how many African urbanites live in slums or experience "utterly miserable living conditions caused in part by state neglect, skewed economic development patterns, limited resources and administrative incompetence" (Pieterse, 2011:5). "Africa also happens to be the world's poorest and most precarious continent, which raises the spectre of 'urbanisation without growth'"(Turok, 2014:62). Africa is not the only continent experiencing the growing phenomenon of slums constituting the 'real' city; as Davis describes in *Planet of Slums* (2003:13), "residents of slums constitute a staggering 78.2% of the urban population of the least developing countries and fully a third of the global urban population".

Cities are complex socio-technical systems embedded in their surrounding socio-economic and ecological contexts (Ravetz, 2000). Resource consumption is concentrated in cities—more than 75% percent in cities (Swilling *et al.*, 2013). Upward trends in urbanisation and population growth have implications for the manner in which cities affect ecological systems. The agglomeration of people in cities results in concentrated and increasing resource use and has wider implications for climate change. Materials and resources flow through urban systems conducted by technical infrastructure systems which are in turn shared by social values and institutional arrangements. To a large extent, cities are held responsible for rapid resource depletion, ecosystem degradation and climate change (Swilling *et al.*, 2013). However, the outcomes of this

agglomeration of people and societal functions, do not necessarily need to be only negative (ICLEI, 2014). Agglomeration can foster opportunities for addressing these urban challenges. As powerful sites of intersection in the global economy, agglomeration in cities presents opportunities for innovation and economic growth. This potential is captured in the notion of the "urban dividend", a term used to describe the "economic benefits that arise from an alignment of talented job-seekers, livelihood opportunities and services in the city" (Pieterse, 2013 in Cartwright, 2015:8). Urbanisation across the continent has been accompanied by economic growth. However, a counter-perspective, detailed in the Africa Centre for Cities' *Better Growth, Better Climate, Better Cities: Rethinking and Redirecting Urbanisation in Africa* report, highlights the constraints hindering the prospects for Africa's urban dividend (Cartwright, 2015). Cartwright (2015:8) explains that this perspective "emphasise the underlying socio-economic, demographic and institutional conditions that frustrate the emergence of this virtuous cycle in African cities" (Parnell and Pieterse, 2014; Watson, 2014). Transition activities in cities across Africa must address this tension between the urban deficit and urban dividend.

The image of the modern industrial city no longer embodies the reality of the 21st century city (Ravetz, 2000; Swilling & Annecke, 2012). This necessarily "calls into question many deep-seated assumptions about the logic of prevailing patterns of urban development" (Swilling *et al.*, 2011:1) and requires new perspectives and reference points with which to grapple with the contemporary urban condition(s). Tackling sustainability at the city level require steering transition activities in positive directions and requires innovative approaches to management and collaboration. Furthermore, facilitating socio-technical transformation necessitates change in cities that are coordinated to address both the technical infrastructure and material flow aspect but also the socio-economic and socio-political values and systems which shape them.

3.3. Governance

Governance for sustainable development requires the reorientation of development trajectories so that genuine social advance can be sustained (Meadowcroft, 2007). This will require the building of supportive frameworks and coalitions of shared interest, particularly at the city scale (Swilling *et al.*, 2011).

Cities, as socio-technical entities embedded in ecological systems, emerge as the "crucial lever in improving the relationship between humans and the environment" (Swilling *et al.*, 2003:3). However, this also requires the acknowledgement that globalisation has impacted cities too. Swilling *et al.* (2003:3) explain that "whereas cities have traditionally been administrative and/or economic centres, they are now increasingly located in a de-territorialised network of flows, exchanges and concentrations across borders of all kinds, be they territorial, cultural or sectoral". This is reiterated by Hodson and Marvin (2009:194) who bring light to the increased "economic, place-based competition between cities". "This brave new world where global economic competition is spatially located in a globally distributed set of localities" (Swilling *et al.*, 2003:3) adds another dimension to the understanding of the prominence of cities.

Delving further into the governance of cities in this global order requires investigating the relationship between national, regional and local governments. “In Africa, there has been an increasing transference of regulatory powers from the regional to the local level, replacing a state-driven discourse with a municipal one” (Swilling *et al.*, 2003). McCormick (2013:2) emphasises that cities and municipalities do not operate as isolated entities and so “urban transformation is not just about local action, but how it “fits” into multiple scales and levels”. Understanding cities and municipalities as interconnected in complex ways within the global economy is useful in positioning cities as catalysts for change at different scales, including local, national and international viewpoints (McCormick *et al.*, 2013).

3.4. Complexity thinking, regenerative sustainability and social learning

An appreciation for complexity thinking and a regenerative sustainability perspective are needed to orient innovative governance efforts in positive directions. Social learning for sustainability is important for steering transition efforts for embedded sustainability visions and values.

3.4.1. Towards postmodernism, complexity and systems thinking

The pervasive notion of human superiority in modern scientific thinking, embodied by human domination of nature, is tied in with society’s subscription to an outdated worldview, built upon a mechanistic and deterministic understanding of human and natural systems (Du Plessis, 2012). Critics of the mechanistic worldview argue that its omnipresence is at the root of the global polycrisis and the “outcome of reductive thinking and of actions consequent upon that thinking” (Selby, 2007:168). As an alternative perspective, Postmodernism acknowledges the inherent complexity of the phenomena we encounter and realises that certainty and predictability are unattainable. Bauman (1992:xi) suggests that postmodernism aims to “re-enchant the world” by dismantling the limiting modernist structures dictated by reductionist, mechanistic and deterministic principles. Engaging with and making sense of a complex world requires a thought paradigm grounded in complexity and systems thinking (Morin, 1992). Addressing processes of thought as the root of the polycrisis is then the real work of building sustainable futures (Freeth & Annecke, 2014). Forging pathways towards a just, equitable and sustainable future requires unshackling from obdurate mechanistic and reductionist thinking, thereby relinquishing the desire to reduce the world into manageable and solvable problems (Capra, 1996; Selby, 2007). As Bohm and Edwards (1991: 25 in Selby 2007) express, “if we don’t do anything about thought, we won’t get anywhere”.

3.4.2. The emergence of a new paradigm of sustainability

Recent interrogations of the sustainable development discourse have resulted in the emergence of the concept of ‘regenerative sustainability’, a new paradigm of sustainable development (Du Plessis, 2012:8). The first is the internationally negotiated ‘idealistic’ public policy, which was driven by the United Nations and “aimed to develop a set of common criteria, indicators and strategies through international consensus”

(Du Plessis, 2012:8). The second is the "Ecological Modernisation" agenda, driven by businesses as they responded to the "risks, pressures and opportunities presented by the environmental agenda" (Du Plessis, 2012:8). Regenerative sustainability, as the third paradigm, has evolved from radical ecologism that calls for "profound and radical changes to the structures of society, including the dominant worldview, in order for the Earth to remain fit for human habitation" (Du Plessis, 2012:8). Grounded in an ecological or living systems worldview, regenerative sustainability is indicative of the transition away from mechanistic and reductionist thinking. Instead of humans being above nature, it embraces a holistic, integrated and complexity-based ecological worldview which sees humans as a part of nature, governed and guided by ecological principles (Reed, 2007; Du Plessis, 2012, 2014; Mang & Reed, 2012). Transcending the concept of sustainability which further entrenches business-as-usual, regenerative sustainability builds upon resilience (the ability to deal with change), restoration (restoring health and vitality) and reconciliation (designing with and for nature) (Du Plessis, 2014). Instead, regenerative sustainability is about building a future where people live in mutually supportive symbiosis with the social and biophysical environment and creating life-enhancing conditions that serve to restore a lost plenitude (Van der Ryn & Cowan, 2007; Du Plessis, 2012).

Although the three paradigms of sustainability have co-evolved over the last few decades and share a common goal of "improving the human-nature relationship so that the human enterprise can be sustained and humans can flourish" (Du Plessis, 2012:8), the former two are criticised for their perpetuation of the structures of society that gave rise to, and continue to exacerbate the polycrisis. Du Plessis (2012) argues that these paradigms are reaching the limitations of their usefulness given their inability to fully escape the mechanistic worldview. Regenerative sustainability requires effective engagement with a complex, dynamic and living world (du Plessis 2012).

3.4.3. Transformation and sustainability learning

Recognising the connection between thought and action, it is becoming increasingly clear that "to break deeply entrenched unsustainable patterns demands a new kind of thinking inspired by powerful learning processes that simultaneously lead to individual and collaborative action and transformation" (Wals & van der Leij, 2007:17). Loeber *et al*. (2007) motivate the need for learning in sustainable development given its contested status, its normative stance and its revolutionary nature. Regarding the lack of an authoritative, universally valid definition of sustainable development and the processes of value judgement implicit in the notion, Loeber *et al.* (2007) suggest that it needs to be elaborated on in an 'action-oriented' way and within a particular setting or context. Sustainable development is revolutionary in that its realisation implies 'system innovation,' that "the 'opening-up' of existing routines, rules, values and assumptions embedded in the institutions that have co-evolved with earlier, 'unsustainable' modes of socio-technological development" (Loeber *et al.*, 2007:84). Invoking the revolutionary nature of sustainable development requires critical

scrutiny and active reflection of development pathways and the institutional and socio-technical arrangements which perpetuate them (Loeber *et al.*, 2007).

3.4.4. **Social learning**

Like sustainability, no common definition of the concept of social learning exists (Wals & van der Leij, 2007; Armitage, Marschke & Plummer, 2008). The full extent of its application is beyond the scope of this discussion. However, four aspects have been identified from the literature on social learning.

- Walk and van der Leij (2007) highlight the kinds of contexts where social learning occurs; learning that takes place where "divergent interests, norms, values and constructions of reality meet in an environment that is conducive to learning" and occurs at multiple levels of the individual, group, organisation or network.
- A second aspect considers the process of social learning. Keen, Brown and Dyball (2005:5) explain social learning as the "collective action and reflection that occurs among different individuals and groups as they work to improve the management of human and environmental interrelations". Bos, Brown and Farrelly (2013) refer to social learning as the process by which societal actors interact and develop alternative perspectives on a societal issue. Moreover, the underlying idea of social learning is that "actors develop shared meanings, values and understanding through interaction" (Bos *et al.*, 2013:399).
- With respect to the outcomes of social learning a change in perception is highlighted by Pahl-Wostl, Sendzimir, Jeffrey, Aerts, Berkamp, *et al.*, (2007) and Garmedia and Stagl (2010). Pahl-Wostl *et al.* (2007:9) argue that "to escape lock-in, actors need to learn to recognise how their own frames of reference influence and constrain their thinking and that other legitimate frames of reference exist". Garmedia and Stagl (2010:1716) point out that social learning is about "going beyond the acquisition of new factual knowledge by individuals and includes changes in the frames of reference—assumptions and values—while creating capacity for dealing with conflict ridden issues and for finding ways for joint action". Furthermore, "it also implies gaining capacity for systems thinking, notably about complexities and uncertainties, and perceiving oneself as part of a whole" (Garmedia & Stagl 2010:1716).
- The final distinguishing aspect to social learning is that it cultivates outcomes that go beyond mere shifts in perception. According to Selby (2007:170), social learning is about creating contexts, climates and dispositions that allow for radically new ways of seeing the world to emerge and thus "providing the opportunity and space for perceiving deeper implicate realities, and in turn providing richer potential for personal and collective transformation". Reed, Evely, Cundill, Fazey, Glass, *et al.* (2010) explain, that social learning, in general, as a process of social change in which people learn from each other in ways that can benefit wider social-ecological systems. Reed *et al.* (2010) propose

that social learning must demonstrate a change or shift in understanding beyond the individual that becomes situated within wider social, units, communities or networks. Similar to Reed *et al.*'s (2010) notion of shifts in understanding, Safarzyńska, Frenken and van den Bergh (2012) frame social learning as going beyond knowledge acquisition to changing how problems are perceived.

To summarise, social learning illustrates that it is about challenging groups of actors to address, adjust and often radically transform their perceptions and understandings about complex sustainability challenges in such a way that joint and progressive action is made possible.

3.5. **Summary**

As the first component of the literature analysis, this chapter explored three key notions having first motivated widespread transformation towards sustainability. Firstly, cities are important for sustainability action—the places and spaces of sustainability transitions must be considered. Secondly the reconfiguration of socio-technical urban systems must be carefully managed—supportive governance arrangements must be in place. Thirdly, interventions need to be oriented towards genuine sustainability goals—sustainability transition efforts must be underpinned by transformative social learning process. The outcome of this discussion has demonstrated the centrality of cities, the prospects for innovative governance for sustainability and the importance of social learning processes to orient sustainability action.

Having established that cities are the locus for transformative sustainability action, we must now understand how change in society is structured. This is the focus of transitions research, which will be discussed in Chapter 4. As well as exploring the sustainability transitions literature in terms of the three key concepts of space, intermediaries and learning, Chapter 4 will present a conceptual framework of urban learning which will then be deployed in analysing the case study in Chapter 6.

Chapter 4: Literature Analysis Part 2: Towards a conceptual framework of learning in transitions

This chapter intends to generate a richer understanding of how sustainability transition activities might be understood within the context of cities and urban governance systems. Chapter 3 illustrated the increasing prominence of cities in the global sustainability discourse and provided the foundation for thinking about the localities for sustainability-oriented transformation. Governance for sustainability was emphasised since reconfigurations of socio-technical systems need careful facilitation. Such interventions must be underpinned by transformative learning processes to orient them towards meaningful sustainability goals. The concepts of *space, intermediaries* and *learning,* employed in the following analysis of transition theory, are paralleled with these three core arguments.

Engaging with transition theory provides an avenue through which to comprehend structural change in society. Van den Bergh *et al.* (2011) present a framework of transition theory which outlines four distinctive paradigms within which to comprehend complex long-term processes. This framework demarcates the most prominent perspectives on societal transitions. Analysing each of these orientations to sustainability transitions is done in terms of the three core concepts which have been introduced in the preceding chapter—cities, governance and learning. Three explicit questions are asked of each of the formulations of transitions outlined by van den Bergh *et al.* (2011)—how do they relate to space, do they recognise intermediaries, and what do they say about learning processes? In this way, the analysis explicitly connects the notions of space, intermediaries and learning to the framework of transitions offered by van den Bergh *et al.* (2011). Thereafter, to form the conceptual framework of urban learning, three explicit conceptions of learning at the city scale are pieced together, underpinned by social learning. Distinctive approaches to learning are offered through the perspectives of Transition Management, the Learning City and Urban Assemblage. Together, these three formulations of learning constitute a framework of urban learning that can complement the sustainability transitions literature and provide a more robust approach to urban transition activities.

4.1. Introduction to transition theory and sustainability transitions

Societal transitions comprise the reconfigurations of lifestyles, values and infrastructures which result in fundamentally different societal and environmental conditions. Transition theory attempts to explain this structural change by focussing on “non-linear processes … in which a societal system is structurally transformed” (Avelino & Rotmans, 2009:543). These sets of connected changes take place in different domains and levels of society. Employing transition theory as a conceptual framework offers a way of describing the inter-linkages between unfolding global patterns and connecting these with local and regional developments (Martens & Rotmans, 2005). It also focusses on change “which cannot be brought about by

technological innovations alone but which requires mutually reinforcing institutional and socio-cultural transformations," necessary in dealing with socio-technical systems (Van de Kerkhof & Wieczorek, 2005:734).

Transitions theory does not assume that transitions can be controlled or predicted. Instead transition theories frame the manner through which transitions might be initiated, supported, managed and accelerated "by playing into existing dynamics and embracing complexity and uncertainty as opportunities" rather than elements to ignore or control (Roorda, Frantzeskaki, Loorbach, Van Steenbergen & Wittmayer, 2012:6). In this way, transitions perspectives come to signify the multiplicity of potential development pathways (Geels & Schot, 2007).

Sustainability transition theory has emerged as a distinctive and formalised field of transition research. There is evidence to suggest its increased institutionalisation is indicative of a realisation that the nature that sustainability problems require immediate, future-oriented action (Farla, Markard, Raven & Coenen, 2012; Markard, Raven & Truffer, 2012). Markard *et al.* (2012:965) point out that this research is of "high societal relevance, given the magnitude and pervasiveness of sustainability challenges we are facing today".

de Haan & Rotmans (2011:92) describe a transition "as a fundamental change in the structures, cultures and practices of societal systems, profoundly altering the way it functions". In this way, sustainability transitions necessitate radical shifts in the configuration of socio-technical systems (Markard *et al.*, 2012). Geels (2004:900) defines socio-technical systems as "linkages between elements necessary to fulfil societal functions". More specifically, socio-technical systems are "a cluster of elements, including technology, regulations, user practices and markets, cultural meanings, infrastructure, maintenance networks and supply networks" (Geels 2004, from Lawhon & Murphy, 2012). Socio-technical transitions are the sets of processes that lead to the fundamental shift in these socio-technical systems. Socio-technical transitions differ from technological transitions because in addition to major technological transformation, socio-technical transitions result in the reconfiguration of institutional structures, user perceptions and practices. They involve far-reaching changes over the long term across different dimensions of society and implicate a broad range of actors (Markard *et al.*, 2012). Voß *et al.* (2009:278) emphasise the impact of such reconfigurations stating that "transitions to sustainability consequently imply a destabilising of existing socio-technical structures as well as nurturing alternative systems that can fill the opportunities created by structural change".

This section introduced transition theory and the specific field of sustainability transitions as a framing of societal change which sees the transformation of the socio-technical systems within which societies are embedded towards more sustainable and resilient configurations. The following section unpacks four formulations of sustainability transitions as conceptualised by van den Bergh *et al.* (2011) in the Introduction and Overview to the first issue of *Environmental Innovation and Societal Transitions* (EIST).

The journal aims to "contribute insights about the formulation and implementation of strategies and public policies aimed at resolving fundamental barriers to environmental innovations and sustainability transitions,

whether of an economic, social, political or behavioural-psychological nature" (Van den Bergh *et al.*, 2011:2). EIST exemplifies the increasing institutionalisation of the field as a response to the emerging interest in sustainability transitions in both academic and policy circles. Furthermore, its demarcation of the distinctive tracks of sustainability transition theory in the introductory article provides a credible framework from which to explore socio-technical transitions (van den Bergh *et al.*, 2011).

In this introduction van den Bergh *et al.* (2011:2) describe how the compilation of this academic journal is a response to the increasing awareness that solving challenges "requires a combination of technical, organisational, economic, institutional, socio-cultural and political changes". It serves to draw explicit connections between environmental innovation and societal transitions. Environmental innovation is explained as "innovations with a clear environmental angle or aim" (van den Bergh *et al.,* 2011:3). The authors emphasise the need for "radical, large-scale and integrated socio-technical changes, well beyond traditional policy approaches" (van den Bergh *et al.,* 2011:8) and go on to outline four theoretical frameworks that have been used to study sustainability transitions: the innovation systems framework (Jacobsson & Bergek, 2011); the multi-level perspective (Geels, 2011) and the closely linked approach of strategic niche management; the transition management approach grounded in a complex systems perspective (Rotmans & Loorbach, 2008); and finally the evolutionary systems approaches (Safarzynska & van Den Bergh, 2011).

4.2. Space, intermediaries and learning in transitions

Having demonstrated the importance of cities for sustainability, urban systems are further asserted as the spaces or localities in which socio-technical transitions must take place, with special reference to urban systems. The concept of intermediaries and intermediation is used in relation to the structuring of governance arrangements to support socio-technical transitions. Recognising that interventions to reconfigure socio-technical transitions towards sustainability require transformative learning processes motivates the analysis of learning in the orientations to sustainability transitions.

4.2.1. Spatiality and sustainability transitions

Van den Bergh *et al*.'s (2011) summary of the four orientations towards transitions present sophisticated accounts of the dynamics and processes of transitions for understanding how change in society takes place. There is evidence to suggest however that the spatial and institutional contexts in which transitions unfold have not received sufficient attention in the transitions literature and remains implicit, unclear or underdeveloped (Hodson & Marvin, 2010; Coenen, Benneworth & Truffer, 2012; Markard *et al.*, 2012; Hansen & Coenen, 2014). Raven, Schot and Berkhout (2012:76) find that transitions studies focus predominantly on the national level, failing to account for socio-technical change as being "configured and emerging out of interactions between actors situated in structures with different temporal dynamics that are spatially heterogeneous". Hodson and Marvin (2010) reiterate that this often implicit emphasis on national scale transitions leaves the role for sub-national scale murky, especially that of the role of cities and urban

socio-technical transitions. And much like the rationale for a city system of innovation, Hodson and Marvin (2010) find it 'surprising' that urban transitions are given so little attention since cities are sites of intensive economic activity. Coenen and Truffer (2012:369) call for a more "pronounced and explicit focus on the territorial embeddedness and the multi-scalarity of sustainable transitions". Recognising the unique spatial and often temporal nature of transitions needs to be sensitive to the differentiated capacity of cities and urban regions' capacity to shape transition processes. This emphasis on the 'territorial embeddedness' recognises that spatial contexts matter and sheds light on the 'institutional contingencies and particularities' of spatial contexts where transition pathways unfold (Coenen & Truffer, 2012).The emerging argument that transition theory to some extent, ignores, or inadequately addresses, the spatial nature of transitions will be explored with respect to each distinctive transitions orientation.

4.2.2. Intermediaries and sustainability transitions

The issue of stimulating and managing processes of transformation has raised much attention in the field of sustainability transitions (van Lente, Hekkert, Smits & van Waveren, 2003). Jørgensen (2012:998) states that "the location of agency is at the core of discussions in transition theory". This is important given that "transition studies aims to understand the trajectories towards new socio-technical regimes and argues for agency-centric perspectives to explain processes of change" (Ferguson, Brown, de Haan & Deletic, 2014). Transitions might appear spontaneous however "changes in socio-technical systems can often be traced back to strategic interventions of particular actors. Innovation and transition processes, in other words, do not just emerge from a rather unintentional interplay of actors that pursue their own narrow strategies. Instead they may be strategically shaped by players with some kind of a 'larger plan' or vision—at least to a certain extent" (Farla *et al.*, 2012). Within this wider discussion of the necessity for more actor- and agency-centric perspectives on transitions, the role of intermediaries has become increasingly prominent, extensively explored and written about (Guy, Marvin & Medd, 2011).

Faced with increasingly complex interactions and interrelations between societal actors, governance is framed as the move towards broader forms of socio-political coordination between public, private and civil society actors. The concept captures the growing complexity of the institutional structures, political process and social relations involved in broadening the ways in which collective goals and societal interests are advanced (Moss 2009). With this understanding of governance, Guy *et al.* (2011:158) state that "the rise of new intermediaries means thinking beyond the capacity of the state, public agencies, social movements and commercial companies to explore how it is that interrelationships between them, within particular contexts, can generate added value that contribute to sustainable practice". The necessity for intermediaries is further motivated by Hodson and Marvin (2010) who suggest that there is a "need for effective coordination of capacity and capability to initiate and attempt to enact system transitions" (Hodson & Marvin, 2010:484).

As the name implies, intermediaries are often those actors operating in-between other, often more formal and distinctive domains. However, no clear definition or conceptual understanding exists (Hodson & Marvin, 2009; Moss, 2009). The term is employed across a wide range of literature to explain the work of individuals or organisations operating between and within other actor groups (Moss, 2009). Regardless of their form, intermediaries are distinguished by the intentional relational work they perform as well as their positions between other actors or entities (Moss, 2009). "This emphasis on deliberation is of particular relevance for addressing the governance dimensions of intermediation" (Moss, 2009:1483). Hodson and Marvin (2009:521) explain that "intermediaries are deliberately (rather than neutrally) positioned to act in-between by bringing together and mediating between different social interests". This is done for producing outcomes that would not have been possible, or as effective, without their involvement (Hodson & Marvin, 2009).

The process of intermediation and the formulation of intermediary actors has wide interpretation and application within the field of sustainability transitions and is unpacked across the range of van den Bergh *et al.*'s (2011) transition orientations.

4.2.3. Learning

Learning is the third concept used to interrogate transition theory. Each is assessed on whether they recognise and integrate learning processes in their conceptual formulations of how transitions are structured and steered. Safarzyńska *et al.* (2012:1020) highlights that in transition research "much emphasis is placed on the process of social learning through which knowledge develops during interactions between various stakeholders". The section intends to assess whether this is in fact the case and further, the manner in which learning in conceptualised and operationalised in each of the transition orientations.

4.3. Transitions frameworks

4.3.1. Innovation Systems and transitions

4.3.1.1. Overview of IS

The first stream of sustainability transition theory is the innovation systems approach which emerges out of the broad field of systemic approaches to the analysis of innovation. It concerns the analysis of systemic innovations that affect change over the long term placing central the joint analysis of the co-determining technological and institutional characteristics of socio-technical systems (van den Bergh *et al.,* 2011:9).

Innovation systems have been applied at national, regional, sectoral and technology-specific levels looking at the systemic contexts of innovations and the sets of interactions between diverse networks of actors within the process of innovation (Jacobsson & Bergek, 2011). An innovation system comprises of the networks of nested actors or institutions from various sectors that stimulate innovation through interaction (Lander, 2010). Metcalfe (1995:29) sets out a more formal definition with an innovation system described as

"a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies". Both Jacobsson and Bergek (2011) and Hekkert, Suurs, Negro, Kuhlmann & Smits (2007) recognise that technological artefacts lie at the heart of innovation processes though the authors view the concept of technological change not in the narrow sense; rather proposing the "development of technology in interaction with the system in which the technology is embedded" (Hekkert *et al.*, 2007:414). This joint and interactive process of improving and advancing technologies in conjunction with their related social dimensions, is what is understood as the innovation process (Hekkert *et al.*, 2007). Technological change is seen as the interwoven transformation of technology and societal structures.

As a framework and an associated set of policy tools, innovation systems' purpose is to support the creation and diffusion of the required knowledge and technologies to enhance economic growth in a particular nation, region or sector (van Heyningen & Brent, 2010). Until fairly recently innovation systems have focused solely on achieving and enhancing economic development and thus the shift towards mobilising innovation systems to affect institutional change towards sustainability, additional to economic development, is significant (Hekkert *et al.*, 2007).

Sustainability-oriented innovation systems constitute a new approach to innovation systems research premised on the necessity for decoupling economic growth from environmental impact (Stamm, 2009; Altenburg & Pegels, 2012). This signals a shift in the innovation paradigm towards that of innovation for sustainability. Stamm (2009:7) further points out that innovation research, until recently, has in fact "largely neglected sustainability dimensions" whereas a new analytical focus, the concept of system innovations, "accords increased attention to changes in broad socio-technical practices and technical and institutional systems that contribute to sustainable development" (Stamm, 2009:2). Here, system innovation refers to the transition from one socio-technical system to another, qualitatively different one (Stamm, 2009). As such, system innovations occur when disruptions in the system result in the emergence of new system structures (Lawhon & Murphy, 2012). A sustainability-oriented innovation system is one geared towards the pursuit and the achievement of sustainable development goals, away from business as usual (Altenburg & Pegels, 2012).

Altenburg and Pegels (2012:6) set out a conceptual foundation for sustainability-oriented innovation systems motivated by the "need to accelerate the development and deployment of environmentally sustainable technologies". Building on Stamm (2009), Altenburg and Pegels (2012:10) provide the following definition: "we define sustainability-oriented innovation systems as networks of institutions which create, import, modify, and diffuse new technology that help to reduce environmental impacts and resource intensity to a level commensurate with the earth's carrying capacity". Like Stamm (2009) this argument "centres on the need to decouple economic growth from resource consumption through technological innovation" (Altenburg & Pegels, 2012:10).

This first stream of transition theory contributes the systems perspectives on transition process along with the redirection of the innovation process towards more sustainable outcomes. This perspective further recognises the embeddedness of technology in society and suggests system failures as a key policy intervention point in the steering of transition process.

4.3.1.2. Space, intermediaries and learning in IS

The innovation systems orientation to transitions recognises space in the construction of a system of innovation at either a national, regional, sectoral or technology-specific scale (Jacobsson & Bergek, 2011). Spatiality in the innovation systems literature is also identifiable in the conception of a system of innovation being structured by a set system boundaries and constituted by the interactions between diverse networks of actors therein (Jacobsson & Bergek, 2011). System boundaries makes it possible to delineate a system of innovation to a particular geographical location however this is not necessarily the case as a system of innovation could be developed within a sector or technology-specific context unrelated to a specific, or ideal, locality.

Johnson (2008:152) makes it clear that "innovation systems may act at several territorial / spatial levels; we should accept that there are many possibilities and that there is no ideal territorial base where innovation will always flourish". Innovation is integral to economic competitiveness and cities are increasingly positioned as playing a vital role in the economic success of a country.

Seeing innovation as a prerequisite for economic growth requires integrating an analysis of the specific conditions for urban innovation into innovation transition theory (Johnson, 2008). Johnson (2008:152) identifies four specific place-attributes that tend to support innovation performance:

- a geographical area with institutional characteristics that lead to frequent, intense and high-quality interactions;
- a certain degree of production and trade specialisation which has an established competence profile;
- developed knowledge infrastructure and public policy routines as well as an established polity;
- and finally an area that has acquired specific demand characteristics and enables different kinds of user / producer interactions.

The author stresses however that finding a 'spatially delimited unit' with all of these attributes is challenging but that smaller territorial contexts, like regions or city-states might be host to the kinds of interactions and characteristics constituting a local system of innovation (Johnson, 2008). And so, building on the existing conceptualisation of territorially-based systems of innovation, Johnson (2008) offers a complementary formulation: the notion of a 'city system of innovation' suggesting that this concept could be a useful tool in grappling with key urban challenges.

In line with the innovation systems perspective, (van Lente *et al.*, 2003) and Howells (2006) explore intermediation in the process of innovation. In connection to the Multi-Level Perspective, intermediaries are

referenced generally, as well as in an explicit application to strategic niche management (Hargreaves, Hielscher, Seyfang & Smith, 2013). The complex systems perspective, with transition management as its direct application, makes less explicit reference to intermediaries however as a reflexive governance approach, it exemplifies a process of intermediation in the cultivation of a collaborative and participatory context. The evolutionary systems perspectives does not integrate a consideration of intermediaries or the process of intermediation.

The creation of sustainability-oriented systems of innovation can support transition processes by fostering innovations which contribute towards more sustainable modes of production and consumption. Howells (2006) and van Lente *et al.* (2003) both reference the role of intermediaries in this process.

Howells (2006) provides a synthesis of the broad range of actors that are involved in supporting the innovation process. Here, intermediaries have been identified as the nodes and linkages in the increasingly complex process of innovation. The process of intermediation is limited to the players or agencies acting within the innovation process embedded in innovation networks or communities. This is based on an in depth exploration across four broad areas of the study of innovation where the role of intermediaries is emphasised. This demonstrates the potential for broad interpretation of the forms and functions of intermediaries within the innovation process. Howells (2006) also makes clear the distinction between intermediaries as organisations and intermediation as a process and goes on to explore innovation intermediation as a function, process and relationship. This is captured in a typology which offers the following ten types of intermediaries, related to their functions and purpose depicting the numerous and diverse roles that innovation intermediaries can adopt (Howells, 2006).

- Foresight and diagnostics
- Scanning and information processing
- Knowledge processing, generation and combination
- Gate-keeping and brokering
- Testing, validation and training
- Accreditation and standards
- Regulation and arbitrations
- Intellectual property: protecting the results
- Commercialisation: exploiting the outcomes
- Assessment and evaluation

What becomes clear from this framework of the nature of intermediation in the process of innovation is that it is not limited to a specific type of actor but is rather a function a wide array of actors can employ. Intermediation as a process can be achieved by a multiplicity of actors within the complex network of linkages and relationships constituting innovation systems.

Also within the innovation systems orientation, van Lente *et al.* (2003) present a more nuanced discussion on the role of intermediaries in transition processes. This systems approach "rejects linear models of innovation" and rather focuses on the "institutions that support and express the interdependencies" between scientific, technological, economic and political activities" which together constitute systems of innovation (van Lente *et al*., 2003:248). A system of innovation is defined as "a set of distinct institutions which jointly and individually contributes to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies" (Metcalfe 1995 in van Lente *et al.*, 2003:248). van Lente *et al.* (2003:248) view intermediary organisations as a "crucial ingredient of any systems of innovation" in that they connect, translate and facilitate flows of knowledge operating at the network of system level. van Lente *et al.* (2003), like Howells (2006), illustrate the emergence of and increased interest in intermediary organisations that fulfil bridging or strengthening roles in the innovation process.

"The changes in innovation systems evokes and enables the emergence of a new type of intermediary" which operates as a systemic instrument, over and above the basic and conventional distinction between hard and soft intermediaries, focusing on financial or technical diffusion instruments or managerial instruments respectively (van Lente *et al*., 2003:257). van Lente *et al.* (2003) present a typology of the roles of systemic intermediaries as well as their specific functions within the phases of the innovation process. "The management of transitions asks for this new type of intermediary, but their efficacy will depend on the specific make-up of the innovation system at stake" given the fact that its role is strongly connected to and dependent on the context within which it operates (van Lente *et al.*, 2003:276).

van Lente *et al.* (2003:256) propose three systemic functions:

- Articulation of options and demand: the stimulation of technological variety and the search for possible alternatives
- Alignment of actors and possibilities: initiating and strengthening linkages; building and sustaining networks, facilitation of interfaces
- Support of learning processes: enhancing feedback mechanisms and stimulating experimentation and adaptation

Articulation, alignment and learning attend to the challenges posed by innovation systems and are activities increasingly required at the network or system level (van Lente *et al*., 2003). This typology of the functions of intermediaries is supported by a series of phases of the innovation system conception of transition, though this is illustrated as a complex, iterative and multi-linear process (van Lente *et al*., 2003). *Exploration and articulation* sees the search for and presentation of new options and an awareness of alternate directions. Systemic intermediaries' roles in this stage of the innovation process are to "enhance the articulation of societal needs", "make the variety of technical options more visible" and to "identify possible stakeholders"

(van Lente *et al.*, 2003:262). van Lente *et al.* (2003:262) capture this as the delineation of the "arena for transition". During the *take-off: competition and niches* stage systemic intermediaries assist in the pursuit of particular trajectories by mobilising a critical mass of stakeholders as well as identifying or creating promising niches for viable action. *Entrenchment: momentum and irreversibilities* demands the support, embedding or strategic nudging, of development trajectories as well as the facilitation of learning processes. The final stage, *stabilisation: a time for change?* requires systemic intermediaries to intervene in order to revitalise the innovation process.

Van Lente *et al.*'s. (2003) conception of a systemic intermediary within an innovation system coupled with Howell's (2006) illustration of intermediation as a process and function able to be performed by a variety of actors, is sufficient evidence to assert that the innovation systems orientation recognises the importance of intermediaries in an overarching agency-centric perspective on transitions.

The innovation systems literature acknowledges the importance of learning platforms that support the innovation process. Systems of innovations should focus on providing conditions conducive for different forms of learning such as learning by doing, learning by using, and learning by interacting resulting in learning at the level of the system (van Lente *et al*., 2013). van Lente *et al*. (2003) highlight the importance of facilitating and supporting learning processes as one of three key systemic roles of systemic intermediary actors in the innovation process. Here, a clear connection between the role of intermediaries and learning is established however the particularities of learning are not built into the transition theory.

4.3.2. The Multi-Level Perspective

4.3.2.1. Overview of MLP

The second stream of transitions research, according to van den Bergh *et al.* (2011), is that of the Multi-Level Perspective (MLP), conceptualised by Geels (2002, 2004). This perspective originates from a critique of innovation systems since the "societal context in which new socio-technical configurations are embedded (have) to be conceived of in even broader terms" (Van den Bergh *et al.*, 2011:10). Geels (2004) proposes a widening of sectoral systems of innovation to that of socio-technical systems where the fulfilment of societal functions is central and implicates innovations and technologies as well as user practices. Technologies are crucial elements in the myriad of functions constituting modern society however they are inextricably connected to the social systems in, and for which they operate. In this way, "socio-technical systems do not function autonomously, but are the outcome of the activities of human actors" (Geels, 2004:90). This perspective on transitions necessarily invokes an exploration of the technologies as well as the actors across various levels in socio-technical systems. A multi-level perspective might enable a better understanding of the "dynamics and complex assemblages of actors, relationships, institutions, scales, rules, and activities that constitute a system" (Lawhon & Murphy, 2012:357).

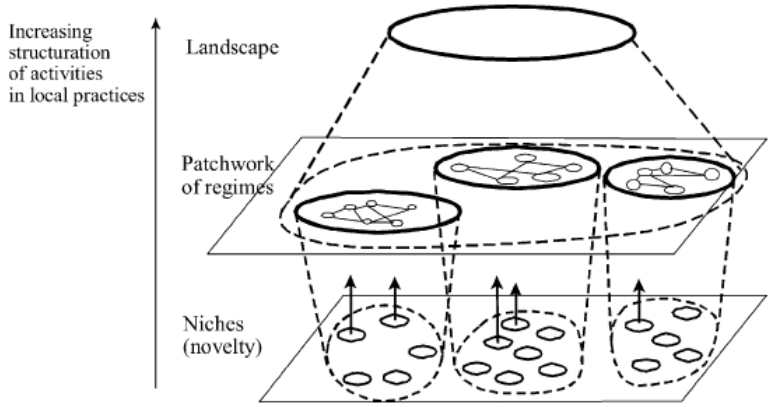

Figure 4.1 Multiple levels as nested hierarchy (Geels, 2004:913)

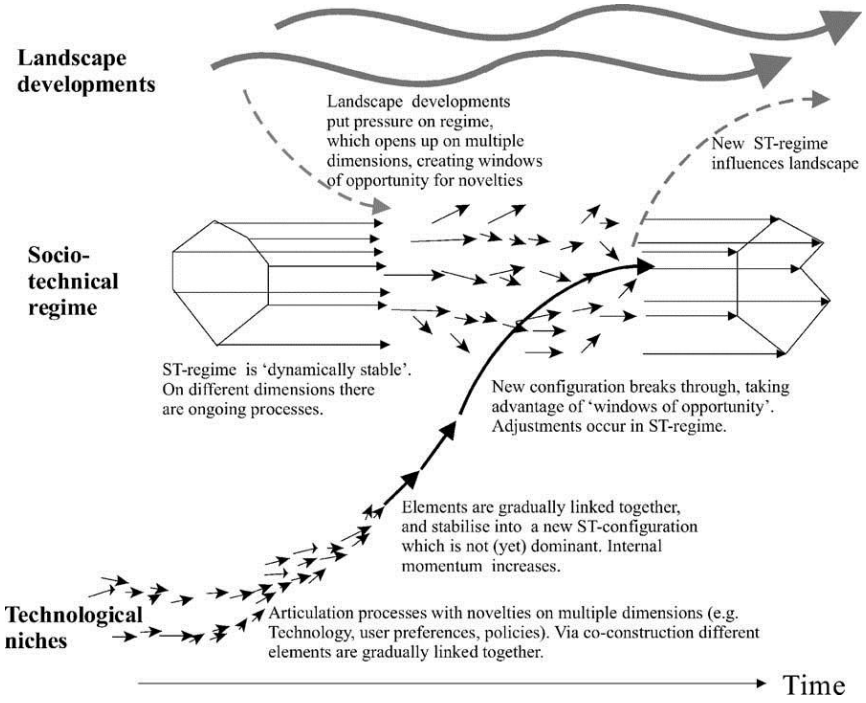

Figure 4.2 A dynamic MLP perspective on system innovations (Geels, 2004:915)

The MLP is a framework that provides an "overall view of the multi-dimensional complexity of changes in socio-technical systems" (Geels, 2010:495). This is done via three analytical levels, niches, as the locus for radical innovations, socio-technical regimes and the exogenous socio-technical landscape (Geels, 2002, 2004). The complex array of actors, institutional, artefacts and interrelations implicated in transition processes are situated within a multi-level three-tiered framework consisting of the macro (landscape), meso (regime) and micro (niche) levels, visually represented in Figure 4.1. The niche, regime and landscape levels of analysis are not ontological descriptions of reality but serve as descriptive and heuristic concepts to understand the complex dynamics of socio-technical change (Geels & Schot, 2007; Lawhon & Murphy, 2012).

Illuminating the transition process is about describing the particular interactions between the landscape, regime and niche, demonstrated in Figure 4.2. At the lowest and least stable level, lies the niche where novel

and experimental innovations are developed. Ideally nice innovations challenge existing regimes by asserting more sustainable alternatives (Lawhon & Murphy, 2012). Regimes, the "more pervasive and stable level of the framework, are constituted by the conventions, rules and norms that guide the producers, workers, consumers, state agencies, scientists, societal groups, and business people who participate in the regime" (Lawhon & Murphy, 2012:26). Safarzyńska *et al.* (2012:1015) see a regime as "a combination of tangible and intangible elements: it evidently included production equipment, infrastructure and other material artefacts next to routines, expectations and norms". As the exogenous context within which regimes are defined, socio-technical landscapes "are beyond the direct influence of actors, and cannot be changed at will. Material environments, shared cultural beliefs, symbols and values are hard to deviate from" (Geels, 2004:913). The landscape level is employed to account for the influence of factors beyond the niche and regime context.

Seen together, the niche, regime and landscape concepts enable analytical categories with which to understand and describe sustainability transition processes. "Sustainability transitions are conceptualised as shifts from one stable socio-technical configuration to a new one by interacting processes at the different 'levels' of landscapes, regimes and niches" (Coenen *et al.*, 2012:369). This theory of transitions "builds on the idea that socio-technical regimes develop from the stabilisation of technologies and institutions within sectors of society, leading to path dependencies" (Jørgensen, 2012:997). These stable and well-defined pathways of development build up momentum and become resistant to change (Jørgensen, 2012). Socio-technical transitions are defined as regime shifts deviating from established path dependencies that do not come about easily but rather result from the breaking through of niche innovations made by windows of opportunity created by destabilising factors induced by the landscape level (Geels, 2010). Pressures inducing a regime shift might result from niche-innovations building up internal momentum; changes at the landscape level which create pressure on the regime; or destabilisation of the regime which create windows of opportunity for niche-innovations (Geels, 2010; Jørgensen, 2012).

Due to the path dependency and stability, it is often difficult to produce radical innovations at the niche level which might challenge socio-technical regimes (Geels, 2004). Geels (2004) references the importance of 'protected spaces' in cultivating transformative technological innovations crucial for the transition process. Strategic niche management (Kemp, Schot & Hoogma, 1998; Schot & Geels, 2008) offers an approach through which niche innovations are initiated and nurtured with a view to instigating socio-technical transitions. The deliberate creation and support of niche innovations might trigger regime shifts. Strategic niche management provides insights into how to "stimulate niches with a high potential for sustainable development so as to induce a transformation in the dominant regime" (Safarzyńska *et al.*, 2012:1014).

MLP is not without its limitations. From the perspective of political ecologists and human geographers, Lawhon and Murphy (2011) identify four central points of criticism, namely, the emphasis on technological artefacts at the expense of context-specific social and political relations (Meadowcroft, 2005, 2009; Shove & Walker, 2007, 2010); a bias in its applications towards elite actors and against more participatory decision-

making processes; a geographic naivety regarding the conceptualisation of space, scale and its transferability; and finally its insufficient regard to the role of power in shaping transition outcomes (Avelino & Rotmans, 2009; Meadowcroft, 2011). Criticisms related to the notion of space and scale are supported by Hodson and Marvin (2009; 2010), Coenen and Truffer (2012), Coenen *et al.* (2012) and Hansen and Coenen (2014).

4.3.2.2. Space intermediaries and learning in MLP

Distinctive from the spatial scales in the innovation systems literature, the MLP recognises various levels of transitions in terms of the niche, regime and landscape. While the MLP presents a robust conceptual framework of socio-technical transitions, what has not been considered are the spaces, places and scales of socio-technical transitions. According to Markard *et al.* (2012), applications of the MLP have failed to systematically analyse the spatial particularities of transitions and raises the issue of where cities 'fit' within the MLP's landscape-regime-niche-hierarchy (Hodson & Marvin, 2010). In response to this identified gap in the MLP, Hodson and Marvin (2009; 2010), Coenen and Truffer (2012) and Raven *et al.* (2012) explore the scale, framing and geographical delineation of sustainability transitions.

Coenen and Truffer (2012) suggest that the MLP needs a richer conceptualisation of space and scale if it is to achieve its full potential as a theoretical framework of socio-technical transitions. Both Hodson and Marvin (2009; 2010) and Raven *et al.* (2012) premise their research on the re-emergence of the city as a prominent scale in the globalisation and simultaneous regionalisation of contemporary society. Raven *et al.* (2012) propose a multi-scalar MLP that incorporates an account of spatial relations between actors implicated in sustainability transitions. This is similar to Hodson and Marvin's (2010) position that the role of cities and the different scales of action must be taken seriously in the MLP. The authors suggest a framework around the distinctiveness of purposive transitions might address the neglect of cities in the MLP (Hodson & Marvin, 2010). Cities can be sites for the cultivation of potential urban transitions and their role must be viewed in a multi-level transition perspective which accounts for the different scales of action (Hodson & Marvin, 2010).

This discussion of the spatiality of transitions in terms of the MLP highlighted the theory's shortcomings but also the immense potential of locating transitions at the urban scale. Investigating the potential conceptual development of the MLP however, is beyond the scope of this discussion. Despite the spatial naivety of the MLP (Lawhon & Murphy, 2011), there has been significant effort applied to conceiving of how better the places and spaces of transitions are recognised in the MLP (Hodson & Marvin, 2009, 2010; Coenen & Truffer, 2012; Coenen *et al.*, 2012; Raven *et al.*, 2012; Hansen & Coenen, 2014).

Within the MLP formulation of sustainability transitions, a consideration of intermediaries has accompanied the criticism of the perspective's lack of attention to the places and spaces of transition processes (Hodson & Marvin, 2009, 2010). Moss (2009) introduces a type of intermediary within the field of socio-technical transitions, increasingly prominent in the shifting governance of urban infrastructure systems. Moss (2009) takes up the idea of 'intermediary space' and how the concept can contribute to an understanding of "how

intermediaries emerge out of changes to conventional modes of governance, and, in turn, shape these changes themselves" (Moss, 2009:1483). According to Moss (2009:1489) intermediaries are "organisations that act between the traditional relationships between utilities, regulators, and consumers to enable the uptake of new technologies and changes social practices within the production-consumption nexus" of infrastructure systems. Moss' (2009) research focuses particularly on water and wastewater sectors, shedding light on the sectoral, as opposed to systemic, focus of intermediation work.

The critical issue for Hodson and Marvin (2009) is how place-based systemic intermediaries established by cities and regions attempt to purposively shape and manage technological transitions. An important role for intermediaries is to create contexts within which they can work at mediating different social priorities and facilitating joint collaborative action to bring about purposive urban transitions. With a similar focus as Moss (2009), Hodson and Marvin (2009:522) define intermediaries as "usually cross-sectoral in composition, network based, with a focus on a broad technological sector". These kinds of intermediaries have two key sets of activities; the first being to develop place-based technological transitions, or visions of transitions and the second relating to the governance of these place-based transitions by managing processes and actors around these visions (Hodson & Marvin, 2009). The deliberate—rather than neutral—positioning enables intermediaries to act in-between by bringing together and mediating different social interests; in this way, they are defined as strategic intermediaries, distinguished by their function as opposed to their form (Hodson & Marvin, 2009). Hodson and Marvin (2010) develop a framework for understanding purposive urban transitions. The first component is the development of shared visions of urban transitions. The construction of such shared visions "encompasses multi-level governance arrangements and socio-technical systems that are often messy involving multiple actors and institutions across different scales" (Hodson & Marvin, 2010:482). The inherent difficulty in constructing shared visions of infrastructure transitions requires the mediating role of intermediary bodies—their intentions and positioning is deliberate, relational and strategic. Translating visions is the following component of intermediary work in socio-technical transitions: shared visions are taken forward by coordinating capacity and mobilising capabilities which support meaningful action.

The authors present six issues that are important in constituting the necessary capacity and capabilities for various actors to take collaborative action towards realising visions for the socio-technical transitions (Hodson & Marvin, 2010).

- Secured, sustained and broad-based financial support is necessary for the creation of long term stability and commitment.
- Connected to the provision of funding, is the importance of resources to underpin and support the efforts and commitment of involved stakeholders.
- The stability of organisational resources and commitments then supports the foundation for shared and collective values and visions within the organisation.

- Intermediary work requires adaptability and learning and this means constantly working at re-developing and extending the knowledge base.
- Communication forums must be established to align the multiple sets of social interests for the negotiation and successful integration of different knowledges.
- Establishing credibility and building trust is important as intermediaries work to establish their work, engage stakeholders and develop partnerships.

Together, these six factors are all important in "embedding the intermediary within a specific urban context and facilitating the development of the resources, relationships, forms of knowledge and communications, and, thus visibility, to be able to affect a credible influence' (Hodson & Marvin, 2010:483).

Guy *et al.* (2011) present a collection of case studies which brings together the various different conceptions of intermediaries in socio-technical urban transitions. This publication draws together the array of conceptions of intermediaries as well as a variety of cases which illustrate the facilitative and guiding role of intermediaries.

Connected to the MLP is the framework of strategic niche management, which provides a theory of "how innovations develop and grow and how these processes can be harnessed strategically so as to challenge and potentially replace existing socio-technical systems" (Hargreaves *et al*., 2013:869). As a formulation of transitions complementary to the MLP, strategic niche management focuses on the support of radical grassroots innovations as a means of challenging and transforming unsustainable socio-technical regimes (Hargreaves *et al.,* 2013). Hargreaves *et al.* (2013) identify that intermediaries can be supportive actors and assist grassroots innovations in overcoming challenges to their growth and diffusion.

Intermediaries can guide the development of robust niches and their integration into global niches contributing to systemic transformation at the regime level (Hargreaves *et al.*, 2013). Intermediaries in this context, can be defined as "organisations or individuals engaging in work that involves connecting local projects with one another, with the wider world and, through this, helping to generate a shared institutional infrastructure and to support the development of the niche in question" (Hargreaves *et al.*, 2013:870). Strategic niche management implies a relationship between the local and global context where the development of niches at a local scale aim to impact and feed into global niches. Geels and Deuten (2006) explore the socio-cognitive activities that make it possible for knowledge to flow between the local context and the global level given that generic global level knowledge does not emerge spontaneously from the local level. This conception of technological knowledge development supports the notion that "local practices and global orientations have a dialectical relationship" (Geels & Deuten, 2006). Its relevance for strategic niche management and the MLP is that intermediaries engage in various socio-cognitive activities which enable the transformation of local knowledge into robust knowledge that is "sufficiently general, abstracted and packaged" and not tied to specific contexts (Geels & Deuten, 2006). It is asserted that this contributes to the diffusion of niche innovations in pursuit of systemic transformation of socio-technical systems.

Hargreaves *et al.* (2013) build upon Geels and Deuten's (2006) three roles of intermediaries in the facilitating the flow of knowledge in strategic niche management.

- The first of these roles is the aggregation of knowledge which sees knowledge made 'context-free' and thus able to travel between local practices within a wider global orientation.
- The second role is the creation of an institutional infrastructure which assists in the storage, exchange and circulation of abstracted, generalised knowledge at the global niche level.
- The third role is the framing and coordination of local niche level activities where intermediaries draw from aggregated global knowledge.

In light of these three roles, intermediaries are favourably positioned to assist local niche innovations to address challenges of diffusion and internal robustness. Hargreaves *et al.* (2013) identify a further role for intermediaries suggesting that building the confidence and capabilities of niche actors is critical, beyond merely the aggregation and transfer of knowledge. Moreover their findings assert that the brokering and managing of relationships is of critical importance for intermediaries in strategic niche management.

This investigation of intermediaries in strategic niche management is relevant in that it illuminates the notion that "intermediation may be about opening up space in different contexts for new and diverse kinds of activity, rather than about developing a single successful approach or a strategic vision for (a niche's or innovation's) growth and diffusion" (Hargreaves *et al.*, 2013:879). A diversity of aims, roles and approaches is necessary to create the institutional conditions conducive to and supportive of radical grassroots innovation. "Different kinds of intermediation might be required in different areas to achieve different ends" (Hargreaves *et al.*, 2013:878).

Seen together with Guy *et al.*'s (2011) volume, it is apparent that there is substantial evidence to suggest that the importance of intermediaries is recognised by the MLP formulation of transitions.

Learning in the MLP is referenced both in the sense of contributing to path dependency in regimes and supporting challenging or destabilising niche innovations (Geels, 2004). Niches are important as they function as the locations for alternative learning processes and contexts within which to experiment and deviate from the rules of the dominant regime (Geels, 2004; Lawhon & Murphy, 2012; Markard *et al.*, 2012). Much like the innovation systems perspective, the MLP acknowledges and to some extent, assumes learning as an inherent component of transition processes however, beyond infrequent references, this formulation of transition theory's consideration of learning is limited.

4.3.3. Transition Management, underpinned by a complex systems approach

4.3.3.1. Overview of TM

The transition management application is a complexity-based governance paradigm, which seeks to organise and mediate transition processes through the creation, structuring and facilitation of a transition arena

(Loorbach, 2007; Rotmans & Loorbach, 2008; de Haan, 2010). Within the field of sustainability transitions, the complex systems perspective is based on the idea that transitions can be best understood as changes in complex (socio-economic) systems (Van den Bergh *et al.*, 2011). Loorbach (2007) outlines complex systems theory as a promising basis for conceptualising and influencing long-term and complex social processes. Moving beyond a reductionist analysis of systems, complexity theory allows for a better understanding of the dynamic and interlinking systems which constitute contemporary society (Morin, 1992; Cilliers, 1998, 2000). Beyond systems thinking, transition management draws inspiration from resilience theory, complex adaptive system theory and self-organisation theory (van den Bergh *et al*., 2011) as well as incorporating governance approaches in its formulation (Markard *et al*., 2012). Transition management is a reflexive governance approach and is applied as an instrumental, practice-oriented model for influencing ongoing transitions into more sustainable direction (Markard *et al*., 2012).

Avelino and Rotmans (2009) refer to the transition of societal systems as complex adaptive systems, examined in terms of non-linear and long-term processes of change. “A transition occurs when a social system moves from one dynamic state of equilibrium to another though a sequence of alternative phases of relatively fast and slow dynamics which form a non-linear pattern” (Avelino & Rotmans, 2009:545). Loorbach (2007:74) motivates the value of a complex systems thinking perspective for understanding how transitions might be understood: “thinking about society as a patchwork of complex adaptive systems seems a very promising starting for thinking about governing social change. Since societal sectors consist of numerous interlinked elements, since there is a high degree of uncertainty about their interactions and feedback and since they have an open and nested character, they seem to behave as complex adaptive systems”. van den Bergh *et al.* (2011) highlights variation, selection, attractors, feedback, emergence, dissipative structures, punctured equilibrium and self-organisation as key principles of the complex systems stream of transitions research. Loorbach (2007) goes on to explain how these concepts have been introduced in an effort to better understand the dynamics of complex adaptive systems though the author provides a synthesis and suggests co-evolution, self-organisation and emergence as the core principles.

4.3.4. **Space, intermediaries and learning in TM**

The spatiality of transitions has received less attention in the TM approach. The inherent notion of scale makes possible an interrogation of whether this transition theory orientation recognises the localities or contexts of transitions. Complex adaptive systems are made up of nested organisational levels and a multiplicity of diverse components and interactions (Loorbach 2007). These are two of the numerous properties of complex adaptive systems which signal an implicit consideration of multi-scalar interdependencies and a holistic understanding of system interactions and emergence (Loorbach 2007). This systems perspective, embodied by TM, means, for example, that “it appears to be impossible to understand the ‘global’ (or macro) behaviour or a complex system by analysing the ‘local’ (or micro) behaviour of the individual parts” (Loorbach 2007) Instead, the dynamics of complex adaptive systems need to be sensitive to

the cross-scale inter-linkages and interactions between multiple levels contributing to their behaviour and emergence.

Transition management has primarily been employed at the national scale and as a governance approach to managing transitions, recognises the multiplicity of actors at various levels implicated in the institutional configurations of the nation state. There are numerous case studies where transition management has been applied to a particular sector at the national scale, for example, Kemp and Rotmans' (2009) *Transition policy: co-production of a new strategic framework for energy innovation policy in the Netherlands*; Kemp's (2011) *The Dutch energy transition approach*; van der Burgge *et al.*'s (2005) *The transition in Dutch water management*; and Loorbach *et al.*'s (2008) *Governance in the energy transition: practice of transition management in the Netherlands*. These case studies exemplify the deployment of transition management in a particular institutional and spatial context. However as a conceptual orientation to transitions, transition management is not theoretically explicit in its recognition of space and the locality of its application. That being said, the application of transition management at the regional scale has been recently explored (Roorda *et al.*, 2012) since it is believed to be a suitable governance approach for urban transitions to sustainability. Urban transition management has been developed to operationalise transition management in cities, aimed at providing a methodology for city leaders to pursue collaborative sustainability visions and objectives (Roorda *et al.,* 2012).

Transition management provides guidelines for the establishment of a transition process within a facilitated transition arena. As the container or holding space for an innovative participatory and multi-actor process, the transition arena, made possible by a transition team, brings together representatives from government, societal organisations, business, knowledge institutes and intermediary organisations (Loorbach, 2007). By virtue of the nature of engaging such a large array of societal groups in participatory multi-actor processes, the transition management approach embodies and exemplifies a process of intermediation. The deliberate, relational and mediating function of the transition team in bringing together a host of actors in a participatory process of engagement exemplifies the strategic work of an intermediary actor. Transition management's crafting of a transition arena made up of 'forerunners' and 'change agents' who might be influential in mediating transitions within the broader transition context is also indicative of the methodology's appreciation of intermediary work.

Transition management goes further than appreciating intermediation by formulating an approach to transitions that places proactive agency at the centre of its governance approach. Explicit references to the transition team operating as an intermediary are infrequent however a careful reading of the transition management literature reveals an inherent embodiment of intermediary work. Therefore, it can be said that transition management recognises the importance of intermediaries and intermediation in transition processes.

The transition management approach is based on a multi-stakeholder learning approach. Transition management is a governance approach that organises and facilitates the transition arena as "an innovative participatory process of envisioning, searching learning and agenda-building aimed at social learning as a means to achieve (sustainable) social change" (Loorbach, 2007:44). In essence, "transition analysis should stimulate and support the necessary problem structuring processes, reflective capacity and social learning that create the conditions for change to occur" (Loorbach, 2007:22). The connection between social learning and societal change is clearly illustrated in the transition management approach, since it "suggests that changes at a systems level should be brought about through changes in actors' perceptions and actions (social learning) as a result of systems reflection on present and future and through interaction and cooperation with other actors" (Loorbach, 2007:95). Transition management sets out to create stimulating contexts that facilitate the exchange of knowledge and perspectives leading to social learning and change in practice, at both individual and institutional levels (Loorbach, 2007; Voß *et al.*, 2009). Ultimately, "social learning in transition management is thus a means as well as a goal in itself" (Loorbach, 2007:100).

4.3.5. Evolutionary systems perspective

4.3.5.1. Overview of ES

The evolutionary systems approach argues that like cultural transitions, a sustainability transition will occur by means of an evolutionary process (van den Bergh *et al.,* 2011). Similar to the complex systems perspective, this stream of thinking recognises that transitions can, to a certain extent, be controlled or steered. van den Bergh *et al.* (2011) explains that the evolutionary perspective accounts for the nature and transformation of complex systems as the outcome of cumulative change driven by evolutionary mechanics. This evolutionary change is predominantly of an incremental nature although it may often seem discrete or radical (van den Bergh *et al*., 2011).

According to Safarzyńska *et al.* (2012), transition thinking and evolutionary thinking already share many features. However, evolutionary theories and modelling approaches can offer further insights into the dynamics of transitions and their management. The evolutionary systems perspective assumes that society changes in an evolutionary and organic way—it is inherently complex, and thus shares many of the same principles as the complex system perspective (Van den Bergh *et al.*, 2011; Safarzyńska *et al.*, 2012). Safarzyńska *et al.* (2012) explain evolutionary thinking as the theory underpinning how processes of change take place and evolutionary modelling as the tools of analysis that generate deeper, structured understanding of these change processes. Therefore, evolutionary studies of transitions look beyond the impact of technological changes to address "changes in preferences, social structure and prevailing institutions" (Safarzyńska *et al*., 2012:1011). Core elements and mechanisms of evolutionary thinking are diversity, variety generation and selection; additional features include bounded rationality, path dependency and lock-in, group selection and co-evolutionary dynamics (Safarzyńska *et al*., 2012).

Safarzyńska *et al.* (2012) suggest a "complete evolutionary-economic framework to study transitions", grounded in the core principles and mechanisms of evolutionary thinking and modelling. Given that the multiple transition theories draw from certain evolutionary notions, it is argued that further integration of evolutionary thinking and modelling can offer useful contributions to transition theory.

4.3.5.2. Space, intermediaries and learning in ES

Of all of the transition orientations, the evolutionary systems perspective gives the least attention to the spatial aspect of transitions. The location of transitions is not interrogated, instead the evolutionary-economic framework suggested by Safarzyńska *et al.* (2012) is intended to complement transition thinking.

There is little reference to intermediaries or evidence of intermediary work in the evolutionary systems perspective on transition theory. With regards to learning, Safarzyńska *et al.* (2012) develop individual and social learning according to evolutionary thinking where emphasis is placed on the process of social learning resulting from knowledge developing through stakeholder interactions. Evolutionary thinking recognises individual learning, where people learn from past experiences and the acquisition of knowledge, as well as social learning resulting from the interactions with others (Safarzyńska *et al.*, 2012). Individuals operate with bounded rationality, according to evolutionary economics and processes of individual and social learning process typically occur in a path-dependent manner, often resulting in lock-in (Safarzyńska *et al*., 2012). Evolutionary models refer to specific mechanisms for inducing individual and social learning which draws attention to this orientation's recognition that learning in integral for achieving regime shifts and sustainability transitions.

4.3.6. On the whole: a transitions perspective in terms of space, intermediaries and learning

Drawing together the four formulations of transition theory in terms of how each relate to space, there seems to be sufficient consideration of the geography of transitions in order to, overall, reconcile transition theory with the spatial aspect of sustainability transformation. The innovation systems perspective recognised the various levels at which systems of innovation might be cultivated ranging from the national or sectoral scale right down to the regional or city level. The MLP perspective as conceptualised by Geels (2002; 2004) is heavily criticised for its spatial naivety although Hodson and Marvin (2009; 2010), Coenen and Truffer (2012), as well as Raven *et al.* (2012) give attention to how this shortcoming might be addressed in the further development of the MLP. The TM perspective is sensitive to the nested levels within complex adaptive systems and deploys a governance approach to transitions predominantly at the national and urban scale. The fourth orientation, the evolutionary systems perspective, relates least to the spatiality of transitions and rather offers complementary thinking to develop and extend current transition thinking. In essence, it has been demonstrated that the different approaches to transition are generally focussed at the national level, with only some supplementary literature arguing for the application of certain approaches (for example the

MLP) to the urban context. This thesis therefore aims to contribute to the further application and amplification of transition theory to the urban context.

Having examined each transition orientation in terms of whether, and to what extent, they recognise the importance of agency and transition actors in transitions, it is evident that intermediaries and intermediary work are prominent in three of the four formulations of transitions that van den Bergh *et al.* (2011) demarcates. Each of these perspectives offers a unique conception of how intermediation contributes to the structuring and furthering of transition processes and makes it possible to assert that in general, intermediaries and intermediation processes are recognised in an agency-centric framing of transition theory.

References to learning are evident across the transition theory orientations. However, besides transition management's explicit focus on individual, social and institutional learning, and the evolutionary systems' extension thereof, there seems to be an insufficient and in many cases superficial consideration of learning in transition frameworks. Overall, a general recognition of learning is evident although learning as part of transition processes is somewhat taken for granted and not sufficiently conceptualised in transition theory. A gap in the transition literature is revealed with respect to the conceptual integration of learning and learning processes.

Thus far, this section has developed a particular transitions perspective by exploring explored the connection between transition theory and space, intermediaries and learning, respectively. The following section presents a complementary conceptual framework of urban learning.

4.4. **A conceptual framework of urban learning**

"A regime shift cannot occur without changing worldviews, institutions, and technologies together as an integrated system" (Safarzyńska *et al.,* 2012:1014). Learning, for individuals and in social settings, is an essential mechanism in transforming preferences, behaviour and institutions in sustainability transitions. Engaging with the governance of socio-technical transitions requires building an understanding of how urban actors learn as part of transition activities.

This section draws together three modalities of learning to develop a multi-faceted, multi-layered framework of urban learning. On their own these formulations of learning are not adequate. Seen together they provide a more robust strategy for creating spaces of intermediation that cultivate social learning. The previous section investigated whether, how, and to what extent transition theory addressed spatiality, agency and learning aspects; this framework of urban learning will contribute to each of these aspects. This framework of urban learning sets out to investigate the conditions under which learning is stimulated and contributes towards social learning for sustainability. Each formulation of learning sets out principles and strategies for structuring a learning environment; which, seen together, provide a robust platform upon which to investigate learning processes as part of urban governance experiments.

Before outlining the three conceptions of learning in Transition Management, the Learning City and Assemblage Theory, social learning, introduced in the previous chapter, is presented as the foundational conception of learning useful in realising sustainability transitions.

4.4.1. Social Learning and sustainability transitions

Social learning was introduced in Section 3.2. This conception of learning is the chosen foundation for engaging with urban learning because it advocates for learning beyond the individual and is about developing interaction and joint action within groups based on alternative perspectives on reality (Reed *et al.*, 2010; Safarzyńska *et al.*, 2012). Social learning has come to the forefront as a way of analysing and conceptualising social change. It refers to the ways individuals and groups question and reflect on the values, assumptions and policies that drive their action, and in turn find ways of changing them. Creating stimulating environments were diverse stakeholders can comprehend the perspectives, motives and visions of one other and in turn develop shared understanding for joint action, is crucial for achieving social learning. Transition Management, the Learning City and Assemblage Theory are three frameworks which offer strategies for creating such learning environments.

4.4.2. Transition Management

Transition management recognises that "managing transitions is by definition a highly uncertain and sometimes chaotic process in which an attempt is made to link different actors and organisations with different time horizons, ambitions and values" (Loorbach, 2007:80). At the core of its relevance to a framework of urban learning is how TM implies an entirely different governance approach, one that "views social change as a result of the interaction between all relevant actors on different societal levels within the context of a changing societal landscape. Managing societal change thus becomes the organization and coordination of this interaction; a way of indirectly influencing, adjusting, redirecting and guiding actions" (Loorbach, 2007:80). This exemplifies a reflexive governance approach since transition management is a process which challenges societal actors to jointly scrutinise and reconsider the underlying assumptions of how socio-technical systems are structured, practiced and governed (Hendriks & Grin, 2007; Voß *et al.*, 2009).

Facilitating multi-stakeholder engagement, oriented towards long term social change and sustainability goals is central to transition management (Kemp & Loorbach, 2006; Loorbach, 2007; Avelino & Rotmans, 2009). TM will be explored in terms of its distinctive features, the activities comprising the transition management process and how these are operationalised in a transition arena.

4.4.2.1. Features of TM

"Transition management is based on a process-oriented and goal-seeking philosophy which helps to deal with complexity and uncertainty in an integrated manner" (Loorbach, 2007:85).

- Multi-actor policy making

Transition management facilitates a multi-stakeholder engagement process based on a selective participatory approach that brings together diverse actors implicated in the challenges at hand, and representative of the stakeholders engaged in these issues in reality. Organising participation and facilitating interaction that can achieve radical innovation and effective governance is addressed by selecting participants "based on their specific roles, backgrounds and competences, and their explicit ambition for innovation" (Loorbach, 2007:89). Interactions between these stakeholders is facilitated in such a way that a destabilising context gives rise to shared understanding around appropriate sustainability visions and collaborative strategies for action.

- Long-term, collective goal setting and anticipation

Long-term, flexible visions of at least 25 years operate as frameworks for shaping short term agendas and action. Transition management allows for a flexible, adaptive approach to the development of shared agendas and "enhances anticipation of long-term systemic effects through the use of envisioning, scenario- and trend analyses, back- and forecasting exercises and identification (and selection) of innovations" (Loorbach, 2007:90).

- Agenda-building

Developing a shared transition agenda—"a societal strategy to work towards shared visions, including a number of sub-strategies and concrete experiments"—sets out the means through which different actor-groups realise their objectives (Loorbach, 2007:92). The process of agenda-building is integral in developing transition pathways and "is seen as a means to achieve coherent network- and coalition-building and create shared notions of goals and ambitions" (Loorbach, 2007:92). More important than the actual agenda, is how the agenda building process surfaces barriers to change. Therein, problem recognition and structuring, and balancing individual and collective agenda, are two critical aspects.

- Experimenting and innovation

TM aims to develop a context in which desired innovations, supportive of the transition agenda, can mature and diffuse. "Transition management focuses on societal innovation which is not only driven by economic criteria and logic and also involves large-scale institutional and cultural innovation preceding product- and process innovation" (Loorbach, 2007:93).

- Evaluation, adaptation and reflexivity

As a form of reflexive governance, "re-institutionalisation and reframing is an important aim of transition management for which it relies on stimulating reflexivity and creating the conditions for social learning" (Loorbach, 2007:95). This requires anticipating future dynamics and developing flexible, forward-looking strategies, systematically evaluating progress and adapting to changes in the environment and the transition process itself.

- Knowledge diffusion and learning

Transition management recognises the need for developing and integrating various forms of knowledge into shared understandings of societal problems and for developing new knowledge supportive of transition agendas. Structured interactions within the transition arenas allow for in-depth discussions which lead to the confrontation of different perceptions, the development of shared problem understanding, the integration of new knowledge as well as knowledge gaps (Loorbach, 2007). "The process of reflecting on problem and solution, of co-constructing strategies and of experimenting with different options and solutions, can be seen as a process of social learning" (Loorbach, 2007:99). A further goal of the approach is the diffusion of the knowledge into wider networks in which actors are embedded. Social learning in transition management constitutes both these aspects—"it is aimed at stimulating a shift in perspective among the participants in an arena and later on in a wider societal context… In the context of transition management, creating a context in which social learning takes place is seen as a governance approach which leads to behavioural changes at the individual and institutional level. Social learning in transition management is thus a means as well as a goal in itself" (Loorbach, 2007:99).

4.4.2.2. The TM framework

The features of TM outlined above translate into a cyclical, multi-level framework for implementing this reflexive governance approach. The framework distinguishes between different types of governance activities (strategic, operational and tactical) and difference phases of transition management (Loorbach, 2007). "The major ambition of transition management is to develop effective (adaptive and anticipative) governance systems for transitions through systematically influencing, guiding and structuring governance activities at the different levels over time" (Loorbach, 2007:104). This process is a cyclical and iterative one, as depicted in Figure 4.3 (Loorbach & Rotmans, 2006).

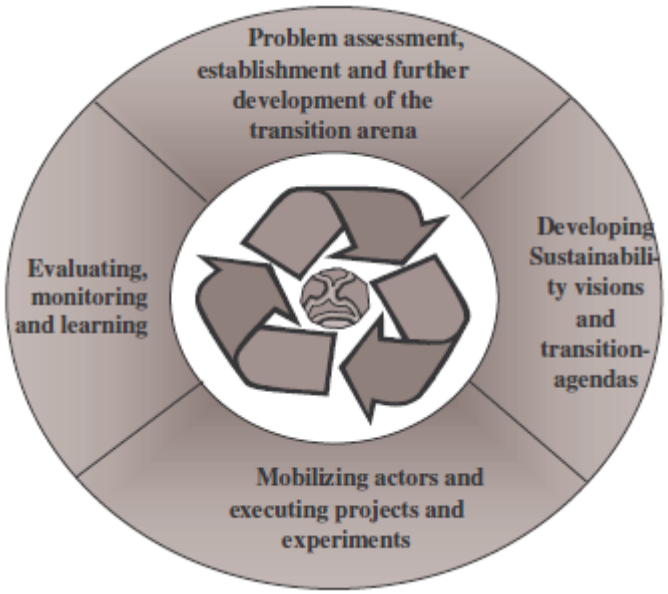

Figure 4.3: Activity clusters in transition management (Loorbach & Rotmans, 2006:11)

The establishment, organisation and development of a transition arena forms the basis of the transition management process and constitutes the strategic aspect of transition activities. Selecting a wide range of stakeholders needs to reflect the complexity of the transition environment. The facilitation of the transition arena is critical; in terms of both process and substance. The role of the transition manager and transition team influences both aspects. From an operational activities perspective, *the development of sustainability visions and a transition agenda* emerges out of an organised envisioning process. These guide the formulation of programs and policies and inform short- and long-term objectives. Arrived at through a process of network and coalition building, "the transition agenda forms the compass, which the transition arena participants can follow during their transition journey" (Loorbach & Rotmans, 2006:15). What follows is the operational activity—the *initiation and execution of transition-experiments*. The entire transition management initiative is underpinned by *monitoring and evaluating the transition process*; the iterative and recursive approach is demonstrated in Figure 4.4.

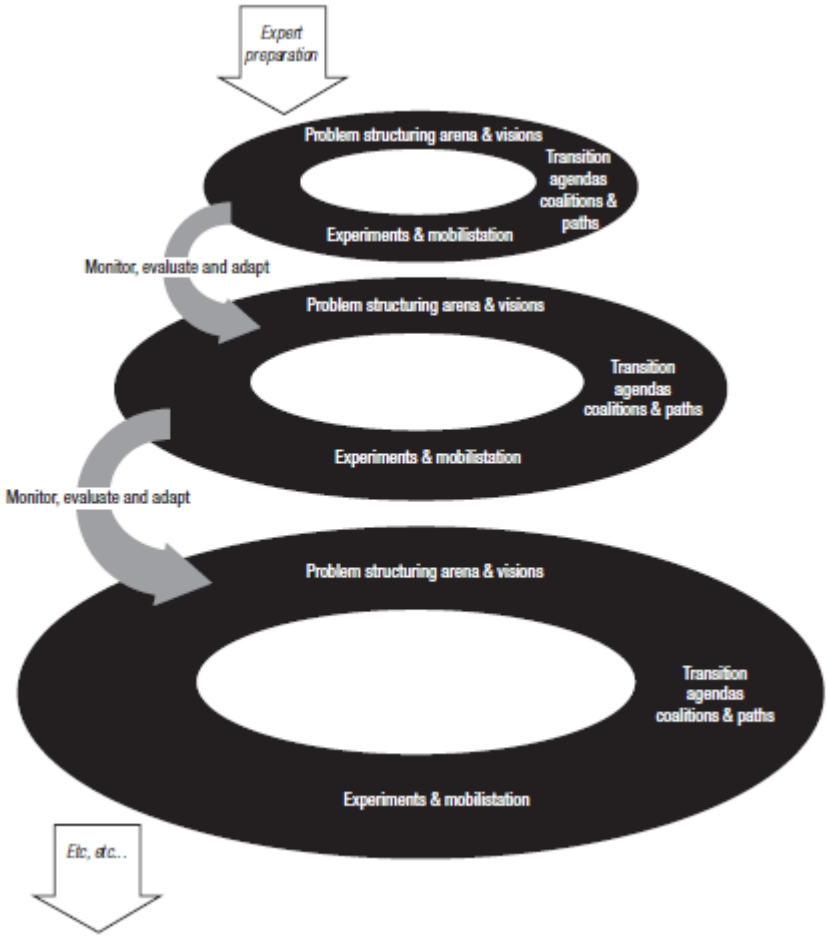

Figure 4.4: Different cycles of transition management (Loorbach, 2007:124)

"Learning-by-doing and doing-by-learning is the essence of transition management" (Loorbach & Rotmans, 2006:16). Whereas, learning-by-doing concerns developing theoretical knowledge from practice, doing-by-learning is the development of practical knowledge from theory. Formulating specific learning goals that encompass these different modes of learning is important for monitoring and reflecting on the transition management process.

4.4.2.3. The transition arena

The distinctive features and iterative phases of transition management are operationalised within the transition arena—a carefully constructed social environment or engagement space for a selective number of creative, strategic and visionary societal actors. Transition management is a response to the need for more innovative governance arrangements and instruments and at its core, is multi-actor and has a long term focus on learning and innovation (Loorbach, 2007). As a new field of governance, transition management is a specific conceptualisation of steering for sustainability and the transition arena is one of its strongest contributions. "Transition management can therefore be seen to propose a new governance community or arena between government and market that allows for long-term reflection, innovation and social learning and collective goal- and strategy-formulation" (Loorbach, 2007:82). As depicted in Figure 4.5, the transition arena functions as an institutional environment that is separate yet closely connected from the market and policy arenas. It serves as a holding space for the transition process in order to "pressurise the current regime subtly, by developing alternative visions and an alternative agenda within protected environments" (Loorbach, 2007:92).

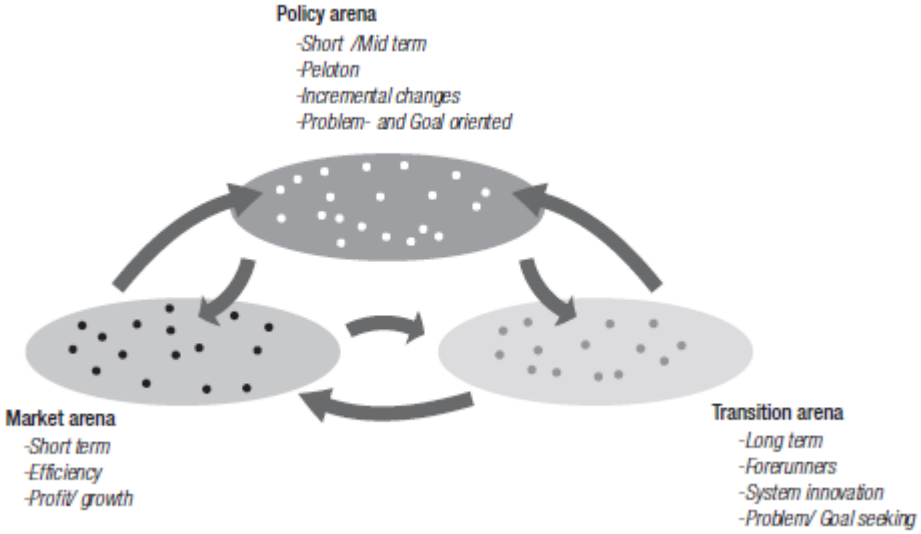

Figure 4.5: Transition arena as alternative circuit (Loorbach, 2007:82)

4.4.2.4. Lessons from transition management about urban learning

Transition management's primary contribution to a framework of urban learning is the notion of a transition arena as a protected space for a multi-stakeholder engagement process focused around the development of a long-term transition agenda towards sustainability. As a prescriptive governance approach, transition management can be interpreted and applied in diverse contexts and is not limited to specific scales of governance. Initiated and guided by an organised transition team, a transition management process can be structured around a wide range of societal problems. The explicit leadership and facilitative role taken on by the transition team in bringing together a group of frontrunners and strategically positioned stakeholders is another distinguishing feature of the transition management approach. The transition arena is about "opening out the decision space, establishing new coalitions of actions, and encouraging societal learning about various alternatives" (Meadowcroft, 2009:337).

Transition management is an extremely valuable governance framework in developing a framework about how urban actors learn. It outlines a structured process and associated activities on how to create an institutional setting where learning processes can support the realisation of a shared transition agenda for achieving sustainability goals. However as van de Kerkhof & Wieczorek (2005:734) explain, "the proposed framework for organising the transition process does not indicate explicitly enough how to increase learning so that it better serves the purpose of systems change towards sustainability, and it does not make full use of the methodological insights from the field of social learning".

Lawhon and Murphy (2011) provide a critique of transition management that responds to the nature of its approach to participation. As a governance arrangement, transition management advocates for sufficient stakeholder representation in the structuring of a transition team with members specifically chosen based on their knowledge, expertise and capacity for collaboration and innovation. Following this Lawhon and Murphy (2011:361) suggest that "transition management studies generally emphasise the voice and agency of individuals directly involved in *technical* or *economic policy* changes, eliding those individuals affected by or directly involved in the *social* or *political* changes that will accompany a transition towards sustainability". This connects closely with the approach's particular conceptualisation of knowledge and how this can be transformed and developed. Lawhon and Murphy (2011:362) suggest that what is needed is not only "an expansion of the range of participants and knowledges deemed relevant for transition management decision-making processes, but also a broader reconsideration of what knowledge is, where and how it is constructed, and what it means for the long-term development of a socio-technical system". A second component of Lawhon and Murphy's (2012) criticism of transition management relates to how it evades power relations in how participation and collaboration is framed. Given that conflict and contestation are inherent in decision making around complex sustainability issues, transition management must confront the political nature of interactions. Recognising how uneven power relations within the transition area "can result in a vision that

includes and/or excludes different artefacts, social priorities, groups of people etc." (Lawhon & Murphy, 2012:363).

4.4.3. The Learning City

The learning cities (LC) perspective is also interested in learning, but proceeds from a distinctly different conception of reality and knowledge to what informs the transition management approach. The LC approach emphasizes how the development of knowledge- and innovation can lead to improved economic performance and competitiveness at the urban and regional scale (OECD, 2001; Campbell, 2009). This approach has been adopted as an explicit development strategy by cities across the world as leaders aim to create the conditions for continuous learning and innovation that allow leading cities to keep pace with socio-economic, political and environmental challenges (OECD, 2001; Campbell, 2009, 2013).

The learning cities approach's unique contribution to a framework on urban learning is how the learning cities approach can serve as an explicit urban development agenda the political and administrative leadership at the municipal level commits to. This has the effect of cultivating a development agenda that supports the fostering of conditions for learning within an urban system as well as establishing linkages and interdependencies in networks of learning cities across the world. This development discourse also signifies a reconceptualization of cities as entities or organisations of learning and innovation which has vast implications for mechanisms of urban governance.

This section will explore the position of cities in the knowledge economy and the imperative for cities to compete on a global scale. Its foundations in the innovation systems orientation to sustainability transitions will be explored before the mechanisms and specificities of the learning cities approach are outlined.

4.4.3.1. Cities and the knowledge economy

Cities are positioned as drivers of local economic development and "since large cities typically account for 40% of national GDP, any improvement in efficiency or efficacy is important not just for the city, but for the wider economy as well" (Campbell, 2009:195). Cities that champion governance strategies and interventions supportive of the learning cities approach can help to foster increased economic performance (OECD, 2001). Beyond the motivation for cities enhancing economic performance and competitiveness, urban systems and regional economies are increasingly leveraged as contributors towards a learning- and knowledge-based society.

In the move away from an industrial economy to a knowledge economy, cities are seen to offer appropriate mixes of resources, institutional structures, technologies and values that position them as incubators of knowledge-based societies. Increasingly recognised as players in regional and national affairs, the diverse range of cities that constitute the emerging knowledge-based economic development approach are reflective of the complex interactions between global and local contexts. As such the "regional (or more local) level

offers the greatest prospect for devising governance structures able to facilitate and foster the transition to the new patterns of knowledge-based economic activity" (OECD, 2001:8).

The OECD's (2001:8) report, *Cities and Regions in the New Learning Economy,* suggests that such a governance approach implies a much wider consideration than just economic issues: "if 'learning cities' and 'learning regions' are to provide the basis for sustainable development, they need to be viewed in the widest economic, social and environmental terms". UNESCO's conference report from the 2013 International Conference on Learning Cities in Beijing, China, defines a learning city as one that "creates and reinforces individual empowerment and social cohesion, economic and cultural prosperity, and sustainable development" (UNESCO, 2013:2). A leading learning city commits to creating and fostering the conditions for continuous learning and innovation in support of these broad goals. Campbell (2013:9) explains that "in a globalising economy where knowledge plays an increasing role, cities are the crucibles where linkages are made. In turn, linkages are the channels of learning, and learning is a key not only to good practice but also to creating wealth and reducing poverty amongst the poorest".

4.4.3.2. Innovation systems and learning cities

The learning city approach to regional development is an expression of the innovation systems orientation towards sustainability transitions. 'Learning regions' find their basis in the conceptualisation of regional systems of innovation which develops the relationship between learning, innovation and regional economic development (OECD, 2001). An innovation system comprises of the networks of nested actors or institutions from various sectors that stimulate innovation through interaction (Lander, 2010). Cities have long been recognised as central to innovation. However, they have not been explored in terms of their knowledge-exchange and learning properties until more recently (Campbell, 2013).

Learning cities or learning regions are best understood as virtuous regional systems of innovation and as such, are distinguished by an explicit commitment to placing learning and development at the core of development (OECD, 2001). Learning regions are spatially delineated regions where economic competitiveness is underpinned and characterised by the innovative capacity of the organisations, firms, institutions and markets constituting it (OECD, 2001). This innovative capacity is in turn dependent upon its learning capacities—both the individual, but primarily, organisational learning within and between firms and organisations in the particular region. Learning regions are further characterised by regional institutions which "facilitate individual and organisational learning through the coordination of flexible networks of economic and political agents" (OECD, 2001:24).

4.4.3.3. Learning and the changing urban governance agenda

"Cities have always been the centre of information intensity and resource transformation, but not always in charge of their own destiny" (Campbell 2013:17). Campbell (2013) identifies three major trends which have

resulted in considerable shifts in the position and responsibilities for cities: “the leviathan trinity of decentralisation/democratisation, metropolitisation and globalisation have together produced a thorough transformation in political and institutional relationships over the last two decades” (Campbell, 2013:27). They have propelled cities into a more open environment and brought powerful incentives for cities to acquire new knowledge (Campbell 2013).

Albeit disproportionality, globalisation has contributed to a process of decentralisation and devolution of government authority, administration and resources to subnational levels (Bontenbal, 2009). The reshaping of public administration has given local governments a more prominent role, bolstered by urban regions’ importance in regional and national economies. An outcome of these complex dynamics related to globalisation is that the state is no longer viewed as the sole framework for organising space, people and economic activities (Bontenbal, 2009:62). The resulting decentralisation has an underlying rationale that “bringing government closer to the people will make it more responsive to the needs or ordinary citizens” (Bontenbal, 2009:62). The shift towards governing cities, rather than managing them, has seen the evolution of the role of local government. Parallel to this has been the trend towards new opportunities for citizen participation and democratisation (Bontenbal, 2009). As well as gaining new responsibilities, “a primary competence has emerged since municipalities are increasingly expected to become ‘developmental; through taking a leading role in local development processes” (Bontenbal, 2009:32). Efforts to strengthen the governance capabilities of local authorities are best understood against this background.

Linked to the economic performance imperative, an evolving conception of urban governance has allowed for the emergence of a multiplicity of development approaches; the learning cities approach is one such metaphors around which space, people and economic activities are organised in urban localities. Others include creative cities, smart cities, nurturing cities, compact cities, resilient cities and green cities amongst others. Framed by wider regional or national frameworks, these signify the articulation of specific urban development agendas, priorities and values, by urban administration and political leadership.

Campbell’s 2013 publication, *Beyond Smart Cities: How cities network, learn and innovate*, represents the most comprehensive research done in the field of learning cities. It is an effort to illuminate the learning aspect of urban development and whilst it acknowledges that all cities have the potential to learn, innovate and adapt, the learning cities agenda is most closely aligned with cities that proactively integrate a learning perspective into their governance strategies. As such, the learning cities approach is structured around an explicit focus on learning and innovation in support of economic and environmental sustainability. Its implications for urban governance strategies are evident in how the learning cities approach builds on cooperation, partnership and knowledge exchange with other cities as part of wider urban learning networks coupled with a stronger focus on collaboration and participation with local public, private and community actors (Bontenbal, 2009:63). Campbell (2013) highlights, however, that learning is different from urban

governance—cities learn as part of their governance structure but learning is also informal or technical and sometimes off the 'governance radar' all together.

Cities across the developed and developing worlds are adopting the learning cities approach to tackle their unique urban sustainability challenges (Seymoar, Mullard & Winstanley, 2009). Supportive networks have also emerged to facilitate better exchange and interaction between these cities. There has been a rapid growth in the number of city partnerships and networks worldwide, *Cities as Partners* reports that 70% of the world's cities are engaged in some form of international cooperation from sister city agreements, international city networks, partnerships and programs. Municipal partnerships are increasingly employed as instruments for cities and communities to assist one another through knowledge sharing, the transfer of resources and technology as well as cooperation. "Cities—both local administrations and civil societies—partner up and their partnerships seek to contribute to a variety of objectives, including poverty alleviation, institutional strengthening, democracy and peace building, knowledge exchange and the attainment of the Millennium Development Goals" (Bontenbal, 2009:17). The *Cities as Partners* report notes that the number of international city arrangements has increased as well as the regional thematic scopes of these city-to-city partnerships become more diverse. It has a particular focus on city-to-city cooperation structures and city networks linking municipalities in the global North with the global South. Other initiatives indicative of this rise in city exchange and partnership, and with an explicit focus on learning, are the International Centre for Sustainable Cities (ICSC) which created the Partners for Long-term Urban Sustainability (PLUS) network, UNESCO's Global Network of Learning Cities and the Learning Cities 2020 Network. UNESCO's report on the 2013 International Conference on Learning Cities reported that the main outcomes of building a modern learning city included individual empowerment and social cohesion, economic development and cultural prosperity and sustainable development. This however, requires strong political will and commitment, robust governance and the participation of all stakeholders and the mobilisation and utilisation of resources (Seymoar *et al.*, 2009).

4.4.3.4. Mechanisms of city learning

The framing of urban governance in the literature on the learning cities approach shapes a conceptualisation of learning and closely related to the capture, dissemination and adoption of knowledge and best practice (Campbell 2013). This is captured in how the PLUS Network aims to "catalyse action on urban sustainability in cities around the world by accelerating the transfer of learning, knowledge and research from city to city" (Seymoar *et al.,* 2009:5). As part of this network, representatives from member cities participate in regular peer exchanges, biennial conferences, training events and facilitated online dialogues providing those opportunities to share their work and learn from one another's experiences (Seymoar *et al.*, 2009). Sustained exchange between cities is expected to build more resilient cities, better able to result to economic, ecological and social stresses (Seymoar *et al.,* 2009).

Networks of peer learning entities such as PLUS exemplify integration of both individual, and organisational or institutional learning. Organisational learning is framed as when an organisation both learns and facilitates learning; this is constituted by knowledge acquisition, information dissemination, information interpretation and organisational memory (Seymoar *et al.,* 2009).

Specialised and distributed networks enable urban learning around sustainability in the following five ways (Seymoar *et al.,* 2009):

- Lowering the costs associated with knowledge acquisition
- Acting as an organisation's memory
- Nurturing organisational flexibility
- Bridging solitudes, silos and stovepipes
- Making knowledge communal instead of a tool of control.

The unique shift in the formulation of the learning cities strategy is the move from organisational learning to city learning. Campbell (2009) frames cities as learning organisations and develops a typology of cases representing different characteristics and modalities of city learning. Certain patterns are evident in how successful cities deliberately and systematically engage in strategies for knowledge acquisition, storage and dissemination and ultimately, how these insights might be applied to solve local problems (Campbell, 2013).

Campbell's (2013) typology is based on a distinction between proactive cities' and informal learners or reformer-learners. For proactive cities, Campbell (2013) investigates how cities build the capacity and capabilities for learning, creativity and knowledge development. For reformer-learners, learning takes place through combinations of informal, technical and corporate styles of learning (Campbell 2013).The distinction between cities that learn proactively or in more informal ways is important since "cities will learn by accident, but they can learn in deeply transforming ways if they see a purpose in doing so" (Campbell, 2013:68).

These five types of learning comprising the proactive city learners, correspond to groups of cities and represent their city-to-city exchanges and partnerships in terms of the degree of effort, the objectives of learning and the modes of interaction between and among main actors. Cities can be assigned to different categories, often simultaneously, in terms of the degree to which institutional effort in the city is organised and dedicated to seeking out and capturing pertinent information (Campbell, 2013). Thus, these categories represent the main mechanisms used by cities to get new ideas.

- Individual cities, one-on-many: cities organise deliberate learning missions
- Individual cities, one-on-one: cities engage in episodic visits or exchanges
- City clusters on clusters: cities that share common program objectives or campaigns
- Cities in active networks: cities that are members in regional or global associations
- Cities in passive networks: cities that engage casually in conferences, events and network bulletins

Campbell (2009) identifies two key dimensions of learning from this typology of cities' approaches to learning. The first concerns the learning modality in terms of the degree of initiative, intensity, continuity and means of storage that cities generate in the learning process. The first class of cities, the proactive learners, indicate that "a major commitment in needed in both gathering and managing knowledge if it is to be useful in reform or innovation" (Campbell, 2009:200). The second consideration is the soft infrastructure associated with learning—"the learning process itself seems to generate an emerging quality in the city that might be as important as the aggregated lessons a city learns" (Campbell, 2009:200).

4.4.3.5. Lessons from the learning cities approach

Campbell's (2013) extensive research on how cities learn, network and innovate is helpful in understanding the multiplicity of ways that cities learn as either a strategic undertaking or an emergent outcome of particular urban conditions. "The key step is to facilitate exchange in cities, internally and externally, but above all to create an atmosphere of trust involving a wide swathe of stakeholders" (Campbell, 2013:13). A learning city, regardless of whether these as proactive-learners or reformer-learners, is constituted by four elements:

- A *trusting milieu* as an atmosphere of underlying quality underpinning relationships among key urban stakeholders
- *Institutional processes* referring to the documentation, deliberation and discussion of knowledge gathered through internal and external mechanisms
- *Agency* exhibited through a central unit responsible for managing, recording and disseminating knowledge
- *Knowledge gathering* as the activity of harvesting ideas from internal and external sources for adaptation as innovations in the city

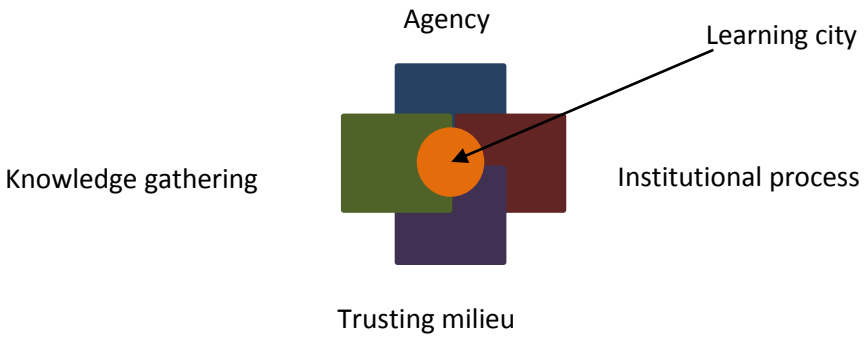

Figure 4.6: The Learning City (Campbell, 2013)

Finding the reason to learn, and assembling a platform that reflects the common interests of key stakeholders, constitute indispensable parts of the process of creating a conducive environment for urban learning (Campbell, 2013).

As an orientation towards regional urban development, the learning cities formulation outlines a governance strategy reliant on a proactive political and administrative leadership facilitating broader governance arrangements as well as looking towards other cities and urban networks for lessons on how to tackle urban sustainability challenges. The Learning Cities conception of urban learning is in many ways similar to the transition management approach however its emphasis on networking, sharing and partnerships is indicative of a stronger outward focus and a reliance on strong political leadership at the forefront of an explicit commitment to learning.

4.4.4. **Assemblage**

This final orientation towards urban learning provides a critique of the underlying assumptions of how knowledge is created, managed and shared in formulations of learning such as transition management and the learning cities approach. Assemblage "conceives of knowledge and learning as partial, social, produced through practices" (McFarlane, 2006:5). Drawing from Actor Network Theory (ANT) the assemblage approach to urban learning builds on a post-rationalist perspective on knowledge and provides novel contributions on how knowledge is created, how it is communicated and the ways in which learning take place (Latour, 2005). After addressing these two foundational aspects, the particularities of assemblage and learning are explored and lessons for a framework for urban learning discussed.

4.6.4.1. **A post-rational perspective on knowledge**

McFarlane (2006) critiques the traditional rationalist conception of knowledge. "In mainstream development, knowledge and learning are commonly viewed through a rational lens that frames learning as a cumulative process of 'adding' new information to existing knowledge 'stacks' in a straightforward way in order to make them more effective" (McFarlane, 2006:9). In line with this, "knowledge transfer is conceived as instrumental, reducing knowledge itself to a technology that can be applied, that is, a static entity that can be shifted around to do the job of development" (McFarlane, 2006:8). This rationalist perspective on knowledge and learning, where knowledge is a commodity and the transfer of knowledge a technical process, has the effect of separating knowledge from politics and context (McFarlane, 2006). An assemblage perspective on knowledge and learning is an attempt to reintegrate these aspects.

Instead of viewing knowledge, produced through learning processes, as objective and universal, and a technical entity that can be transferred and translated in a linear way, assemblage presents a post-rational framing of knowledge. Thus, knowledge is characterised as being situated in systems of ongoing practices, as relation and mediated by artefacts, being rooted in a context of interaction, acquired through different forms of participation in communities of practice, and continually reproduced and negotiated and thus always dynamic and provisional (McFarlane, 2006). This post-rational understanding of knowledge has implications for urban learning processes. Essentially, the post-rational perspective is sensitive to the dynamic and plural

forces shaping knowledge production and dissemination. It emphasises that knowledge and learning is situated, socio-material, formed through practices and often political (McFarlane, 2006).

Knowledge is formed through interaction

McFarlane (2006) argues that knowledge formed through interaction which means that it is socially produced through various forms of interaction among individuals and organisation, both formal and informal. In this way, knowledge is embedded in the lives and experiences of urban dwellers.

Knowledge is situated

A post-rational perspective acknowledges how knowledge is situated and thus context-specific and dependent on particular time and spaces (McFarlane, 2006). Thus, it is also associated with identity and belief: "Information becomes knowledge when it is interpreted by individuals and given a context and anchored in the beliefs and commitments of individuals" (Nonaka, Toyama & Konno, 2000:7). Knowledge is often politicised since it becomes imbued with values and contexts (McFarlane, 2006). However, whilst knowledge is situated, it is also mobile: "it is formed not simply *in* place but through multiple knowledges and informations that run *through* various spaces and pathways" (McFarlane, 2006).

Knowledge is either tacit or codified

These two broad forms of knowledge are complementary and useful in understanding knowledge creation. Codified, or explicit knowledge, can be expressed in formal or explicit terms and shared in the form of data, manuals or reports. Tacit knowledge is more difficult to communicate and transfer since "it is deeply rooted in action, procedures, routines, commitment, ideals, values and emotions" (Nonaka *et al.*, 2000:7).

Essentially, a post-rationalist perspective posits knowledge as practice and learning as the participation in these practices. Recognising knowledge as social brings to light the practices through which knowledge is formed. "Practice connects 'knowledge' with 'doing' pointing to the work, or fabrication involved in knowing" (McFarlane, 2006: 23). An emphasis on experience and practice positions knowledge as produced through everyday interactions between people and objects in socio-technical systems (McFarlane, 2006). Following this, learning is framed as the participation in these everyday practices and interactions. Wenger's (1991) concept of communities of practice is useful in understanding groupings of people with particular interactions, practices and values. Communities of practice are "autonomous groups that are self-organising and share a mutual commitment to a community, built around activities commonly understood and continually renegotiated by its members" (McFarlane, 2006:32). Forming 'constellations of learning' is "attentive to a whole range of mobilities in knowledge creation, including those that produce face-to-face interaction—the most potent and powerful medium of communication—and other inter-related modes of communication" (McFarlane, 2006:27). A post-rationalist perspective on knowledge supports constellations of learning which take into consideration the spatial relationality of knowledge creation as opposed to emphasising an 'in-here' (local) 'out-there' (global) ontology (McFarlane, 2006).

4.4.4.1. Actor Network Theory, assemblage and the city

Assemblage theory has its roots in ANT (Latour, 2005). ANT's unique contribution is about inquiring into the assemblage of the urban—how the city is constituted, arranged and enacted (Farías, 2011). This involves an open and explorative engagement with the urban; a methodological approach to engaging with the configurations and problems constituting the city. ANT enables seeing "urban subjects perform and group themselves situationally, but also (how) urban objects, natures, built environments and bodies are enacted in fluid multiple ways depending on the socio-technical networks and sets of practices they are involved in" (Farías, 2011:366). Together these dynamic interconnections are actively involved in the performative production of the city (Farías, 2011). McFarlane (2011) aims to "conceptualise learning as an important political and practical domain through which the city is assembled, lived and contested, and as a critical opportunity to develop progressive urbanism". Therein, assemblage is "used to emphasise the labour through which knowledge, resources, materials and histories become aligned and contested: it connotes the processual, generative and practice-based nature of urban learning, as well as its unequal, contested and potentially transformative character" (McFarlane, 2011: 35).

Assemblage "allows us to move away from a notion of the city as a whole to a notion of the city as a multiplicity, from the study of 'the' urban environment to the study of multiple urban assemblages" (Farais, 2011:369). In this way, assemblage urbanism focuses on the multiple ways of dwelling in the city, the various networks, localities and communities of interaction and communities of practice implicated in the multiple ways of constructing the city (Farías, 2011; Blok, 2013). Swilling (2003) captures this, explaining that assemblage is "comprehending the city…as the emergent outcome of a vast constellation of assemblages of actively learning human agents, ever-changing cultures, extensive networked urban infrastructures, transformed ecosystems and the unstoppable innovations that constantly reassemble the globally-locally sourced physical materials and natural resources that everyday urban life depends on". These aspects are synthesised into the notion of 'emergent ecoculture assemblages' which ties together this renewed perspective of the urban: "dynamic learning processes expressed in spatially specific ever-changing provisional (re-)configurations of people, cultures, infrastructures buildings, materials, ecosystems and natural resource flows" (Swilling, 2003).

4.6.4.2. Assemblage and learning processes

McFarlane (2006:5) argues for learning as "partial, social, produced through practices, and both spatially and materially relational", essentially that which emerges through practical engagement with the world. McFarlane (2011) positions learning as both a process and an outcome and as such learning is actively involved in changing or bringing into being particular assemblages of people, resources and knowledges. Assemblage highlights the spatiality of learning since it is constituted through socio-spatial interactions (McFarlane, 2011). Further, learning is framed as a constructive act of world-making, rather than occurring prior or following from engagement in everyday practices (McFarlane, 2011).

This orientation to learning and the generation of knowledge highlights that they are place-focused but not restricted to that specific context—there are ongoing efforts to forge and develop connections between different resources and actors in diverse localities. An additional useful distinction is between knowledge and learning where knowledge is located in space and time, situated in particular contexts and mediated through language, technology and collaboration, and learning is about the processes, practices and interactions through which this knowledge is produced (McFarlane, 2011). Learning is better understood through the following three processes: translation; coordination; and dwelling and perception; each of which will be explored below (McFarlane, 2011).

Learning as translation

"Firstly, learning is always a process of translation. This underlies the importance of intermediaries in the production of travelling knowledge; the space and actors through which knowledge moves are not simply supplement to learning, but are constitutive of it" (McFarlane, 2011:21).

Learning as translation offers four perspectives to the creation and transformation of urban learning.

- Distribution emphasises the materialities and spatialities through which knowledge moves and seeks to unpack how they make a difference to learning, whether through hindering, facilitating, amplifying, distorting, contesting, or radically repackaging knowledge.
- Intermediaries and displacement points to the role of actors in impacting how translation of learning is open to varying possibilities of stability and flux.
- Recognising learning as partial, multiple, territorialised and practice-based highlights the contingencies of knowledge production.
- Recognising learning as being produced through comparison stresses how knowledge of the urban is relative, both spatially and temporally, to other urban contexts and experiences.

Learning as coordination

"Secondly, learning is not simply a process of translating knowledge through space of accessing stored data, but depends on the (re)configuration of functional systems that coordinate different domains" (McFarlane, 2011:22). Translation requires coordination and the construction of these function systems enable learning as a means of coping with complexity, facilitating adaptation, and organising different domains of knowledge.

Learning as dwelling and perception

"Thirdly, while learning can be structured through the inculcation of facts, rules, ideas or policy models, in substantive practice learning operates as the 'education of attention'. This means that learning can entail shifts in ways of seeing, where 'ways of seeing' is defined not simply as an optical visuality, but as haptic immersion" (McFarlane, 2011:22). The notion of dwelling is helpful to see how learning emerges through relations between individuals or groups and the city, and the everyday practices which constitute urban realities.

4.4.4.2. Lessons from Assemblage

"Assemblage is used to emphasise the labour through which knowledge, resources, materials and histories become aligned and contested. It connotes the processual, generative and practice-based nature of urban learning as well as its unequal, contested and potentially transformative character" (McFarlane, 2011:1). An assemblage perspective on knowledge and learning is helpful in grounding these processes in particular, distinctive urban localities. As opposed to the previous two conceptions of urban learning which had a strong governance approach, assemblage is based in a vastly different conception of knowledge and advocates for a means of engaging with how the city is assembled and constituted through diverse learning processes.

4.5. Chapter Conclusion

Thus far, this thesis has, in the four preceding chapters, presented the articulation of a unique research question and related objectives; detailed an embedded research process giving expression to a transdisciplinary research methodology; and constructed a two-part Literature Analysis. Essentially, this distilled a focus on how urban actors learn and the use of a transdisciplinary research approach in crafting a hybrid space and a 'prepared environment' for research collaboration between SU and SM. Seen together, this provides the foundation for the contextualisation and analysis of the case study of the REMF to follow.

The Literature Analysis in Chapter 3 and Chapter 4 culminates in a perspective on sustainability transitions premised on the firmly-established strategic centrality of cities, stresses the important of the conceptual notions of space, intermediaries and learning therein, and advances a framework of urban learning to enhance the sustainability transitions perspective at hand. To clarify, the concept of space refers to the geography of sustainability transition and the necessity for transition efforts to be deployed at the urban scale. The concept of intermediaries points to the appropriate structuring of governance arrangements to support socio-technical transitions. Finally, the recognition of learning stresses the importance of transformative social learning processes in orienting sustainability transitions. Overall, an analysis of the transitions literature with special reference to space, intermediaries and learning motivated a more detailed exploration of intermediation and learning processes in particular, hence the formulation of a conceptual framework of urban learning, that combines transition management, the Learning City and Assemblages approaches. Each of these modalities of urban learning is underpinned by different conceptions of knowledge and stress distinctive learning mechanisms. TM structures a top-down governance approach reliant on the strong facilitative role of core transition team actors steering a multi-stakeholder process within a carefully structured transition arena. The Learning City approach advocates an explicit political leadership focus on learning built on networking, partnership and exchange between diverse city representatives. The Assemblage approach has a vastly different conception of knowledge as being situated and learning the result of the participation in and enactment of specific urban practices.

The thesis will progress by contextualising the embedded case study in Chapter 5. Thereafter, Chapter 6 will be the case study narrative interwoven with an analytical interpretation, moving from the perspective on sustainability transitions elaborated above and deploying the set of discursive tools developed in the framework of urban learning.

Chapter 5: **An introduction to Stellenbosch Municipality**

The purpose of the following chapter is to provide the reader with a richer understanding of the context in which the REMF collaboration is situated. However, rather than just providing a descriptive overview of various components of its regional socio-economic, political and environmental dynamics, the perspectives and insights offered in this chapter will endeavour to capture some of the complexities and contestations unique to the greater Stellenbosch region, particularly those pertinent to the focus of the IIC and the IPC substructures. In this way, readers are invited into a more intimate understanding of the tensions that constituted the daily reality of actors participating in these initiatives.

5.1. **An overview of Stellenbosch Municipality**

SM is situated roughly 50 km from Cape Town in the Western Cape Province of South Africa. It is also one of five local municipal authorities in the Cape Winelands District Municipality as indicated in Figure 5.1.

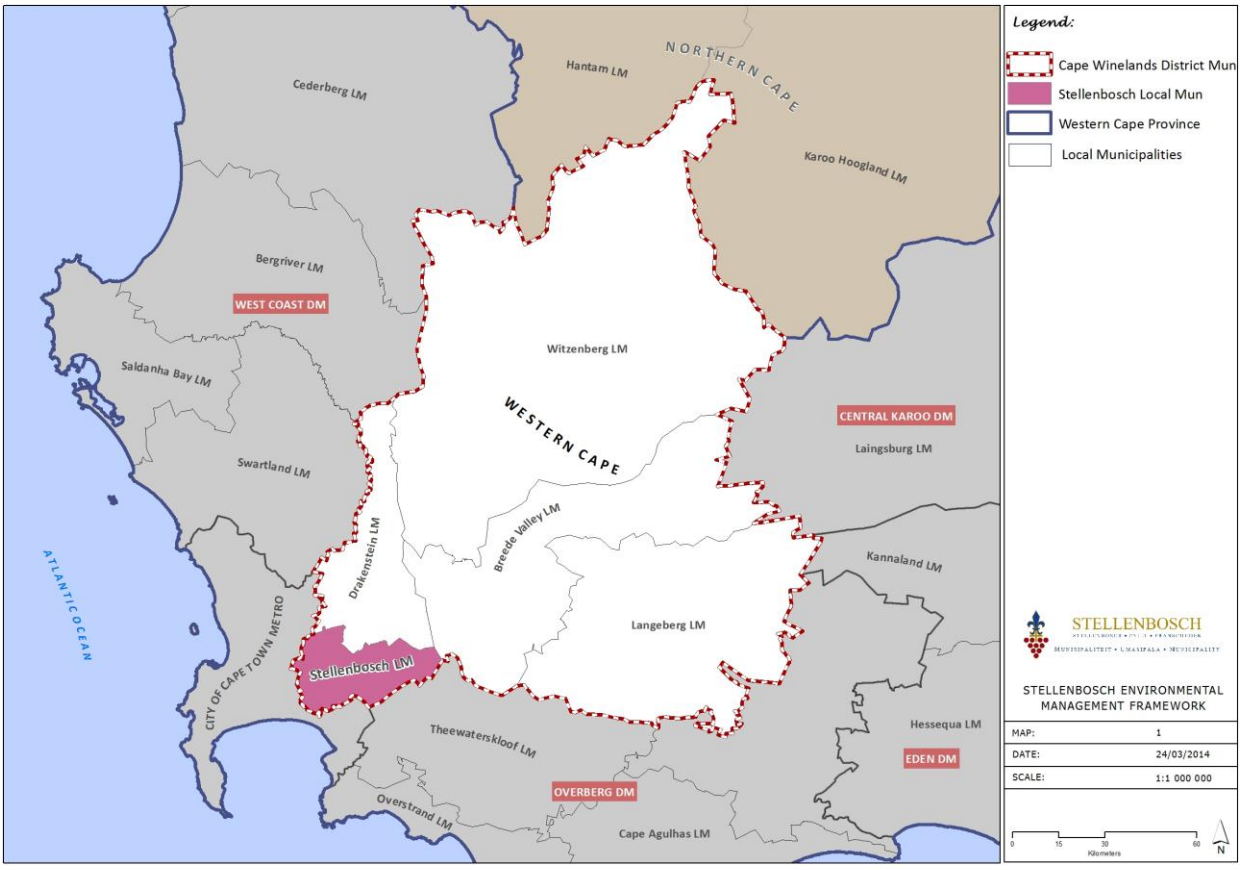

Figure 5.1: Stellenbosch Municipality in relation to Cape Winelands District Municipality (Stellenbosch Municipality, 2014b)

Since the formation of a unitary Stellenbosch Municipality a decade ago, this local municipality has had to bring together previously separate administrations. The municipality's area of jurisdiction now includes the

town of Stellenbosch, stretches past Jamestown and Raithby in the south, to Bottelary, Koelenhof and Klapmuts to the north, and over the Helshoogte Pass to Pniel, Kylemore, Gorendal and Franschhoek in the east. The municipal region covers around 900 $km^{2,}$ is comprised of 22 separate wards, demonstrated in Figure 5.2, and has a total population of roughly 180 000 people, according to municipal figures (Stellenbosch Municipality, 2015a). This figure is contested, with other sources indicating a population as high as 220 000 (Swilling, Sebitosi & Loots, 2012). Regardless, the region, and the town of Stellenbosch in particular, is a focal point for growth.

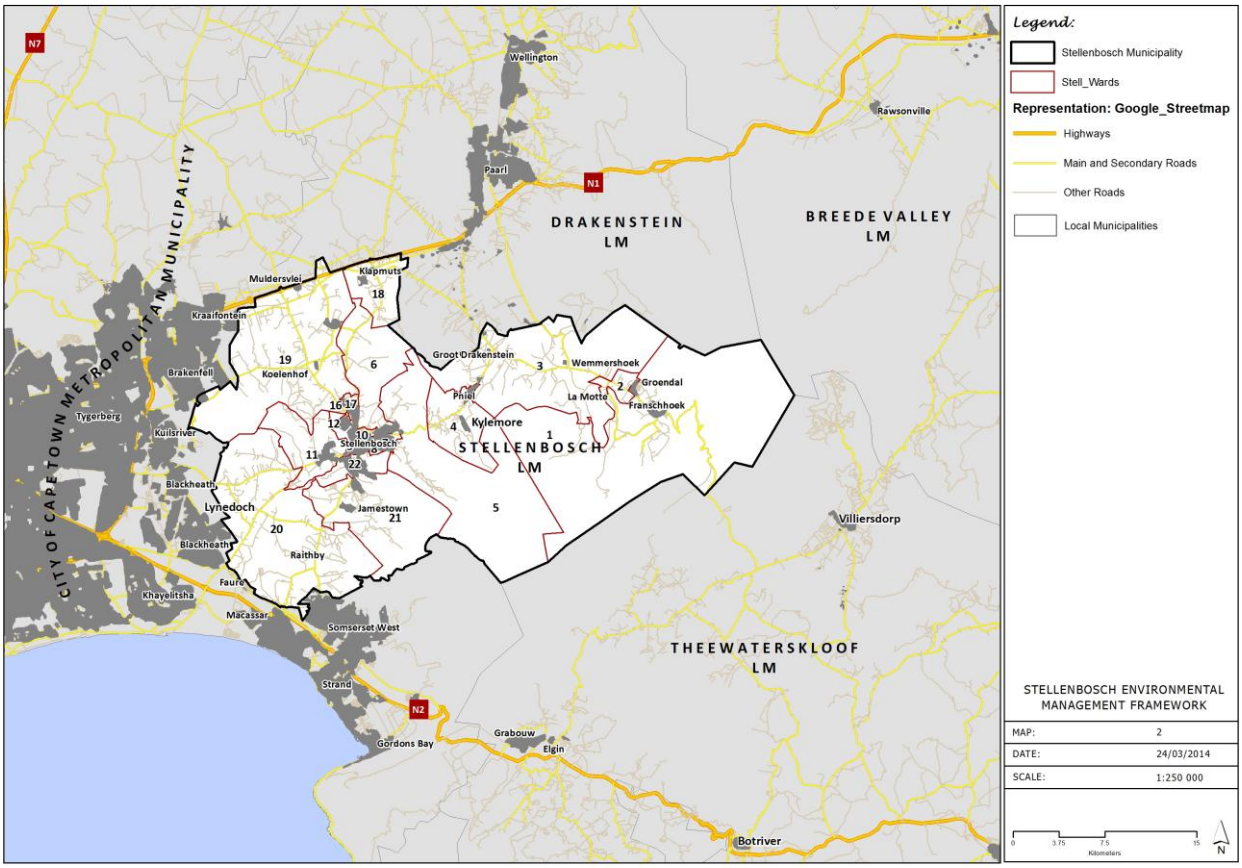

Figure 5.2: Ward delineation in Stellenbosch Municipality (Stellenbosch Municipality, 2014b)

The municipality has a long history with the town of Stellenbosch having been established in the late 1600's. Over the centuries, the greater Stellenbosch region has developed as a rich agricultural area. It now includes well developed tourism, education, research and agricultural industries whilst moving towards a more tertiary services-oriented economic focus supported by a growing manufacturing and construction industry.

It is widely recognised that Stellenbosch and the greater Stellenbosch region is endowed with a remarkable and unique concentration of capabilities, resources and opportunities (Swilling *et al.*, 2012). In 2012, *Sustainable Stellenbosch* was published and signifies a tangible outcome of the improved collaboration

between SU and SM over the last decade. It is the product of diverse interactions between researchers at Stellenbosch University and officials and councillors at Stellenbosch Municipality (Swilling *et al.*, 2012).

The publication is the first of its kind—an interdisciplinary collaboration, that in the words of Mayor Conrad Sidego, has resulted in "a shared body of knowledge that, for the first time, provides an integrated understanding of the challenges Stellenbosch faces and the possible future solutions at its disposal" (Swilling *et al.*, 2012:xi). In the introduction to *Sustainable Stellenbosch*, the following aspects are outlined which are helpful in describing the unique sense of place and that Stellenbosch and the greater Stellenbosch region, is distinguished by (Swilling *et al.*, 2012).

- *A growing and increasingly diversified economy embedded within a wide set of ecosystems that not only sustain it, but are also stunningly beautiful;*
- *A large, well-resourced research and teaching university that brings together a wide range of expertise and knowledge generation capabilities;*
- *A cluster of wealthy individuals and profitable businesses for whom Stellenbosch represents more than just a convenient location, and who view it instead as a place where they would like to live, work and support a more sustainable future;*
- *A network of environmental scientists, government officials, farmers and NGOs working with our natural systems and who have developed the kind of expertise required to inform alternative ways of planning and executing development projects;*
- *Increasingly active and robust social, business, cultural and religious initiatives that connect people across race and class barriers;*
- *Active and well-organised communities, from wealthy rate-payers to impoverished shack dwellers;*
- *A rural-urban (or 'ruban') setting that is not (yet) overwhelmed by large numbers of people whose needs dwarf the size of the local economy;*
- *A long tradition of well-managed municipal infrastructures (water and sanitation, solid waste, energy, mobility)which are, nevertheless, under severe stress at present;*
- *A pool of knowledge and skills that enable knowledge-intensive businesses and organisations to locate in Stellenbosch rather than a larger metropolitan city; and*
- *Committed and capable leadership in local government, business, civil society, education and the faith sector and the will to work together.*

The publication provides a comprehensive investigation of these various dynamics but from the onset, acknowledges how "none of these features are static and the relations between many of them may be undermined or reversed very easily" (Swilling *et al.*, 2012:4).

As a local authority, Stellenbosch Municipality is comprised of two branches—the council and the administration. The Municipal Manager oversees the administration which is made up of six departments:

Financial Services, Heritage and Planning, Strategic and Corporate Services, Community and Protection Services, Engineering Services and Human Settlements and Property Management. Each headed by a director, these departments cover the range of municipal services for which Stellenbosch Municipality is responsible. Officials participating in the IIC and IPC were primarily from the Financial Services, Engineering Services and Heritage and Planning Departments although there was occasional participation from officials from Human Settlements and Corporate Services.

The Council is made up by the Mayoral Office, where the Executive Mayor, Deputy Executive Mayor and Executive Mayoral Committee (Mayco) are situated, and the wider Council. The Council is overseen by a Speaker and in total, including the Executive Mayor and Deputy Executive Mayor is made up of 41 representatives, 19 of which are Proportional Representative Councillors and 22 Ward Councillors. Mayco members are chosen from this group of councillors and are each allocated a portfolio which corresponds to the administrative departments. Directors from the administration communicate to council through their Mayco representative. Representative of wider community stakeholder groups, the Council is Stellenbosch Municipality's political decision making arena.

This overview of SM's political conditions and governance structures was included to convey the particularities of this local municipality that political and administrative representatives from SM negotiate in fulfilling their respective service delivery mandates. For example, officials in the administration are accountable to Council and this interaction is mediated by the Director of each department. As such, the role of Directors extends beyond ensuring the efficient functioning of a particular department, but also communicating and engaging with council via a designated Mayco member. Introducing the six department also serves to illustrate the municipality's scope; it is a relatively small municipality and as such, its areas of focus are limited.

To date, SM has been fraught with political instability, as indicated in Table 5.1.

Table 5.1: Changes in political power in Stellenbosch Municipality 1996-2015 (Swilling *et al.*, 2012)

Date	**Party in Power**	**Event**
1996	ANC	Elections
2000	DA	Elections
2002	ANC/NNP	Floor crossing
2006	DA Coalition	Elections
2008	ANC Coalition	By-election
2009	DA Coalition	Motion of no confidence
2011 (ongoing in 2015)	DA	Elections

In the 2011 Local Elections, the DA gained a majority, giving the party control of the municipality. This has been the first term in Stellenbosch Municipality's recent history where a single party majority has allowed for some stability in council. Before that, the municipality experienced considerable volatility. The following local municipality elections are scheduled for 2016.

5.2. **Development tensions**

As is a central objective of transdisciplinary research, a sustained and reiterative process of problem structuring is reflected in how it has been possible to clearly delineate and elaborate the following four tensions that have a bearing on the REMF collaboration. Building on the vantage point of an embedded researcher, it is only retrospectively that four core tensions could be neatly identified and communicated. It must be noted, that the intersections between these and various other dynamics account for a richer, more complex and contested reality than what is conveyed in the following four points. Nonetheless, the following tensions are significant in that they provide a tentative window into a reality which framed and motivated particular actors' participation in the IIC and IPC.

5.2.1. **'Be innovative, but just within the rules and regulations'**

The strategic direction of SM is captured in the Integrated Development Plan (IDP). The IDP is the primary policy instrument which guides development decisions in the municipality. It is a legal requirement of the Municipal Services Act (MSA) for municipalities to prepare a five-year strategic plan to inform management within the municipal area (Stellenbosch Municipality, 2015a). "The plan is developed in consultation with community stakeholders, and the provincial and national government" (Stellenbosch Municipality, 2015a:11). The IDP comprises a package of documents, informed and supported by various policy

instruments including the municipal budget, the Service Delivery and Budget Implementation Plan (SDBIP), various sector plans and ward plans. As such, it presents the overarching strategic focus of the municipality under the leadership of the Executive Mayor and Municipal Manager.

The municipality's focus on innovation is demonstrated in its vision to become (Stellenbosch Municipality, 2015a):

> *"The Innovation Capital of South Africa".*

Its mandate is captured in the mission (Stellenbosch Municipality, 2015a):

> *"Our mission is to deliver cost-effective services that will provide the most enabling environment for civil and corporate citizens".*

This mission is operationalised in strategic objectives which focus on the following (Stellenbosch Municipality, 2015a):

> *1. Striving to make Stellenbosch the **preferred town for investment and business**, where investment inflows and new enterprise translate into jobs and prosperity.*
>
> *2. Establishing the **greenest municipality** which will not only make Stellenbosch attractive for visitors and tourists, but will also provide a desirable environment for new industries.*
>
> *3. Ensuring **dignified living** for all Stellenbosch citizens, who feel that they own their town, take pride in it and have a sense of self-worth and belonging.*
>
> *4. Creating a **safer Stellenbosch valley,** where civic pride and responsibility supplant crime and destructive behaviour.*
>
> *5. Entrenching **good governance**, which implies compliance with and adherence to mandatory policies and procedures and is the hallmark of a well-run municipality.*

The municipality's vision to be the "Innovation Capital of South Africa" was spearheaded by the Executive Mayor elected in 2011. Together with a focus on innovation, a commitment to clean governance is a strategic focus of the municipality. The interplay between these two focuses is captured in an anecdotal reference to the Mayor's leadership style, for officials to 'be innovative, but just within the rules and regulations'. This has had significant implications for the municipality's public positioning as well as its internal workings. It is clear that the Mayor has been successful in aligning his efforts to build a unique municipal culture on an already established and evolving dynamic-Stellenbosch is widely recognised as a hub for innovation (Phakathi, 2013). However, this vision has proved problematic internally in terms of the emergent political leadership and decision making climate.

Achieving a culture of innovation and clean governance, which evidently the Executive Mayor recognised as a factor conducive to the favourable positioning and performance of this local authority, is reliant on more than a declaration of commitment. Instead, it is more the emergent outcome of cultivating relational dynamics that are constructive, trusting and transformative, and that support collaboration and critical engagement. This is closely linked to the extent of political support for municipal decision makers across departments. As such, a supportive organisational culture would allow for experimentation and risk taking within the scope of regulatory boundaries. However, in this municipality, an espoused commitment to innovation appears to be at odds with the sentiments and experiences of officials, highlighted by those participating in the IIC and IPC, as they are afforded perspective and reflection on their agency as administrative decision makers. Officials' positionality and the extent of their political support has implications for how they approach they job, their attitude towards taking risks whilst they navigate a complex bureaucratic landscape. Political support is advantageous if officials hope to proceed boldly and innovatively whereas those officials who perceive themselves to lack political support might have a different experience within a strict, regulatory environment.

This tension must be recognised as a significant factor framing the mind-set of municipal officials as they engaged within the IPC and the IIC as an autonomous space with organising principles independent of the municipal environment. The IIC and IPC presented opportunities for officials and researchers to engage in a collaborative and trusting environment which contrasted to the perceived lack of surety that municipal officials felt in operating within a relatively incoherent and unstable political decision making landscape. This contrasts strongly with the relative autonomy that was afforded to university researchers and management representatives within the REMF substructures, by virtue of their positioning within a research institution. In essence, this tension speaks to the widespread impact of the overarching political leadership in this local municipal authority and emphasises the unique dynamics bearing down on officials and decision makers as they are mandated to fulfil particular expectations and legislated outcomes.

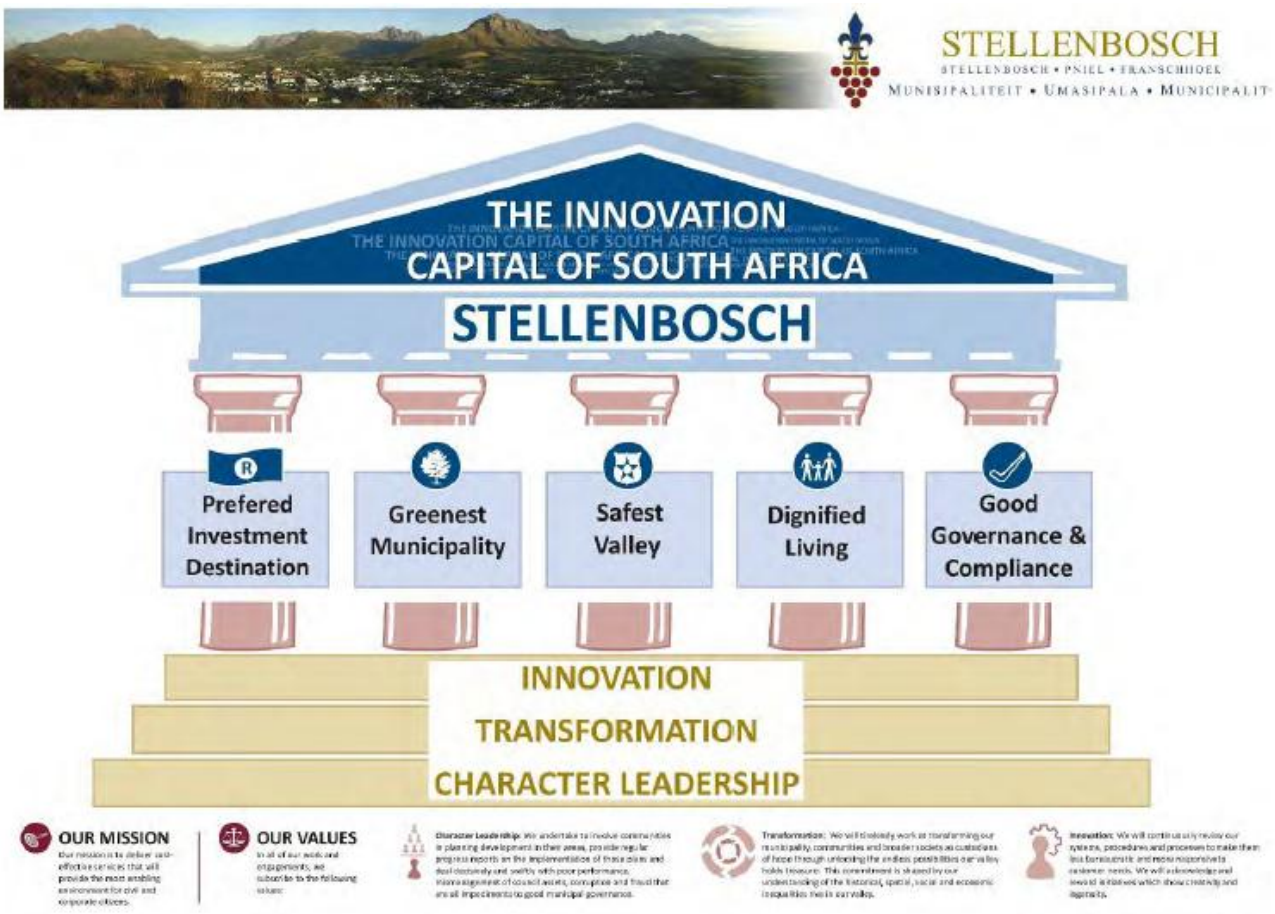

Figure 5.3: Stellenbosch Municipality's Strategic Vision (Stellenbosch Municipality, 2015a)

5.2.2. Over-burdened infrastructure hindering inclusive economic growth

As outlined below, on an aggregate level, and from both a regional and national perspective, the municipality exhibits favourable economic performance. Whilst this presents a favourable view of the local economy, factoring in massive infrastructure backlogs and their resultant impacts has implications for how the municipality provides a conducive environment for achieving inclusive economic growth. The municipality recognised that efficient infrastructure and service delivery lies at the heart of its mandate: "without appropriate, well maintained infrastructure, the greater Stellenbosch area will fail as a place of living, work and learning" (Stellenbosch Municipality, 2015a:139).

SM is of high strategic importance given its proximity to Cape Town and its contribution to regional and provincial growth and development. Demonstrating its economic contribution on a provincial scale, Stellenbosch Municipality is both the largest and fastest growing non-metro municipalities (Stellenbosch Municipality, 2015a). In terms of GDPR, SM contributed no less than 17% of cumulative growth in the Western Cape's non-metro municipalities between 2000 and 2013 (Stellenbosch Municipality, 2015a).

Figure 5.4 outlines the municipality's Gross Value Added between 1994 and 2011 and indicates that it grew faster than both the Western Cape and National economy, apart from two brief periods in 1998 and 2009.

This is supported by Figure 5.5 which shows how the municipality has increased its contribution to the Western Cape and National economy.

The sectoral contribution of Stellenbosch Municipality in 2011, shown in Figure 5.6, indicates that from a national and provincial perspective, SM has a significantly larger secondary (manufacturing) sector—31% versus the national and provincial level of 25%. The primary sector is very small, at 5% but still above the provincial level of 4%. According to the Bureau of Economic Research (BER) data report, the largest component growth in the secondary sector was registered by construction but there is also significant contribution from food manufacturing.

“Consistent employment and economic growth are arguably the most important goals from an economic point of view, given South Africa’s dire employment situation” (Bureau for Economic Research, 2014:11). As is the case for economic growth, Stellenbosch Municipality performs better than the province or the country in terms of levels of employment, indicated in Figure 5.7 and Figure 5.8. Nonetheless, the municipality contends with a high level of unemployment at 24.4% (Stellenbosch Municipality, 2015a).

Even though the primary and secondary sector managed to grow moderately since 1994, the sectoral composition of employment has changed dramatically (Bureau for Economic Research, 2014). There has been a decrease in the employment levels in the primary and secondary sectors with the greatest impact felt in a near three-quarter contraction in absolute employment in the agricultural sector, as was the general trend experienced in other parts of the country (Bureau for Economic Research, 2014). Contrasted to this is an increase in employment across all tertiary sectors and a growth in employment in manufacturing and construction (Bureau for Economic Research, 2014). During this period, manufacturing employment contracted in other parts of South Africa whereas SM experienced an increase.

“It is therefore rational to deduce that Stellenbosch Municipality now enjoys a significant competitive advantage over other South African regions as a manufacturing destination and not just as a service and agricultural region” (Bureau for Economic Research, 2014:16). At a ward level, variations in employment are evident and are indicative of the wide socio-economic spectrum that is attached to an area with such high economic growth prospects.

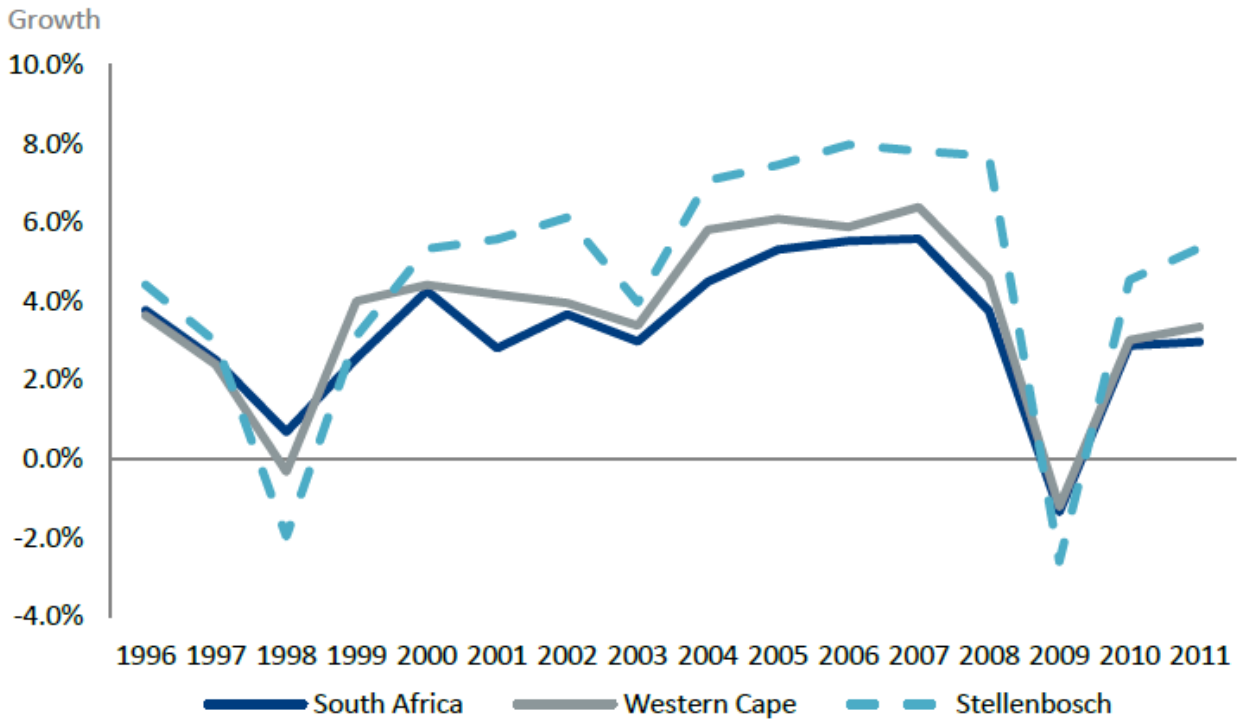

Figure 5.4: Gross Value Add: 1996 - 2011 (Bureau for Economic Research, 2014)

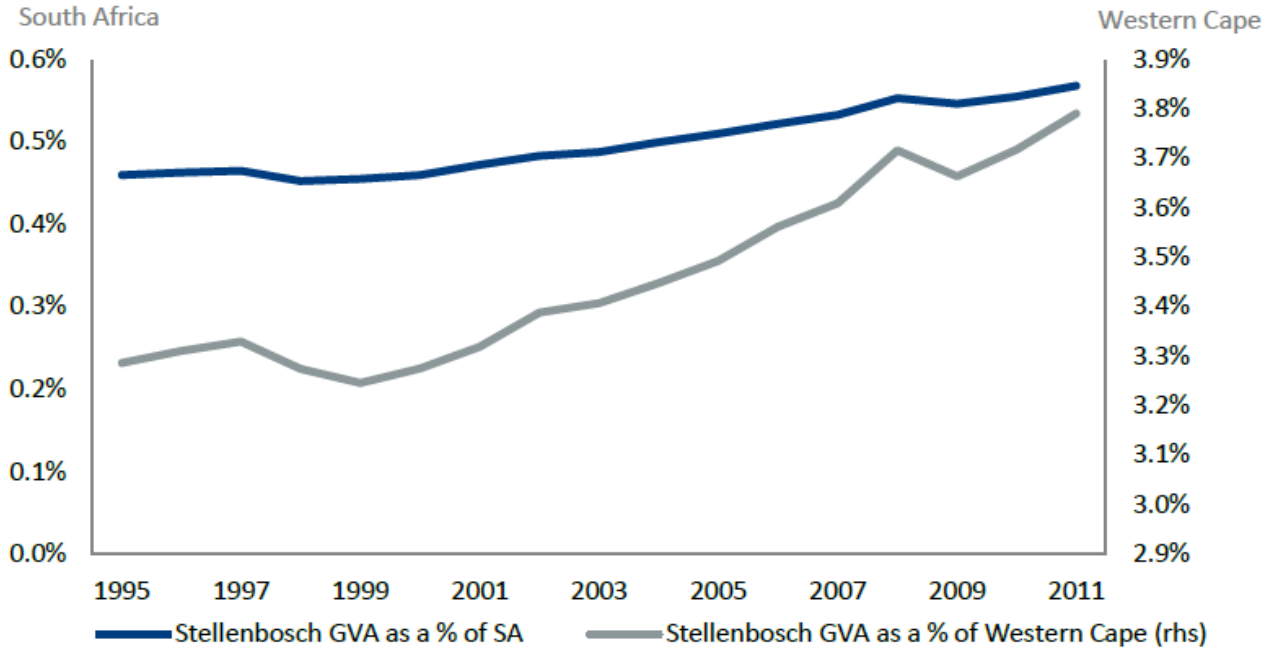

Figure 5.5: Stellenbosch Municipality GVA as a percentage of Western Cape and South Africa (Bureau for Economic Research, 2014)

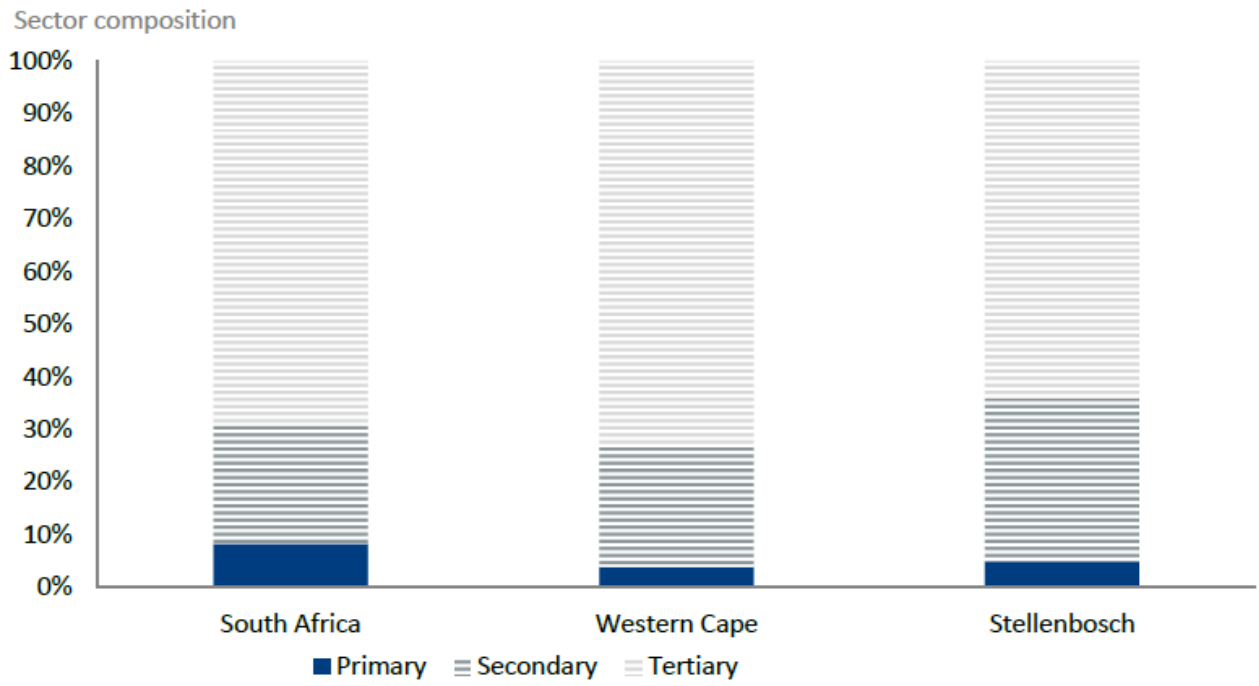

Figure 5.6: Gross Value Added sectoral contribution: 2011 (Bureau for Economic Research, 2014)

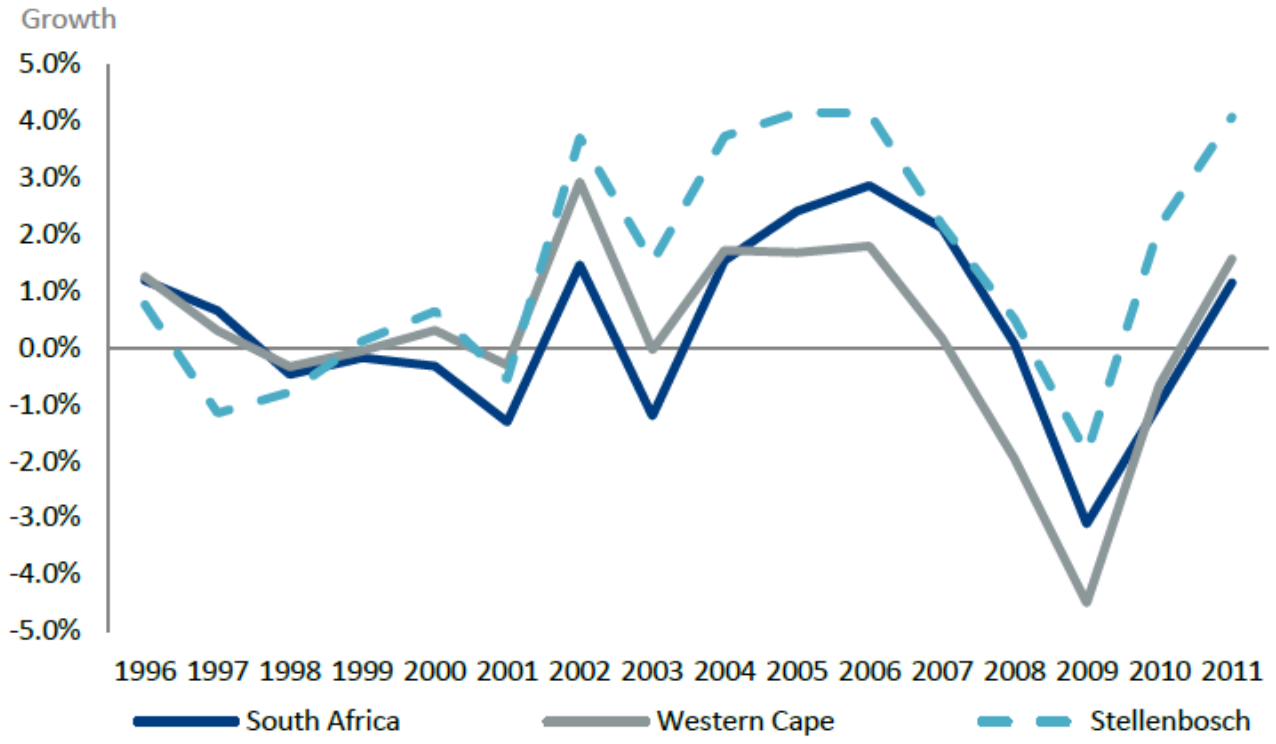

Figure 5.7: Employment growth: 1996 - 2011 (Bureau for Economic Research, 2014)

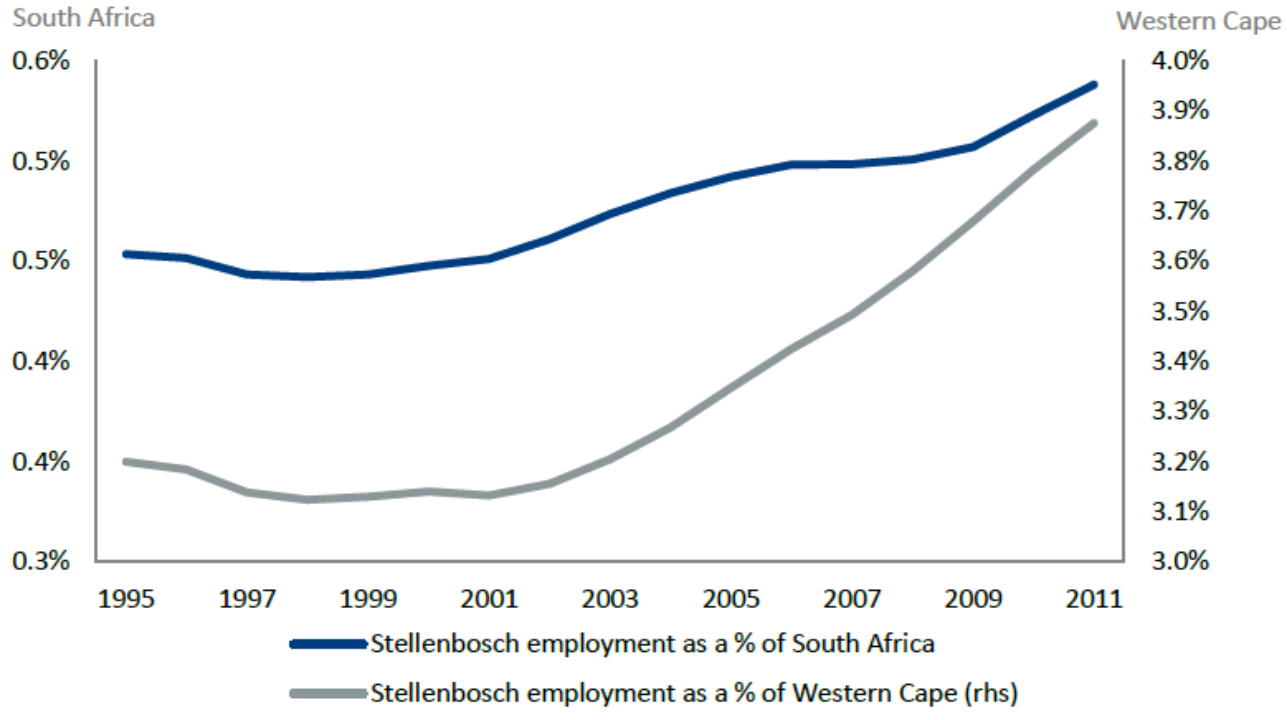

Figure 5.8: Stellenbosch Municipality employment as a percentage of Western Cape and South Africa (Bureau for Economic Research, 2014)

SM reports a total population in 2011 of 155 733 of which 51.1% are female and 48.9% male. This is a 23.8% increase in population since 2001, up from 12.4% between 1996 and 2001. The municipality's projected population growth is 2.71% per annum. There have been notable changes in the municipality's population

composition between 2001 and 2011 (Stellenbosch Municipality, 2015a). In 2001, Coloureds (57,6%) were the highest percentage of people residing in Stellenbosch, followed by whites (21,8%), Black African (20,4%) and Indians or Asian (0,2%), however in 2011 Coloureds (52,2%) represented the highest percentage of people staying in Stellenbosch, followed by Black Africans (28,1%) , whites (18,5%) and Indians or Asian (0,2%) (Stellenbosch Municipality, 2015a). The African population has grown the fastest (over 40%), mainly because of in-migration from the Eastern Cape.

The majority of the population are potentially economically active with 72.3% aged between 15 and 64 years, the most populous age range is between 20 and 24, largely attributed to students at the university. 22.8% of the population is comprised of those under the age of 15, indicating that a large percentage of the population will be entering the labour market in the next two decades. The imperative for employment opportunities is clear, and the municipality will be required to find pathways towards inclusive economic growth to accommodate these needs. Compounding the necessity for inclusive growth, are high levels of inequality—in 2011 the municipality's Gini coefficient was 0.60, the highest of all local municipalities in the Cape Winelands District Municipality, averaging at 0.58 (Stellenbosch Municipality, 2015a).

Clearly, the municipality and the town of Stellenbosch in particular, is recognised as a place of opportunity in terms of education, employment and quality of life (Swilling *et al.*, 2012). Realising inclusive economic growth that accrues to a broad spectrum of citizens is hampered by debilitating infrastructure backlogs. This infrastructure challenge, spanning the range of service delivery functions, can be attributed to long-term under-funding of mounting backlogs, inadequate provision for future demand as well as the necessity for repairs and rehabilitation (IIC, 2014a). The infrastructure backlog, affecting the entire municipal region, is experienced most acutely in Stellenbosch town with regards to transport and mobility, human settlements, solid waste management, water and sanitation and energy provision. As a "local expression of the global 'system of auto mobility'" Stellenbosch exhibits a "combination of infrastructure, urban form, institutions, beliefs and ways of life" that reinforce how the town services car mobility (Moody, 2012:ii). Severe congestion has become commonplace with major commuter routes linking Paarl, Somerset West and Cape Town flowing directly through the town. A housing pipeline has been developed, as part of the 2017 Integrated Human Settlement Plan, to address a growing housing backlog—the IDP refers to the provision of roughly 20500 residential units across the municipality to cater to the current backlog in housing (Stellenbosch Municipality, 2015a). This is planned across over 200 projects in the Stellenbosch region and makes provision for informal settlement upgrading, social housing, formalised town ownership and private rental opportunities, amongst others. Regardless of this comprehensive strategy to cater for the housing backlog, a lack of affordable housing opportunities is especially problematic for an expanding middle class.

Regarding fresh water in the municipality, "much of the key water supply infrastructure of Stellenbosch is in a state of disrepair, severely constraining the municipality's ability to deliver uninterrupted fresh water services and preventing future development" (Stellenbosch Municipality, 2015a:86). A similar situation is

experienced with regards to waste water treatment: “SM’s seven waste water treatment works and sewage reticulation system cannot meet the needs of the current population, let alone support future development” (Stellenbosch Municipality, 2015a:86). Urgent upgrading to the main waste water treatment site in Stellenbosch town is receiving a third of the current three year capital budget of R973 million (IIC, 2014a). The solid waste system for the municipality is at maximum capacity—the dump site has surpassed its legal capacity and the most recent landfill site constructed in 2012 is expected to reach its capacity within the next five years (Stellenbosch Municipality, 2015a). This has serious financial and logistical implications for the management and disposal of solid waste in the near future. Energy is closely connected to tackling infrastructure backlogs given that “economic growth and the provision of housing are directly affected by the availability of electricity, and the municipality is entirely dependent on the Eskom grid in this regard” (Stellenbosch Municipality, 2015a:86). Nationally, the supply of electricity and the provision of reliable energy is severely constrained and given the municipality’s reliance on the national utility service, its efforts to supply electricity are jeopardised.

The following excerpt from the Quo Vadis demonstrates the broader implications of these interconnected infrastructure backlogs (IIC, 2014a):

> “The potential for large-scale upliftment and development across the municipality is severely hampered by a lack of historic attention to the maintenance of vital infrastructure systems in the past few decades (Stellenbosch Municipality, 2014a). This limitation of existing urban infrastructure to support growth and development is widely recognised. Furthermore, the municipality acknowledges that the cost implications of repairing, maintaining and upgrading existing infrastructure is high and thus inhibits the ability to do necessary investments to accommodate new needs for future growth. The infrastructure backlog now equates to a funding requirement of circa R2 billion. This is particularly significant and problematic given the constraints on municipal capital budgets and limitations on its borrowing capacity. Without concerted efforts to address these issues, the municipality might continue to experience a downward spiral of declining condition of its infrastructure, leading to a risk of reduced private investment further undercutting municipal revenues needed to fund the future upgrading and extension of infrastructure. A deterioration in the overall condition of infrastructure assets also leads to an even larger funding requirement to reverse this trend, as the cost of rehabilitation of infrastructure are in orders of magnitude larger than the cost of timeous and adequate maintenance. This dynamic is gathering momentum and cannot be contained or reversed without major restructuring. The necessity for alternative and innovative approaches to contending with the municipality’s infrastructure situation is clear”.

5.2.3. **Contested green agenda**

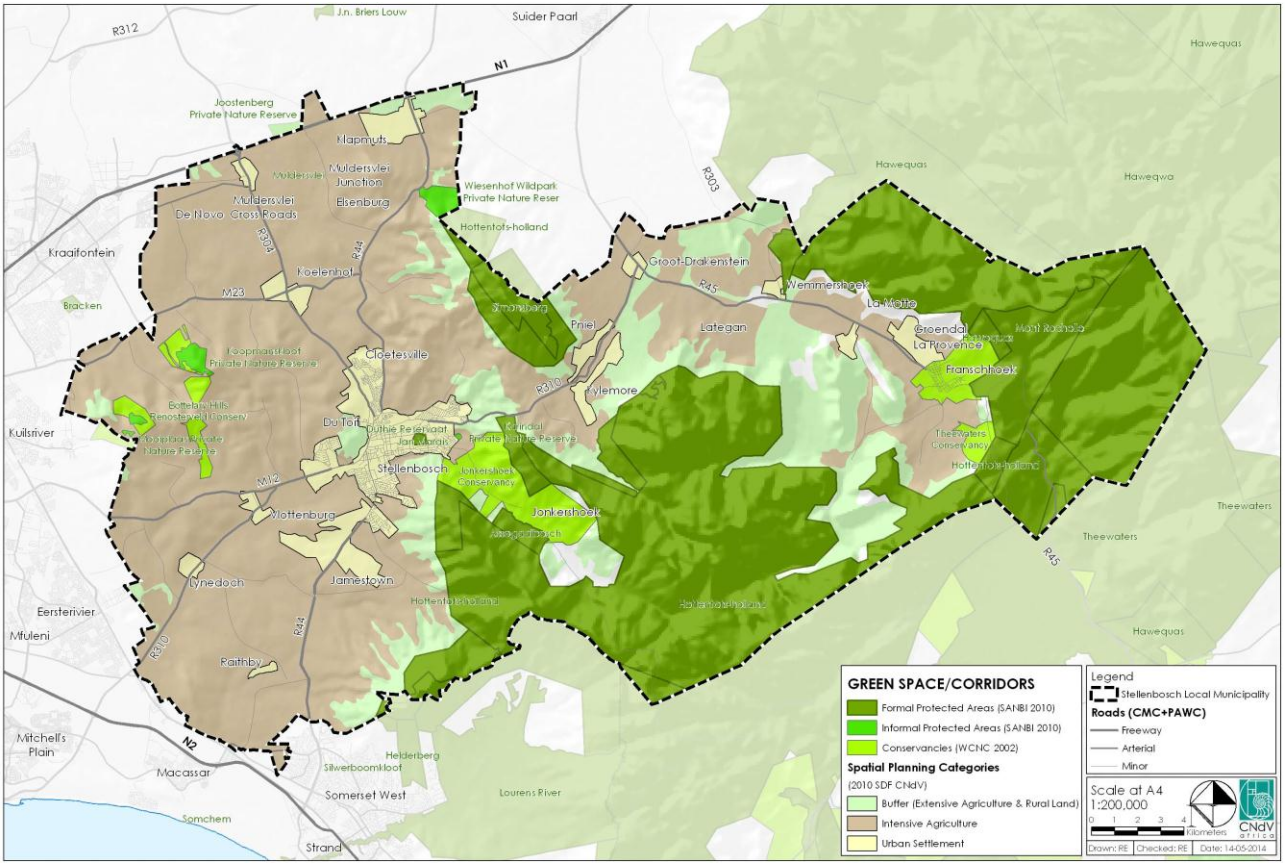

Figure 5.9: Green space / corridors Stellenbosch Municipality (Stellenbosch Municipality, 2014b)

SM is characterised by a unique sense of place resulting from a combination of natural and cultural assets. The municipality is located in the heart of the Cape Winelands which is dominated by agricultural land of high historic and aesthetic value and globally-important natural habitats (Stellenbosch Municipality, 2014b). Historically, the greater Stellenbosch area is an agri-based economy and more than 40% of the total land area has been modified through cultivation (Stellenbosch Municipality, 2014b). The region's extensive agricultural areas, particular those under vineyards and orchards, also contribute to the scenic value and character of the region which is positioned as one of the country's premier tourism destinations. Complementing this is the region's natural beauty. Significant portions of the municipality are designated for conservation purposes and as indicated in Figure 5.9, fall within both public and private conservation zones (Stellenbosch Municipality, 2014b). A primary reason for the conservation of this natural environment is that it forms part of the internationally- recognised and -renowned Cape Floral Kingdom. The Cape Winelands Biosphere Reserve was established in order to properly manage and conserve this hotspot for unique plant diversity and Stellenbosch Municipality is integral its administration (Stellenbosch Municipality, 2014b).

Whilst the 'green' agenda can be strongly motivated from aesthetic and conservation perspectives, an equally compelling one is that of the region's biodiversity and the functional value of vital ecosystem services.

For example, in Stellenbosch, the river ecosystem plays a crucial role in supplying the town with clean water for agriculture, storm water management, recreational public space, food processing and direct human consumption (Stellenbosch Municipality, 2015b). The condition of this river ecosystem is jeopardised by inadequate sanitation, storm water and solid waste infrastructure in Stellenbosch's informal settlements and this has implications not only for the health of the riverine ecosystem, but for human health and agricultural productivity downstream. The example of Stellenbosch's river ecosystem serves to illustrate how the green agenda is a contested one—the aesthetic component does not necessarily support a consideration biodiversity and ecosystems services.

5.2.4. **Adverse spatial development logjam**

Set within this network of agricultural and conservation areas, is a network of urban settlements. The municipality has two major towns—Stellenbosch and Franschhoek—and a range of other formal, more rural and informal settlements (Stellenbosch Municipality, 2015a). Spatial planning regulations and instruments have a bearing on the form, function and expansion of this network of settlements and green areas. The spatial transformation of the region over the last few decades can be better understood by the distinctive forces impacting the municipality's position and rationale towards spatial development.

Stellenbosch is the largest of SM's fourteen official urban nodes and is the urban centre around which the local economy is anchored (IIC, 2014a). As outlined above, the municipality is a region of high economic opportunity, in part, indicated by its above-average economic performance and escalating population growth. The town of Stellenbosch is a major driver for the region's performance and growth. It is where the municipality's headquarters and most major retail and commercial services are located. The town also has a flourishing private sector with numerous prominent corporates choosing to establish their headquarters in Stellenbosch. The town is South Africa's second oldest town and like most South African communities, it exhibits considerable inequality (Ewert, 2013). It also has to contend with many of the same challenges (Nicks, 2012). The town's urban fabric is reminiscent of the "suburban dream of apartheid planning" given its fragmentation and physical segregation", even so, Stellenbosch "offers an urban experience of a quality and intensity unique amongst South African towns" (Nicks, 2012:24).

Contrasting perspectives on the future development of the greater Stellenbosch region at large continue to have a bearing on its particular spatial configurations and resultant urban conditions. An unresolved tension between three opposing forces has paralysed coherent spatial planning efforts by the municipality, in Stellenbosch town particularly, and has had adverse impacts on the growth and transformation of the region. A heritage and conservation perspective sees development as a threat to the cultural and ecological heritage of Stellenbosch and is at odds with both a private developer-driven perspective that favours urban sprawl and the expansion of informal settlements through land occupation by the urban poor (IIC, 2014a). The three perspectives regarding the spatial form of the Stellenbosch town and the wider region, have culminated in a

spatial development logjam that has had adverse effects in the management of inevitable growth. Each perspective demonstrates particular contrasting values and visions of the future driven by the respective agendas of the stakeholder groups driving them. In the absence of a coherent spatial development strategy in the municipality, these opposing perspectives have come to the fore in how they have influenced, or circumvented, official spatial planning processes. The municipality had been without an approved MSDF until 2012, in part attributable to political instability in the council. One of the many implications of this record of instability was how it compromised long-term strategic planning as well as weakened the institutional memory of the municipality, undermined collaboration, incentivised corruption and exacerbated poverty (Swilling *et al.*, 2012). "This is turn, has freed up space for unscrupulous developers, whose security villages have created a patchwork of disconnected privatised elite enclaves of urban consumption that have contributed nothing to the building of an integrated and sustainable urban culture nurtured by public and street spaces that allow for the celebration of diversity and creativity, or urban markets that reinforce the production and sale of locally produced goods and services" (Swilling *et al.*, 2012:9). Similarly, land occupation by an expanding urban poor has increased the number of informal settlements in the municipality. These forces are strongly opposed by those groups that set out to protect the historical and cultural heritage of Stellenbosch town in particular, and they see no place for the expansion, densification and commercialisation of the region. An ad-hoc approach to strategic planning and spatial development has come to characterise the municipality's stance in response to these forces.

5.3. **Chapter Conclusion**

Four development tensions were described within the context of a growing local municipal region. Unpacking these four interconnecting tensions at play in the research context endeavoured to convey some of the complexities in SM, and those which shaped the focus and participation of a wide range of stakeholders from the university and municipality in the REMF and is substructures. The framing of these tensions was done in such a way as to invite the reader into an understanding of the contested and seemingly intractable nature of the issues undertaken by the REMF participants. The first tension referred to the municipality's explicit aspiration to be innovative in its approach to service delivery and urban governance whilst demanding strict adherence to stringent municipal legislation and prohibitive regulatory frameworks. Whereas this dynamic refers more to a tricky internal governance dynamic stemming from the municipality's political leadership and legislative mandate, the second development tension described a more tangible dynamic relating to the impact of over-burdened infrastructure hindering the prospects for inclusive growth. The final two tensions described the contested green agenda and a logjam in emergent spatial development logics, which, seen together with the first two, present a challenging environment for institutional decision makers to navigate. This context is significant as it gives meaning to the realisation of a key officials within the municipality that amongst themselves, and with the limitations of this local municipality, they have been, and will continue to be, unable to coordinate sufficient adaptive and innovative responses required to overcome these obstacles.

Similarly, from the perspective of the university's officials and researchers, these tensions present similar hindrances to the management of the university and the fulfilment of its teaching, research and community engagement mandate. The REMF collaboration is significant as a response to these tensions and the position of university and municipal stakeholders. The following chapter will build on this contextual foundation is outlining and analysing the case of the REMF collaboration process.

Chapter 6: **Case study narrative: REMF transition context**

The case of the REMF and its subcommittees demonstrates a unique approach to facilitating a governance arrangement supportive of greater collaboration and more meaningful integrated planning between two prominent institutions in the greater Stellenbosch region. Propelled and shaped by different leadership agendas and a dynamic, changing environment, the REMF has evolved as a collaborative platform which both institutions recognise as in some way supportive of the fulfilment of their respective mandates.

Framed by the particular research question and objectives of this thesis, the case study narrative analysis is useful in generating insight into the particularities of how urban actors learn within this governance arrangement between SU and SM.

Carrying through the perspective on sustainability transitions that focusses on the three core concepts of space, intermediaries and learning, this chapter sets out to address the essence of the research question, '*how is it that urban actors learn?',* by unpacking the three components of the research question, demonstrated through the analysis of the process of collaboration within the REMF.

In pursuit of ***urban socio-technical transitions****, how is it that urban actors learn, particularly as they engage within a* ***facilitated 'learning agora'****, supported by transdisciplinary research efforts that serve to enrich their understandings in way that reinforce* ***multi-level learning processes****?*

The narrative analysis to follow comprises three sections—the first builds on the previous chapter's contextual foundation with a brief reiteration of the unique urban context and the prospects for socio-technical transitions in the region; the second section investigates the structuring of a space of intermediation supported by transdisciplinary research; and the third section uses the framework of urban learning developed in Chapter 4 to analyse various multi-level learning processes therein.

6.1. **A unique urban context**

Chapter 5 introduced SM, contextualising the unique geographic location of the research engagement, and described four development tensions that were identified as important in shaping the focus of REMF and the IIC and IPC processes. The four development tensions elaborated on the specificities of the spatial, strategic planning and infrastructural conditions that need to be engaged with to move Stellenbosch towards a sustainability transition. This contextualisation was helpful in demonstrating the centrality of Stellenbosch town as a site for proactive efforts to support this potential sustainability transition if it could be spatially re-imagined as a *compact, inclusive and sustainable town*—the vision that emerged through the SSDF process, detailed below. The report, *Growing Greener Cities* (Swilling *et al.*, 2011:15), suggests that a city-based approach is a critical factor in structuring transition efforts since "adopting cities as the spatial context for transitions recognises their important role in the manipulation of resources, and emphasises the need to ground development plans in the complexities of their unique contexts". The section was intended to briefly

reinforce the importance of such a city-level approach to sustainability transitions and the recognition of Stellenbosch as a conducive urban context for socio-technical interventions.

6.2. Towards collaborative governance and a 'learning agora'

The institutional conditions enabling partnership and collaboration between the municipality and the university have been made possible, primarily, through the establishment of the REMF in 2005 and the commitment to transdisciplinary research that accompanied it (Swilling, 2014b). The REMF can be framed as a hybrid space positioned between the two major institutions in Stellenbosch and facilitated by transdisciplinary research principles. Considering how the collaboration emerged is helpful in understanding how it developed into a 'learning agora' enacted and held together by a network of key actors or 'intermediaries'.

In the early 2000's the Rector and Vice Chancellor Chris Brink at the time introduced the vision of Stellenbosch as university town and undertook to reposition SU within a network or league of internationally renowned university towns. The implication of this, was the realisation that in order to frame Stellenbosch as a university town, the university needed to rejuvenate its local roots, leverage its connections to a particular context and embed itself further in the dynamics of a distinctive municipal and regional system. What became apparent, however, was that the relationship between the two institutions was limited and in an effort to facilitate greater coordination between the university and municipality on a very practical level and to address greater strategic alignment, a monthly meeting was initiated between the Rector, Executive Mayor and key officials from the respective administrations.

The sustained effort to build this partnership between SU and SM further served to reinforce the university's positioning within a global discourse—one which has been successful and is now widely accepted. The introduction of The Hope Project, pioneered by the previous Vice Chancellor and Rector Prof Russel Botman, and a strategic focus on 'science for society', further entrenched the positioning of the university as an institution embedded in its local context, and one cognisant of its responsibility to wider regional, national and international research imperatives (Stellenbosch University, 2013). Whereas the legitimation of the REMF collaboration under the leadership of Chris Brink was in terms of the positioning of SU in a global discourse, the orientation under Prof Russel Botman was towards achieving the Millennium Development Goals (MDGs) (Swilling, 2014b). This attitude towards collaboration has been carried forward by university leadership as "the university endeavours to create the conditions that will ignite the imagination of scientists to solve problems in creative ways through basic and applied research and through multi-, inter- and transdisciplinary academic activities" (Swilling *et al.*, 2012:4).

In 2012, the book *Sustainable Stellenbosch* was released and signified a tangible outcome of the improved collaboration between SU and SM over the last decade. It is the product of diverse interactions between SU researchers and officials and councillors at SM. The publication is the first of its kind. In the words of Prof

Russel Botman, the Rector at the time, "…the university has a social contract with the town and all of its people. Unlike the conventional use of the term, which seeks to provide a legitimate basis for political authority, the university's pact with Stellenbosch entails a willingness to be of service to the community" (Swilling *et al.*, 2012:xvii).

From the onset the REMF has provided a forum where officials of the university and municipality meet at least once a month to discuss issues of mutual concern and to coordinate their efforts in the promotion of human development in the greater Stellenbosch region (Swilling *et al.*, 2012; de la Bat, 2014; Opperman, 2014). From the municipality's perspective, a partnership with the university and more specifically the SPL and the Sustainability Institute (SI) was advantageous as it would support developing innovations for the building of a green economy in the municipality (Swilling *et al.*, 2012; Swilling, 2014b). As Mayor Conrad Sidego wrote in *Sustainable Stellenbosch* (Swilling *et al.*, 2012:xi), "Innovations, however, do not happen just because they are needed. World-wide experience shows that spaces for engagement, dialogue, exploration and creativity need to be opened up and fostered, because it is from these kinds of spaces that innovations tend to emerge. Innovations are usually the outcome of intense interactions between researchers, investors and practitioners who manage to build sufficient trust so that they can jointly tackle complex problems. Without trust and these spaces for innovation, we will not overcome the challenges faced by Stellenbosch". The municipality's focus on innovation is demonstrated in its vision to become *"The Innovation Capital of South Africa".*

The emergence of a sustainability-agenda in the REMF

Recollections of the relationships between the university and the municipality preceding the establishment of the REMF are of it being a distant, mistrustful and often antagonistic one (Basson, 2014; Opperman, 2014; Swilling, 2014b). Without any formal structures to facilitate communication and collaboration, there was no real understanding between the institutions and according to the university's planning division, this was unfortunate since the university comprises such a large chunk of the town. This is reflected in the words of the division's director that "if the university sneezes, the town gets a cold" (Opperman, 2014). This so-called 'town-gown' tension meant that initial discussions as part of the REMF were perceived as somewhat reluctant, reserved and stiff (Opperman, 2014). However, sufficient support and leadership from both institutions meant that the initiative was pursued and as discussions about issues of mutual importance and relevance continued, more amicable relationships were developed (Opperman, 2014).

In the late 2000's, with housing a pressing issue in Stellenbosch, the focus of the REMF was first developing a sustainable housing strategy in the face of a considerable housing backlog (Swilling, 2014b). What emerged from research conducted by the SI together with SM in 2007 was that investments in housing must be part of a wider infrastructure strategy. This shifted the discussion with the understanding that, underpinned by

pertinent sustainability issues, coherent and integrated infrastructure planning is imperative when thinking about the future of Stellenbosch.

A direct spin off from the housing report was the necessity for investigating and improving the condition of the municipality's infrastructure. However, at the time (around 2009/2010) the Engineering Services department at the municipality was in a shambles (Swilling, 2014b). Appointed as a permanent Director in July 2010, Andre van Niekerk set about bringing some stability to the department which has been undermined by political instability in council (van Niekerk, 2014). Over the first few years of his five year tenure, he appointed five professional engineers in management positions which did a great deal for bolstering the municipality's capacity to engage in infrastructure discussions with the university (van Niekerk, 2014). Although there were attempts at mobilising cooperation around the shared issues of infrastructure and housing, there was little success in rallying together stakeholders from the private sector, university and municipality (Swilling, 2014b). Despite this lack of progress, the foundation for an alliance was formed between engineering services officials and a few key university researchers around a joint understanding of the importance of building coherence in infrastructure planning as the key to a functional local municipality (Swilling, 2014b; van Niekerk, 2014).

Over the next few years between 2007 and 2011, the REMF had a strong project focus with progress made in expanding the University's Mobility Plan and various initiatives such as Stellenbosch Free Wi-Fi to improve connectivity in Stellenbosch's CBD (Swilling *et al.*, 2012).

Political stability—a window of opportunity

The 2011 local elections were a turning point in the REMF collaboration and presented a window of opportunity for progress. It was around this time that two committees were set up as substructures of the REMF—the IPC and SITT. As the name implies, the IPC was conceptualised with an explicit focus on facilitating more effective integrated planning primarily between the university and the municipality. The SITT had a broader focus on infrastructure planning in the greater Stellenbosch area and from the onset, envisioned cooperation between municipal officials, researchers and practitioners.

After the 2011 elections and the resultant administrative appointments, the Engineering Services department was better equipped to investigate the municipality's infrastructure challenges. Prior to the elections, the Integrated Human Settlements department had driven the housing development investigations for the REMF however the shifts in council had implications for appointments in the administration. A change in officials within the housing department meant that the engineering department was now the driving force of the collaboration between the university and municipality (van Niekerk, 2014). A newly appointed CFO heading up the Financial Services department, who was both a qualified as a chartered accountant and an engineer, later proved to be advantageous to the IIC (Swilling, 2014b; van Niekerk, 2014).

Van Niekerk's first major project was the development of a Draft 15 Year Budget for Engineering Services which was the first indication of forethought about infrastructure planning over the medium term (van Niekerk, 2014). These specialist studies reported a strong and disheartening message to the council—a preliminary analysis of the infrastructure backlog and a Draft 15 Year Budget outlining spending requirements showed that no future development in Stellenbosch was possible (van Niekerk, 2014).

The need for an infrastructure subcommittee of the REMF was widely supported. In November the SITT was established and had the aim of "finding alternative, innovative and sustainable solutions regarding the provision of infrastructure services to the greater Stellenbosch area" (Strategic Infrastructure Task Team, 2011a). Initial discussions recognised the importance of discussing and investigating the regulatory and institutional frameworks to facilitate this collaboration, an emphasis that alternate technologies must be employed in addressing infrastructure backlogs, the development of innovative funding sources and mechanisms to contend with restrictive municipal regulations and the importance of a supportive spatial framework (Strategic Infrastructure Task Team, 2011b, 2012).

Stellenbosch Municipality has a complicated spatial planning history compounded by political instability (de la Bat, 2014). According to Swilling (2014b) and van Niekerk (2014) the election of a majority in council in 2011 opened a window of opportunity to get the Municipal Spatial Development Framework (MSDF) approved. As recounted by de la Bat (2014), an urban planner working at the municipality since 1997, the approval of the MSDF was pivotal for the initiatives and energy it unlocked. Up until 2012, the municipality had been without a formal and approved MSDF however SM engaged in a series of processes with spatial planning consultants to structure a coherent spatial plan for the recently designated Stellenbosch Municipality region. In 2009 CNdV delivered a comprehensive MSDF which was not approved by council (de la Bat, 2014).

With the establishment of the IPC and under pressure from the Western Cape Provincial Government for SM to implement a MSDF, approving a binding spatial framework was prioritised (de la Bat, 2014). The MSDF was reviewed with the understanding that the power of municipal planning officials lies in an approved plan. In the absence of a plan decisions were ad-hoc and general planning principles were all officials could refer to in adjudicating development proposals (Swilling, 2014b). The MSDF was condensed, simplified and restructured to succinctly communicate a clear spatial strategy captured in a set of seven binding principals and shaped around an integrated nodal development approach. The municipality was able to produce this document with input from researchers at the SI and it was approved in February 2013 (Swilling, 2014b; de la Bat, 2014). The approval of this MSDF was instrumental in laying the foundation for collaboration within the IPC and SITT/IIC.

A short-lived SITT

Meeting regularly every second Friday during 2011 and 2012 and chaired by an external facilitator, the SITT forum drew in municipal councillors and administrators, provincial representatives, business stakeholders as

well as university researchers and students (Spiropoulos, 2013; van Niekerk, 2014). An objective was identified which proposed the "adoption of a local infrastructure financing framework that (guides) consideration, adoption and implementation of investment and financing schemes for the private sector to participate in the provision of infrastructure required to grow and sustain economic development" (Strategic Infrastructure Task Team, 2011a). This culminated in Terms of Reference for the SITT which stipulated the overall aim of the forum was "to ensure that an integrated and sustainable Strategic Infrastructure Plan (is) developed for Stellenbosch that addresses the 'condition', 'provision' and 'growth' backlogs of the greater Stellenbosch area, with special priority for the Stellenbosch urban area" (Strategic Infrastructure Task Team, 2011b). Particularities of the SIP were expanded as well as supporting aims of the SITT. A series of Work Groups were established to tackle these tasks; Institutional, Finance and Technology Work Groups were run by particular SITT members and were tasked with exploring key interventions and recommendations.

To support the SITT's work of developing a SIP supported by a long term Financial Plan, the Palmer Development Group (PDG) was contracted in April 2012 to develop a Municipal Services Financial Model for SM. This enabled an analysis of the infrastructure challenge from a financial perspective and was useful in building cooperation in the SITT that resulted in useful and accessible outcomes (van Niekerk, 2014). The PDG process can be interpreted as a multi-stakeholder policy making process which engaged in extensive problem structuring to develop a robust understanding of the infrastructure problem that the SITT was tasked with addressing. A comprehensive final report was completed in January 2013 with the model finding that capital expenditure of R4 455 million would be required over the next ten years to allow for eradication of backlogs, extension of services as the municipality grows and rehabilitation of infrastructure (Palmer Development Group, 2013). However, this report was never formally acknowledged or carried forward as "for various internal political reasons the Mayor shut (the SITT) down in about August 2012 after it did some good and important work" (Swilling, 2013:1). An unease with the increasing role of the university, a lack of communication, internal conflicts within the ruling parting, shifting political alliances and pressure on political leaders for immediate solutions to immediate infrastructure crises, are cited as possible motives for the Mayor to disband the committee. Over the next few months, various internal discussions resulted in the reconceptualisation of the SITT as the IIC and in November 2013; the first IIC meeting was held with political consent from the Mayor.

Reflecting on the enactment of a learning agora underpinned by transdisciplinary principles

In line with the Mayor's reflection on the value of spaces for innovation, the learning agora opened up by the REMF relied on a transdisciplinary research approach. This conception of knowledge and unique approach to research was invaluable in structuring a learning agora that supported the learning processes exemplified in the IPC's Draft SSDF and IIC's Quo Vadis Document, both detailed in the following section. Participation in these sub-structures offered stakeholders from SU and SM opportunities to interact in a learning agora that provided a measure of protection, discipline and strategic direction. Municipal administrators utilised this

collaboration as a way of activating pertinent resources and capabilities outside of their jurisdiction. For researchers, this space opened up novel research opportunities for real-world problems to become the focus of applied sustainability research. Thus, the facilitation of collaborative governance in SM by key researchers and students made possible the demand of sustainability science: allowing real-world problems to become the drivers for transdisciplinary research and learning.

The survival of the learning agora opened up by the REMF was ensured by the commitment of key intermediary actors, clearly demonstrated in how a core group advocated for the SITT to be re-established after the Mayor shut it down in 2012. Similarly, the necessity for a committee to support integrated planning between the institutions resulted in the IPC being set up at the 2011 local elections. As a hybrid space between the university and municipality, the REMF had legitimate support but its subcommittees were shown to be susceptible to wider political and institutional dynamics since they were more fluid and informal in nature. As relatively pioneering spaces of engagement, many officials from within the university and municipality were ill-informed about the purpose of the IIC and IPC. And despite the attempt to ensure clear and formal communication by distributing meeting agendas and minutes, facilitators within the intermediation space were powerless to advocate on behalf of the IIC and IPC in the face of larger, deep-seated institutional or political battles. The REMF and its sub-structures were continually contested however this was not directly connected to the contributions or failings of the committees themselves. Instead, as fluid and emergent processes, the committees were often used as 'footballs' in the institutional and political 'battles' between municipal departments, between the council and the administration and between different informal and formal factions within both the university and the municipality. Internal fallouts had implications for the framing of the IIC and IPC—for example, conflict between members of the Mayco served to undermine the IIC in the eyes of the wider council as they 'used' the committee to further their own political or personal agendas. Prominent actors within the learning agora were advantageously positioned to facilitate and mediate internally but in many cases were limited in how they could advocate for the committees within wider formal processes. This was where high level support was useful as the rank of prominent and powerful stakeholders within the municipality and the university could be leveraged. The converse was also shown to be true, for example, how the removal of political support by the Mayor resulted in the SITT's shot down in 2012. Another example of the impact of political support was how the sudden death of Rector Prof Russel Botman in late 2014 essentially closed the chapter on the REMF as it had operated under his leadership at the university.

6.1. Tracking a learning process

The processes of engagement that ensued after the IIC was reconstituted, namely, the drafting of the Quo Vadis Document and the Draft SSDF under the IPC, express in practice a learning approach than can be understood using the synthesis of concepts and instruments drawn from transition management, the Learning City and Assemblage approaches as part of the urban learning framework.

Reconstituting the SITT as the IIC

Re-establishing the IIC was no easy feat but the collaboration entered a new and rejuvenated phase in 2014. Entering this new phase was done with the intention of building on and learning from both the SITT's successes and shortcomings. This is paralleled with transition management's iterative approach to the transition process made possible by reflexivity, monitoring and evaluation—the SITT's evolution into the IIC demonstrate how the REMF substructures moved through cycles of problem assessment, the structuring of the transition arena and initiation of transition experiments. Key actors, essentially the transition team, were instrumental in building on the SITT's successes whilst reframing the initiative to adapt to shifting perceptions and an expanded and evolving understanding of the problem at hand. "The real achievement (of the SITT) was the creation of the relations of trust and understanding between officials and between officials and university representatives" (Swilling, 2013:1). The other major contribution of the SITT was a problem statement that adequately captured the nature of the infrastructure logjam which then served as the basis for discussions going forward in the IIC. Similarly, the SITT was instrumental in corroborating the extent of the massive infrastructure backlogs and the considerable capital investments required to overcome these. It is important to note that the projections generated by the PDG model were based upon business-as-usual principles and did not account for the potential of alternative technologies or innovative solutions.

The IIC was convened in November 2013 and a small initial group met to discuss the way forward. Picking up on the progress in the SITT, working groups were suggested; these included a Financial Working Group, a set of Technical Working Groups (Water and Sanitation Services; Energy; Transport, Roads and Storm water; Integrated Waste Management) and an Institutional Working Group. It was agreed that TORs should be drafted for the working groups so that each could generate an action plan with clear objectives and deliverables (IIC, 2013). The SITT TORs were revised and the modus operandi for the committee outlined. The IIC, firmly positioned as a sub-committee of the REMF, continued to meet every second Friday, chaired by Prof Swilling and coordinated by myself, and committed to provide regular feedback and open communication with relevant departments and structures in SU and SM. As the coordinator, I ensured that meeting agendas and minutes were distributed to the Mayor, Municipal Manager and Municipal Directors, over and above regular communication with the IIC committee network. Emphasises as a critical component in cultivating a Learning City, these institutional processes played an important part in legitimising the initiative by setting regular and reliable practices in place that built accountability and transparency.

The first meeting in 2014 was well attended by both municipal and university officials. It was symbolic that the Mayor agreed to attend, showing his support of the initiative in this comment captured in the meeting's minutes: "given the fact that progress is imperative, the IIC should operate with confidence and integrity in an effort to give direction, new knowledge or ideas" (IIC, 2014c). It was agreed that a Founding Document would be compiled for distribution to various municipal committees. The motivation for this is captured in the minutes from that meeting: "It is the intention of the committee to report regularly to the Mayco to

ensure transparency and this is motivation behind the intended submission, which is currently in draft format" (IIC, 2014c).

The diffusion and translation of knowledge is highlighted through both the Learning City and Assemblage approaches which is demonstrated in how the IIC was about to build on the progress of the SITT. The insights generated from the SITT process were diffused within the IIC and contributed towards a shared understanding of the interconnected problems related to infrastructure, finance and spatial planning. Building on the SITT's successes and shortcomings provided a good foundation for the IIC to proceed. The Learning City approach highlights that learning can take multiple forms and Assemblage demonstrates that knowledge and learning is the outcome of participation in spatially unique contexts. Knowledge gathered about the state of Stellenbosch's infrastructure challenges, co-produced through a sustained period of engagement, was both tacit and codified which was advantageous and problematic as the initiative transitioned to the IIC. For officials and researchers entering the process afresh, the SITT's progress was summarised in a closing report by the previous chairperson and the PDG report, over and above meeting minutes and other internal documentation. However, reconvening the IIC relied more on the establishment of shared practices and rituals amongst the network which were more effective in bringing actors up to speed with the history and intention of the process. For example, at the beginning of each meeting, the IIC chairperson relayed pertinent relevant events and interpreted the implications for the specific focus or task for that meeting. Crafting this storyline was helpful in strengthening the IIC's narrative which participants could locate themselves within and contribute to. Another significant ritual that supported the cultivation of an open, critical and creative learning agora, was the informal drinks that followed IIC meetings every second Friday. Meetings usually finished around 16:30 after which a group municipal and university officials would gather at a pub in the central part of Stellenbosch where they would sit and talk informally for another hour or two. Students and IIC guests were invited along and it became common practice for those who were able to stay longer, to move from the regular meeting venue on the university campus to a pub in the town. The emergence of a distinctive culture within the IIC is supportive of the idea of a trusting milieu which the Learning City approach emphasises as an important factor in developing partnerships and spaces of engagement that support learning. Similarly, in line with Assemblage, learning is formed through interaction and the IIC's diverse forms of engagement allowed for a varying interactions, from formal meeting spaces to casual get-togethers at the end of the week, to encourage rich interactions open to a wide range of participants.

Table 6.1: IIC Meetings 2013-2015

Date	Venue	Note
15-Nov-13	Engineering Services Boardroom, Ecclesia Building, SM	Inaugural meeting for IIC
24-Jan-14	SPL Boardroom, AI Perold Building, SU	Mayor attended first meeting of 2014

07-Feb-14	SPL Boardroom, AI Perold Building, SU	Presentation from Nick Graham from Palmer Development group re Western Cape Infrastructure Framework
21-Feb-14	SPL Boardroom, AI Perold Building, SU	Quo Vadis workshop scheduled
07-Mar-14	Main Classroom, SI	Quo Vadis brainstorm
04-Apr-14	SPL Boardroom, AI Perold Building, SU	Presentation from Maarten Hajer, PBL: The Energetic Society
02-May-14	SPL Boardroom, AI Perold Building, SU	Quo Vadis progress
30-May-14	SPL Boardroom, AI Perold Building, SU	Quo Vadis progress
13-Jun-14	SPL Boardroom, AI Perold Building, SU	Presentation from Shahid Solomon: Greater Tygerberg Partnership
27-Jun-14	SPL Boardroom, AI Perold Building, SU	Quo Vadis progress
25-Jul-14	CANCELLED	
08-Aug-14	CANCELLED	
22-Aug-14	SPL Boardroom, AI Perold Building, SU	Towards working groups
05-Sep-14	SPL Boardroom, AI Perold Building, SU	Presentation by Andre Boraine: Western Cape Economic Development Partnership
19-Sep-14	SPL Boardroom, AI Perold Building, SU	Working groups discussion
03-Oct-14	SPL Boardroom, AI Perold Building, SU	Working groups discussion
17-Oct-14	SPL Boardroom, AI Perold Building, SU	Working groups discussion
28-Nov-14	SPL Boardroom, AI Perold Building, SU	Final meeting of 2014
13-Feb-15	SPL Boardroom, AI Perold Building, SU	Presentation by Herman Pienaar, CoJ: Capital Investment Management Strategy
27-Feb-15	Main Classroom, SI	ICLEI Workshop
13-Mar-15	Engineering Services Boardroom, Ecclesia Building, SM	IIC way forward
27-Mar-15	Mayor's Chambers, SM	Presentation by Novus3

A breakthrough connecting infrastructure and spatial planning

The IIC proceeded with investigating how it might best work towards a SIP linked to a Financial Plan. There were regular presentations by outside people whose work had a bearing on what the IIC was trying to tackle in implementing a SIP. The first of these presentations introduced the Western Cape Infrastructure Plan, developed by PDG (IIC, 2014d). Over the next year, the IIC hosted a diverse range of guests as part of the committee's approach to knowledge gathering, networking and exchange—processes emphasises by the Learning City approach as crucial for generating strategies for transforming urban conditions. The IIC interacted with international policy experts, representatives from other city administrations, including the

City of Cape Town and the City of Johannesburg. Participants agreed that realising greater economic competitiveness required learning from and adapting the insights generated in other cities. Their eagerness to translate these insights into their own unique context supports the emphasis in the Assemblage approach that knowledge is translated in such a way that it becomes situated and congruent with a unique urban context. The intimate understanding that municipal officials had of the Stellenbosch context meant that this translation of knowledge came relatively easily to them. This corroborates the idea that urban change is embedded in specific socio-material conditions and that interventions and experimentation need to align with these conditions.

In February at a casual meeting between the CFO and the Director of Engineering Services, the recently appointed CFO came to a watershed realisation with regards to the linkages between infrastructure planning, budget planning and a spatial framework. This matter was then discussed with the wider IIC group. As noted in the meeting minutes from 21 February 2014, the CFO "highlighted that the issue for municipal plans is what informs the budget. Projects are identified for infrastructure master plans which in turn are derived from spatial matters…Infrastructure plans cannot be compiled without knowing what the spatial strategy and guiding principles are which might provide a basis and offer direction for urban planning" (IIC, 2014e). The IIC came to a joint understanding that it could not progress with infrastructure planning without a coherent spatial vision. The Western Cape Infrastructure Plan presented at a previous meeting demonstrated the importance of this interconnection from the perspective of a provincial planning perspective (Davies, 2013). This breakthrough unlocked significant potential and novel thought based on the realisation that SM, besides its 5-year IDP, did not have a binding vision of the future development of the region. Furthermore, it became apparent through IIC discussions that the university's long term planning processes, captured in its Campus Master Plan, were not necessarily in line with the emergent thinking within the municipality. Thus, the two institutions with the greatest bearing on the town and the surrounding region's future, were misaligned in their planning approaches. In order to overcome this disparity the group resolved to produce an internal guiding document which could be produced as a tangible output of the IIC (IIC, 2014e). This would inform a long term development strategy for the municipality to then guide the emergent SDF process for the town of Stellenbosch and the SIP which the IIC aimed to produce (IIC, 2014e). A workshop day was scheduled where this guiding document could be brainstormed—"This document will be a Quo Vadis document (*where are we going?),* necessary in order for the IIC to proceed with its work having distilled and interpreted the MSDF, and as an output of the IIC, it is for the committee's intention of delivering an infrastructure plan connected to a financial plan" (IIC, 2014e).

The following extract from the description of the workshop (provided in full in Appendix A), shows how the workshop was carefully structured by the core transition team to facilitate a discussion around the interconnections between finance, infrastructure and spatial planning in the municipality. The workshop was hosted at the SI, located outside Stellenbosch town, and began with informal lunch and drinks.

The purpose of this workshop was to produce a Quo Vadis document as an instrument to guide to work of the IIC; one which was the product of collaborative efforts between municipal planning officials, private sector experts and university researchers. Held at the SI on Friday 7 March, the IIC workshop was attended by the core IIC team who spent an afternoon thinking creatively about the strategic direction of the municipality. It also provided a unique and productive opportunity for officials and councillors from the planning, engineering and finance departments to share and integrate their work in the municipality.

Given the focus on integrating the spatial, infrastructure and finance thinking, the afternoon's discussion was planned and structured in such a way as to provide time and space for each of these elements to be explored. The workshop was held in the main classroom at the SI; the space was arranged in such a way that the spatial context anchored the conversation. With the understanding that the spatial component must provide the foundation for strategic planning, the approved MSDF policy document was used as the starting point. A circle of chairs was set up around a central desk where a large MSDF map of the municipality was placed. Around the room, the 14 sketches of Stellenbosch's urban nodes were printed and stuck up on the walls. At the front of the classroom, the 7 SDF principles, printed out on large pieces of paper, were stuck up on the wall. Following a short introduction to the purpose and content of the workshop, the first component commenced with pairs discussing and then giving feedback on a particular principle of the MSDF. The idea was to explore the meaning of each of the 7 principles to generate a shared understanding of the spatial underpinning of infrastructure and financial planning.

Thereafter, the group moved to the main desk and the conversation continued around the map of the municipality highlighting growth and pressure points as well as potential areas for development. Using a variety of mediums, including different coloured Plastacine, sticky notes, pins and coloured cards, the group together negotiated and crafted a framework of thinking about planning Stellenbosch Municipality's future development direction, one which gravitated strongly towards a TOD-approach.

In the months that followed, officials from the IIC referred to this workshop as a defining moment for the IIC. It also marked a watershed in the collaboration between the municipality and the university and one which shifted and broadened their perspective on how to address the infrastructure backlog and development conundrum in Stellenbosch (van Niekerk, 2014; Wüst, 2014). Wüst (2014) reflected on the value of the workshop: "in essence, anytime you get the right role players around the table with maps and tools to actually be a bit creative and throw their ideas on the table to discuss the practicalities and possible solutions, it's in in those places that you will actually get innovative solutions". In terms of crafting a long term development agenda, this experimental workshop succeeded in creating "an environment where a picture was developed

of what could happen and now everyone knows that is a possibility, but if that didn't take place, business-as-usual would continue" (Wüst, 2014).

More than providing the setting for the prevailing transition agenda the workshop was also instrumental in setting the tone for the IIC going forward and for building a culture, essentially a community of practice, conducive to collaboration and learning. It was also significant in how it began to institutionalise a spirit of experimentation in IIC participants. Thereafter the setting and format of meetings followed a similar pattern and created an open atmosphere and a trusting milieu that nurtured relationship building and strategic thinking as the foundation for the initiative. The informality of the workshop and the chairperson's facilitation style allowed a positive rapport to develop between participants and meant that they felt they did not have to defer to conventional bureaucratic formalities; the most obvious being the conversational atmosphere of the IIC in comparison to the IPC meetings which were run by the chairperson according to strict agenda points.

The informal and conversational tone of IIC meetings did not detract from it being a space of engagement where agenda and long-term collective goal setting and experimentation was possible. According to Wüst (2014), "from an administration point of view, the big positive of the IIC is that it pulls you out of the normal day to day operational issues to a much more strategic level so you are encouraged to think on a different level, more practically and holistically". Haider (2014) conveyed a similar sentiment saying that "the IIC lets you to step into a different space that allows you to get perspective to see how things are developing, compared to your day to day work". As a political representative of council, Botha (2014) said that "the IIC lets me move away from the dog-eat-dog culture in politics", indicative of the constructive and collaborative environment that the IIC fostered. In terms of roles and identities, the IIC was experienced as a safe space for officials to flesh out ideas and learn from the collective expertise of the group. For Botha (2014), "it is really invigorating to sit in a meeting of peers where there are first of all, no roles that are important, and secondly, it's just a good discussion about concepts and principles, and where you know that in your field you are probably the most knowledgeable person in the room and on any of the other fields you could be the least knowledgeable, but that doesn't matter because that joint input is recognised and that is a wonderful space to be in". Botha (2014) provided a further reflection on the IIC: "I don't miss a meeting for anything. I also find relief (in the IIC), I call it intellectual oxygen, from the stuffy, political atmosphere of the municipality, I find it tremendously liberating for my thoughts. If I go there tired, I never leave there tired. I always feel stimulated, career wise, intellectually". Similarly, van Niekerk (2014) conveyed that even with demanding workloads, participation in the IIC was sustained, indicative of the benefit that that this engagement space provided for municipal officials in particular. "You know, we all joke and talk about indicators and performance management, but find me any example where municipal officials will freely sit on a Friday afternoon until after closing time and not have a problem with that…if people felt they were wasting time they would not do that" (van Niekerk, 2014). Botha (2014) supported this idea of the IIC's

benefit, saying that “professionally we are also gaining a lot, we just go back better and then from our work we come here and get better again”.

In terms of generating knowledge, the IIC drew from the collective expertise of participants but also drew from outside sources, much like how the Learning City approach advocates for knowledge exchange between different urban contexts. For Wüst (2014), “in that space, whatever is discussed takes place on a strategic level and then with thought-provoking presentations it actually further stimulates ideas” (Wust, 2014). The IIC also emphasised an importance of place and grounding strategic discussion in the particular realities faced in Stellenbosch. In this way, place-based experimentation was encouraged as a way of demonstrating alternative pathways to sustainability in a real-life setting. Botha (2014) commented on the importance of place and the shared responsibility of university and municipal officials in addressing regional issues: “part of university staff’s (mandate) is to apply their knowledge to a practical situation. It doesn’t help to teach people about sustainability and to manage yourself out of a problem, if you don’t actually get involved and get some experience. I really believe that the people that are involved in the IIC are professionals, people who really care for Stellenbosch and actually want to apply their expert knowledge”. Botha’s comments are also important for highlighting the vested interest that many officials had in addressing Stellenbosch’s development challenges and how the IIC leveraged the personal motivations and official mandates of university and municipal officials. The deep understanding that many officials had about how the town and the wider region functioned demonstrated the extent of the practice-based and situated nature of knowledge and learning. For de la Bat (2014), the importance of this intimate knowledge of the town is crucial since “you can’t have the same passion or the same understanding or the same feeling of responsibility if you don’t live in this town…I live here, further than that, I own property here so if this town goes down the drain, there goes my investment. So, I have a vested interest in the wellbeing of this town and I think it must play a role in decision making”. The IIC provided a space where officials felt comfortable opening up about these kinds of personal sentiments, opinions or motives. Botha (2014) reiterated the feelings of openness saying, “I feel free to say exactly what I want, I feel free to make a fool of myself and I’m free to some days make valuable contributions”. As such, the learning agora provided a space for honest debate where ideas could be interrogated and reshaped, supported by trusting relationships. Commenting on the deeper understanding between officials in the planning and engineering departments, de la Bat (2014) commented that “there is a general level of trust that has developed between us…they’re comfortable enough to just walk into my office and ask me what I think, so we’re is a better position in that regard”.

Crafting the Quo Vadis Document

Between March and September of 2014, crafting the Quo Vadis Document became the core focus of the IIC (IIC, 2014f,g,h,i,j,k,l,m,n). “In light of the IIC’s redirection stemming from the discussions at the workshop, the committee agreed that the working groups will require re-conceptualisation. The focus has shifted from addressing an infrastructure backlog challenge which required the work of specific and focused working

groups, to giving direction to the town's future development" (IIC, 2014f). The IIC's facilitation of the Quo Vadis Document process is further indicative of learning in how the understanding of the problem statement expanded as the months passed. Botha (2014) explained how the IIC's approach was "not a narrow exercise, we started with infrastructure but realised we had to talk about finance, spatial planning and housing".

A broad structure of the Quo Vadis Document was developed and for each meeting that took place in these few months, iterations of the document were circulated and then discussed in detail. The document evolved as the committee's thinking matured until it got to a point in September 2014 that the process could not be stretched out any further and the committee was satisfied with the vision it captured.

The Quo Vadis Document which was released and circulated internally in September 2014, stated:

> "In response to the discussions around the long term integrated strategic planning gap in the municipality at an IIC meeting on 21 March 2014, the IIC and IPC decided to set up a joint workshop to link together financial, spatial and infrastructure planning. The purpose of this workshop was to produce a Quo Vadis document (*where are we going?)* as an instrument to guide the work of the IIC and IPC; one which was the product of collaborative efforts between municipal planning officials, private sector experts and university researchers. Held at the Sustainability Institute on Friday 7 March, the IIC workshop was attended by the core IIC team who spent an afternoon thinking creatively about the strategic direction of the municipality. It also provided a unique and productive opportunity for officials and councillors from the planning, engineering and finance departments to share and integrate their work in the municipality" (IIC, 2014a).

The outcome of the meeting, which unlocked considerable momentum is captured in the IIC's Quo Vadis Document:

> "For at least a decade, development in Stellenbosch has been paralysed by an unresolved tension between two opposing perspectives: a heritage perspective that sees development as a threat to the cultural and ecological heritage of Stellenbosch, and a developer-driven perspective that favours urban sprawl. This document proposes a third option: an innovative Sustainable Transit Oriented Development (STOD) approach that would radically redefine the future spatial development of Stellenbosch around a set of ecologically sustainable high density development nodes built around integrated public transport services. Stellenbosch is faced with a serious infrastructure challenge due to long-term under-funding of infrastructure backlogs, provision for future demand as well as repairs and rehabilitation" (IIC, 2014a).

The Quo Vadis Document was significant as it signified a change in understanding of the infrastructure problem that shifted from a focus primarily on eliminating backlogs to one that sees this challenge as an opportunity for public transport-focused, infrastructure-led development in future. Furthermore, it served

as a novel planning instrument that facilitated municipal and university planning officials to communicate and integrate their planning agendas and in numerous instances, to challenge the underlying assumptions about future growth that guided their thinking. This important internal work was dominated by a focus on achieving coherence in municipal planning and in particular, supporting greater cooperation and alignment between the finance, infrastructure and planning departments (Wüst, 2014). Contrasted to this, Haider (2014) was more critical and stressed the necessity for a focus on implementation saying: "we need to get out of that talk shop mode". An unfortunate implication was that participation from university researchers was diminished whose involvement would have been more effective in a project-oriented context.

A renewed approach to working groups

Towards the end of 2014, having a more coherent transition agenda, the IIC then attempted to revive working groups. A new approach was suggested whereby a smaller number of more focused working groups be jointly coordinated by a researcher from SU and a suitable municipal official (IIC, 2014l).

The four working groups would be Energy, Transport, Integrated Waste Management and Integrated Settlement Planning with an additional high-level finance perspective group—the Strategic Integration Working Group. Reinvigorating the way working groups operationalised the Quo Vadis vision meant that the IIC considered how it might approach developing partnerships with private sector players. Seeking input on this matter, Andrew Boraine from the Western Cape Economic Development Partnership (WCEDP) was invited to present on his experience. Informed by Boraine's input and guidance, "it became clear that the IIC has made a great deal of progress in developing partnerships that are transversal, inter-governmental and cross-boundary; where the work is needed is how to organise, structure and build the relations with the business community" (IIC, 2014m). The WCEDP was noted as a partner who could assist the IIC to initiate and structure cooperation with the private sector through the various working groups.

Efforts towards the end of 2014 to get working groups up and running were fruitless. Despite relative clarity around the conceptual and strategic focus of the working groups, the practicalities were proving more tedious. R1 million was allocated to the IIC in the 2014/2015 budget but the IIC could not come to agreement about how best the working groups could access this finance (IIC, 2015a,b,c,d). In line with municipal supply chain regulations, instructions were given to working group chairs to structure TORs to comply with a Formal Quotation advertised by the municipality. There was disagreement as to whether this was an appropriate approach as the process was subject to rigorous supply chain processes where there was no certainty that the IIC's designated research group would be allocated the designated funding. These blockages stalled the process, frustrated committee members and served to undermine the momentum that the IIC had gathered during the course of 2014. The IIC's task of developing a SIP comprising the work of a range of working groups was further diluted by energy invested into parallel processes, in particular the draft SSDF process.

A parallel process—the IPC and the SSDF

There was considerable overlap in participation in the IPC and IIC which was advantageous for creating stronger alignment and feedback between the formal spatial, finance and infrastructure planning processes as well as reinforcing the emerging development logic in concurrent initiatives.

Whilst the IIC was getting underway, a closely connected process regarding a spatial development framework for Stellenbosch town was being initiated through the IPC. In line with the MSDF's integrated nodal development approach, each of the recognised fourteen nodes required their own SDFs to translate the principles of the municipal-wide SDF and outline exactly how development will take place. Davidson (2014), de la Bat (2014) and Swilling (2014b) explain how the SSDF and the Shaping Stellenbosch campaign emerged out of discussions between a core group of municipality officials and SI affiliated researchers and professionals in July 2013.

Conversations between key planning officials and researchers in the IPC explained that an alternative approach to drafting the Stellenbosch town plan was pursued primarily due to the lack of funding to appoint a consultant (de la Bat, 2014; Swilling, 2014b). Furthermore, they identified this as an opportunity to design a potentially radically different approach to developing an urban spatial plan which leveraged the growing connection between the municipality and the SPL and SI, made possible by the REMF (de la Bat, 2014; Swilling, 2014b). The spatial planning department was more favourably positioned to initiate this kind of approach, especially given the recent positive shift in the dynamic between the planning and engineering departments—"I know (the director) personally and that helps a lot, if you understand and get on well with the engineer" (de la Bat, 2014). de la Bat (2014) was all too familiar with how planning processes are easily derailed by political instability and the entire process of working with expert consultants was made cumbersome by rigorous supply chain regulations. "The biggest internal challenge you have is politics, if the politics changes tomorrow you can chuck this (plan) out the door" (de la Bat, 2014). It was decided that the SSDF would be done as an 'in-house' project —"I can draw the lines of the map with my eyes closed"—with support from the SI (de la Bat, 2014). Working with the SI provided an opportunity to tap into a range of research capabilities and knowledge sources otherwise not accessible to the municipality.

Structuring expert and public participation on a commitment to collaboration and innovation

The team was committed to crafting an alternative and innovative approach and according to Swilling (2014) a key motivation for this was that a diversity of inputs is key for real innovation. The municipality officially appointed the SI to "assist in the preparation of an SDF for Stellenbosch town, incorporating transdisciplinary thinking innovative approaches to ensure a sustainable spatial plan" (IIC, 2014a). A core team was put together consisting of Bernabe de la Bat, Stellenbosch Municipality's Manager of Spatial Planning, Heritage and Environment; Prof Swilling from SPL; Blake Robinson, the project manager from the SI. As a researcher, I also became involved in this core group and provided input and assistance where I could. Recognising the importance of skilled facilitation, the SI contracted Robert Davids from Rainn to come on board as an independent facilitator to manage the stakeholder engagement process (Robinson, 2014a). What followed,

between July and September of 2013 was a phase of discussion and exploration about how the crafting of a town plan for Stellenbosch following an alternative method might be used as an opportunity to go beyond conventional municipal community stakeholder participation practices. This was done with a view to generating a long term town plan guided by the seven core principles of the MSDF that would culminate in a vision for urban development connecting economic development, social inclusion and ecological sustainability.

A commitment from the onset to incorporating innovative design thinking to ensure a sustainable spatial plan for the town set the tone for the evolution of a unique and inclusive process-oriented project unlike previous spatial planning processes at SM (de la Bat, 2014). Initially, this began with the idea of hosting a series of ward committee workshops in the various wards in Stellenbosch town and then integrating these insights and contributions with those generated from engagements with university and municipality affiliated professionals, officials and experts in the SAG (Davids, 2014). De la Bat (2014) reflected on the commitment to an innovative approach saying “I’m so keen on doing it with the public. If you involve the public from the beginning in an intelligent way, so that they understand the argument and the constraints on what you are doing, it will be difficult for any political party to derail the process…This needs to be a plan by the community”. This attitude from municipal planners is similar to what Du Plessis (2012:18) suggests as ‘regenerative design’ which “redefines not only the design process, but also what constitutes design and who qualifies as a designer. The role of the architect/planner/designer shifts to that of facilitator of a process of revealing, rather than acting as master mind”. Moreover, this kind of engagement hoped to link to actual lived experiences of people dwelling in Stellenbosch to the formal planning process and thus contribute to policy learning and innovation.

With the involvement of Robert Davids from RAINN, specifically appointed to manage the stakeholder engagement process, the idea soon grew. Reflecting back on the process, it is clear that the Shaping Stellenbosch campaign remained fluid, and that is continually responded to the areas of need and interest that emerged (Davids, 2014). Loosely, a two-pronged approach was adopted to ensure that expert knowledge was matched with the needs and aspirations of the diverse residents of Stellenbosch. A series of targeted interventions were structured to elicit valuable insights to feed into the high level strategic policy making process.

The SSDF project consisted of two parallel processes thus drawing together and integrating insights generated through expert and community engagement processes. “Combining 'bottom up' insights with 'top down' leadership, the process demonstrates that even statutory planning processes such as the drafting of a town plan can be achieved in innovative and inclusive ways” (Robinson, 2014b). The first component of the project was the SAG which aimed to integrate expert knowledge relevant to spatial planning challenges in Stellenbosch. The second aspect, the Shaping Stellenbosch Campaign, a unique and innovative process-oriented project was “carefully designed to demonstrate in practice how it is possible for the citizens of a

historically divided South African town to generate a positive vision for urban development that connects economic development, social inclusion and ecological sustainability" (Robinson, 2014b).

Facilitating 'top down' leadership in the Strategic Analysis Group

The expert engagement process constituted a series of five workshops between experts from SU and SM. Drawing from the collective experience, knowledge and expertise within the SAG, a series of structured brainstorming sessions over a period of eight months were captured and stitched together using Parmenides Eidos, a decision support tool. This process was "designed to enable strategic clarity by helping to define the key elements in complex situations, develop flexible and focused strategies to address them, test the robustness of these strategies against several different scenarios, and assess their ability to be implemented" (Stellenbosch Municipality, 2015b). Facilitators from the Department of Information Science at SU assisted in structuring this series of engagements and then capturing outputs into the software program. According to Robinson (Robinson, 2014a), the SAG process was shaped around what was required by the Parmenides Eidos software and this was useful for guiding the process and designating tasks and outcomes for each workshop.

Much like the IIC, the approach in the SAG relied upon facilitation by a core transition team who were instrumental in moving the group through a process of problem assessment, agenda setting, and experimentation. Even though the role of the transition team was important in sustaining and progressing a strategic discussion, the SAG relied upon the collective and situated knowledge of officials familiar with the intricacies of complexities of a unique spatial location. The use of a decision support was helpful in capturing these insights. As a comprehensive decision support tool, Parmenides Eidos required inputs, first on an array of plausible future development scenarios for the town of Stellenbosch and then more specific spatial planning tools at the municipality's disposal. These were integrated into the model using a comprehensive pairwise analysis which was conducted by the core SSDF group made up of the SI researchers and planning department's officials responsible for the project. Populating the model focused and sustained a strategic conversation amongst planning officials, the outcome of which was a report detailing the most consistent scenario and set of planning tools and possible interventions. The strategic discussion within the SAG also drew inspiration from sustainability transitions in cities across the world, which further reinforces the Learning Cities approach that gives emphasis to learning from other contexts. Examples of sustainability interventions in urban planning in cities across the world were presented at SAG meetings, videos and images were helpful in inspiring peoples' imaginations of what might be possible in the greater Stellenbosch region. This was tempered with a focus on the practicalities of the region; one SAG meeting saw a small group take a drive around the town, stopping to discuss ideas along the way. In this way, place-based experimentation was encouraged whilst also learning from real world interventions from a variety of locations.

Table 6.2: SAG meetings 2013-2015

Date	Venue	Notes
10-Jun-2013	Sustainability Institute	Session 1 brainstorm
14-Nov-13	Sustainability Institute	Session 2 brainstorm
9-Apr-14	Sustainability Institute	Session 3 brainstorm
9-April-14	Stellenbosch town	Session 4 – drive around Stellenbosch town
26-Jun-14	Sustainability Institute	Session 5 brainstorm

***Accessing grassroots insights through the* Shaping Stellenbosch Campaign**

The public engagement process was where the name *Shaping Stellenbosch* came alive and drew from the lived experiences of a broad spectrum of Stellenbosch residents. Illustrating an appreciation for the practise-based nature of urban learning, the Shaping Stellenbosch Campaign looked to obtain insights from people's everyday experiences of the town in terms of its spatial structuring into the future. Following various preliminary meetings and discussions with stakeholder groups in Stellenbosch, an appreciative inquiry methodology was adapted to elicit constructive contributions.

Complementing the SAG's 'top-down' leadership with 'bottom-up' insights, Davids took charge in initiating a series of stakeholder engagements as part of Shaping Stellenbosch's ideas gathering campaign (see Appendix B for further details). Davids (2014) reflected on the value he has added to SSC, highlighting his ability to move in between space where the gaps usually are and literally, through conversations, start the process of dialogue in a highly fragmented and divided community. Davids' role echoes the important function of intermediaries to translate and coordinate knowledge, as emphasised in the Assemblage approach to learning processes. His role as a neutral, external and expert facilitator with a remarkable ability to connect and engage with people, meant that he has been able to move easily between a ward committee, a business person, NGOs, advocacy groups and other diverse stakeholders. Davids engaged in similar open conversations about Shaping Stellenbosch with all stakeholder groups, to convey a consistent message about what the process entailed but tailored this message in a way that was digestible, accessible and meaningful to the recipient(s). Even with his vast experience, Davids (2014) noted that he underestimated the number of conversations necessary to get the campaign off the ground. This behind-the-scenes work set the foundation for the public campaign in how it stitched together a series of conversations, identifying the linkages between different actors and feeding this subtly into the formal processes. As the facilitator and public face of this municipal intervention, Davids (2014) also shared the importance of engaging with sincerity, sensitivity and discretion to support trust building across a diversity of networks in Stellenbosch. Davids (2014) explained his ethos of facilitation as responding to the energy that he encountered and simply extending an invitation for people to participate. He captured his approach with the Afrikaans saying—"*jy kan nie mense gaan haal nie*" (you can't just go and fetch people). Ultimately, Davids' (2014) involvement

was one of creating added value to what would have been an otherwise conventional stakeholder engagement campaign.

David's (2014) facilitative work of the stitching together of conversations and the cultivation of dialogue within and between communities and groups, ultimately set the tone for the campaign, in that it represented an invitation to partake in an unconventional and hopeful participation process. These interactions were guided by the campaign's ultimate intention of generating positive, appropriate and viable suggestions for the town's spatial development framework, informed by the seven principles of the MSDF (Davids, 2014). Put more simply, the goal of the campaign was to get a broad spectrum of people to submit proposals for their neighbourhood or any another location in Stellenbosch that spoke to a combination of these principles. It was important to use these guiding principles to focus participants' attention and harness useful results, rather than just perpetuating conventional civic complaints. In order to accommodate individual preferences and to make provision for participants without access to the internet, proposals could be submitted either at one of the five town libraries where forms and campaign boxes were stationed, or through the online form on Shaping Stellenbosch's website (shapingstellenbosch.co.za). To find out more, people were also able to visit and explore the Shaping Stellenbosch website. With the exception of articles printed in Afrikaans in the local newspaper, Eikestadnuus, all other published communications, i.e. that on the campaign website, flyers, posters and e-mails, were offered in Afrikaans, English and isiXhosa. It was therefore possible for people to access relevant information about the project in a language and medium of their choice and in a manner that was accessible to them. A concerted effort was made to reach those who might not have internet access via flyers distributed at intersections and the taxi rank, and posters along popular thoroughfare routes. It was recognised early on however, that the concept of 'spatial planning' and a 'spatial development framework' might be inaccessible or foreign to many of Stellenbosch's residents. The idea of referring to a town plan was suggested at a SAG workshop in late 2013 and proved a term that people were easier able to grapple with or make sense of.

The period for submissions ran from June until midway through August 2014 and all of the campaign engagements, as well as those of the wider Shaping Stellenbosch team, were intended to set the foundation for this by creating awareness, building relationships and assisting people in how to go about sharing their ideas (Davids, 2014).

Illuminating a golden thread for the SSDF

The challenge for the Shaping Stellenbosch team became how to integrate the range of outputs from the campaign into the draft SSDF framework. The window for submissions ended in mid-August 2014 and the process of sorting and categorising proposals began—in total, over 200 ideas were submitted from around 108 stakeholders. Thereafter ideas were clustered around the following thirteen thematic areas: mobility; community facilities; roads; housings; utilities and services; parks; ecosystems; tourism; safety and management (see Appendix B). In processing the array of ideas, it was found that the majority fell within the

mobility and roads clusters with parks and recreation and safety as other strong focus areas. Of the 214 ideas, 75% were relevant to the SSDF with the remainder pertaining to other municipal functions such as community development or safety. Having gone through the screening and filtering process, around 80 proposals emerged as suitable for further consideration in terms of their applicability to the principles and mandate of the SSDF. Each proposal was captured on an easy-to-read spreadsheet which was shared with relevant municipal representatives.

Concurrent to the processing of submissions from the ideas gathering campaign, the team set about interpreting the outputs of the decision analysis exercise with the SAG. What emerged out of the high level strategic discussions was a preferred, most consistent scenario for the future spatial growth of the town together with a set of tools available to the municipality to affect this. The team's task was then to find a way of integrating the range of ideas with the most consistent future scenario without undermining the integrity of either. Essentially it was agreed that proposals could be interpreted as expressions of particular future scenarios for the town and with the most consistent overarching long term future scenario anchored around a *compact, inclusive and sustainable town,* proposals were filtered and framed accordingly.

Cognisant of the context out of which the proposals emerged and the necessity of weaving together community and expert thoughts about the future of the town, the team, over a series of meetings, worked through their experiences and then shared strategic insights and lessons with the SAG in more formal presentations at IPC meetings. Feedback was also given to the 112 people who submitted the 208 ideas as part of the public campaign through personalised emails, written by Robinson, and formal presentation by Robinson and Davids to municipal officials at an IPC meetings in late 2014 (20 October).

Table 6.3: IPC Meetings 2013-2015

Date	Venue	Notes
17-Mar-2014	Planning Department, SM	
15-Sept-2014	Planning Department, SM	
10-Oct-2014	Sustainability Institute	Joint Planning Session
20-Oct-2014	Planning Department, SM	
17-Nov-2014	Sustainability Institute	Joint Planning Session

The set of proposals and the emerging spatial development storyline was expanded on in a spatial mapping workshop on 21 October 2014 and aligned with the set of development opportunities identified through the SAG discussion process. An urban designer from CNdV, the consultancy that developed the MSDF, assisted the Shaping Stellenbosch team and a group of officials from the planning and engineering departments in the municipality, to begin transforming the range of proposals into a spatial expression of the emerging narrative encapsulated in the vision of a *compact, inclusive and sustainable town.* The purpose of the workshop was to map this emerging storyline; a series of around eight nodes within the Stellenbosch town were unpacked drawing together community proposals and expert recommendations. Each were assessed in terms of three criteria over and above the implicit consideration of the seven broad MSDF principles—

firstly the alignment with a transit oriented development approach which prioritises investments in public transport; secondly the potential for inclusivity especially in terms of broad access to economic and livelihood opportunities, and finally their infrastructure readiness over the short, medium to long term.

Positive spinoffs for the IPC

Much like a transition experiment, the SSDF mobilised actors around a collaborative policy making process. This in turn sparked an unprecedented enthusiasm to achieve more effective cooperation and communication between officials from the management teams of SU and SM. Building on the goodwill developed through the SAG and IIC engagements, SU and SM officials indicated that they would be interested in participating in a series of Joint Planning sessions rather than attending formal IPC meetings. These were help at the SI on 17 October 2014 and again on 17 November 2014. According to Wüst (2014), "from the outside, it is very hard to understand the bureaucracy and the regulation that must be complied with in local government". A lack of understanding between the university and municipal planning officials of their respective regulatory frameworks and strategic objectives was shown to limit their ability to work together. This lack of understanding further resulted in fear and mistrust and as Opperman (2014) commented, "you can't collaborate if you don't understand each other and you certainly can't go into collaborative planning without relationships". High level representatives from the university and municipality's management teams attended their first Joint Planning session where they met together in a relaxed environment and were able to talk freely about the strategic thinking guiding their decision making and the kind of pressures that have a bearing on these processes. Opperman was insightful in saying that "we've done a lot of integrated meetings, but I have not been part of a lot of integrated planning". He was positive about progress made in these initial discussions: "for the first time, I sense that the municipal officials are planning openly and we are not just seen as this 'big bad brother'. We put our plans on the table and put our heads together to talk about them…Since that first meeting people are more inclined to share" (Opperman, 2014). Regarding the overall value of the IIC and the IPC, Opperman (2014) commented that "since these committees have come about I really am sensing an ever increasing collaborative attitude amongst all the parties. I think people can start to see the benefit of it".

Attempts to reignite the process in 2015

The integration and mapping efforts towards the end of 2014 did not neatly culminate in a clear and succinct SSDF. Instead, the year ended without any internal agreement on the maps for the draft policy. The 2014 year-end period saw a significant loss of momentum in both the IIC and IPC initiatives.

With an emerging spatial vision in place and agreement around the importance of a proactive municipal approach to infrastructure planning, the IIC reconvened in 2015 and got stuck in with tackling how budget and infrastructure planning decisions could be used to steer the municipality's growth in that direction. Herman Pienaar, the Director of City Transformation and Spatial Planning at the City of Johannesburg (CoJ) was invited to attend the IIC and on 13 March he presented the CoJ's Growth Management and Capital

Investment Planning program. Pienaar's "presentation addressed the IIC's current challenge and outlined how CoJ has achieved integration between infrastructure and spatial planning with the formal budget and capital investment planning process" (IIC, 2015c). The Capital Investment Management System (CIMS) at the CoJ demonstrated to SM officials that a decision support tool had made it possible to integrate the full range of development planning and service provision, transparently and effectively. The potential for such a decision support tool to assist SM to integrate and align finance, infrastructure and spatial planning, prompted the CFO to invite Novus3, the service providers who developed CoJ's decision support tool, to present to SM officials on their offerings for local municipalities. Their presentation to the IIC on 27 March turned out to be the final IIC meeting of 2015.

Bound by specified project deliverables, the core SSDF team from the SI pushed to finalise the SSDF document in early 2015. The planning department undertook to work on more suitable maps for the SSDF document and after a series of iterations, a series of maps were drafted. A final task that the SI assisted with was organising an event in April 2015 where all those members of the public that had submitted proposals were invited to a feedback session hosted by the municipality. Thereafter, the draft SSDF document was handed over to the planning department who took responsibility for finalising it.

From the core IIC and IPC facilitators there was a palpable frustration with how formal municipal and university processes, as well as unexpected events such as shifts in leadership, could derail and undermine the considerable progress made in the months before. In the face of demanding municipal processes, for example the revision of the budget or IDP, many core officials were forced to lessen their involvement and contribution to the IIC and IPC in 2015. For university researchers, the bureaucratic hurdles (for example the issue of accessing municipal finance) were frustrating and with more pressing academic commitments, many university officials pulled back from the IIC and IPC as well. A few months into 2015 saw a further loss of momentum. During this time, the process fragmented to such a point that it felt that efforts to push the process forward were fruitless. Shifts in leadership at both SU and SM drew energy away from the IIC; political pressure also had negative effects on the image of the IIC in the Council. In April 2015, IIC meetings were suspended in order to allow for necessary internal discussions to take place so as to establish the most favourable positioning of the REMF collaboration, taking into consideration the leadership agenda of the recently appointed Rector, Prof Wim de Villiers.

Future prospects

The process documented in this narrative reaches a close in April 2015. At this point, a draft SSDF document was complete and in the municipality's possession—it was now their sole responsibility to finalise the document and submit this to council. The progress made by both the IIC and IPC in developing a coherent development strategy to inform municipal decision making internally as well as in conjunction with university management can be summed up in this excerpt from the Draft SSDF document (Stellenbosch Municipality, 2015b).

> "The end result of this process is a preferred narrative future scenario that responds to poverty and the rising cost of natural resources by envisaging the future of Stellenbosch as a *compact, sustainable, inclusive town.* In practice, a compact town is about high density living rather than sprawled out suburbia; a sustainable town is about living in a way that restores rather than destroys the natural ecosystems we all depend on; and an inclusive town is about ensuring that poverty is eradicated and everyone feels included in more equitable economic growth and development".

Achieving a level of internal coherence around future development—the potential for infrastructure-led, Transit Oriented Development (TOD) to achieve the vision of a *compact, sustainable, inclusive town*—informed a few additional processes involving SM and SU. Much of the strategic thinking has already been established in how decisions are being made within the REMF space as well as in the wider SU and SM planning spheres. There is already evidence that this will result in a series of targeted interventions; much like urban acupuncture points, these will help in bringing the wider regional vision to fruition. The redevelopment of the Stellenbosch town stations is one such opportunity that might be the source of unprecedented innovation and an opportunity to demonstrate the impact of alternative forms of urban development in a real life setting. A consultant has been appointed by SM to develop proposals for the regeneration of the precinct made possible by interventions in the public transport system. It has the potential to become a flagship project given the unique governance processes that will be required to bring together the range of stakeholders into a social process of collaboration and innovation. This initiative is further supported by the revision and reorientation of SM's Comprehensive Integrated Transport Plan which will support and further develop a transit oriented development approach. The SSDF will also be first of the town plan's put together for SM's 24 urban nodes—ideally, the social process that Shaping Stellenbosch designed can be redeployed in the region's other major towns and spark further place-based experimentation in the region. It will be most telling to see which of these processes come to fruition and whether the public transport planning processes initiated by the university and the municipality respectively, can be used to leverage more effective integrated planning going forward. Another massive opportunity lies in the potential support of such a collaboration by the newly appointed Rector; if the university views the initiative favourably, this could potentially unlock considerable research funding and support.

6.2. Chapter Conclusion

The framework of urban learning conceptualised in Chapter 4 argued that social learning should underpin, and stem from, the three modalities of urban learning, namely, transition management, the Learning Cities and Assemblage approaches. Social learning is about challenging groups of actors to address, adjust and often radically transform their perceptions and understandings about complex sustainability challenges in such a way that joint and progressive action is made possible. In many ways, this is true for the REMF as a learning agora held together by divergent and often conflicting perspectives about urban development were

mediated in such a way that allowed a shared problem statement to provide the basis for meaningful collaboration in reality. As suggested below, the Quo Vadis Document and the SSDF are tangible expressions of social learning shaped by the tools and techniques of transition management, the Learning Cities and Assemblage approaches. All three approaches to urban learning stress the foundational role of trust and relationship building in communities of practice, networks and transition arenas.

Employing the lens of transition management, it is clear that strong leadership from a core group of frontrunners was integral to the evolution of the REMF as a strategic partnership, and the IIC and IPC are practical expressions thereof. Additionally, the benefits of a strong, structured and well-coordinated transition arena are evident in how agenda-building as part of a multi-stakeholder process, resulted in robust and shared sustainability goals, communicated in the Quo Vadis document. This was true for the IPC but especially the IIC which saw a core leadership group of stakeholders carefully managing a network of experts and practitioners who could assist in realising the forum's mandate. Participation emphasised involvement of strategically positioned decision makers and influencers. A collaborative agenda-building process saw interactions between stakeholders facilitated in such a way that a destabilising context gives rise to shared understanding around appropriate sustainability visions and collaborative strategies for action. This is most clear in the emergence of a vision of future development that overcame previously conflicting visions of Stellenbosch's development trajectories. Intensive discussion in carefully managed spaces, most notably the day workshop in March 2014 and the series of SAG brainstorming sessions, allowed competing visions to be mediated in ways that built shared understanding about more suitable alternatives. As is the case with governance in line with transition management, progress has largely, been limited to the stakeholders that were intensely involved in the intermediation space. The downside of this is that the cooperation and joint understanding built in this forum was difficult to transfer into wider municipal departments. Nonetheless, the participation of directors and councillors from various departments meant that the broad vision was, to varying degrees, integrated into the management and leadership of the Financial Services, Engineering Services and Heritage and Planning departments.

The Learning City approach is useful in understanding how many municipal officials and university researchers looked to other cities, municipal authorities and research bodies for inspiration and assistance. Some examples of this were numerous invitations by the IIC to representatives from the City of Joburg, the Western Cape Economic Development Partnership (WCEPD), the Tygerberg Partnership, the Western Cape Government as well as international guests such as Maarten Hajer, to present on their particular field of expertise. Professionals for Green Cape, a research agency under the Western Cape Government also brought outside expertise to the IIC discussion by participating actively in working groups. The IIC learnt about the Western Cape Government's Infrastructure Framework, the City of Johannesburg's Capital Investment Management System, the collaboration between the City of Cape Town and the business sector to develop the Tygerberg Partnership and the role of the WCEDP in supporting innovation and partnerships at the

municipal level. At each of these meetings, rich discussion followed more formal presentations and the benefit derived by the IIC participants was easily identified given their close alignment with the challenges the IIC were trying to address.

The final perspective on urban learning is integral in grounding learning processes in a unique urban context. A unique feature of the REMF collaboration and many of the officials, councillors and researchers participating in the IIC and IPC had strong vested interests in the functioning and wellbeing on this urban system—beyond their formal responsibilities. Many of them lived in Stellenbosch, or had worked in the town or wider region for many years meaning their personal lives were closely intertwined with the urban system for which they were formally responsible. Their lived experiences of Stellenbosch meant that there was a far deeper understanding of the particularities of this urban system. The vested interest also meant that for many participants there was a higher motivation for committing time and energy into tackling these seemingly intractable problems. In facilitating the IIC and IPC, effort was made in consistently grounding discussions in the vast array of lived experiences and urban realities existing in Stellenbosch—interventions could not just serve a limited proportion of the greater Stellenbosch region's residents. Taking officials on outings around the town was a successful in bringing to the fore the urgency of the infrastructure and mobility challenges, but also for inspiring creative thinking about how a 'compact, inclusive and sustainable town' could be achieved in Stellenbosch. The public campaign as part of Shaping Stellenbosch was built around an appreciative inquiry approach and thus recognised the insights that residents of the town could offer in imagining a positive future for their neighbourhood and the wider town.

Drawing conclusions from this case, transition management highlights how instrumental a strong transition arena and effective transition team is in coordinating transition efforts as well as mediating agenda-building processes. The Learning Cities approach demonstrates how urban actors can look elsewhere for lessons that can be translated into applications in their particular urban contexts. And finally, the assemblage approach reminds urban actors to be sensitive to the particularities of the urban system under their jurisdiction—interventions need to be modified or applied in ways that are sensitive to the political, cultural and socio-ecological conditions in that specific locality.

Chapter 7: Conclusions and Recommendations

This thesis documented an extensive period of embedded research, reflection, and analysis as I undertook to investigate how it is that urban actors learn, in pursuit of sustainability transitions. Chapter 1 outlined the background and motivation for the study and explained how I became interested in the governance of socio-technical transitions and the initial experiences in Stellenbosch that shaped my research focus. An introduction to a transdisciplinary research methodology accounted for the emergence of a research question that had its foundation in my articulation and interpretation of the problem of a lack of adaptive capacity in Stellenbosch Municipality. This was signalled by a shared problem statement that was generated by the actors in the SITT and incorporated into the IIC and in essence, stated the inability of municipal actors to overcome a growing infrastructure backlog in order to address development issues in the Stellenbosch region. My identification of this lack of adaptive capacity led me to investigate the transition context, as a function of the availability of resources and coordination, to shape the form, direction and modes of governance to support socio-technical transitions. In this way, an exploration of a transition context validated a focus on a process of engagement within the REMF, the IIC and IPC. The research question was addressed through the development of a literature analysis in Chapter 3 that culminated in a transitions perspective that emphasised space, intermediaries and learning. The literature analysis in Chapter 4 then interrogated the sustainability transitions literature in terms of these three concepts and advanced a conceptual framework of urban learning. This framework is based in social learning and draws together three modalities of learning presented across the sustainability transitions literature and linked to urban transformation. The transition management, Learning City and Assemblage approaches each emphasises distinctive orientations towards learning and knowledge generation and were useful in identifying an array of learning tools. The case study, contextualised in Chapter 5 and analysed in Chapter 6, were an opportunity to deploy this transitions perspective and framework of urban learning to express and illuminate different processes of learning demonstrated by the IIC's Quo Vadis Document and the IPC's Draft SSDF. Whist also narrating various learning processes using the conceptual language captured in the framework of urban learning, the analysis in Chapter 6 also outlined how a unique spatial urban context, and a sustained transdisciplinary engagement that facilitated a learning agora, were instrumental in structuring the transition context in which these learning processes unfolded.

In conclusion, this thesis has succeeded in responding to the research question in a comprehensive conceptual framework and a detailed case study narrative and interpretation. The thesis found that urban learning can be engaged in, understood and described in a multiplicity of ways, made possible by a the facilitation of a learning agora underpinned by transdisciplinary research. Overall, social learning was presented as a suitable form of learning in that it advocates for learning beyond the individual and is about developing interaction and joint action within groups based on alternative perspectives on reality. Creating stimulating environments were diverse stakeholders can comprehend the perspectives, motives and visions

of one other and in turn develop shared understanding for joint action, is crucial for achieving social learning. A framework of urban learning provided the discursive tools with which to illuminate various learning dynamics, in the form of transition management, the Learning City and Assemblage approaches. These three frameworks offer strategies for creating transformative social learning environments. Ultimately, the case study demonstrated the usefulness of this conceptual framework in describing and analysing learning processes and dynamics in an ongoing urban governance experiment. This conceptual framework has the potential to be deployed in other urban contexts where related transition activities or governance experiments have taken place; this would be recommended to test the usefulness of this framework and to finds ways for it to be refined or expanded. The transitions perspective and the framework of urban learning might also be useful in how urban governance experiments are initiated and structured. Facilitators might be sensitive to how to better cultivate learning agoras or hybrid spaces of intermediation that encourage a range of learning processes, as detailed in the urban learning framework.

This research could be developed in a number of ways. Following Swilling, Musango and Wakeford (2015), the notion of a socio-political regime could be integrated into the perspective on sustainability transitions presented here. A socio-political regime is explained as a new term for understanding the politics of a just transitions. The term describes the “arena where strategic coalitions make political decisions” and a “specific constellation of actors who have agreed on a set of ground rules for conducting the business of everyday politics within and outside the formal institutions of the political systems” (Swilling *et al*., 2015). Integrating this concept might attend to the important role of politics in transitions that simultaneously recognises the importance of partnerships, coalitions and spaces for intermediation and learning. An additional concept that this research would benefit from exploring further is that of ‘encounter spaces’, following Valentine (2007) which might offer opportunities to deepen the exploration of a transdisciplinary research approach. In particular, this might sensitive the methodology further in terms of the positionality of researchers therein giving particular attention to the intersectional nature of issues of power, gender, culture and so on (Valentine, 2007; Kronsell, 2013; Murphy, 2015).

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Appendices

Appendix A: Story of the IIC Workshop

In response to the discussions around the long term integrated strategic planning gap in the municipality at an IIC meeting on 21 March 2014, the IIC decided to set up a workshop to link together financial, spatial and infrastructure planning. The purpose of this workshop was to produce a Quo Vadis document as an instrument to guide to work of the IIC; one which was the product of collaborative efforts between municipal planning officials, private sector experts and university researchers. Held at the SI on Friday 7 March, the IIC workshop was attended by the core IIC team who spent an afternoon thinking creatively about the strategic direction of the municipality. It also provided a unique and productive opportunity for officials and councillors from the planning, engineering and finance departments to share and integrate their work in the municipality. Given the focus being on integrating the spatial, infrastructure and finance thinking, the afternoon's discussion was planned and structured in such a way as to provide time and space for each of these elements to be explored. The workshop was held in the main classroom at the Sustainability Institute; the space was arranged in such a way that the spatial context anchored the conversation. With the understanding that the spatial component must provide the foundation for strategic planning, the approved SDF policy document was used as the starting point. A circle of chairs was set up around a central desk where a large SDF map of the municipality was placed. Around the room, the 14 sketches of Stellenbosch's urban nodes were printed and stuck up on the walls. At the front of the classroom, the 7 SDF principles, printed out on large pieces of paper, were stuck up on the wall.

Main classroom at SI prepared for IIC workshop

Following a short introduction to the purpose and content of the workshop, the first component commenced with pairs discussing a particular principle of the SDF. The idea was to explore the meaning of each of the 7 principles to generate a shared understanding of the spatial underpinning of infrastructure linked to financial planning. After a short discussion, each pair gave feedback to the group on how they understood the respective principles.

IIC participants brainstorming future development in Stellenbosch Municipality

Leading on from the conversation about the SDF principles, Andre van Niekerk introduced the notion of Transport Oriented Development (TOD) with an overview of the discussions taking place with PRASA about the proposed developments around the main railway station in Stellenbosch. The theme of TOP remained a strong one throughout the workshop.

Following the introduction of the potential TOD project in Stellenbosch town, the group moved to the main desk and the conversation continued around the map of the municipality highlighting growth and pressure points as well as potential areas for development. Using a variety of mediums, including different coloured Plastacine, sticky notes, pins and coloured cards, the group together negotiated and crafted a framework of thinking about planning Stellenbosch Municipality's future development direction, one which gravitated strongly towards a TOD-approach.

IIC workshop discussions

IIC workshop creative expression

The map served to highlight the strong connective potential of Stellenbosch Municipality's rail infrastructure aligning strongly with existing road routes and natural resource corridors. The potential value of concentrating development efforts along this railway route around specific nodes generated considerable energy and positivity from the group. The railway route from Lynedoch to Klapmuts surfaced as a corridor of opportunity. As the backbone or spine of development, this route made it possible to think about the planning of mixed-use high density precincts around station nodes, in this way potentially replicating and extending the existing thinking around the Stellenbosch rail node improvement. These high density and mixed-use rail precinct developments would serve as high leverage urban acupuncture points aligned with the nodal development approach and other guiding principles outlined in the SDF.

Additional to and complementing the rail station nodes, other potential green- and brown-fields development sites were identified. The final component of the workshop tried to focus on how these infrastructure developments might be prioritised and scheduled over the short, medium and long term. A 30 year timeline is appropriate when thinking about the long term corridor development vision though these aspirations need to be translated into short and medium term initiatives and budgetary decisions.

Appendix B: Shaping Stellenbosch Campaign

Shaping Stellenbosch Campaign Poster & Logo

Shaping Stellenbosch Campaign Poster & Logo

Nuus
News.

Inwoners het insae in ruimtelike plan

DANIE KEET

Die Stellenbosch-munisipaliteit se afdeling vir beplanning is tans besig met 'n unieke ontwikkelingsplan waarby inwoners van die dorp direk betrokke kan raak, dus by die toekomsbeplanning van Stellenbosch.

"Shaping Stellenbosch is 'n projek om te bepaal hoe Stellenbosch se inwoners die dorp se toekomstige voorkoms ten opsigte van ruimtelike beplanning sien, sê Bernabé de la Bat, bestuurder ruimtelike beplanning, erfenis en die omgewing van die munisipaliteit.

"Dit is die eerste keer dat 'n munisipale owerheid in Suid-Afrika so 'n openbare deelnameproses bedryf en ons is trots daarop dat Stellenbossers nou 'n direkte inspraak het in die toekomsontwikkeling van die dorp. In vorige gevalle is 'n plan gewoonlik aan die inwoners voorgelê, waarop geleentheid gebied is om kommentaar en alternatiewe voorstelle te lewer.

"Nou vra ons die inwoners om voorstelle vir ontwikkeling en die benutting van die ruimtelike omgewing te maak. Daarna sal 'n span kundiges dit oorweeg, ontleed en teruggevoering aan die gemeenskap gee.

"Hierdie voorstelle sal gebruik word om riglyne te ontwikkel vir wat in watter dele van die dorp ontwikkel mag en moet word en watter grond teen ontwikkeling beskerm moet word, vir ontspanningsdoeleindes opsygesit moet word of vir bewaring.

"Die projek is slegs gemik op Stellenbosch-dorp en sluit in gebiede soos Kayamandi, Cloetesville tot by Jamestown en Onder-Papegaaiberg," sê De la Bat.

Hy het dit ook beklemtoon dat die beginsels waarop inwoners voorstelle vir die ruimtelike ontwikkeling van Stellenbosch kan maak, uit sewe bestaan.

"Hierdie beginsels is voorsiening van openbare vervoer vir almal, die skep van voetgangervriendelike woonbuurte, die uitbreiding van die ekonomie vir groter werkskepping, doelmatige gebruik van grond, besparing van hulpbronne, die verbouing van voedsel vir die dorp se inwoners en die bewaring van Stellenbosch se ryke erfenis.

"Ons werk nou saam met die Sustainability Institute van die Universiteit Stellenbosch en dit is een van die uitvloeisels van 'n samewerkingsooreenkoms wat onlangs tussen ons en die universiteit onderteken is," verduidelik De La Bat.

Robert Davids is die projekbestuurder van die Sustainability Institute en is reeds sedert einde September verlede jaar besig om die projek bekend te stel en wyke in die Stellenbosch-gebied te raadpleeg.

"Ons fokus is op deelname deur die inwoners sodat ons hul voorstelle en begrippe kan bekom om die uiteindelike ruimtelike ontwikkelingsplan te kan saamstel. Daarvoor konsulteer ons met individue en belanghebbende organisasies en wil ons so wyd as moontlik insette kry voordat die planne bymekaar gesit word. Almal het dus 'n gelyke geleentheid om insette te lewer.

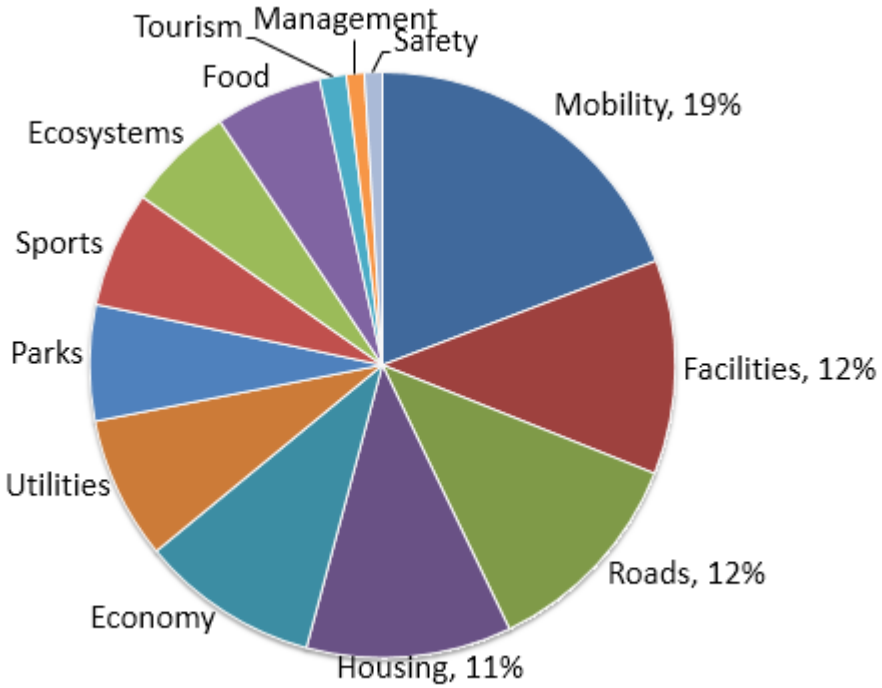
"Deur die samewerking tussen die US, die Instituut en die munisipaliteit, het ons 'n magdom kundigheid tot ons beskikking wat uiteindelik saam sal kan werk om die ruimtelike ontwikkelingsplan saam te stel. So word tyd en onnodige kostes vir buite-konsultante gespaar en kan ons dit waarskynlik gouer afhandel," sê Davids.

Gaan kyk gerus na www.shapingstellenbosch.co.za hoe jy direk jou insette oor Stellenbosch se ruimtelike ontwikkeling kan gee.

Inwoners kan betrokke raak by Shaping Stellenbosch.

Shaping Stellenbosch Campaign posters, flyer distribution and Eikestad Nuus article

Shaping Stellenbosch Campaign workshops



Shaping Stellenbosch Campaign inputs

Appendix C: Strategic Analysis Group

Appendix D: Research engagements 2013 – 2015

Research engagements 2013-2015

Date	Venue	Time	Title	Details
10-Jun-13	Sustainability Institute		SSDF SAG Workshop Session 1	First session
25-Jul-13	Planning Department, SM		SSDF meeting	Initial discussions with core team about how project might unfold
12-Aug-13	Vida E Cafe, Stellenbosch		SSDF meeting	Discussion with core team and Alyne Reeseberg
04-Sep-13	Tastebud Eatery, Stellenbosch		SSDF meeting	Discussion about how students might participate or contribute
29-Oct-13			SSDF meeting	Discussion about Shaping Stellenbosch campaign approach
30-Oct-13	Vredenheim Wine Estate, Stellenbosch	08:00	IDP Sector Engagement meeting	Invited by Pieter van Heyningen to attend Winelands District Municipality IDP Sector Engagement. Pieter van Heyningen presented about SID and Robert Davids about Shaping Stellenbosch.
12-Nov-13	Blaauklippen Wine Estate, Stellenbosch	08:00	SSDF Shaping Stellenbosch Workshop	SS workshop with Blaauklippen ward, provided the model upon which further SS workshops were initially planned.
14-Nov-13	Sustainability Institute		SSDF SAG Workshop Session 2	SAG session 2
15-Nov-13	Engineering Department, SM	14:00	IIC Meeting	Initial meeting for IIC, first since it had been disbanded.
06-Feb-14	Engineering Department, SM	08:00	SITT/ IIC background check	Read through all SITT and IIC material.
23-Jan-14	Planning Department, SM	14:00 - 16:00	SSDF meeting	Feedback about campaign progress and evolution, further planning.
24-Jan-14	AI Perold Building, SU	14:00 - 16:00	IIC Meeting	First IIC meeting of 2014.
05-Feb-14	John van Breda Office, SU	10:00 - 11:00	Thesis discussion	Discussion about research process and methodology.
07-Feb-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Nick Graham from Palmer Development Group presented on the Western Cape Infrastructure Framework as a way for the IIC to begin imagining the Strategic Infrastructure Plan for SM.
14-Feb-14	Slug and Lettuce, Stellenbosch	16:00 - 17:00	IIC Finance Working Group Meeting	Breakthrough meeting - Marius makes the spatial connection and says we can't do the work without a guiding long term vision.

17-Feb-14	Sustainability Institute	08:00 - 12:00	Interview with Mark Swilling	Interview and discussion about SITT, IIC, MRF, IPC. Governance and infrastructure challenges in Stellenbosch.
17-Feb-14	Sustainability Institute		Thesis discussion	Developing the learning conceptual framework, building on transitions literature.
17-Feb-14	Sustainability Institute	14:00 - 14:00	Thesis discussion	Discussion about research process and methodology as well as her involvement as a student with the SITT.
21-Feb-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Breakthrough meeting in terms of putting together a strategy meeting to guide action and progress forward. Plans for a workshop discussed.
25-Feb-14	Anneke Muller's Office, SU	10:00 - 11:00	Thesis discussion	Discussion about spatial planning in the Stellenbosch and South African context.
26-Feb-14	Sustainability Institute	11:00 - 13:00	IIC workshop meeting	Discussion to plan the IIC workshop.
07-Mar-14	Sustainability Institute	14:00 - 19:00	IIC workshop	Workshop to discuss future growth and development in Stellenbosch. Breakthrough in terms of a Third Way - TOD approach instead of preservation or sprawl. NB event.
12-Mar-14	Engineering Department, SM	14:00 - 15:00	Interview with Andre van Niekerk	Interview with Andre van Niekerk about SITT, IIC and his role.
13-Mar-14	Admin B, SU	10:00 - 13:00	REMF Meeting	REMF meeting where Shaping Stellenbosch, SU Mobility Plan, amongst others were presented and discussed.
17-Mar-14	Planning Department, SM	14:00 - 16:00	IPC Meeting	Feedback about SSDF process given.
19-Mar-14	Sustainability Institute	14:00 - 16:00	IIC workshop meeting	Discussion about how to structure Quo Vadis document and reflection on meeting.
04-Apr-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Maarten Hajer gave presentation about energetic society and an enabling state, smart urbanism, smart about cities.
09-Apr-14	Stellenbosch town	09:00 - 12:00	SSDF SAG Workshop Session 3	Outing to drive around town and look at different development nodes.
09-Apr-14	Sustainability Institute	14:00 - 15:00	SSDF Shaping Stellenbosch Workshop meeting	Discussion to plan the SS NGO workshop
16-Apr-14	Planning Department, SM	09:00 - 10:30	SSDF Shaping Stellenbosch Workshop meeting	Further development of workshop with NGOs

17-Apr-14	Sustainability Institute	09:00 - 13:00	SSDF Shaping Stellenbosch Workshop	Workshop session with NGO / NPO representatives from Stellenbosch. Predominantly Khayamandi, Idas Valley.
25-Apr-14	Planning Department, SM	14:00 - 15:00	SSDF Shaping Stellenbosch communication campaign meeting	Meeting with Deon from Sunflood about Shaping Stellenbosch communication campaign. Working towards the oublic component of Shaping Stellenbosch.
29-Apr-14	Trumpet Tree, Stellenbosch	16:00 - 17:00	Thesis discussion	Conversation with Mark about structure and conceptual framework.
30-Apr-14	Planning Department, SM	14:00 - 16:30	SSDF Shaping Stellenbosch communication campaign meeting	Meeting with Deon from Sunflood to develop the communication strategy. Input from SM.
02-May-14	John van Breda Office, SU	12:30 - 13:30	Thesis discussion	Input from John about what exactly I'm exploring in my research.
02-May-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Progress made with the Quo Vadis document. Additional committee members discussed.
05-May-14	Planning Department, SM	10:00 - 13:00	Interview with Bernabe de la Bat	In depth insight into Stellenbosch's planning history and dynamics.
06-May-14	Planning Department, SM		SSDF Shaping Stellenbosch communication campaign meeting	Meeting with Deon from Sunflood to finalise concept and images for campaign, things started coming together here.
09-May-14	Sustainability Institute	12:00 - 16:00	SSDF SAG Workshop Session 4	Simon Nicks from CNdV presented on potential spatial planning instruments. Moving from scenarios to tools.
26-May-14	Doornbosch Hall, Stellenbosch	08:00 - 15:00	SM LED PACA Feedback meeting	John Lawson facilitated session where all councillors and major SM representatives got feedback from the PACA engagement processes and then a small group discussed potential projects to take forward within each of the five economic sectors identified as unique to Stellenbosch. SS and SSDF mentioned quite a bit.
27-May-14	Sustainability Institute	15:00 - 16:30	Interview with Johan Basson	Discussion about his role with the SITT and IIC.
28-May-14	Planning Department, SM	10:00 - 11:00	Interview with Basil Davidson	Discussion about LED, IIC, IPC and planning in Stellenbosch.
28-May-14	Melissa's, Tygervalley	15:00 - 16:30	Interview with Robert Davids	Discussion about Shaping Stellenbosch and in particular Robert's role as an external facilitator.
30-May-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Megan and John facilitated the meeting in Mark's absence.

02-Jun-14	Sustainability Institute	14:00 - 17:30	Interview with Saliem Haider	Discussed his role in the SITT and IIC, challenges faced. Shift in understanding, being more critical about transformation / diversity but still take with a pinch of salt!
04-Jun-14	Blue Crane and the Butterfly, Stellenbosch	09:00 - 11:00	Interview with Dawid Botha	Discussion about his role in the SITT and IIC. Most exciting time of his career.
09-Jun-14	Planning Department, SM	09:30 - 13:00	IPC SSDF SAG Meeting	Pairwise analysis for Eidos.
13-Jun-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Shahid Solomon presented to the IIC about the Greater Tygerberg Partnership and the Voortrekker Road Corridor project. Inspired by TOD thinking, reinforced regional perspective, excellent learning opportunity.
13-Jun-14	Cloetesville Community Hall	18:00 - 20:30	SSDF Shaping Stellenbosch Workshop	Workshop in Cloetesville with ward committee and community representatives.
26-Jun-14	Sustainability Institute	14:00 - 16:30	SSDF SAG Workshop Session 5	Presented scenarios and tools to the group, developed and refined the tools.
27-Jun-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Progress made with Quo Vadis document and how it should be taken forward - where, to who?
07-Jul-14	Slug and Lettuce, Stellenbosch	14:00 - 15:00	IIC Meeting	Informal discussion because so few people attended. I wasn't there - Nobelusi was meant to take minutes. Dates on minutes are incorrect.
21-Jul-14	Stellenbosch		Thesis discussion	Conversation with Mark about social learning, chapter sections / outline. Helpful.
25-Jul-14	Provincial Training Institute, Koelenhof	09:00 - 15:00	SM TOD project workshop	RHDHV and SM workshop about TOD project, initial major meeting between consultants and municipality.
22-Aug-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	NB meeting - decided to invite Andrew Boraine to meeting. Fleshed out how working groups could work, as jointly coordinated by researchers and officials with suggestions of potential new candidates.
04-Sep-14	Sustainability Institute	10:45 - 12:00	IIC Waste Working Group Meeting	Saliem had removed himself from the committee a few months ago and Mark and Vanessa were meeting with him to discuss the possibility of coming back on board to chair the waste working group.

05-Sep-14	Planning Department, SM	09:00 - 12:00	IPC SSDF SAG Meeting	Post Eidos strategy and report back. Interesting seeing outputs. First time Dupre Lombaard as new Director, attended. Introduced to the rationale and process.
05-Sep-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Andrew Boraine presented. Useful discussion in how the IIC can move forward - organising the business sector as a partner. Innovation Committee and Innovation Steering Committee introduced
10-Sep-14	Planning Department, SM	09:00 - 13:00	SSDF meeting	Robert 'downloaded' all insights from community engagement process. First significant period of convergence, bringing together both tracks - SAG and Shaping Stellenbosch.
12-Sep-14	Facilities Management, SU	10:30 - 11:30	IIC Waste Working Group Meeting	Mark and I met with Busi Sibanda from Facilities Management about her getting involved with the Waste Working Group. The SU and SM management teams had had a meeting, think it was the 07-Sep-14, where they had first tried to discuss joint planning. Went badly, insights from Busi.
12-Sep-14	Prof Krygsman Office, SU	11:15 - 12:00	IIC Transport Working Group Meeting	Mark and I met with Prof Stephan Krygsman from the Logistics Department about coordinating the transport and mobility working group. Brilliant new thinking, ideas. Refreshing, critical.
15-Sep-14	Planning Department, SM	14:00 - 16:30	IPC Meeting	Feedback on Eidos and Shaping Stellenbosch.
19-Sep-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Most well attended meeting with external players there too. Progress made in terms of working groups, terms of reference. Idea for planning workshop confirmed.
02-Oct-14	Council Chambers, SM	12:00 - 14:00	SM Mega Development Planning Project Meeting	Chaired by Dupre Lombaard, pressure to get on with the housing pipeline but should this be a mega project or more in line with the SDF - integrated nodes. Interesting discussion, not aligned with the IIC's Quo Vadis thinking nor the SSDF re nodal development.
07-Oct-14	Prof Krygsman Office, SU	11:00 - 12:00	IIC Transport Working Group Meeting	Met to discuss more about IIC history with Stephan.

10-Oct-14	Sustainability Institute	09:00 - 13:00	IPC Joint Planning Workshop Session 1	SU and SM officials met to do real joint planning, around the SSDF. Greater understanding, trust and relationship building.
17-Oct-14	Stellenbosch Library, SM	10:00 - 14:00	TOD presentation and technical meeting	Consultants presented the project and proposals to a wider group, including councillors and was followed by a more technical meeting with smaller group. Urban regeneration focus rather than merely public transport.
17-Oct-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Productive discussion around Terms of Reference for working group, particularly waste and water. Interaction with Innovation Steering Committee discussed and the background to the Mega Dev / IHS Strategy.
20-Oct-14	Planning Department, SM	14:00 - 16:30	IPC Meeting	Mark presented the emerging framework of SSDF. Minimal representation from SU. Clear that the workshop had helped - even in this formal meeting there was a shift in offering real solutions / suggestions to one another.
21-Oct-14	Sustainability Institute		IPC SSDF Shaping Stellenbosch Mapping Workshop	Mapping session to try and draw together campaign suggestions and ideas as well as expert inputs. Lance from CNvD did urban design work which helped to visualise it on the map. Corridors showing nicely. Express the narrative in the map.
29-Oct-14	Facilities Management, SU	10:00 - 11:0	Interview with Schalk Opperman	Discussion about IPC and IIC and in general the relationship between SU and SM.
31-Oct-14	TechnoPark, Stellenbosch	08:00 - 16:00	SID Conference	Mark's video presentation: 'Towards collaborative governance in Stellenbosch: reflections on the Rector-Executive Mayor Forum'. Also progress in the Innovation Committee, what it will be / do - cluster development, private sector focus.
17-Nov-14	Sustainability Institute	14:00 - 17:00	IPC Joint Planning Workshop Session 2	Second joint planning session. Megan facilitated which was a big deal. Turned into more of a mapping session with CNdV between SU and SM. Progress nonetheless.
24-Nov-14	Sustainability Institute	14:00 - 15:30	Interview with Blake Robinson	Discussion about SAG and Shaping Stellenbosch.
28-Nov-14	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Final meeting of 2014

05-Feb-15	Planning Department, SM	15:00 - 17:00	SSDF Meeting	Mapping discussion with core team.
13-Feb-15	AI Perold Building, SU	14:00 - 16:30	IIC Meeting	Presentation by Herman Pienaar, CoJ. Growth Management and Capital Investment Planning. Attended by all 4 directors.
25-Feb-15	Sustainability Institute	13:00 - 14:00	Thesis discussion	Breakthrough with Mark re thesis structure and focus.
26-Feb-15	Planning Department, SM	08:00 - 10:30	SSDF Meeting	Discussed progress with SSDF draft document and maps.
27-Feb-15	Sustainability Institute	13:00 - 17:30	ICLEI Workshop	ICLEI Workshop with CoCT officials about integrated planning.
13-Mar-15	Planning Department, SM	14:00 - 15:00	IIC Meeting	Badly attended. Casual conversation.
16-Mar-15	Planning Department, SM	10:45 - 13:00	SSDF Meeting	Preparation for public meeting and how to get internal input from directors and departments
27-Mar-15	Engineering Department, SM	11:30	IIC Pre-Meeting	Discussion with team from Novus3 about the PPP.
27-Mar-15	Mayor's Chambers, SM	14:00 - 16:30	IIC Meeting	Presentation on PPP to IIC and representatives from WCG.
16-Apr-15	Planning Department, SM	09:00 - 11:00	SSDF Meeting	Discussed progress with SSDF draft document and maps.
17-Apr-15	Planning Department, SM	09:30 - 13:00	IPC SSDF Meeting	Assisted to facilitate workshop session with internal
22-Apr-15	Neelsie	12:30 - 13:30	IIC discussion	Way forward with IIC via SU
22-Apr-15	SM Library	17:30 - 20:00	SSDF Public Meeting	Presentation to participants re Shaping Stellenbosch progress.