

**ADAPTABLE URBANISM**  
**UNDERSTANDING SELF-ORGANISED TERRITORIALISATION**  
**IN URBAN COMMUNITIES**

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# Keywords

adaptability, adaptive cycle, assemblage, becoming, Christiania, coding, community, decoding, decentralisation, Delanda, Deleuze, deterritorialisation, eco-village, emergence, favela, forces, Guattari, informal settlement, intentional communities, lines of flight, logos, micropolitics, molarity, molar lines, molecularity, molecular lines, Narara, nomos, panarchy, plateaus, resilience, reterritorialisation, rhizomes, rhizomic, Santa Marta, segmentarity, self-organisation, self-organising, sociocracy, space, territorialisation, urban design, urbanism, urban planning, urban systems, Vauban.

# Abstract

There is a clear need for cities and urban communities (also referred to in this thesis as “social-environmental systems”) to be more resilient, and thus more adaptable. In order to achieve this, it is necessary to first recognise the complex and dynamic nature of such communities, and to better understand self-organisation as a “city-making” process. While much is understood about the adaptability and resilience of environmental systems, and much is understood about self-organisation in social systems, there is still something to be learned about how self-organisation relates to adaptability in social-environmental systems (such as urban communities). More important is the need to understand how the process of urbanisation affects and is affected by self-organisation. This is where this thesis expands on current knowledge.

In order to make sense of the concept of self-organisation, and of change in complex systems more generally, this thesis draws on the philosophy of Gilles Deleuze and Felix Guattari, and particularly on one of their key concepts: “assemblages”. The concept of assemblage is apt for describing communities because it recognises a number of fundamental qualities of communities, including their dynamic nature — a quality that is often overlooked in urban theory. Assemblage theory (as developed by Manuel Delanda) is a guide to social ontology and provides a means of conceptualising the way people engage with, manipulate, and affect space (the process of territorialisation).

The aim of this thesis, then, is to develop a new theoretical understanding of adaptable community development by adopting assemblage theory (and Deleuzian philosophy) to advance concepts of self-organisational and adaptable change, and to then explore the relevance of that theory in established and emerging community contexts.

This aim is realised through: the synthesis of assemblage theory and theory related to self-organisation and adaptability in complex systems; the subsequent identification of a set of factors which are thought to affect and be affected by the process of territorialisation in self-organising systems; case study research of three international communities to confirm the relevance and behaviour of the identified factors; and a subsequent case study of a community in Australia, including interviews

with key stakeholders, to further understand the relevance and applicability of the identified factors.

The theory development ultimately confirmed that there is a correlation between self-organised capacity and the position of the system in the adaptive cycle, that there are a number of factors that cause self-organised change, and that there are a number of variables that affect the capacity for self-organisation to respond to those causes.

The case studies confirmed these observations about the identified factors (correlation to the adaptive cycle, causes, and variables) and also provided further insight into the effect of the identified causes and behaviour of the key variables. Critically, the case studies provided a better understanding of the relationships between the variables — how each affected the other.

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# Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: [QUT Verified Signature](#)

Date: 27/07/2019

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# Chapter 1: INTRODUCTION

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## 1.1 BACKGROUND AND PROBLEM STATEMENT

It is widely recognised<sup>1</sup> that cities and urban populations need to be more resilient, in terms of both general resilience and resilience to specific threats and vulnerabilities, such as climate change impacts, financial crises, and terrorism. As Newman and others explain ‘[cities] too need to last, to respond to crisis and adapt in a way that may cause them to change and grow differently; cities require an inner strength, a resolve, as well as a strong physical infrastructure and built environment’.<sup>2</sup> While they are the most preferred human habitat, cities — where humans and hazards are concentrated — are often identified as the most vulnerable environments when it comes to a wide range of threats and impacts. However, cities also concentrate adaptive resources, store capital, and foster innovation, making them potentially more able to avoid or respond to such threats and impacts. As Gleeson points out, cities are both the locus of threat (for external impacts) and a site for containment and resolution.<sup>3</sup>

The significance of these observations was made clear to me by the coincidence of my introduction to resilience theory (as part of my Masters degree) and a significant flood event in Brisbane (where I was living) in 2010. The flood event forced the evacuation of thousands of people from Brisbane and resulted in severe damage to much of the CBD and low-lying suburbs. It was in the midst of the aftermath that I, along with many of Brisbane’s citizens, witnessed an extraordinary phenomenon — the activation of what became known as “the Mud Army”. As the flood waters subsided and the devastation became known, and in the apparent absence of any direct relief action from the various authorities, people across Brisbane turned up to the

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<sup>1</sup> ResilientCity.Org, *Why Do Cities Need to become more Resilient?* <<https://www.resilientcity.org/index.cfm?id=11448>>; United Nations, *Making Cities Resilient* <<https://www.unisdr.org/we/campaign/cities>>; The World Bank, *Sustainable Cities* The World Bank <<https://blogs.worldbank.org/sustainablecities/category/tags/resilient-cities>>; CSIRO, *Resilient Cities of the 21st Century* <<https://www.csiro.au/en/Research/LWF/Areas/Resilient-cities-21C>>; R Laberenne and P Lamson-Hall, *Planning for Urban Growth for a More Resilient Future* 100 Resilient Cities <<https://www.100resilientcities.org/planning-urban-growth-resilient-future/>>.

<sup>2</sup> P Newman, T Beatley and H Boyer, *Resilient Cities: Responding to Peak Oil and Climate Change* (Island Press, 2009).

<sup>3</sup>B Gleeson, 'Critical Commentary. Waking from the Dream: An Australian Perspective on Urban Resilience' (2008) 45(13) *Urban Studies* 2653.

affected areas in their thousands. Brandishing mops, brooms, and whatever other cleaning and repair equipment they had available, the Mud Army cleaned up the city over the course of days and weeks. What struck me at the time was the entirely organic and undirected nature of the whole exercise — without instruction, but with the benefit of social media, the Mud Army found their way to people and places in need of assistance, lent a hand, then moved on to the next place. While I could appreciate the phenomenon as an act of adaptability in a complex social-environmental system, I was eager to better understand the undirected, self-organised aspect of it — to understand self-organised<sup>4</sup> adaptability as part of the larger adaptive capacity of social-environmental systems (such as urban communities). This interest was reinforced when my research brought me to informal settlements and, despite the despair one inevitably feels when introduced to these environments, I was again impressed by the apparent resilience of these complex systems, and observed a high level of adaptability by way of community-scale self-organisation. This was the driving motivation for my PhD: the need to better relate resilience research to urban communities, and a need to unpack the concept of self-organisation, both with regard to its relationship to resilience and adaptability, and with regard to city-making.

Preliminary research revealed that, although ever-present to some degree in the histories of city-making and urbanisation, the concept of self-organisation in contemporary city-making processes is often overlooked or overwhelmed by the top-down and hierarchical systems of control that tend to prevail in rigid command economies (such as in Australia). This tension between top-down processes (also referred to as hierarchies<sup>5</sup>, tree structures<sup>6</sup>, aborescence<sup>7</sup>, or ‘made order’<sup>8</sup>), and bottom-up processes (also referred to as heterarchies<sup>9</sup>, meshworks<sup>10</sup>, rhizomes<sup>11</sup>, or ‘grown order’<sup>12</sup>) has always existed, and both processes are always present in all systems to varying degrees. This is made clear by philosopher Manuel Delanda in his

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<sup>4</sup> The concept for self-organisation is described and defined at Section 3.4.1 of this thesis. For present purposes, self-organisation can be regarded as a process whereby systems acquire and maintain structure in the absence of external control.

<sup>5</sup> C Alexander, 'A City is Not a Tree' (1965) 122(1) *Architectural Forum* 58, p5.

<sup>6</sup> Ibid.

<sup>7</sup> G Deleuze and F Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (B Massumi trans, Continuum International Publishing Group, 2004).

<sup>8</sup> F A Hayek, 'Rules and Order. Law, Legislation and Liberty, Vol. 1' (1973).

<sup>9</sup> Alexander, above n, p5; 5.

<sup>10</sup> Ibid.

<sup>11</sup> Deleuze and Guattari, above n 7.

<sup>12</sup> Hayek, above n 8.

book *The Nonlinear Development of Cities*<sup>13</sup>, wherein he explains that cities are a mixture of hierarchies of command and control and self-organising systems. What differs is the balance of weight between the processes in various systems — some systems being more top-down, some more bottom-up — depending on the particular political, environmental, or social conditions present at any given time, and depending on whether forces are being enacted at the community scale, or at scales above or below.

As described in Chapter 2 of this thesis, authors such as John Holland, Christopher Alexander, Jane Jacobs, Juval Portugali, and Nikos Salingaros have long advocated for greater recognition of the role of self-organisation in cities. Indeed, Jane Jacobs' book *The Death and Life of Great American Cities*<sup>14</sup>, and Christopher Alexander's book *A City is not a Tree*<sup>15</sup> were both an appeal for city designers to give more thought to self-organisation and bottom-up logic. More recently, scholars such as David Graham Shane, Michael Weinstock, Carlo Ratti, and Rod Barnett have written on the apparent trend towards more emergent processes in city-making, and Kim Dovey, Michael Batty, Jenni Partenan and others have substantially developed research around complexity and emergent dynamics in cities. Also, in a practical sense, there appears to be a resurgence — due in no small part to the proliferation of social media — of urban design and planning approaches that embrace self-organisation, such as tactical urbanism and open-source or crowd-sourced interventions. There is also a growing prevalence of grass-roots activism in urban environments, particularly in relation to political events such as Occupy Wall Street<sup>16</sup> and the Arab Spring<sup>17</sup>.

However, past efforts and approaches to self-organisation have largely been motivated by desires to either: recognise the complex adaptive nature of cities; capitalise on the social capital and collective intelligence (or wealth) of urban communities; or to make possible more cost-, time-, and resource-efficient solutions to urban issues. Seldom have such efforts been dedicated to recognising the

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<sup>13</sup> M Delanda, 'The Nonlinear Development of Cities' in A Marras (ed), *Eco-tec: Architecture of the In-Between*. (Princeton Architectural Press, 1999)

<sup>14</sup> J Jacobs, *The Death and Life of Great American Cities* (Pimlico, first published 1961, 2000).

<sup>15</sup> Alexander, above n 5.

<sup>16</sup> A community protest against economic inequality, based in Zucotti Park in New York City in September 2011.

<sup>17</sup> The term 'Arab Spring' refers to a series of demonstrations held across a number of cities in countries such as Tunisia, Libya, Egypt, Syria, and Bahrain from late 2010 to mid-2012, protesting oppressive political regimes and corruption.

importance of self-organisation as a critical process for improving the adaptability of urban communities. Furthermore, there is little consideration of how planning and design professions could more deliberately envision or effect self-organisation in city-making — a notion that, on the face of it, might seem oxymoronic.

So, while much is understood about the adaptability and resilience of environmental systems, and much is understood about self-organisation in social systems, there is something to be learned about how self-organisation relates to adaptability, and more fundamentally, how the process of city-making affects and is affected by self-organisation. This is where this thesis expands on current knowledge.

This research also expands on current knowledge through the application of Deleuzian philosophy to self-organised change and related concepts. My initial investigations into concepts relating to self-organisation revealed that they were often expressed in highly abstract or opaque ways, and there was a lack of unity and coherence in the way knowledge relating to complexity, change, non-linearity, emergence, immanence, and so on, was articulated. There was a clear need to approach this collection of concepts and ideas from some higher perspective, to draw them together in a way such that they could make sense as a unified whole. This is when I discovered the philosophy of Gilles Deleuze and Felix Guattari, and particularly one of their key concepts: “assemblages”.

Regarded by many as one of the most important philosophers of the latter part of the twentieth century, Deleuze, along with Guattari, developed a new way of thinking — a philosophy that reflects an ontology of difference whereby the world is conceived as a constantly becoming set of relations and an unfolding of immanence, where the inertia comes from within, as opposed to from transcendent (external) forces. As Colebrook observes, ‘at the heart of all Deleuze’s thought is his insistence that our relation to the world is dynamic, not just because our ideas about the world change, nor because the world is a thing that goes through change ... [but also because] life is itself constant change and creation’.<sup>18</sup> One of the many theoretical constructs developed by Deleuze was the concept of assemblages — complex, immanent wholes formed through the becoming of discrete parts.

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<sup>18</sup> C Colebrook, *Understanding Deleuze* (Allen and Unwin, 2002).



Contemporary philosopher Manuel Delanda has written extensively on Deleuze and assemblage theory<sup>19</sup>. Delanda's work goes the furthest to presenting a consolidation of Deleuze and Guattari's concepts of assemblage, and he extends them with his own. As Delanda explains<sup>20</sup>, assemblage theory is not presented as a consolidated theory in Deleuze and Guattari's writing, but is woven through a number of their works. He describes assemblage theory as a guide to social ontology. Importantly, as Dovey observes, assemblage theory is a theory of society rather than place<sup>21</sup> — it is therefore tailored to an exploration of the way people engage with, manipulate, and affect space.

Of particular relevance to this thesis is that, as Delanda states, assemblages are defined by two dimensions — the first defines the roles of entities in an assemblage, and the second describes how assemblages change. Referring to the second dimension, Deleuze and Guattari explain:

*[This] dimension defines variable processes in which these components become involved and that either stabilize the identity of an assemblage, by increasing its degree of internal homogeneity or the degree of sharpness of its boundaries, or destabilize it. The former are referred to as processes of territorialisation and the latter as processes of deterritorialisation.*<sup>22</sup>

The concepts of territorialisation/deterritorialisation/reterritorialisation (hereafter shortened to 'territorialisation') describes the process of socio-spatial structuring that is of most relevance to the realm of city-making. As Dovey says, territorialisation 'describes the ways social and spatial boundaries are inscribed and erased, the ways identities are formed, expressed and transformed.'<sup>23</sup> In more simple terms, territorialisation, as it is adopted in this research, refers to the way individuals and communities engage with and manipulate their environments.

My initial research into the process of territorialisation suggested that there were a number of variables which might affect the process and nature of territorialisation in

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<sup>19</sup> M Delanda, *A New Philosophy of Society: Assemblage Theory and Social Complexity* (Continuum Intl Pub Group, 2006)

<sup>20</sup> T Lorraine, 'Lines of Flight' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 144, p143.

<sup>21</sup> K Dovey, 'Place as Assemblage' in K Dovey (ed), *Becoming places: urbanism/architecture/identity/power* (Routledge, 2009) 13.

<sup>22</sup> J M Wise, 'Assemblage' in C.J. Stivale (ed), *Gilles Deleuze: Key Concepts* (Acumen Publishing Ltd, 2005), p77.

<sup>23</sup> K Dovey, 'Informal Urbanism and Complex Adaptive Assemblage' (2012) 34(4) *International Development Planning Review* 349, p353.

social-environmental systems, and that understanding those variables could assist in understanding how territorialisation could affect the self-organisational capacity and adaptability of those systems. So, while the motivation for this thesis is the recognised need for more adaptable (and thus more resilient) social-environmental systems, the problem the thesis addresses is the consequent need to better understand self-organisational change in urban communities (or social-environmental assemblages). More specifically, the problem it addresses is the need to understand how the process of territorialisation occurs in urban communities, and particularly what factors affect the process of territorialisation to alter self-organisational capacity, and thus adaptability of urban communities.

Figure 1 below illustrates how the thesis essentially sits at the nexus of three different but related areas of theory, as they relate to urbanism: adaptability and resilience theory; self-organisation and emergence theory; and assemblage theory.

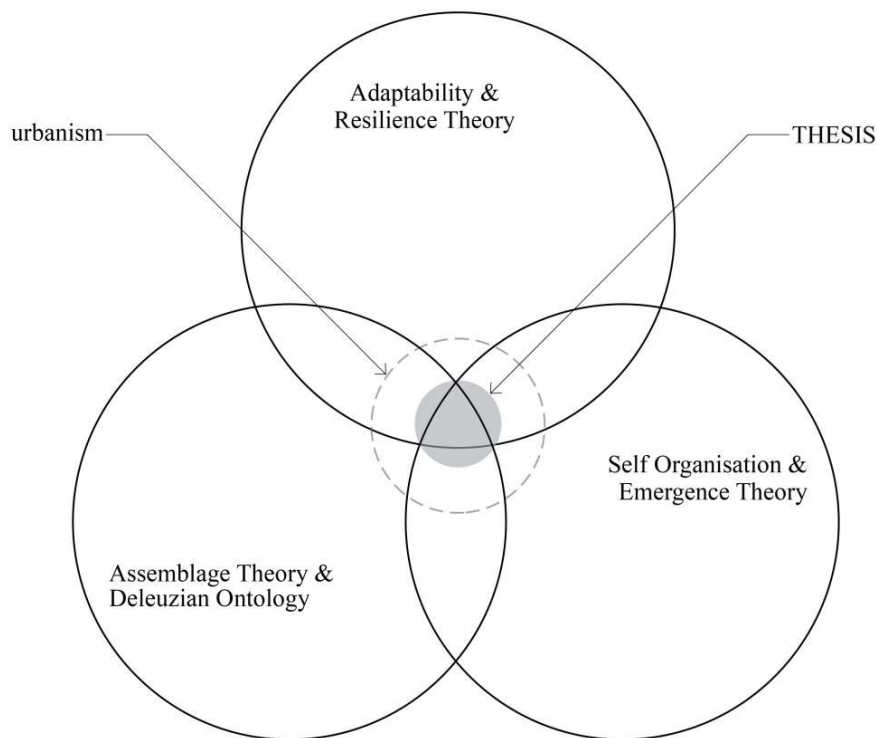


Figure 1: Key concepts of thesis.

## 1.2 RESEARCH AIM AND HYPOTHESES

### 1.2.1 Aim

In response to the problem identified above, the aim of this thesis is **to develop a new theoretical understanding of adaptable community development by adopting assemblage theory (and Deleuzian philosophy) to advance concepts of self-organisational and adaptable territorialisation, and to then explore the relevance of that theory in established and emerging community contexts.**

This aim gives rise to the following primary research question: **In the context of assemblage theory, what factors affect self-organisational territorialisation and thus adaptability in urban communities (assemblages)?**

This primary research question gave rise to a number of sub-questions, which were employed to frame the research:

1. How does self-organisation relate to adaptability generally?
2. How does self-organised territorialisation occur in complex social-environmental systems such as communities?
3. What are the factors that affect self-organised territorialisation in complex social-environmental systems such as urban communities?
4. How do the identified factors affect the capacity for self-organised territorialisation in complex social-environmental systems such as urban communities?
5. Are these causes and variables a relevant consideration in relation to intentional community development?

### 1.2.2 Hypotheses

The theory set out and synthesised in this thesis indicates that change in urban communities is affected by: the position of the system in the adaptive cycle (a conceptual diagram used to describe how systems progress through a cycle of change); a number of causes; and in accordance with a set of key variables.

The adaptive cycle serves as a type of temporal gauge by which to understand the degree of self-organisation of a system (considered in terms of molarity<sup>24</sup> and molecularity<sup>25</sup> of the system). I anticipate that the molarity and molecularity of assemblages would affect, and be directly affected by, the position of the assemblage in the adaptive cycle. In simple terms the related hypotheses are:

1. Molarity will be most apparent through the front loop of the adaptive cycle<sup>26</sup>, and will contribute to the stabilisation and rigidity of the system; while
2. Molecularity will be more apparent through the back loop of the adaptive cycle<sup>27</sup> and will contribute to the destabilisation and desegmentation of the system.

I expect that there will be a direct relationship between self-organisation and adaptive capacity of a system. I also expect that there will be a number of factors causing self-organised change in systems, including factors generating change from within the system and factors acting on the system from beyond the system. The nature of these factors is expected to affect the nature of the change that is caused.

Finally, I expect that a set of key variables will affect the processes of territorialisation in urban assemblages, determining whether the assemblage is more or less self-organised, and consequently affecting the adaptive capacity of the system. I expect that, when the identified variables express certain qualities, molecularity of the system will increase, creating opportunities for self-organised territorialisation (and more adaptable urbanism); alternatively, when the variables express contrasting qualities, I expect that molarity will increase, creating opportunities for more top-down territorialisation (and rigid, less adaptable urbanism).

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<sup>24</sup> Molar entities and relationships are those associated with top-down hierarchies and are characterised by formality, homogeneity, and rigidity. This concept is discussed further in Section 3.4.1.

<sup>25</sup> Molecular entities and relationships are those associated with bottom-up heterarchies and are characterised by informality, heterogeneity, and perpetual change. This concept is discussed further in Section 3.4.1.

<sup>26</sup> The 'front loop' represents the part of the adaptive cycle mainly characterised by growth and conservation. This concept is discussed further in Section How do Systems Change?3.5.1.

<sup>27</sup> The 'back loop' represents the part of the adaptive cycle mainly characterised by release and reorganisation. This concept is discussed further in Section 3.5.1.

### **1.3 RESEARCH APPROACH**

The aim of the research will be realised through a mixed research approach comprising:

1. Theory development through synthesis of existing knowledge on self-organisation, adaptability, system dynamics, and assemblage theory, and assisted through the application of a philosophical lens (based on Deleuzian ontology).
2. Three application case studies to test and expand on the developed theory and to understand the potential relevance of the identified causes and variables affecting self-organised territorialisation.
3. A subsequent empirical case study (including interviews with stakeholders), to confirm the relevance of the developed theoretical framework to an emerging community (within the Australian context) and to further observe the behaviour of the identified causes and variables.

The research strategy is described in detail in Chapter 4 below.

### **1.4 SIGNIFICANCE AND CONTRIBUTION**

This research makes several key contributions to knowledge:

1. It contributes to theory by the application of assemblage theory (and Deleuze's wider social ontology) to theory related to systems change. Deleuze's ontology, and assemblage theory in particular, has proven to be a potent means for understanding and describing change in complex systems. This thesis is substantially an exploration of how assemblage theory can make sense of, and provide a conceptual vocabulary for, self-organisation in social-environmental systems.
2. By illuminating the relationship between self-organisation theory and resilience theory in the broader context of social-environmental studies, this research advances knowledge in relation to self-organising change in social-environmental systems, and potentially in relation to resilience theory.

3. It makes a contribution by identifying a set of causes and variables that affect, and are affected by, the process of territorialisation, and thus forms a framework by which to analyse and potentially affect the process of self-organisation in social-environmental systems.
4. Through analysis of the case studies (and unique tabulation of findings), this thesis improves understanding of how self-organising social-environmental systems behave and change generally, and also provides insights into how self-organisational change in social-environmental systems affects adaptability. By contributing to this elemental understanding of how territorialisation occurs in self-organising social-environmental systems, the research will ultimately show how cities can be differently planned and designed to make them more adaptable and resilient.
5. The empirical case study tests and expands upon the findings of the research in a “real-world” situation — a community-scale social-environmental system, with ambitions for sustainability and resilience. The nexus of the theoretical research with this case study project provides an empirical scaffold for the theory and allows a novel consideration of a unique community and community building program.

## 1.5 POINTS OF CLARIFICATION

There are a number of points worth making at the outset to assist with comprehension of the thesis.

First, this thesis adopts Lozano’s definition of a “system” as being ‘a group of parts whose interactions facilitate the performance of the parts into an organised whole with characteristic overall responses’<sup>28</sup>. McGreevy explains that within this definition ‘there are three main types of systems: the natural bottom-up organised ecosystem, the engineered top-down organised system of the machine, and social systems, subject to either top-down or bottom-up or a combination of both.’<sup>29</sup> As already mentioned, the social-environmental systems discussed in this thesis are best described as the third type of system: systems comprising a combination of top-down and bottom-up

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<sup>28</sup> E Lozano, *Community Design and the Culture of Cities: The Crossroad and the Wall* (Cambridge University Press, 1990), p73.

<sup>29</sup> M P McGreevy, 'Complexity as the Telos of Postmodern Planning and Design: Designing Better Cities from the Bottom-Up' (2017) *Planning Theory* 1473095217711473, p1-2.

processes. Put simply, there is no such thing as an urban system that is defined entirely by top-down or bottom-up activity. Rather, the constitution of social-environmental systems and the processes which direct their change are constantly being recast, such that there is always a combination of self-organisation (bottom-up) and centralised control (top-down). For clarification, when the social-environmental systems are described in this thesis as “urban” systems or “urban” communities, the broadest definition of the term “urban” is being employed — i.e. ‘occurring or situated in a city or town’<sup>30</sup>. The term takes in suburban and small scale communities.

Second, self-organised communities are a focus of this research. For the purposes of this thesis, the term “self-organised communities” refers to urban communities wherein change is mainly determined at the community level or below (such as sub-community groups or individuals). The term might also be thought to have a more political meaning and to refer to concepts such as autonomous regions or sovereign governance, but this is not intended in this thesis. The thesis describes self-organised communities as complex social-environmental systems; communities have been conceptualised as complex systems by a number of authors, including Dooley<sup>31</sup>, Comfort and others<sup>32</sup>, and Crichton and others<sup>33</sup>.

Third, it is relevant to note that, while adaptability is a critical concept motivating this research, this thesis is not concerned with trying to measure the adaptability of the community, as this would not be possible in the timeframe available, nor would it assist with addressing the research questions or aim. Rather, the research is concerned with how self-organisation is expressed in the community, particularly in relationship to social-spatial interactions. The expression of self-organisation is intended to be understood through analysis of key conceptual parameters.

Fourth, this thesis is fundamentally concerned with the process that drives change in social-environmental systems, rather than the outcomes of change (the

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<sup>30</sup> Macquarie Dictionary Publishers Pty Ltd, *Macquarie Concise Dictionary*, Macquarie Concise Dictionary (Macquarie Dictionary Publishers Pty Ltd, 5th ed, 2009).

<sup>31</sup> K Dooley, 'A Complex Adaptive Systems Model of Organization Change' (1997) 1(1) *Nonlinear dynamics, psychology, and life sciences* 69.

<sup>32</sup> L Comfort et al, 'Complex Systems in Crisis: Anticipation and Resilience in Synergetic Environments' (2001) 9(3) *Journal of contingencies and crisis management* 144.

<sup>33</sup> M Crichton, C Ramsay and T Kelly, 'Enhancing Organizational Resilience Through Emergency Planning: Learnings from Cross-Sectoral Lessons' (2009) 17(1) *Journal of contingencies and crisis management* 24.

material and expressive qualities that result from change in the system). It is apparent that these qualities also affect the adaptability of a system (for example, the material aspects of a community developed through incremental, small-scale aggregation of built form is likely to be more adaptable than a community relying on large-scale centralised structures), but these are outcomes of change, rather than features that are integral to the process of change.

Fifth, this thesis draws on the philosophy of Gilles Deleuze and his collaborator Felix Guattari. Deleuze and Guattari collaborated on a wide range of philosophical projects and it is often unclear where the distinction between their collaborated work and their individual work lies. Many scholars (such as those referenced throughout this thesis) typically credit much of their corpus relating to assemblages and becoming to Deleuze, and citing of these concepts in this thesis has typically followed the approach taken by these scholars.

Sixth, Deleuze's ontology is complex and challenging. Often, the fundamentals of his concepts are more succinctly expressed by Deleuzian scholars. As such, many references to Deleuze's work in this thesis are by way of the consolidated interpretations of recognised scholars.

Seventh, as mentioned above, this thesis is limited to an investigation of those aspects of self-organisation (and subsequently of Deleuze's concepts) which relate to the interaction of urban space and urban actors. The concept of territorialisation (and by extension deterritorialisation and reterritorialisation) is one of the critical concepts investigated, along with a range of concepts which ultimately affect the process of territorialisation (such as coding, micropolitics, etc).

Finally, this research recognises that self-organisation is not something that can practically be designed or planned into a complex system. Rather, this thesis is based on the idea that by identifying key causes and variables that affect and even manipulate social-environmental systems, self-organisation can be factored in or even facilitated, and adaptability ultimately manifested in the system. As such, the key findings of this thesis are not intended as a design or planning method. The findings are instead intended for those involved with urbanism or city-making who seek ways to understand or affect how self-organisation can be facilitated and ultimately how social-environmental systems can become more adaptable.



## 1.6 THESIS OVERVIEW

Figure 2 below illustrates the overall thesis structure. The next chapter (Chapter 2) sets out a preliminary overview of related literature to provide a context for this research. Chapter 3 incorporates a more detailed review and subsequent synthesis of relevant literature and presents a theoretical framework relating to self-organisation and change in complex systems, as interpreted by way of Deleuzian concepts and assemblage theory. This synthesis of theory allows identification of a set of key factors affecting territorialisation. Chapter 4 describes the research methods and strategies employed. Chapter 5 documents the application case study research and presents the findings. Chapter 6 documents the empirical case study research. Chapter 7 sets out the conclusions of the research and provides some discussion of the potential for further research.

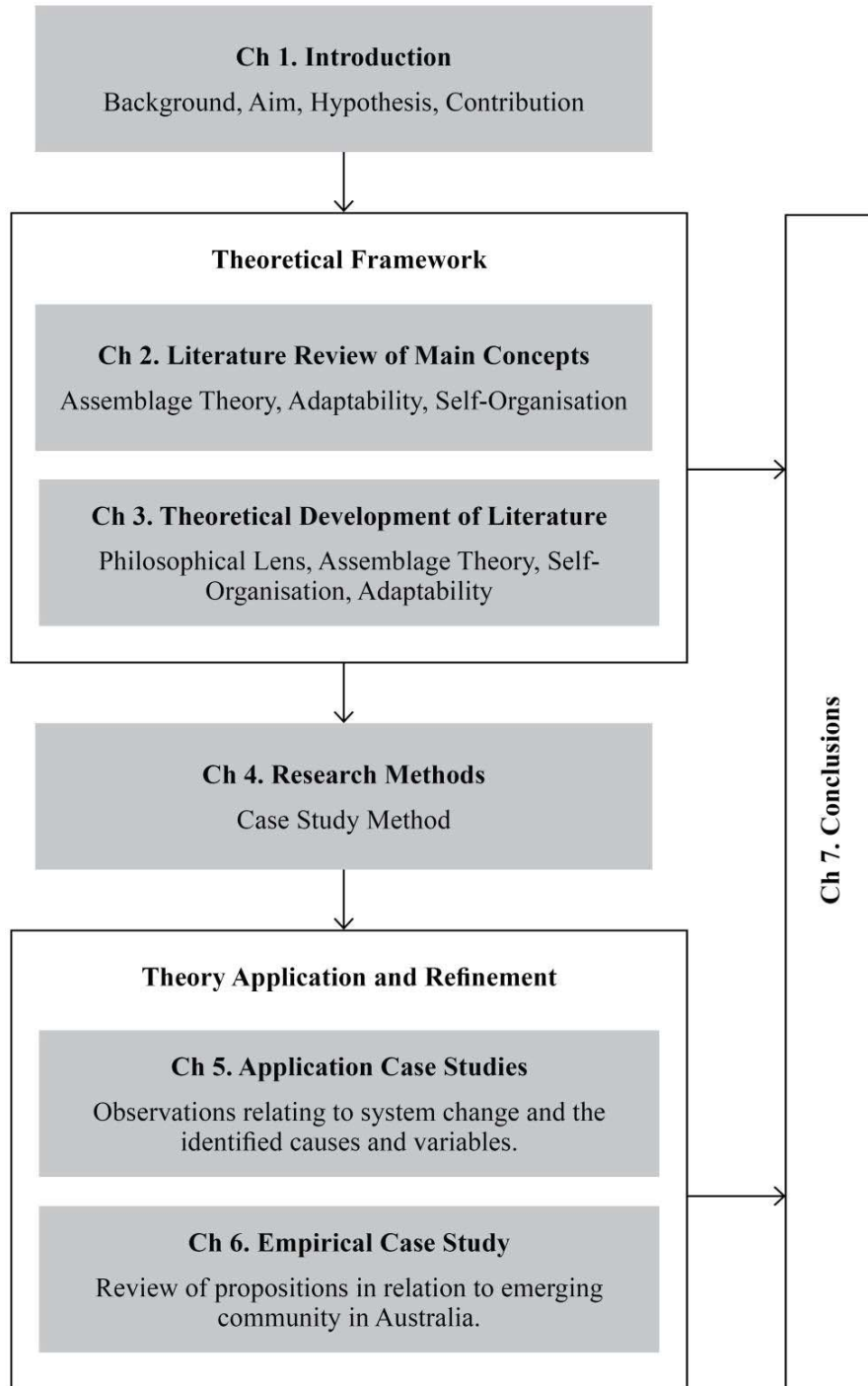


Figure 2: Thesis structure.

It is relevant to explain at the outset that the preparation of this thesis has been a lengthy and divagating process. It has been what Deleuze describes<sup>34</sup> as an “experimentation” — an open-ended process employed when there is no clear expectation of the end result; a process that explores what is new rather than what is known; a process of discovery. This thesis is precisely this type of experiment and the mixed research strategy provides an adaptable means of addressing the research aim. As Baugh says, for Deleuze:

*Experimentation does not interpret what something, such as a text, an idea or a desire, “means”, but seeks to discover how it works or functions by uncovering an order of causes, namely, the characteristic relations among the parts of an assemblage — their structures, flows and connections — and the resulting tendencies.*<sup>35</sup>

The challenges of such an open-ended process were borne out at numerous stages of the research, including: the need to bring together different areas of theory to make sense of the notion of self-organised change as it applies to social-environmental systems, and to adaptability; the difficulty in finding cases where self-organisation can be clearly observed in a short period of time; and the difficulty in finding projects which might serve as an Australian example of a self-organised urban community. These challenges, however, are reflective of the novelty of much of the research.

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<sup>34</sup> G Deleuze and F Guattari, *Anti-Oedipus: Capitalism and Schizophrenia* (R Hurley, M Seem and H R Lane trans, University of Minnesota Press, 1983).

<sup>35</sup> B Baugh, 'Experimentation' in A Parr (ed), (Edinburgh University press, 2005), p91.



# Chapter 2: LITERATURE REVIEW OF MAIN CONCEPTS

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## 2.1 OVERVIEW

This thesis integrates three main areas of knowledge relating to:

1. assemblage theory (and Deleuzean philosophy);
2. adaptability (and resilience theory); and
3. self-organisation (and emergence theory).

This section sets out an overview of current literature related to these knowledge areas. The literature review provides a context for the research and indicates where this research expands on current knowledge. Some literature identified in this section is further reviewed and described in more detail in Chapter 3 (Theoretical Development of Literature). As such, the complete review of relevant literature should be understood as including both this chapter and Chapter 3.

Figure 3 identifies authors of particularly relevant research and maps how their research relates to the three main knowledge areas of the thesis. As shown, most of the research relates to one or two of the knowledge areas, but there are few authors whose research extends to all three. As is also illustrated, some of the research relates specifically to urbanism or “city-making”, as this thesis does, while some does not.

The following section provides a brief summary of the relevant research from the identified authors. For clarity, a number of authors have been grouped together under the headings of Deleuzean Theory, Resilience Theory, and Emergence Theory. These headings are coarse and are not sufficiently reflective of the contributions made by a number of the identified authors, but do provide some assistance in distinguishing the various contributions.

There is also a group of authors (or, more accurately, designers) who have been collected under the heading Related Design Practice and Research. This thesis is a theoretical thesis and, while it is relevant to the field of urban design, it does not involve any design exercises, nor does it explicitly contribute to design practice. So, while it is relevant to recognise the work of these designers — because their work

relates to one of the main knowledge areas — it is also important to recognise that there is a clear distinction between the theoretical basis of this thesis and design projects.

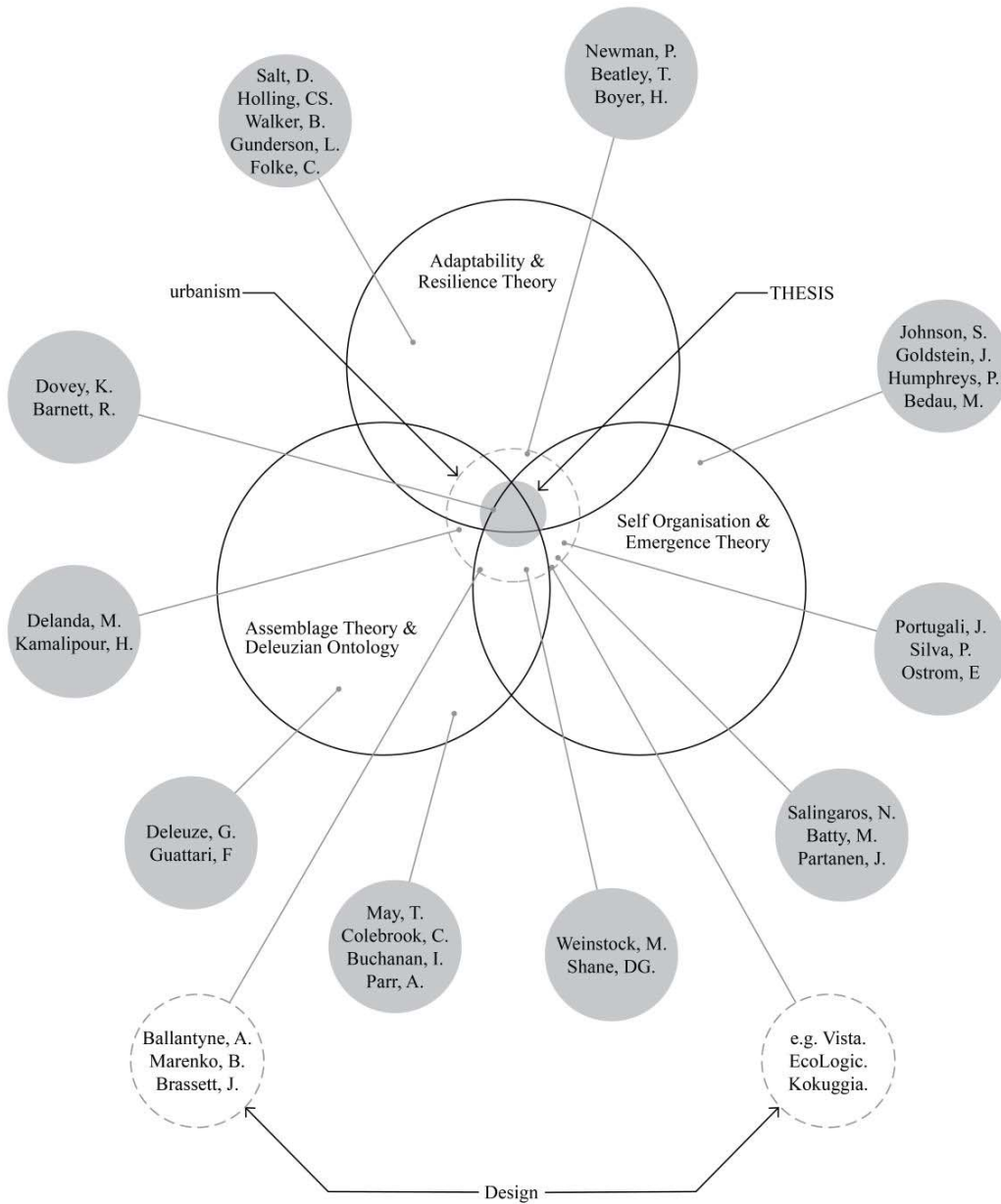


Figure 3: Relationship of key authors/literature to main knowledge areas of thesis.

## 2.2 LITERATURE RELATING TO ASSEMBLAGE THEORY

Deleuze and Guattari established the concepts that underpin assemblage theory, and their work was critical to this thesis, both in terms of providing a philosophical lens and a discrete theory for understanding and describing self-organisation. Given the complexity of Deleuze and Guattari's concepts, they are often understood more succinctly through the interpretation of a range of scholars, including Adrian Parr, Claire Colebrook, Todd May, Hesam Kamalipour, and Ian Buchanan. These authors are frequently referenced in this thesis.

Manuel Delanda is another primary author heavily relied on in this thesis, and is often credited for constructing and advancing assemblage theory.<sup>36</sup> Delanda's philosophical work and teaching spans a wide range of topics, including self-organisation and the dynamics of social-environmental systems.

The work of Deleuze, Guattari, and Delanda, as presented in their own writings and the work of others, substantially contributes to the foundation of this thesis, and the research undertaken applies this knowledge in a specific and novel way — particularly insofar as it applies assemblage theory (and concepts of territorialisation) as a means of analysing self-organisation in social-environmental systems.

It is relevant to note that a number of authors have specifically applied the work of Deleuze and Guattari to design practice. Notable contributions include: Andrew Ballantyne's book, *Deleuze and Guattari for Architects*<sup>37</sup>, and Betti Marenko and Jamie Brassett's book, *Deleuze and Design*<sup>38</sup>. While some of their research has been referenced in this thesis, these works are largely philosophical and relate more to design practice than to the theoretical base of this thesis.

## 2.3 LITERATURE RELATING TO ADAPTABILITY (AND RESILIENCE THEORY)

Literature relating to adaptability and resilience theory provides an important background for this thesis and is expanded upon in Chapter 3. The leaders in this area of research include CS Holling (who is regarded by many as the pioneer of this field), Brian Walker, Bernard Salt, Thomas Elmqvist, Lance Gunderson, and Carl Folke. Other important scholars include Fikret Berkes, Johan Colding, Cornelia Ludwig,

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<sup>36</sup> Delanda, above n 19.

<sup>37</sup> A Ballantyne, *Deleuze and Guattari for Architects* (Psychology Press, 2007).

<sup>38</sup> B Marenko and J Brassett, *Deleuze and Design* (Edinburgh University Press, 2015).

Reinette Biggs, Frances Westley, and Stephen Carpenter. Many of these authors have a strong association with the Resilience Alliance and/or the Stockholm Resilience Centre.

These authors have developed knowledge in the area of resilience theory and adaptability, and much of their research relates to self-organisation, which is seen by most as an important quality of resilient systems. It is this overlap which provides an important background to this thesis and gives rise to concepts such as the adaptive cycle and panarchy, which I employ as a means for analysing self-organisational change. As Garcia points out:

*The area of knowledge is squarely focussed on fields such as ecology and environmental science, and extends to a diverse range of other fields including psychology, business, and agriculture. While fundamental concepts and knowledge can be broadly applied to a wide range of social-ecological systems, there is a relatively limited amount of research at the nexus of resilience theory and urban theory (particularly planning and design).<sup>39</sup>*

Barthel also observes:

*What is largely still missing in social-ecological resilience theory is a treatment of cities and urban areas. This includes the historical lessons that can be drawn from distant urban pasts in regard to sustaining ecosystem services during times of hardship and crisis.<sup>40</sup>*

Another common observation or criticism of resilience theory relates to the abstract nature of some of the concepts, and the need to recognise this when attempting to apply the concepts to observations of complex systems. As Cumming and others state:

*The abstract, multidimensional nature of the concept of resilience makes it difficult to operationalise. It is by no means obvious what leads to resilience in*

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<sup>39</sup> E J Garcia, *The Application of Ecological Resilience to Urban Landscapes* (PhD Thesis, Victoria University of Wellington, 2013) <researcharchive.vuw.ac.nz>.

<sup>40</sup> S Barthel, S Sörlin and J Ljungkvist, 'Innovative Memory and Resilient Cities: Echoes From Ancient Constantinople' in P Sinclair et al (eds), *The Urban Mind: Cultural and Environmental Dynamics* (Department of Archaeology and Ancient History, Uppsala University, 2010) 391



*complex systems, or which variables should be measured in a given study of resilience.*<sup>41</sup>

This is reinforced by others who observe that research on resilience, and that which relates to organisational resilience in particular, is lacking in empirical application and practical utility.<sup>42</sup> These practical limits of the concept are recognised in this research, but as illustrated, the field of research offers a number of concepts which, while abstract, are useful for understanding and describing change and adaptability in social-environmental systems.

As well as the foundational research from the authors identified above, *Navigating Social-Ecological Systems*<sup>43</sup> by Berkes, Colding, and Folke was of particular interest. This book draws on complex systems theory to investigate how societies deal with change and how adaptive capacity can be developed. It cites numerous cases that (among other topics) explore resilience in local systems, social-ecological learning and adaptation, and cross-scale institutional responses to change. Key concepts in this work that are of relevance to this thesis, such as adaptive capacity, adaptive cycles, and feedback processes, have been considered. The book is, however, mainly focussed on non-urban situations.

Of the research on “urban resilience” that does exist, much relates to specific mitigation strategies, such as reducing reliance on fossil fuels and associated policy changes (Newman, Beatley and Boyle<sup>44</sup>), hazard avoidance (Godschalk<sup>45</sup>), or specific recovery case studies (Campanella<sup>46</sup>).

This thesis, whilst it is informed by the above-mentioned research, occupies a more particular niche in the field of urban resilience theory: exploring specifically how self-organisation (as a pillar of adaptability) occurs in social-environmental systems.

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<sup>41</sup> G S Cumming et al, 'An Exploratory Framework for the Empirical Measurement of Resilience' (2005) 8(8) *Ecosystems* 975, p976.

<sup>42</sup> R Bhamra, S Dani and K Burnard, 'Resilience: The Concept, a Literature Review and Future Directions' (2011) 49(18) *International Journal of Production Research* 5375.

<sup>43</sup> F Berkes, J Colding and C Folke, *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change* (Cambridge University Press, 2008).

<sup>44</sup> Newman, Beatley and Boyer, above n 2.

<sup>45</sup> D R Godschalk, 'Urban Hazard Mitigation: Creating Resilient Cities' (2003) 4(3) *Natural Hazards Review* 136.

<sup>46</sup> T J Campanella, 'Urban Resilience and the Recovery of New Orleans' (2006) 72(2) *Journal of the American Planning Association* 141.

## 2.4 LITERATURE RELATING TO SELF-ORGANISATION (AND EMERGENCE THEORY)

As with the works relating to resilience theory and adaptability, this literature provides an important background to this thesis, and is expanded upon in Chapter 3.

Pioneering and foundational research in this field includes the research of Francisco Varela (and his work on autopoiesis from 1974 onwards)<sup>47</sup> Herman Haken (and his work on synergetics from 1977 onwards)<sup>48</sup>, Ilya Prigogine (and his work — alone or with Nikolis and Stengers — on dissipative structures from 1977 onwards)<sup>49</sup>, Manfred Eigen (and his work on chemical hypercycles and catalytic networks from 1977 onwards)<sup>50</sup>, and Peter Allen (and his work on complex systems from 1977 onwards)<sup>51</sup>. More recently, Jeffrey Goldstein<sup>52</sup>, Steven Johnson<sup>53</sup>, Mark Bedau and Paul Humphreys<sup>54</sup>, and Elinor Ostrom<sup>55</sup>, have written expansively on the principles and concepts underpinning emergence theory and self-organisation.

Ostrom substantially advances theory relating to the governing of what she refers to as ‘common pool resources’<sup>56</sup>. Fundamentally, Ostrom advocates for an alternative approach beyond either state control or privatisation of such resources in an effort to address Hardin’s notion of the tragedy of the commons<sup>57</sup>. Based on extensive case studies, Ostrom’s alternative solution envisages a situation whereby beneficiaries of common resources are themselves responsible for developing co-operative strategies. This approach reflects a particular form of self-organisation and is discussed further at Section 3.4 below. Ostrom’s approach also has parallels with the concept of sociocracy, observed in the Narara case study and described at Section 6.1 below.

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<sup>47</sup> F G Varela, H R Maturana and R Uribe, 'Autopoiesis: The Organization of Living Systems, its Characterization and a Model' (1974) 5(4) *Biosystems* 187.

<sup>48</sup> H Haken, 'Synergetics. An Introduction. Nonequilibrium Phase Transitions and Self-Organisation in Physics' (1983) 3 *Chemistry, and Biology* .

<sup>49</sup> I Prigogine and I Stengers, *Order Out of Chaos: Man's New Dialogue with Nature* (Random House, 1984).

<sup>50</sup> M Eigen and P Schuster, 'A Principle of Natural Self-Organization' (1977) 64(11) *Naturwissenschaften* 541.

<sup>51</sup> P M Allen, 'A Complex Systems Approach to Learning in Adaptive Networks' (2001) 5(02) *International Journal of Innovation Management* 149.

<sup>52</sup> J Goldstein, 'Emergence as a Construct: History and Issues' (1999) 1(1) *Journal of Complexity Issues in Organizations and Management*

<sup>53</sup> S Johnson, *Emergence: The Connected Lives of Ants, Brains, Cities, and Software* (Scribner, 2002)

<sup>54</sup> M A Bedau and P E Humphreys, *Emergence: Contemporary readings in philosophy and science* (MIT Press, 2008)

<sup>55</sup> E Ostrom, *Governing the Commons* (Cambridge University Press, 2015)

<sup>56</sup> Ibid55.

<sup>57</sup> G Hardin, 'The Tragedy of the Commons' (1968) 162(3859) *Science* 1243

Regarding urbanism, prominent researchers include John Holland, Christopher Alexander, Jane Jacobs, and Juval Portugali, all of whom advocated for better recognition of self-organisation as a process in city making. Notably, a key assertion of Jacobs' book *The Death and Life of Great American Cities*<sup>58</sup> is that there needs to be a better understanding and appreciation of the complex nature of cities. Jacobs argued that employing more self-organisation in the planning and design of cities enabled urban actors to develop ecologies which best suited their needs and would be more adaptive to the constant change cities undergo. In 1964, Christopher Alexander, in *Notes on the Synthesis of Form*<sup>59</sup>, recognised that cities are inherently imbued with a complexity that defies the traditional top-down, centralist tree-like structure that is so readily recognised, understood and implemented. In 1965, Christopher Alexander wrote *A City is Not a Tree*<sup>60</sup> for American journal *Architecture Forum*. Alexander's paper draws a distinction between the ordering structures of cities, arguing that some, the "natural" cities favoured by societies across the globe, exhibit a complex system with a high degree of overlap forming a "semi-lattice", while the "artificial cities", those allegedly derided by citizens and critics, exhibit less complex "tree" structures. Ultimately, Alexander argued that, to create better cities, urban actors need to draw from the more complex organisational structure of natural cities (cities which have evolved more or less spontaneously with a high degree of self-organisation) instead of the tree structures of artificial cities (those that have been rigidly planned and designed).

Juval Portugali's book *Self-Organization and the City*<sup>61</sup> is an important foundational text for this knowledge area, and for this thesis. Portugali attempts to elaborate on what he sees as the "common ground" between the 'mathematically oriented self-organisation discourse of cities and the hermeneutic social theory of the city'.<sup>62</sup> He achieves this in several ways:

1. by comparing self-organisation and social theory as two general conceptual frameworks;

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<sup>58</sup> M Batty, *Cities and Complexity: Understanding Cities with Cellular Automata, Agent-Based Models, and Fractals* (The MIT Press, 2007).

<sup>59</sup> C Alexander, *Notes on the Synthesis of Form* (Harvard Univ Press, 1964).

<sup>60</sup> W Weaver, 'Science and Complexity' (1948) 36(4) *American scientist* 536.

<sup>61</sup> J Portugali, *Self-Organization and the City* (Springer, 2000).

<sup>62</sup> *Ibid.*

2. by expanding on issues relating to the nature of cities and urbanism, urban revolution, and challenges of current planning approaches;
3. by developing a new modelling approach, which incorporates properties of self-organisation and social theory. This modelling approach is described as FACS: Free Agents in Cellular Space, incorporating an infrastructure cellular automata layer and a superstructure layer describing the spatial behaviours of free agents; and
4. by employing synergetics (from Haken<sup>63</sup>) as a formal mathematical theory and algorithm.

In his approach, Portugali employs both a conceptual-theoretical framework of self-organisation — which this thesis most closely aligns with — and then progresses a formal mathematical approach, including free agent simulations. The latter approach is similarly adopted by Batty<sup>64</sup>, Partanen<sup>65</sup>, Salingeros<sup>66</sup>, and others who tend towards a scientific and quantitative approach to the theory, often adopting metrics and formulae to analyse and predict urban processes, and extending to computer simulations employing space syntax theory, cellular automata modelling, and so on. As Portugali states, there are two main philosophical approaches to the study of cities: one is a more ‘positivist quantitative approach’, the other a more ‘Marxist and humanistic’ approach.<sup>67</sup> Portugali explains that since the 1970s, because of the two approaches, the study of cities and urbanism has been conducted along two separate domains: one quantitative, influenced by exact sciences (and reflective of the above authors), the other qualitative, influenced by social theory and philosophy. The theories of Jane Jacobs<sup>68</sup> are an example of the latter approach. As noted, this thesis aligns most strongly with a qualitative approach, understanding cities as complex adaptive systems (and recognising the relationships between a range of scales), largely because this approach is more applicable and adaptable to an acknowledgement of complexity, systems thinking, self-organisation, and the particular underpinnings of the philosophical ontology being employed.

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<sup>63</sup> Haken, above n 48.

<sup>64</sup> Batty, above n 58.

<sup>65</sup> J Partanen, 'Indicators for Self-Organization Potential in Urban Context' (2015) 42(5) *Environment and Planning B: Planning and Design* 951

<sup>66</sup> N A Salingeros, *Principles of Urban Structure* (Techne Press, 2005)

<sup>67</sup> Portugali, above n 61.

<sup>68</sup> Jacobs, above n 14.

Some scholars are critical of a quantitative approach to emergence theory — Barnett<sup>69</sup>, for example, describes it as inimical to emergence — and there is a clear distinction between the approach adopted by this thesis and the more quantitative approach employed by some of the relevant authors. However, the two approaches are not mutually exclusive, and each undoubtedly enables advancement of the other. Certainly, this thesis does draw on the research of Batty<sup>70</sup>, Partanen<sup>71</sup>, and Salingeros<sup>72</sup>, all of who take quantitative approaches to their research.

Other recent contributions to the self-organisation knowledge area include those from Nikos Salingeros, Jenni Partanen, David Grahame Shane, Michael Wienstock, Rod Barnett, Paulo Silva, and Kim Dovey. These contributions are expanded upon below.

Nikos Salingeros is a mathematician and physicist and was a long-time collaborator with Christopher Alexander. He has written extensively on topics such as pattern languages, urban structure, urban fractals, and urban patterns. His book *Principles of Urban Structure*<sup>73</sup> is a particularly relevant work that attempts to explain how and why cities are successful or not, based on a set of rules relating to scale, distribution, connectivity, and coupling. As with Michael Batty, Salingeros takes a scientific and quantitative approach to these concepts, and makes an attempt to establish an urban science. The work is nonetheless referenced throughout this thesis as it usefully explains and describes concepts of complexity, emergence, and self-organisation in urban systems.

Partanen's work, like Salingeros', includes general theoretical synthesis of self-organisation and emergence, and then applies that theory to a qualitative analytical approach (employing cellular automata modelling, space syntax, and power laws). The former is of some relevance to this thesis. Notably, in her papers *Indicators for Self-Organization Potential in Urban Context*<sup>74</sup> and *Complex Patterns of Self-Organized Neighbourhoods*<sup>75</sup>, Partanen investigates the process of self-organisation and its

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<sup>69</sup> R Barnett, *Emergence in Landscape Architecture* (Routledge, 2013).

<sup>70</sup> Batty, above n 58.

<sup>71</sup> Partanen, above n 65.

<sup>72</sup> Salingeros, above n 66.

<sup>73</sup> Ibid.

<sup>74</sup> Partanen, above n 65.

<sup>75</sup> J Partanen and A Joutsiniemi, 'Complex Patterns of Self-Organized Neighbourhoods' in L Boelens and G de Roo (eds), *Spatial Planning in a Complex Unpredictable World of Change* (Cooperatie In Planning UA, 2016) 242.

relationship to planning and argues that ‘more effort is needed to explore the actual self-organising processes in the city to improve the accuracy of ... planning tools’<sup>76</sup>. She also says that:

*To build planning tools to support positive self-organization for promoting economic viability and avoiding negative development, we first need to know more about the characteristics and interlinkages of physical self-organization mechanisms currently existing in cities.*<sup>77</sup>

Partanen goes on to identify a number of indicators for self-organisation: flows of energy, where she calls up the concept of the rhizome; internal order, which can be seen to relate to concepts of bodies and relationships explored in this thesis; and enrichment, which can be seen to relate to research on phase transitions and bifurcations explored in this thesis. She also explores the idea of cross-scale dynamics, but without explicit reference to the concept of panarchy. While she recognises the difficulty in understanding spatial interactions between activities and parcels of land uses, she approaches this challenge through quantitative analysis and simulation. There are therefore parallels between the theoretical aspect of Partanen’s research and this thesis. Hers is ultimately a more quantitative approach, although it is not in any way at odds with the approach of this thesis.

In *Urban Design Since 1945*<sup>78</sup>, David Grahame Shane highlights the decentralised, fragmented, and dynamic nature of the contemporary city. In this book and in his previous book, *Recombinant Urbanism*<sup>79</sup>, Shane explores the evolution of the role of urban actors in these contemporary urban ecologies. One of his fundamental observations is the shift in the significance of individual urban actors in the organisation and change of contemporary cities. He states that, in contemporary cities, multiple actors attend to the development of the individual fragments and agendas of the city, with little co-ordination with other actors and fragments. He reiterates that city change is no longer from a centralised authority or master plan, ‘only the actions of individual elements whose coordination results from the remorseless processes of competition and adaptation.’<sup>80</sup> Shane goes on to observe how the emergent influences

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<sup>76</sup> Partanen, above n, p3; 59.

<sup>77</sup> Partanen and Joutsiniemi, above n, p243; 74.

<sup>78</sup> D G Shane, *Urban design since 1945: a global perspective* (Wiley, 2011).

<sup>79</sup> D.G. Shane, *Recombinant urbanism: conceptual modeling in architecture, urban design, and city theory* (Academy Press, 2005).

<sup>80</sup> Ibid.

of numerous urban actors now define the contemporary city and are an inevitability in the complex and necessarily adaptive contemporary urban environments.

In *Recombinant Urbanism*<sup>81</sup>, Shane references Deleuze and assemblage theory, particularly the concept of rhizomatic assemblages. According to Shane, with rhizomatic assemblage, ‘there is still no emphasis on a single centre or command position, still no place of total control. Instead there are multiple narratives that thread through the city, intersecting and bypassing each other as the case may be.’<sup>82</sup> He continues, ‘rhizomatic assemblage mixes the concept of the narrative path of the individual with the networked or shared information of the group, forming a group consciousness from the collective experiences of individuals in communication with each other.’<sup>83</sup> While Shane did point to “rhizomatic assemblage” as a means for dealing with what he saw as a new (complex and emergent) urban condition, he did not go further to unpack the wider assemblage theory and its offerings.

Michael Weinstock’s book *The Architecture of Emergence*<sup>84</sup> provides an expansive historical overview of complexity and emergence at a range of scales, from cosmic occurrences, to climate, to geology, biography, and cultural evolution. In simple terms, the book provides an historical explanation of how urban forms and systems (including civilisation) came to be, with a focus on complexity and emergence. It is an intriguing account and provides an interesting background to the research of this thesis, but it explores the concepts of emergence and self-organisation (and to a lesser extent, adaptability) at much greater scales than is being explored in this thesis. As an example, his historical overview of the process of territorialisation (noting that Weinstock does not reference Deleuzean terms) considers the evolution of habitation from pit homes to modern cities — it is not a specific local scale exploration as undertaken in this thesis.

Rod Barnett’s research provides a comprehensive overview of emergence theory and self-organisation, particularly as it relates to urban design and landscape architecture. I have heavily relied on his book *Emergence*<sup>85</sup> in the development of this thesis. Barnett provides a comprehensive overview of emergence theory and practice,

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<sup>81</sup> Ibid, p10.

<sup>82</sup> Ibid, p147.

<sup>83</sup> Ibid, p147.

<sup>84</sup> M Weinstock, *The Architecture of Emergence: The Evolution of Form in Nature and Civilisation* (Wiley, 2010).

<sup>85</sup> Barnett, above n 69.



and sets out a new approach to urban design and landscape architecture based on complex systems thinking and emergence theory, as well as a range of philosophies, particularly that of Deleuze and Guattari. His book identifies nine key concepts, which he refers to as ‘guides to emergence’ — including assemblages and morphogenesis. Unlike many others in this field, Barnett makes the connection between emergence and self-organisation to assemblage theory and to adaptability and resilience theory, even recognising the importance of understanding cross-scalar change:

*The relationship between an assemblage and its components is nonlinear. Assemblages are formed and affected by the populations and elements of lower-level assemblages, but may also act back upon these components, causing adaptive strategies to occur.*<sup>86</sup>

Barnett’s research does not extend to the specific application of assemblage theory to analysis of self-organisation, although he does make some steps in that direction (particularly in relation to territorialisation) with his section on morphogenesis. Here he says:

*Self-organizing tendencies and interactive affordances need to be discovered, and the relationships between these processes and spatial orders revealed. Of special significance are the relationships between people and the dynamic conditions that they create and inhabit. Close observation of behaviour is necessary.*<sup>87</sup>

Silva’s research deals with similar issues and contexts as this research, investigating notions of ‘co-evolution’ in the context of informal settlements<sup>88</sup>, where he observes informal and formal systems benefitting from their interaction with one another. Silva and Farrall describes co-evolution as a particular form of evolution where ‘two or more overlapping hierarchies are linked in such a way that each affects the evolutionary path of the other’.<sup>89</sup>

Importantly co-evolution is not necessarily a process of self-organisational change, but is a consequence change (which may or may not be self-organised). Silva’s

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<sup>86</sup> Ibid, p62.

<sup>87</sup> Ibid, p74.

<sup>88</sup> P Silva, 'Designing Urban Rules from Emergent Patterns: Co-evolving paths of informal and formal urban systems-the case of Portugal' (Paper presented at the IOP Conference Series: Earth and Environmental Science, 2018).

<sup>89</sup> P Silva and H Farrall, 'Lessons from Informal Settlements: a ‘peripheral’ problem with self-organising solutions' (2016) 87(3) *Town Planning Review* 297, p5.



research is focussed on the co-evolution of planning institutions and informal settlements, but makes clear that it is an intentional and directed process, rather than a process of self-organisation. Relevantly though, co-evolved outcomes are observed in the case studies explored at Chapter 5, particularly in the case of Vauban.

While Silva goes on to observe that such interactions can potentially realise a type of co-dependent adaptation, it is focussed more on institutional relationships (particularly planning institutions) than with the notion of self-organised territorialisation that is the focus of this thesis. He, along with Farrall<sup>90</sup>, does however discuss the significance of a number of key concepts (including feedbacks and local rules) explored further in Section 3.6 below.

Kim Dovey's research spans a range of topics, but includes a significant contribution to research on informal settlements and urban design, which is specifically backgrounded by his application of aspects of emergence theory, assemblage theory and resilience theory. He argues:

*If we are to take the notion of place-as-assemblage seriously then we need to know a lot more about how places work and how they are transformed. This is the yawning gap in so much of the research applying Deleuzean theory to built form — the actual mechanisms that operate at different scales of room, building, neighbourhood, landscape, city and nation.*<sup>91</sup>

Dovey's chapter, 'Incremental Urbanism: The Emergence of Informal Settlements'<sup>92</sup> in *Emergent Urbanism*<sup>93</sup> is a notable example of such research — it calls for a rethinking of informal urbanism (which Dovey sometimes describes as incremental urbanism) and introduces basic concepts of resilience theory, emergence theory, and assemblage theory as a way of understanding and working with informal settlements. He states:

*This... suggests a rethinking, urban design and planning in terms of theories of emergence, self-organization and assemblage. Traditional forms of urban theory and practice — focused on formal regulation and top-down plans — have*

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<sup>90</sup> Ibid

<sup>91</sup> Dovey, above n, p29; 21.

<sup>92</sup> K Dovey, 'Incremental Urbanism: the Emergence of Informal Settlements' in T Haas and K Olsson (eds), *Emergent Urbanism: Urban Planning & Design in Times of Structural and Systemic Change* (Ashgate, 2016) 45.

<sup>93</sup> T Haas and K Olsson, *Emergent Urbanism: Urban Planning & Design in Times of Structural and Systemic Change* (Routledge, 2016).

*proven poorly equipped to cope with the dynamism, complexity and resilience of informal urbanism. In terms of research this requires an analysis of where such settlements emerge and why; and understanding of the morphology and dynamics of how such settlements work — the spatial patterns, constructions systems, increments of change and informal codes.*<sup>94</sup>

In his article on *Informal Urbanism and Resilient Assemblages*, Dovey again intersects assemblage theory with resilience theory and self-organisation, explaining ‘I want to suggest that assemblage theory can be usefully linked to the cluster of theories on complex adaptive systems and resilience’.<sup>95</sup>

The parallels between Dovey’s research and this thesis are clear, and this thesis constitutes an extension of the research foundation that Dovey has constructed. This thesis continues the integration of emergence, resilience, and assemblage theories in order to better understand how self-organisation occurs in urban systems. It attempts to do so in a more specific way, particularly through the adoption of Deleuzian concepts as a means of describing and analysing change. This thesis also differs from Dovey’s research in that the analysis is not limited to informal urban conditions, but considers other urban communities which demonstrate clear self-organisation.

Hesam Kamalipour<sup>96</sup>, a PhD candidate at the University of Melbourne has, like Dovey, written extensively on informal settlements and the need to understand the complex dynamic nature of such settlements. He also employed assemblage theory as a means of understanding and describing these settlements. While there are parallels between his work and the research in this thesis, there are notable differences. Specifically, his work focusses on the morphology of informal settlements (considering issues such as density, access, functional mix, and interfaces). He does not directly employ assemblage theory (and key Deleuzian concepts) to analyse informal settlements, or other self-organising communities.

It is also relevant here to make brief mention of Actor Network Theory (ANT), if only to discount its relationship to this thesis. ANT was pioneered by Bruno Latour<sup>97</sup>

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<sup>94</sup> Dovey, above n, p45; 92.

<sup>95</sup> K Dovey, 'Informal Urbanism as Resilient Assemblages', p6;

<sup>96</sup> H Kamalipour and N Peimani, 'Assemblage Thinking and the City: Implications for Urban Studies' (2015) 3(04) *Current Urban Studies* 402; H Kamalipour, 'Urban Morphologies in Informal Settlements' (2016) *Contour, Agency/Agents of Urbanity* .

<sup>97</sup> B Latour, 'On Actor-Network Theory: A Few Clarifications' (1996) *Soziale welt* 369; B Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford University Press, 2005).

and expanded by others such as John Law<sup>98</sup> and it effectively offers a method for understanding how social networks are established and changed amongst human and non-human entities. As Müller and Schurr point out:

*The similarities between assemblage thinking and ANT are striking. Both have a relational view of the world, in which action results from linking together initially disparate elements. Both emphasise emergence, where the whole is more than the sum of its parts. Both have a topological view of space, in which distance is a function of the intensity of a relation. And both underscore the importance of the socio-material ...*<sup>99</sup>

However, the reason that ANT does not form part of this thesis is that it is often criticised for not being able to adequately deal with concepts of flux and change<sup>100</sup>, does not adequately account for unexpected change<sup>101</sup>, and does not adequately recognise the concept of the virtual<sup>102</sup>. Furthermore, as Muller and Schurr note, assemblage theory offers more of a philosophical perspective instead of an empirical toolbox, while empirical work is at the core of ANT.<sup>103</sup>

It is also relevant to mention that there is extensive research on informal settlements, such as Davis<sup>104</sup>, Neuwirth<sup>105</sup>, and UN Habitat – State of the World Cities Annual Reports<sup>106</sup>. Notably, most of these are observational rather than analytical and do not reference assemblage theory or resilience theory.

## 2.5 RELATED DESIGN PRACTICE AND RESEARCH

As well as the academic work outlined above, which is expanded upon further in Chapter 3, it is worth recognising that assemblage theory and self-organisation have been occasionally employed or recognised in various design approaches and design projects. Barnett<sup>107</sup> provides a comprehensive overview of where and how self-

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<sup>98</sup> J Law, 'After ANT: Complexity, Naming and Topology' (1999) 47(1\_suppl) *The Sociological Review* 1.

<sup>99</sup> M Müller and C Schurr, 'Assemblage Thinking and Actor-Network Theory: Conjunctions, Disjunctions, Cross-Fertilisations' (2016) 41(3) *Transactions of the Institute of British Geographers* 217, p217.

<sup>100</sup> G Harman, *Prince of Networks - Bruno Latour and Metaphysics* (re.press and Harman, G, 2009).

<sup>101</sup> N Thrift, 'Afterwords' (2000) 18(2) *Environment and Planning D: Society and Space* 213

<sup>102</sup> Müller and Schurr, above n 99.

<sup>103</sup> Ibid.

<sup>104</sup> M Davis, *Planet of Slums* (Verso, 2006).

<sup>105</sup> R Neuwirth, *Shadow Cities: A Billion Squatters, a New Urban World* (Routledge, 2016).

<sup>106</sup> For example: UN-Habitat, 'State of the world's cities 2010/2011: Bridging the urban divide' (1849711763, Earthscan/James & James, 2010)

<sup>107</sup> Barnett, above n 69.

organisation or emergence theory has been adopted in design theory. In terms of design practice, Barnett explains that, by the 1990s, open systems theory (which includes principles of emergence) was being applied to cities. He says:

*Chaos theory (the popular term for nonlinear dynamical theory) developed into a tool for devising new strategies in urban development when it was found that urban systems, too, are open-ended and unpredictable ... High-profile practitioners like Allen, Corner and Koolhaas drew explicitly on the work of scientists and science popularizers such as Capra and Gleick to develop urban landscape design strategies that took account of the unpredictable and open-ended character of urban systems, and used it to generate design proposals that were time-based and adaptive.*<sup>108</sup>

It is worth noting that, in discussing his concepts, Barnett acknowledges the difficulties of applying emergence theory to practice, and the tendency for its application to be metaphorical, rather than instrumental. This is apparent in many design projects which reference emergence and self-organisation, as it is with those that reference assemblage theory. For example:

- Koolhaas and Mau's Downsvew Park
- Atelier Christian Portzamparc's Le Grand Paris scheme
- Toyo Ito's Buona Vista Masterplan
- Coop Himmelblau's competition entry for Melun Senart, and
- Zaha Hadid's Peak Project in Hong Kong.

More are identified in Chapter 4 of Barnett's book *Emergence*.<sup>109</sup>

There are some practices that have taken these ideas beyond the metaphor or the abstract in their design projects. Of note are:

- Kokkugia, whose Swarm Urbanism project (for the Melbourne Docklands) explores the potential of computer simulation for modelling swarm intelligence and rhizomic forms.

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<sup>108</sup> Ibid, p38.

<sup>109</sup> Ibid.

- Vista, whose work on remediation of the Volgermeer Polder in Amsterdam aimed to demonstrate how to establish conditions for emergence in a complex landscape.
- EcoLogic Studio who have developed a manifesto for emergent design (which they call Systemic Architecture) and who have developed a number of abstract design projects.

While these design exercises are of interest, they are not directly relevant to the scope of this thesis. They are not exercises in conceptual analysis and do not apply the same extent of theoretical or philosophical content. For example, there is no accounting for panarchical interactions, decision making, or responses to coding.



# Chapter 3: THEORETICAL DEVELOPMENT OF THE LITERATURE

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## 3.1 OVERVIEW

This chapter synthesises resilience theory (particularly in relation to adaptability); complex systems theory (particularly in relation to self-organisation); and assemblage theory (as well as related parts of Deleuze's corpus). Deleuze regards theory as a relay between one practical field and another in order to overcome barriers.<sup>110</sup> It is in this sense that assemblage theory is employed in this chapter — as a means of traversing and bringing together the fields of adaptability and self-organisation.

Because this thesis is fundamentally dealing with concepts of change and complexity, Deleuze's ontology is employed as a philosophical lens to help tie together these ideas under a single conceptual framework and to provide a unified vocabulary by which to understand and describe self-organisational change in social-environmental systems. Deleuze's ontology includes a description of territorialisation, which is a concept of fundamental relevance to community building and city-making professions, and is the focus of this thesis.

Following an expansion of the philosophical lens and an overview of assemblage theory, this section seeks to address three of the five key research questions identified in Section 1.2.1 above:

1. How does self-organisation relate to adaptability generally?
2. How does self-organised change occur in complex social-environmental systems such as communities?
3. What are the factors that affect self-organised change in complex social-environmental systems such as communities?

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<sup>110</sup> B Baugh, 'Theory' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 276.

## 3.2 THE PHILOSOPHICAL LENS

As explained above, this research employs a particular philosophical lens to assist with understanding and describing the notions of relationships and change in dynamic, self-organising social-environmental systems. The lens draws on the philosophy and ontology of Gilles Deleuze and his collaborator Felix Guattari, particularly as it relates to assemblage theory — a theoretical base that has been more specifically adapted and described by contemporary philosopher Manuel Delanda.

Through his ontology of difference, Deleuze conceives of the world as a constantly becoming set of relations and an unfolding of immanence, where the inertia comes from within, as opposed to from transcendent (external) forces. Deleuze’s theories relating to assemblages in particular provide a framework by which to understand, describe, and work with complex systems, and particularly change in complex systems. As Levin, and Biggs, Schlüter, and Schoon explain, common attempts to analyse and model the behaviour of such complex, dynamic systems with simple, linear and reductionist approaches gives a misleading indication of how these systems work.<sup>111</sup> They observe that interactions within social-environmental systems cause non-linear dynamics, multiple stability landscapes, and unexpected, rapid change. Critical, then, to understanding the theories explored in this thesis is an ontological approach (such as Deleuze’s) that allows for notions of complexity, change, and unpredictability. As Dovey observes, Deleuzian theory has the potential to encompass the complexities of place and provides ‘a useful framework for the understanding of place and practices or urban transformation’.<sup>112</sup>

Deleuze is one of a number of French post-structuralist philosophers (including Michel Foucault and Jacques Derrida) who challenged the structure and forces that produce conformity in the way we think and therefore act.<sup>113</sup> These philosophers developed new responses to address the fundamental question of “how one might live”. However, as May points out, each has taken a different approach to addressing this question.<sup>114</sup> Foucault’s approach to the question is historical, whilst Derrida’s is more linguistic, but both share a common view about the constraints our world has

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<sup>111</sup> S A Levin, *Fragile Dominion* (Perseus Books Group, 1999); R Biggs, M Schlüter and M L Schoon, *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems* (Cambridge University Press, 2015).

<sup>112</sup> K Dovey, *Becoming Places: Urbanism/Architecture/Identity/Power* (Routledge, 2010), p13; 385.

<sup>113</sup> T May, *Gilles Deleuze: an Introduction* (Cambridge University Press, 2005).

<sup>114</sup> *Ibid.*



placed on us. Unlike Deleuze, both Foucault and Derrida reject ontology (the study of being), to varying degrees. Deleuze, by contrast, approaches the question of how one might live by embracing ontology. May argues that ‘while Foucault and Derrida find ontology to be a threat to asking how one might live, Deleuze finds ontology to be the very route one must take in order to ask about it adequately’.<sup>115</sup>

*By embracing ontology as the study of what there is Deleuze does not only go against the anti-ontological trend of much of twentieth-century philosophy. His work also cuts against the grain of those who have approached the question of how one might live. For Deleuze's predecessors and contemporaries, breathing life into that question requires abandoning what had been considered ontologically necessary, eliminating the search for entities that constrain us to asking questions less radical than that of how one might live.*<sup>116</sup>

Quoting Deleuze, May goes on to say that ‘we begin ontology when we abandon the search for conceptual stability and begin to see what there is in terms of difference rather than identity’.<sup>117</sup> This concept of difference is fundamental to Deleuze’s ontology: ‘difference is behind everything, but behind difference there is nothing’.<sup>118</sup> As Roffe explains:

*Rather than seeing difference as a difference between two things, difference must be thought of as the continual movement of self-differing, like the continual variation of a sound rising and lowering in pitch without stopping at notes in a scale. In other words, difference is continuous variation.*<sup>119</sup>

According to May, Deleuze’s exploration of how one might live, and of living more particularly, is based on this notion of difference and its actualisation. It is an ontology of difference. It is concerned with understanding the world as relationships, and more particularly through the concept of *difference*: intuiting life as difference, not as something that then changes and differs, but as the power to differ.<sup>120</sup> As Colebrook observes, by following such an approach it becomes clear that ‘life ... is

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<sup>115</sup> Ibid, p15.

<sup>116</sup> Ibid.

<sup>117</sup> Ibid.

<sup>118</sup> G Deleuze, *Difference and Repetition* (Columbia University Press, 1994).

<sup>119</sup> J Roffe, 'Variation' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 295, p296.

<sup>120</sup> C Colebrook, *Deleuze: A Guide for the Perplexed* (Continuum Intl Pub Group, 2006).

not a being that then evolves or differs, but is the potential to differ, a potential that is actualised in connections and relations among powers'.<sup>121</sup>

Of particular relevance to this thesis, Lorraine states:

*Throughout A Thousand Plateaus, Deleuze and collaborator Felix Guattari develop a vocabulary that emphasises how things connect rather than how they “are”. They understand things not as substances, but as assemblages or multiplicities, focusing on things in terms of unfolding forces — bodies and their powers to affect and be affected rather than static essences.*<sup>122</sup>

Fundamental to Deleuze's ontology of difference is a philosophy of immanence. As May says 'immanence is the first requirement of an ontology of difference'.<sup>123</sup> He notes that for Deleuze, 'difference is not a thing, it is a process. It unfolds — or better, it is an unfolding'.<sup>124</sup> The unfolding is a process of immanence — where the inertia comes from within — as opposed to one of transcendence, or one that is externally understood or directed. We see here a strong link to the notion of self-organisational change, as opposed to transcendental/hierarchical change. As explained further below, the particular type of unfolding that is of relevance to this thesis is a process of territorialisation, or an unfolding of social-spatial difference.

Stagoll states that, in addition to the concept of “difference”, the concept of “becoming” is one of the cornerstones of Deleuze's corpus.<sup>125</sup> Deleuze uses the term “becoming” to describe the continual production of difference, the perpetual emergence and evolution of relationships that ultimately constitute events. Stagoll stresses that becoming is not a phase between states or a range of states through which something might pass as it undergoes change. 'Rather than a product, final or interim, becoming is the very dynamism of change, situated between heterogeneous terms and tending towards no particular goal or end-state'.<sup>126</sup>

These notions — of constant becoming, of continual self-differing, of unfolding, of immanence rather than transcendence, of expression rather than substantial differentiation — obviously provide a strong grounding for understanding self-

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<sup>121</sup> Ibid, p6.

<sup>122</sup> Lorraine, above n, p174; 20.

<sup>123</sup> May, above n, p27; 113.

<sup>124</sup> Ibid, p24.

<sup>125</sup> C Stagoll, 'Becoming' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, 2005) 21.

<sup>126</sup> Ibid, p21.

organisational change in complex systems. By approaching cities or communities as assemblages, rather than objects, we are able to better focus on the change and becoming of those assemblages, and to understand the bodies, territories, and relationships that affect change. We can then look more closely at immanence in those assemblages — the differing and becoming occurring within the particular social-environmental systems.

### 3.3 ASSEMBLAGE THEORY

#### 3.3.1 Overview

Deleuze and Guattari build on this ontology of becoming and difference to provide a concept (or set of concepts) for describing the parts and relationships that become and differ. Specifically, their concept of assemblage deals with the part-to-whole relationship of groups, where assemblages are a collection of parts which do not have properties recognisable in the whole.<sup>127</sup> To qualify as an assemblage the parts need to interact with one another in such a way as to yield a whole which has properties of its own, properties which are irreducible to the parts.<sup>128</sup> As explained below, this is the essence of self-organising systems. Put more crudely, an assemblage is an identifiable, albeit dynamic, emergent whole formed only by an interaction of constituent parts, but which cannot be reduced in terms of its parts.

It is relevant to note that the term Deleuze and Guattari use when describing assemblages is *agencement*, which refers to an idea of “putting together” or a “process of arranging”. Accordingly, assemblage theory accommodates the notions of dynamics and heterogeneity and, being underpinned by Deleuze’s philosophy of constant becoming, provides a fecund theoretical grounding for understanding and working with complex dynamic systems.

By way of example, Dovey describes the street as an assemblage:

*A street is not a thing nor is it just a collection of discrete things. The buildings, trees, cars, sidewalks, goods, people, signs, etc. all come together to become the street, but it is the connections between them that are crucial — the relations of*

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<sup>127</sup> G Deleuze and F Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (B Massumi trans, University Of Minnesota Press, 1987).

<sup>128</sup> Delanda, above n 19.

*buildings to sidewalk to roadway; the flows of traffic, people and goods; the interconnections of public to private space, and of the street to the city.*<sup>129</sup>

Delanda also provides a useful set of examples of assemblages:

*Interpersonal networks and institutional organizations are assemblages of people; social justice movements are assemblages of several networked communities; central governments are assemblages of several organizations; cities are assemblages of people, networks, organizations, as well as of a variety of infrastructural components, from buildings and streets to conduits for matter and energy flows; nation states are assemblages of cities, the geographical regions organized by cities, and the provinces that several such regions form.*<sup>130</sup>

Assemblage theory provides a set of concepts to understand change (becoming) in complex systems, and offers a relay between various fields (related to adaptability and self-organisation). Venn states:

*[Assemblage theory] focuses on process and on the dynamic character of the inter-relationships between the heterogeneous elements of the phenomenon. It recognizes both structuring and indeterminate effects: that is, both flow and turbulence, produced in the interaction of open systems. It points to complex becoming and multiple determinations. It is sensitive to time and temporality in the emergence and mutation of the phenomenon.*<sup>131</sup>

The relevance of this approach (to understanding cities) is identified by Delanda:

*Today we know that neither nature nor cities are in harmony, that is, in a static state of equilibrium. Both natural and social structures emerge in a complex dynamic process, which may involve changes from one stable state to another, from a steady stable state to a cyclic stable state, to a more chaotic stable state. Cities are unstable eco-systems far from equilibrium.*<sup>132</sup>

Further, because the notion of an assemblage deals with a part-to-whole relationship, where the whole is more than the sum of its parts and is irreducible to its parts, assemblages are, almost by definition, an emergent outcome<sup>133</sup> and emergence

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<sup>129</sup> Dovey, above n, p16; 112.

<sup>130</sup> Delanda, above n, p33; 128.

<sup>131</sup> Ibid, p18.

<sup>132</sup> Delanda, above n, p102; 13.

<sup>133</sup> Barnett, above n, p62; 69.

is strongly tied to self-organisation. Indeed, Barnett identifies assemblages as one of his key concepts for working with emergent processes.<sup>134</sup> Delanda also draws the connection between emergence and assemblage theory, suggesting that assemblage theory can help identify the mechanisms of emergence and more particularly, the linkages between the micro and the macro scales of emergence.<sup>135</sup> This acknowledgement starts to reveal the potential of Deleuzian philosophy to offer ways of dealing with emergence and self-organisation, and thus of dealing with complex systems.

In addition to the concept of assemblage, Deleuze's corpus provides a wide range of concepts that offer unique and powerful ways of understanding, expressing and adapting notions of immanent change and complexity. This is because Deleuze's ontology is one that is based on the generation of positive difference; on the perpetual becoming of entities that are different from what has gone before; on expression and unfolding of concepts; on a rejection of interiority or the notion that things exist independently; on a recognition of milieu of exteriority; on the ceaseless interaction of natural and biological forces which never terminate or find equilibrium; and on the constantly changing and differentiating relationships and flows between bodies. These fundamental concepts of difference and becoming are supported, and understood through a framework of concepts that explain how things are and how they change. Many of these concepts are employed throughout this thesis.

Whilst this thesis can only afford to formulate a narrow application and interpretation of these concepts, they are (combined or independently) extraordinarily potent means of understanding the essence of social-environmental assemblages (such as communities), and of understanding how assemblages change. Despite this apparent value, the actual application of assemblage theory to urban studies (in theory or in practice) is limited. It is expected that this is due to the relatively complex and somewhat abstruse nature of the theory.

The next section unpacks assemblage theory and introduces one of the key concepts describing how assemblages change: territorialisation.

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<sup>134</sup> Ibid, p62.

<sup>135</sup> G E Marcus and E Saka, 'Assemblage' (2006) 23(2-3) *Theory, Culture & Society* 101, p103.

### 3.3.2 Qualities of Assemblages

An assemblage is an identifiable, albeit dynamic, emergent whole formed only by an interaction of constituent parts, but which cannot be reduced in terms of its parts.

As Dovey says:

*An assemblage is a whole that emerges from the interconnectivity and flows between parts ... Assemblage is fundamentally dynamic and productive, a dynamism based primarily in horizontal networks of connectivity ... yet also stabilised by hierarchical territories ... it is fundamentally social-spatial with the spatial and social parts mutually constituting each other.*<sup>136</sup>

We see here the relevance of assemblage theory to understanding self-organisation, and for understanding change in social-environmental systems.

Importantly, an assemblage is not a set of predetermined parts, nor is it a random collection of things. They are:

*Complex constellations of objects, bodies, expressions, qualities, and territories that come together for varying periods of time to ideally create new ways of functioning ... An assemblage transpires as a set of forces coalesces together, the concept of assemblages applies to all structures, from the behaviour patterns of an individual, the organisation of institutions, an arrangement of spaces, to the functioning of ecologies.*<sup>137</sup>

All these “structures” are relevant to understanding social-environmental systems. This thesis is particularly interested in the organisation of institutions and the arrangement of spaces.

Relating the concept of assemblages to social-environmental systems, such as urban communities, McFarlane observes:

*As a conception of urbanism, urban assemblages are not simply a spatial category, output, or resultant formation, but signify doing, performance, and events. There is no necessary spatial template for assemblage; the spatiality of assemblage is that of sociomaterial alignment, which brings into view a range of spatial forms, from those generated by historical processes of capital*

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<sup>136</sup> Dovey, above n, p49; 23.

<sup>137</sup> G. Livesey, 'Assemblage' in A. Parr (ed), *The Deleuze Dictionary Revised Edition* (Edinburgh University Press, Revised ed, 2010) 18, p18.

*accumulation and social polarisation to random juxtapositions and disruptive events and predictable daily and nightly rhythms of activity, atmosphere, and sociability.*<sup>138</sup>

The assemblages that are studied in this thesis (communities or social-environmental systems) are sociomaterial assemblages insofar as they comprise, and are defined by people (or urban actors) and the urban environments (territories) they inhabit.

Delanda makes an important point about the effect that assemblages can have on the individuals that form them:

*... although a whole emerges from the interactions among its parts, once it comes into existence it can affect those parts ... to give a complete explanation of a social process taking place at a given scale, we need to elucidate not only micro-macro mechanisms, those behind the emergence of the whole, but also the macro-micro mechanisms through which a whole provides its component parts with constraints and resources, placing limitations on what they can do while enabling novel performances.*<sup>139</sup>

This concept of cross-scale relationships relates closely to concepts of downward causation and panarchy, which are expanded on in Sections 4.3 and 4.4 below.

Also critical is the notion that emergent outcomes are decomposable, meaning that the parts of an assemblage come together and may have autonomy, but they can then be decomposed — they are not fused and retain their identity. This counters the notion that emergent outcomes, once realised, comprise the “fusing” of the parts into the whole. Delanda says that this was Hegel’s opinion in *The Science of Logic*<sup>140</sup>. Hegel insisted that the parts of the whole are fused into a “seamless totality”, so that all that then remains is the whole itself, and the component parts no longer exist (they are only parts of the whole). This runs counter to practical observations of communities, wherein individuals come together (to form an assemblage) but then can leave the assemblage, and when doing so, retain their identity.

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<sup>138</sup> C McFarlane, 'The City as Assemblage: Dwelling and Urban Space' (2011) 29(4) *Environment and Planning D: Society and Space* 649, p655.

<sup>139</sup> Delanda, above n, p33; 128.

<sup>140</sup> G W F Hegel, *The Science of Logic* (Cambridge University Press, 2010).

Importantly, the difference between assemblages and totalities involves the types of relationships that exist between the parts. There are two possibilities: relationships of interiority and relationships of exteriority. As Delanda observes:

*Unlike wholes in which parts are linked by relations of interiority (that is, relations which constitute the very identity of the parts) assemblages are made up of parts which are self-subsistent and articulated by relations of exteriority, so that a part may be detached and made a component of another assemblage.*<sup>141</sup>

Relationships of interiority are relations that constitute the terms of their relationship by the very fact that they are related. For example, when two things are related by interiority relations they do not have an independent existence. Their identity is defined by their relations. This is why they can be fused into a seamless totality but they cannot be taken apart. So a totality is reducible, but not decomposable. Relationships of exteriority are relationships where parts interact but retain their own identity in those interactions, so they can be detached from an assemblage and then form another assemblage — a critical quality of an adaptable system, and a necessity of self-organisation.

Another important aspect of assemblages is their “segmentarity”. Segments are the components or parts that define an assemblage. Delanda explains that assemblages are composed of material and expressive segments (components).<sup>142</sup> Material segments are those components which comprise the materiality of the assemblage — for example, the buildings of a neighbourhood. Expressive segments refer to the expression of the assemblage — for example, the identity of a neighbourhood.

As Deleuze and Guattari point out, ‘the human being is a segmentary animal ... dwelling, getting around, working, playing: life is spatially and socially segmented’.<sup>143</sup> Delanda observes that for Deleuze, everything begins as a Body Without Organs — smooth and unsegmented.<sup>144</sup> It is then defined by intensities that acquire segmentation and through the actualisation of virtual structures. For illustration, consider, a biological cell that can become anything, but through segmentation develops into something specific, such as an eye or finger.

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<sup>141</sup> Delanda, above n, p5; 128.

<sup>142</sup> Ibid; 128.

<sup>143</sup> Deleuze and Guattari, above n, p208; 131.

<sup>144</sup> Delanda, above n 128.



The concept of segmentarity is important for understanding the concept of assemblages and how they are territorialised. As Dovey argues, ‘one of the key issues for an understanding of place as assemblage focuses on the issue of how boundaries are used to inscribe territories, which Deleuze and Guattari call segmentarity’.<sup>145</sup> Message notes that segmentation is a fundamental structuring principle that contributes to organising the individual and social life of all humans.<sup>146</sup> Dovey goes on to explain that rigid segmentarities are those relating to the state, where systems are organised in a hierarchical structure of concentric segments, such as house/city/nation.<sup>147</sup> Supple segmentarities, in contrast, involve a fluidity of lateral connections. ‘The supple segmentarity is based on the power of networks and a fundamental distinction between tree-like and rhizomatic structures and practices’.<sup>148</sup> We see here parallels with the concept of adaptability and the adaptive cycle (discussed further below).

Deleuze and Guattari contrast primitive and molecular segmented systems, which exist without dedicated political institutions, against more molar and rigid systems such as modern political states. As Message explains, ‘considerable manoeuvrability and communicability are maintained between the differentiated, heterogeneous fields of these [primitive] societies, primarily because of the segmented relationship that each of these fields or units shares with the other.’<sup>149</sup> The primitive segmented systems operate according to discrete, localised forms of management and polyvocal codes that emerge as a result of various relationships and overlapping territories. Message observes, ‘communication, codification and territorialisation occur in these societies via a process of shifting relationships and intersections, rather than any centrally organising power’.<sup>150</sup> Here we start to uncover the qualities of self-organised assemblages and the causes and variables that affect their self-organisational capacity.

### 3.3.3 Dimensions of Assemblages

As well as understanding how assemblages are defined, this thesis is interested in how they change. Deleuze and Guattari identify two dimensions which describe

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<sup>145</sup> Dovey, above n, p18; 385.

<sup>146</sup> K Message, ‘Segmentarity’ in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 240.

<sup>147</sup> Dovey, above n 385.

<sup>148</sup> Ibid, p20.

<sup>149</sup> Message, above n, p241; 146.

<sup>150</sup> Ibid, p241.

assemblages — the first defines the roles of entities in an assemblage, the second describes how assemblages change, and refers to the processes of territorialisation/deterritorialisation/reterritorialisation ('territorialisation' in this thesis).

Describing the first dimension, Deleuze and Guattari state:

*One dimension or axis defines the variable roles which an assemblage's components may play, from a purely material role at one extreme of the axis, to a purely expressive role at the other extreme. These roles are variable and may occur in mixtures, that is, a given component may play a mixture of material and expressive roles by exercising different sets of capacities.*<sup>151</sup>

As Dovey observes 'the first of these axes opposes and connects materiality to formal expression; it both distinguishes and connects flows and interactions of bodies and things in space to expressions of meanings'.<sup>152</sup>

Referring to the second dimension, Deleuze and Guattari explain:

*The other dimension defines variable processes in which these components become involved and that either stabilize the identity of an assemblage, by increasing its degree of internal homogeneity or the degree of sharpness of its boundaries, or destabilize it. The former are referred to as processes of territorialisation and the latter as processes of deterritorialisation.*<sup>153</sup>

Dovey goes on to observe:

*[This axis] involves an opposition and movement between the formation and erasure of territory — from territorialisation to deterritorialisation and reterritorialisation... In terms of representation it involves the inscription/erasure/reinscription of territorial boundaries and identities; in material terms it involves the construction, penetration and enforcement of material boundary control.*<sup>154</sup>

After recognising the preceding two dimensions of assemblages, Delanda then goes on to add a third dimension: an extra axis defining processes in which 'specialized expressive media intervene — processes which consolidate and rigidify

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<sup>151</sup> Wise, above n, p77; 22.

<sup>152</sup> K Dovey, 'Assembling Architecture' (2013) *Deleuze and Architecture* 131, p134.

<sup>153</sup> Wise, above n, p77; 151.

<sup>154</sup> Dovey, above n, p134; 152.

the identity of the assemblage or, on the contrary, allow the assemblage a certain latitude for more flexible operation while benefiting from genetic or linguistic resources'.<sup>155</sup>

While the first dimension relates to notions of expression and identity, and the second dimension relates to processes of change, the third dimension could be seen as an operational variable. It is the second dimension that is the focus of this thesis, because it is the dimension most relevant to urbanisation and to affecting adaptability. Put another way, territorialisation is the process by which social-environmental assemblages inscribe, erase, and otherwise affect space, and this is of primary interest to city-making professions.

There is undoubtedly much value in exploring the first and third dimensions further, but such an opportunity is beyond the scope of this thesis.

### **3.4 HOW DOES SELF-ORGANISATION RELATE TO ADAPTABILITY?**

#### **3.4.1 What is Self-Organisation?**

At the outset it is relevant to note that self-organisation is a phenomenon commonly considered in relation to wider emergence theory — it is the process which delivers emergent outcomes and, as Batty says, is the hallmark of emergence<sup>156</sup>. Notions of self-organisation and emergence are part of a field often described as complexity theory, or by some<sup>157</sup> as 'third-wave system theories'.

According to De Wolf and Holvoet, 'emergence and self-organisation each emphasise very different characteristics of a system's behaviour. Both phenomena can exist in isolation and they can co-exist in a dynamical system'.<sup>158</sup> This thesis is more interested in the *process* (self-organisation) rather than the *outcomes* (emergence).

According to Partanen, 'the origin of [the study of] self-organisation lies in the traditional studying of nonlinear systems dating back to Lyapunov's work at the turn of the 20<sup>th</sup> century'.<sup>159</sup> She goes on to explain that interest grew in the 1950s in the field of control theory, then in the 1960s through mathematics, physics, meteorology, and biology. Partanen observes, there were then a number of ground-breaking studies,

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<sup>155</sup> Delanda, above n, p12; 142.

<sup>156</sup> Goldstein, above n 52.

<sup>157</sup> McGreevy, above n 26.

<sup>158</sup> T De Wolf and T Holvoet, 'Emergence Versus Self-Organisation: Different Concepts but Promising when Combined' in *Engineering Self-Organising Systems* (Springer, 2004) 1, p1.

<sup>159</sup> Partanen, above n, p3; 65.

such as Eigen's concept of the hypercycle in biology, Haken's synergetics approach, Prigogine's dissipative structures, and Varela's autopoietic systems.<sup>160</sup> These studies broadened and crystallised the field of emergence and self-organisation theory and form the foundation of more particular research and theory into self-organisation in complex systems.

In terms of distinguishing between emergence and self-organisation, De Wolf and Holvoet explain

*In most systems that are considered in literature, emergence and self-organisation occur together ... In very complex (multi-agent) systems, i.e. distributed, open, large, situated in a dynamic context, etc., the combination of emergence and self-organisation is recommended ... Self-organisation requires an increase in order that promotes a certain function or property. Simple individuals cannot direct such a complex system, so the global coherent behaviour should emerge from the interactions between the individuals. The other way around, a complex (multi-agent) system can be required to exhibit emergent behaviour. Because of the complexity, it is impossible to impose an initial structure on such a system that results in an emergent property. The only possibility to get a coherent behaviour at the macro-level is to let that behaviour arise and organise autonomously, i.e. self-organisation.*<sup>161</sup>

De Wolf and Holvoet go on to offer the following working definition for emergence:

*A system exhibits emergence when there are coherent emergents at the macro-level that dynamically arise from the interactions between the parts at the micro-level. Such emergents are novel [with regard to] the individual parts of the system.*<sup>162</sup>

For comparison, De Wolf and Holvoet offer the following working definition for self-organisation:

*Self-organisation is a dynamical and adaptive process where systems acquire and maintain structure themselves, without external control. The "structure" can be a spatial, temporal or functional structure. "No external control" refers*

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<sup>160</sup> Ibid, p3.

<sup>161</sup> De Wolf and Holvoet, above n 158.

<sup>162</sup> Ibid.

*to the absence of direction, manipulation, interference, pressures or involvement from outside the system.*<sup>163</sup>

These notions of a whole (a spatial, temporal, or functional structure) that emerges from parts and is more than the sum of its parts, fundamentally describes assemblages.

According to Eigen, self-organisation follows three principles: the system's ability to utilise energy through the system; its ability to stabilise certain structures at the expense of others; and its ability for self-reproduction and mutation.<sup>164</sup> According to Partanen, Eigen also considers the need for a catalyst force and feedback mechanism (both concepts expanded on below).<sup>165</sup>

Portugali explains that a key feature of self-organising systems is that the system is open, and thus part of its environment, and it is therefore a system 'that can attain a spatio-temporal structure and maintain it in far from equilibrium conditions; not in spite of, but as a consequence of, a sufficient flow of energy and matter'.<sup>166</sup> Further, Portugali observes, this flow of energy and matter through the boundaries of a system 'allow[s] the system not only to spontaneously self-organize itself, attain a certain structure and maintain it in far from equilibrium conditions, but also to "create" or "invent" novel structures and new and novel modes of behaviour'.<sup>167</sup>

Cities typically reflect varying levels of self-organisation — they comprise numerous agents acting in response to their independent motivations, contributing to a bottom-up development of the city. As Portugali explains, self-organisation is a central property of complex systems such as cities. Batty reinforces this notion, stating: 'in so far as they are planned, such planning is dwarfed by the actions of millions operating from the bottom up'.<sup>168</sup>

At this point it is relevant to note that Deleuze describes the duality of 'top down vs bottom up' in terms of molar and molecular relationships. The former refers to processes that are fundamentally driven and controlled by central authorities through hierarchical and rigid control and investment systems. The latter refers to more individual processes and behaviour. As Surin states, 'a molecular logic of production

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<sup>163</sup> Ibid.

<sup>164</sup> Eigen and Schuster, above n 48.

<sup>165</sup> Partanen, above n p159; 65.

<sup>166</sup> Portugali, above n, p51; 61.

<sup>167</sup> Ibid, p51.

<sup>168</sup> M Batty, *A Science of Cities: Complexity CASA* <<http://www.complexcity.info/flows/>>

is basically self-organising, whereas its molar counterpart finds its generating principle in some feature or entity that is external to what is being produced'.<sup>169</sup>

Conley explains:

*Molar entities belong to the State or the civic world. They are well defined, often massive, and are affiliated with a governing apparatus. Their molecular counterparts are micro-entities, politics that transpire in areas where they are rarely perceived... The shifting to and from molar and molecular forms can be associated not only with deterritorialisation but also the very substance and effect of events that begin and end with swarms and masses of micro-perceptions.*<sup>170</sup>

The notion of molecularity is the basis for Deleuze's concept of micropolitics, being rhizomic, self-organising and locally responsive social conditions and behaviours. As Deleuze and Guattari say<sup>171</sup>, current societies, which have developed through prevailing capitalist production and accumulation, become more societies of control and molarity. The prevailing molar politics, which favours standardisation and homogeneity, also results in rigidity and less responsiveness to local or small scale dynamics — a situation which fundamentally erodes the adaptability of social-environmental systems.

Stewart provides a concise explanation on what motivates self-organising behaviour in a system:

*In summary, the general condition for the emergence and persistence of a protoorganization is 'consequence-capture' — i.e. that agents capture enough of the benefits and harms of the impacts of their actions on others and on the organization as a whole to sustain them at an optimal level. If this condition is met continually within an organization, it will constitute a self-organizing organization in the sense developed here: any action which an agent discovers that contributes net benefits to the organization as a whole will be adaptive for the agent and will be reproduced as part of the organization. The adaptive interests of the individual members of the organization will be aligned with the*

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<sup>169</sup> K Surin, 'Micropolitics' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, 2005) 162.

<sup>170</sup> T Conley, 'Molar' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 171, p172.

<sup>171</sup> Deleuze and Guattari, above n 131.

*global adaptive interests of the organization. Agents that pursue their own interests successfully will therefore also be pursuing the organization's global interests.*<sup>172</sup>

### **3.4.2 What is Adaptability?**

There are many different definitions provided for the concept of resilience, depending on the particular field in which the concept is being applied. Bhamra and others, for example, identify some 15 different (although similar) definitions used in different fields.<sup>173</sup> As an umbrella term, sufficient for the purposes of this research, “resilience” describes the ways systems cope with unintended or unexpected change, and is related to the capacity of the system to return to a stable state after disruption.<sup>174</sup> According to Newman, Beatley, and Boyer<sup>175</sup>, in social-environmental systems, resilience is related to:

1. the magnitude of shock that the system can withstand and remain in a given state;
2. the degree to which the system can build capacity for learning and adaptation; and
3. the degree to which the system is capable of self-organisation.

This reflects the key attributes (identified by Walker and others) that determine the future trajectories of social-environmental systems: resilience, adaptability, and transformability.<sup>176</sup> Here, resilience refers to the capacity of a system to absorb disturbance and reorganise while undergoing change so as to retain the same function, structure, identity, and feedbacks.<sup>177</sup> Adaptability refers to ‘the collective capacity of the human actors in the system to manage resilience’.<sup>178</sup> Transformability, in comparison to resilience and adaptability, refers to the capacity to create a fundamentally new system when the current system is undesirable or untenable.<sup>179</sup>

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<sup>172</sup> J Stewart, 'The Self-Organizing Society: A Grower's Guide' (2018) 74 *World Futures* 1, p6.

<sup>173</sup> Bhamra, Dani and Burnard, above n 40.

<sup>174</sup> Ibid.

<sup>175</sup> Newman, Beatley and Boyer, above n 2.

<sup>176</sup> B Walker et al, 'Resilience, Adaptability and Transformability in Social-Ecological Systems' (2004) 9(2) *Ecology and Society* .

<sup>177</sup> Ibid, p1.

<sup>178</sup> Ibid, p7.

<sup>179</sup> Ibid.

Of most relevance to this thesis is the attribute of adaptability, because it is most closely tied to the social component of social-environmental systems. Furthermore, in social environmental systems such as cities, adaptability is the factor that is most directly influenced by the actions of urban actors, i.e. people who have a role in the community, such as residents, business owners, politicians, activists, and so on.

Describing the role of actors in achieving adaptability, Walker and others explain that ‘their collective capacity to manage resilience, intentionally, determines whether they can successfully avoid crossing into an undesirable system regime, or succeed in crossing back into a desirable one’.<sup>180</sup> When a self-organising system is attempting to improve its adaptability it is doing so to maintain or change its position in the stability landscape.

The concept of “stability landscapes” can be described by way of Deleuze’s concept of “manifolds”. In simple terms, a manifold represents ‘the space of possible states’<sup>181</sup> that a system can have. A manifold therefore encompasses all the given states that a multiplicity can have. Delanda explains that, within a manifold, the state of any object (multiplicity) at any given time becomes a single point in the manifold, described as a “state space”.<sup>182</sup>

In order to describe the stability landscape, it is also useful to present the ball-and-basin metaphor employed by resilience theorists (illustrated in Figure 4 below). In this metaphor, the ball is the system of concern while the basin is a field of attraction representing the state space within which a particular system moves about, as it responds to internal and external forces.<sup>183</sup> The ball (system) is perpetually moving towards the bottom of the basin, which reflects a virtual equilibrium, but the shape, and thus bottom, of the basin are constantly changing, so the equilibrium state is never static.

If conditions cause the basin to become smaller (see Figure 4b), resilience declines and the potential of the system to cross a threshold into a different basin of attraction becomes greater. If a system changes too much, it crosses a threshold and begins behaving in a different way, with different feedbacks between its component

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<sup>180</sup> Ibid, p3.

<sup>181</sup> M Delanda, *Intensive Science and Virtual Philosophy* (Continuum Intl Pub Group, 2005), p13.

<sup>182</sup> Ibid.

<sup>183</sup> Walker et al, above n 176.



parts and a different structure (see Figure 4c).<sup>184</sup> Whenever a system crosses a threshold it is said to have undergone a “regime shift”. Regime shifts, according to Biggs, Schlüter, and Schoon<sup>185</sup> are large, persistent, and often abrupt changes in the structure and dynamics of the system.

As illustrated in Figure 4, there may be multiple basins of attraction for any particular system, and a system can move into another basin of attraction by crossing a threshold (or by a threshold moving across the system). The multiplicity of basins of attraction for any given system is described as a “stability landscape”.<sup>186</sup>

Walker and others explain that external and internal forces can lead to changes in the stability landscape, such as: changes in the number of basins of attraction, changes in the positions of the basins within the state space (the various social-ecological systems that comprise the affected system), changes in the positions of the thresholds between basins, or changes to the “depths” of basins, which would ultimately affect how difficult it is to move a system around within the basin.<sup>187</sup>

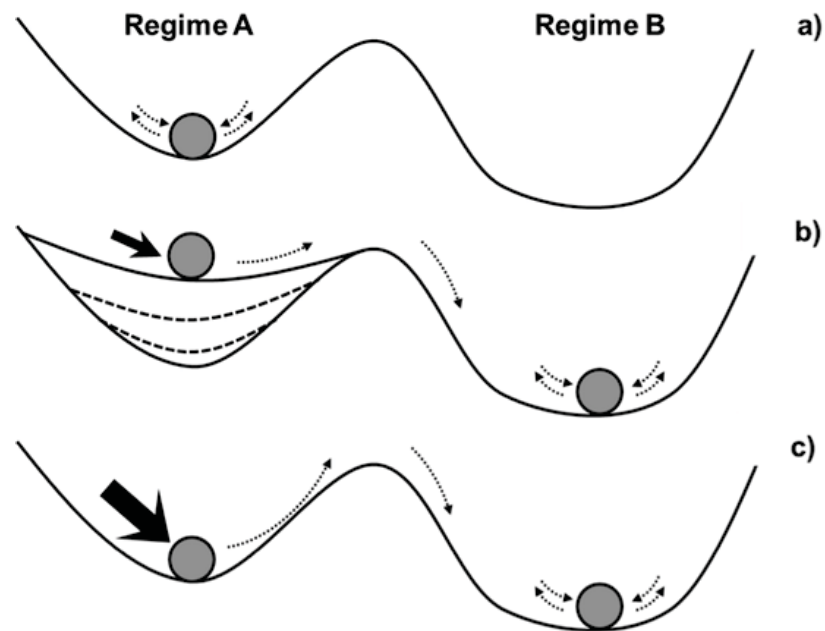


Figure 4: Conceptual illustration of system resilience.<sup>188</sup>

<sup>184</sup> Ibid, p5; 176.

<sup>185</sup> Biggs, Schlüter and Schoon, above n 111.

<sup>186</sup> Walker et al, above n, p5; 176.

<sup>187</sup> Ibid.

<sup>188</sup> Ibid.

As well as changes in the number and arrangement of basins of attraction, according to Walker and others, changes in the stability landscape of a system can result from:

1. changes in the position of thresholds between basins — a change in latitude;
2. changes in the ‘depth’ of basins (a measure of how difficult it is to move the system around within the basin) — a change in resistance;
3. moving the system around, changing its position within a basin relative to the thresholds — a change in precariousness; and
4. a change into another basin, not through movement of the system but through a shift in the stability landscape (described below in terms of panarchy).

Fundamentally, adaptability is about being less rigid and more heterogeneous, with a capacity to deal with forces acting on the system. The main objective of adaptability can be regarded as the capacity to wilfully direct the position of the system in the adaptive cycle.

### 3.4.3 The Relationship between Self-Organisation and Adaptability

Walker and others explain that ‘the ability to either control the trajectory of the system, change the topology of the stability landscape, or change the processes in response to dynamics at other scales, is a measure of adaptability.’<sup>189</sup> Adaptive capacity thus refers to the ability of a system to change, evolve, and innovate in response to a specific threat. More specifically, it refers to the capacity of a system to continually self-organise and adapt in the face of changing circumstances, in a way that retains the same structure and function, and hence keep the system in a particular stability domain.<sup>190</sup>

This capacity — to self-organise and adapt — is largely dependent on the actors in a system that store knowledge and have the ability to innovate. Take, for example, the adaptive capacity of harvester ants.<sup>191</sup> Harvester ant colonies are a phenomenon in terms of social organisation and adaptability, and thus overall resilience. The colonies

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<sup>189</sup> Ibid, p5.

<sup>190</sup> C S Holling, 'Resilience and Stability of Ecological Systems' (1973) *Annual review of ecology and systematics* 1; C Folke et al, 'Resilience Thinking: Integrating Resilience, Adaptability and Transformability' (2010) 15(4) *Ecology and Society* 20.

<sup>191</sup> Described by Johnson in *Emergence* (2002) and Gordon in her TED Talk *The Emergent Genius of Ant Colonies*. (2008).

have no plan to guide their daily activities; there is no control hierarchy (while they typically have a single queen, her role is only to lay eggs, not to direct the actions of the ants); and, apart from the queen and her protectors, individuals do not specialise in certain tasks but instead switch between tasks, such as food gathering or waste removal, as is required. The colonies function, and persist through many generations, as a result of direct response to stimuli by way of instinctual calculations in relation to interactions with their environment, and through strict feedback of information between the ants by way of pheromone trails. Through this self-organising behaviour, harvester ants are capable of amazing feats of communal organisation and adaptation — they ascertain and communicate the shortest distance to food sources, maximise the distance between their waste deposits and the place they store corpses, and switch from nest building to foraging to parenting in response to changing conditions. All this through extremely simple communications<sup>192</sup>, and in direct response to internal and external forces that affect their environment. Perhaps most spectacularly, their capacity to self-organise can continue on through the life of the colony (typically in the order of 15 years) despite the life span of most ants in the colony being around 12 months. Further to this, the colony actually evolves over time, growing more stable as it develops.

As illustrated, the adaptive capacity of the ant colony — as with any social-environmental system — is fundamentally dependent on an ability to self-organise. This notion is reflected in resilience theory, where adaptive capacity is strongly dependent on the ability of the system to self-organise. As Goldstein explains, “self-organisation” refers to the creative, self-generated, adaptability-seeking behaviour of a complex system. Self-organisation delivers novel structures that confer this adaptability.<sup>193</sup> This is reiterated by De Wolf and Holvoet, who explain that ‘the essence of self-organisation is an adaptable behaviour that autonomously acquires and maintains an increased order’.<sup>194</sup> It is also reiterated in recent research on community resilience.<sup>195</sup>

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<sup>192</sup> D. Gordon, 'The Emergent Genius of Ant Colonies' (Paper presented at the TED Ideas Worth Spreading, Online, 2008) <[http://www.ted.com/talks/deborah\\_gordon\\_digs\\_ants.html](http://www.ted.com/talks/deborah_gordon_digs_ants.html)>, p1.

<sup>193</sup> Batty, above n, p51; 58.

<sup>194</sup> De Wolf and Holvoet, above n, p9; 158.

<sup>195</sup> For example, R Bach et al, 'Policy Challenges in Supporting Community Resilience' (2010) *London Workshop of the Multinational Community Resilience Policy Group* 4; L Thornley et al, 'Building Community Resilience: Learning From the Canterbury Earthquakes' (2015) 10(1) *Kotuitui: New Zealand Journal of Social Sciences Online* 23; D Paton, 'Interaction Between Hazards, Resilience and Vulnerability' ; *ibid.*

Reinforcing the connection between adaptability and self-organisation, De Wolf and Holvoet say that self-organising systems are, by definition, robust and adaptable. They say:

*A self-organising system is expected to cope with that change and to maintain its organisation autonomously. In other words, a self-generated, adaptable behaviour is needed ... This adaptability implies the need for the system to be able to exhibit a large variety of behaviours. Self-organisation requires the evolution towards a certain attractor in state space (i.e. towards a certain organised behaviour). There are different kinds of attractors, from a point attractor that allows only one behaviour, a limit cycle that allows periodic behaviour, towards a chaotic attractor that allows a very large variety of behaviours. To be adaptable, the system needs to make a selection between behaviours and at the same time consider a variety of behaviours.*<sup>196</sup>

### **3.5 HOW DOES SELF-ORGANISED CHANGE OCCUR IN COMPLEX ADAPTIVE SYSTEMS?**

#### **3.5.1 How do Systems Change?**

The preceding sections introduced the concepts of self-organisation and adaptability, and the apparent dependencies between the two, and to assemblage theory, which provides a means for understanding and describing processes of self-organisation and adaptability.

This section provides an overview of how complex dynamic systems (such as assemblages) change. A multi-modal and multi-scalar approach is taken: the basic process of self-organisational change is described, i.e. the process by which change within an assemblage occurs; the concept of the adaptive cycle is described, i.e. the temporal cycle through which assemblages as a whole change; and the concept of panarchy is described, i.e. the concept which describes how change between assemblages occur.

It is useful, however, to first acknowledge that: systems are subject to both intended and unintended change; systems change at various temporal scales (they often respond slowly to slow variables, but quickly once a threshold is crossed);<sup>197</sup> and

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<sup>196</sup> De Wolf and Holvoet, above n, p8; 158.

<sup>197</sup> R Biggs et al, '5 Principle 3—Manage Slow Variables and Feedbacks' in R Biggs, M Schlüter and M L Schoon (eds), *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems* (Cambridge University Press, 2015) 105.

that because assemblages are typically linked to and nested within other systems, the notions of scale and cross-scalar dynamics are critical.

Further, it is important to understand the significance of stability/instability in enabling or restricting change. As Barnett explains, change comes about when systems are disturbed and they have to respond (relating to the concepts of desires, forces, lines of flight, and plateaus, described further below). Barnett explains that ‘the response is the production of something new. A novel material condition, a new structure, a new pattern of organization’.<sup>198</sup> He goes on to explain that ‘when new and unpredictable patterns are realised in nonlinear systems — when they are pushed far-from-equilibrium — they reach a point of critical instability and undergo some kind of bifurcation or “jump” to a new condition of organization’.<sup>199</sup> Bifurcations result from events internal or external to a system. They are the change which result in a phase transition or regime change. These changes may, through downward causation, instigate change to lower levels of the system, potentially causing a cascade of bifurcations and phase transitions throughout the system. Describing these concepts in a practical sense, Silva<sup>200</sup> explains that informal settlements are a reflection of how the original equilibrium of an urban system can be tipped. He refers to informal settlements in Portugal and notes that a bifurcation point was reached with a social revolution in 1974, which led to a cascade of non-linear events driving the growth of informal settlements. These concepts of bifurcations and cross-scale effects are described further below.

### *The Primary Processes of Change*

Change in complex systems, whilst expressed at a range of scales and occurring in response to a variety of triggers and forces, is fundamentally a process of competition between variables within the system which, rather than resulting in reproduction, results in variation.

Reinforcing the process of adaptive cycles described below, Portugali<sup>201</sup> explains that systems in far from equilibrium states exhibit a distinct pattern of change — relatively long periods of stability, followed by abrupt periods of instability and chaos — from which the system re-emerges to a new level of steady state.

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<sup>198</sup> Barnett, above n, p8; 133.

<sup>199</sup> Goldstein, above n 156.

<sup>200</sup> Silva and Farrall, above n 89.

<sup>201</sup> Portugali, above n 61.

Referring to Haken's synergetics theory, Portugali explains the more particular mechanisms of change.<sup>202</sup> He observes that while in steady state, systems are governed by a certain variable or a few collective variables, termed "order parameters". In systems that are unstable or chaotic, several order parameters (elements that determine order in systems) coexist. The very act of self-organisation, according to this view, starts at this stage: several order parameters coexist and compete until one "wins" in the sense that it enslaves competing orders to its motion. Haken terms this process 'the slaving principle'.<sup>203</sup> Portugali provides an example of a new immigrant to a city — the individual 'has to learn the city and adapt to its rhythm; the individual is thus enslaved by the city's order parameter, but by adapting to the global movement of the city, the individual's energy enters into and supports the order parameter of the city.'<sup>204</sup>

Portugali expands on the slaving principle (with further reference to Haken) to identify two variations: one (co-operation) where the competition amongst order parameters might end up with a process of cooperation amongst the parameters; the other (captivity) where a certain order parameter might imprison another by keeping it spatially captive.<sup>205</sup> He explains:

*Within a city context the process of slaving is typical to cases of invasion-repelling/invasion-succession, as well as to the more recent process of gentrification. In all these cases a foreign element invades a certain area in the city and creates a local disturbance ... The common de-nominator to all such examples is that a certain socio-spatial order enslaves competing ones by eliminating them ...*<sup>206</sup>

The captivity principle described above is fundamental to the process of territorialisation and is strongly reflected in self-organising communities. Portugali explains that captivity is typical of a case where local instabilities and disturbances are not being eliminated, but imprisoned or captured within a certain spatial niche in the city, and he points to the slums of modern western cities as an example. As he says, 'the common denominator here is the situation by which society or "the city",

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<sup>202</sup> Haken, above n 46.

<sup>203</sup> Portugali, above n 166.

<sup>204</sup> Ibid, p62.

<sup>205</sup> Ibid.

<sup>206</sup> Ibid, p117.

maintains reproducible stable relations and development by socio-spatially imprisoning local unstable elements which threaten its global stability'.<sup>207</sup>

Portugali goes on to identify three primary processes of change. These processes are not specifically identified in the cases studied because they generally occur at a scale that is difficult to observe. Regardless, the following contributes to the base understanding of how system change occurs and affects social-environmental systems.

1. **Stratigraphic Change** (see Figure 5 below). In this process, systems 'move from one stable state to another, via bifurcations, and with every evolutionary move the previous and alternative states die and disappear'.<sup>208</sup> The system moves from one stratum to another. 'Every new bifurcation entails a new city — a new urban stratum'.<sup>209</sup> Portugali explains that past cities are important in terms of the role they play in creating the new city, but they are not part of the new city; the new city effectively supersedes the past cities.
2. **Furcative Change** (see Figure 6 below). In furcative forms of change, 'with every stage of furcation the system becomes more complex in the sense that the old or alternative states (or order parameters) do not die but continue to live, enslaved by the dominant order parameters'.<sup>210</sup> In this process, each phase transition results in a new order parameter which adds new qualities to the system but does not result in elimination of previous parameters. Portugali points to the evolution of society through the hunter-gatherer, agricultural, and urban revolutions. He observes that whilst each revolution was a bifurcation of the previous society it did not do away with the preceding qualities. Rather, the new order parameters enslaved the previous parameters. Agricultural society enslaved hunting and gathering, but did not do away with it — it made it a non-dominant form of production, marginal to agriculture. Similarly, the urban revolution did not do away with agricultural processes, or hunting and gathering; it simply marginalised them.

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<sup>207</sup> Ibid, p118.

<sup>208</sup> Ibid, p81.

<sup>209</sup> Ibid, p81.

<sup>210</sup> Ibid, p82.

3. **Hermeneutic Change** (see Figure 7 below). According to Portugali:

*With hermeneutic forms of change, the system furcates as above, but not by eliminating or enslaving competing order parameters, but by expanding the boundaries of the dominating and thus increasing their internal complexity ... Hermeneutics is “the art of interpretation” ... At the individual level, hermeneutics is the process by which, using an existing set of order parameters, the individual extracts, or creates, information from the ex-formation that s/he sees and experiences in the city. The resultant hermeneutic change thus adds new learning and content to an existing personal perception of a given city structure without changing it.<sup>211</sup>*

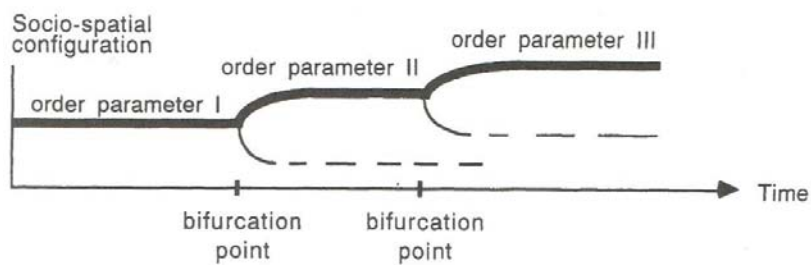


Figure 5: Diagram of Stratigraphic Change, from Portugali<sup>212</sup>.

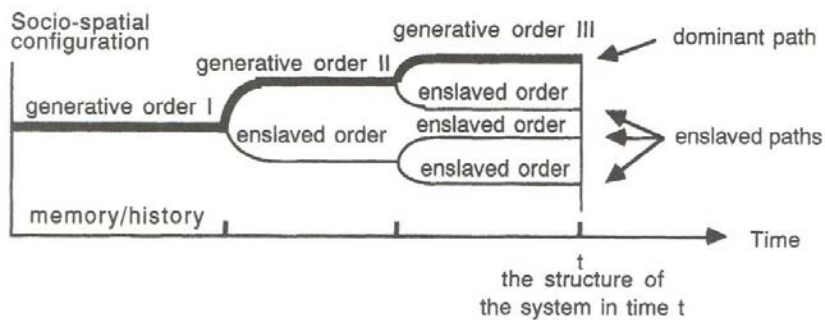


Figure 6: Diagram of Furcative Change, from Portugali<sup>213</sup>.

<sup>211</sup> Ibid, p84.

<sup>212</sup> Ibid, p82.

<sup>213</sup> Ibid, p82.



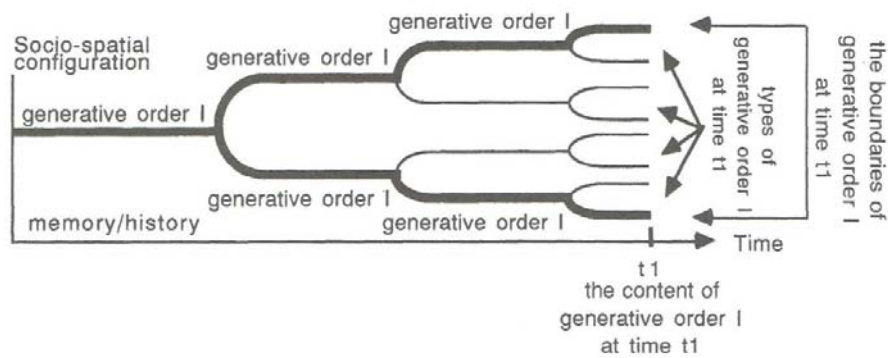


Figure 7: Diagram of Hermeneutic Change, from Portugali<sup>214</sup>.

Consistent with the concepts of the adaptive cycle and panarchy described below, Portugali explains that in self-organising systems, the slow-moving variables at higher scales act as order parameters for the faster moving systems at lower scales. ‘Looking at the large amount of parallel distributed planning that takes place in the city, it can be seen that quite often the slow, spatially-global plans function as order parameters for the fast, spatially-local plans’.<sup>215</sup> He continues:

*[O]n the one hand, the planning system is characterized by circular causality in that the fast-local plans are enslaved by the slow-larger ones, and by so doing they reproduce the structure of the city with its hierarchy of order-parameter plans. On the other, because of parallelism and overlapping, changes at small-scale fast and local plans, often very minor, might in certain circumstances trigger strong fluctuations, bifurcations and phase-transition the city as a whole.*<sup>216</sup>

It is not possible in this instance to analyse the actions of individuals comprising the assemblages, or to observe the primary processes of change (stratigraphic, furcative, and hermeneutic change processes).

### ***The Adaptive Cycle***

In understanding the dynamic nature of social-environmental systems, resilience theorists explain that whilst change is typically unpredictable at more specific scales (such as those described above), there are obvious trends in the ways systems change

<sup>214</sup> Ibid, p82.

<sup>215</sup> Ibid, p244.

<sup>216</sup> Ibid.

at higher scales.<sup>217</sup> More specifically, they explain that at higher scales change generally occurs through four phases of evolution: rapid growth, conservation, release, and reorganisation — usually, but not always, in that sequence. This is known as the adaptive cycle and these cycles operate over many different scales of time and space. Figure 8 presents a commonly provided illustration of the adaptive cycle.

The critical point at this juncture is that adaptability refers to the capacity of the actors in a system to manage the moment within the adaptive cycle (described below) which their system occupies. A high level of self-organisation enables more adaptive change to move the system forward or back through the adaptive cycle when responding to forces from above or below the focus system. Of interest to this thesis is the idea that processes of territorialisation can be a result of self-organisational change and can affect the adaptability of the system.

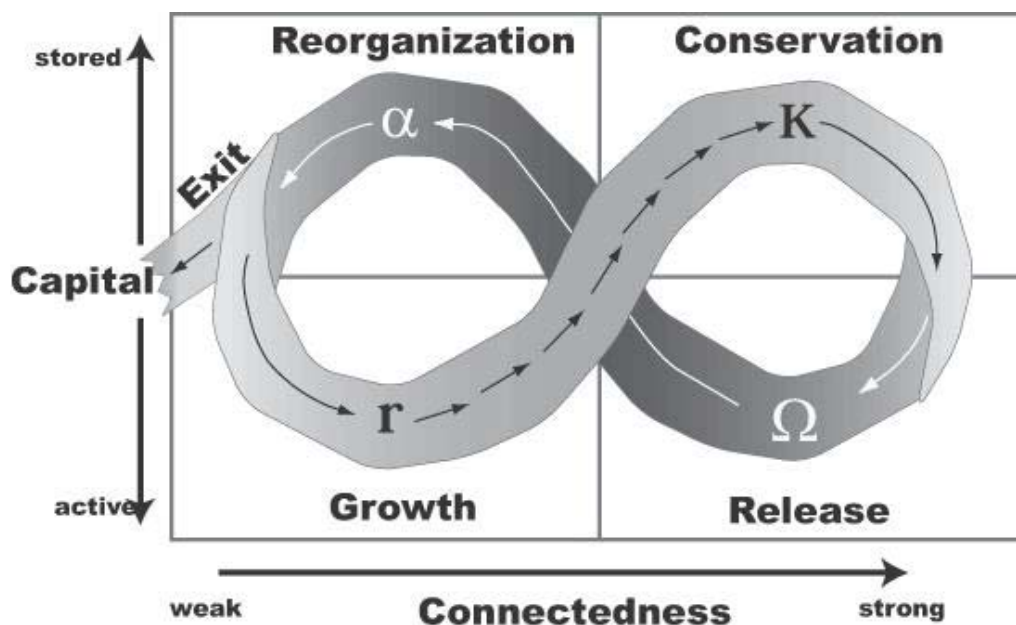


Figure 8: Adaptive Cycle.<sup>218</sup>

During the *Rapid Growth* (*r*) phase, the system is engaged in a period of rapid growth as agents exploit new opportunities and available resources, and rush to

<sup>217</sup> L H Gunderson and C S Holling, *Panarchy: Understanding Transformations in Human and Natural Systems* (Island Press, 2002); C S Holling and L H Gunderson, 'Resilience and Adaptive Cycles' (2002) *Panarchy: Understanding transformations in human and natural systems* 25; Resilience Alliance, *Adaptive Capacity* <[http://www.resalliance.org/index.php/adaptive\\_capacity](http://www.resalliance.org/index.php/adaptive_capacity)>; Resilience Alliance, *Key Concepts* <<http://www.resalliance.org/564.php>>; Walker et al, above n 180.

<sup>218</sup> Gunderson and Holling, above n 217.

establish themselves to gain a competitive advantage.<sup>219</sup> In describing the adaptive cycle, Walker and Salt use a new forest as an example of a system passing through the cycle.<sup>220</sup> The Rapid Growth phase would be reflected in the early stages of forest growth, when pioneer species grow quickly to establish themselves and secure a share of the limited resources.

The system then incrementally transitions to a *Conservation (k)* phase wherein energy and other resources are accumulated and stored. In this phase connections with, and dependencies on, other agents typically increase, and as a result the system becomes more rigid and less adaptable.<sup>221</sup> During this phase few, if any, new agents are able to establish. As the system moves through the late conservation phase it begins to get “locked up”. In the example of the forest, the conservation phase is reflected through the growth of the dominant species to maturity, at the cost of the non-dominant species such that the diversity of species is reduced, and the resources become locked up by the mature trees.

In complex systems, and especially in social-environmental systems, this phase is typically characterised by:

1. increases in efficiency achieved through the removal of apparent redundancies.
2. subsidies being introduced almost always to help people, not to effect change.
3. more “sunk costs” where money is invested to maintain existing investments rather than explore new opportunities.
4. increased command and control (less flexibility), especially from forces outside of the system (described in the following section).
5. a preoccupation with process (more rules and procedures).
6. novelty being suppressed with less support for experimentation.
7. rising transaction costs in getting things done.

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<sup>219</sup> Resilience Alliance, above n ; B Walker and D Salt, *Resilience Thinking: Sustaining Ecosystems and People in a Changing World* (Island Press, 2006).

<sup>220</sup> Walker and Salt, above n 219.

<sup>221</sup> Ibid.

The *Release* ( $\Omega$ ) phase occurs when a disturbance to the system exceeds the system's resilience and causes the system to become undone, breaking apart the web of reinforcing interactions.<sup>222</sup> This is typically when a system crosses a threshold as a result of either fast- or slow-moving variables and the place of the system in the stability landscape (described above) is fundamentally altered. The magnitude of the disturbance needed to cause this reaction varies and the change can happen very quickly. Generally, the longer the conservation phase persists, the smaller the shock needed to end it. Resources that were accumulated in the preceding phases are released as connections break and regulatory controls weaken. There is a subsequent deterioration of the system structure as linkages are broken, and natural, social, and economic capital leaks out of the system.

Throughout the release phase, dynamics are chaotic and difficult to predict. However, Walker and Salt explain that the destruction that ensues has a creative element.<sup>223</sup> This notion recognises Schumpeter's theory of creative destruction.<sup>224</sup> In the example of the forest, the release phase might occur through an immediate impact, such as fire, or a gradual impact, such as disease.

The subsequent *Reorganisation* ( $\alpha$ ) phase is characterised by uncertainty, innovation, and experimentation as system agents seek to re-organise and capture the newly released resources.<sup>225</sup> In the example of the forest, this might be reflected through the establishment of new species, and in fact new ecosystems.

Dovey summarises these phases in relation to the urban environment thus:

*“Growth” involves a major phase of development — the initial informal invasion of unused interstitial urban land may be a good example. The “conservation” phase comes when these gains are significant enough to be conserved and protected: more permanent buildings are constructed, political liaisons established for protection, infrastructure is upgraded and the system becomes more or less resilient to change. This is a formalisation process that can lead to stagnancy and loss of adaptability. The “release” phase (if it comes) is that brief period when the forces for change overwhelm the place and it crosses a threshold and slips into a new regime. In the case of the informal*

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<sup>222</sup> Ibid.

<sup>223</sup> Ibid.

<sup>224</sup> J Schumpeter, 'Creative Destruction' (1942) 825 *Capitalism, socialism and democracy* 82.

<sup>225</sup> Walker and Salt, above n 219.

*settlement this may be when the settlement is demolished and residents are displaced. Re-organisation is a creative period when a new order begins to appear. This may be the formal city that replaces the informal, or it may be the way the residents are either re-housed or re-house themselves. The settlement may also spiral downwards and stabilise as a dangerous and resilient slum, or it may be incrementally upgraded towards a more formal neighbourhood.*<sup>226</sup>

The *Growth* and *Conservation* phases described above collectively comprise what is referred to as the “forward loop”, whilst the *Release* and *Reorganisation* phases collectively comprise the “back loop”. The forward loop is typically slow and predictable, leading to accumulation in the system (or in terms of assemblage theory, leading to increased segmentarity), whilst the back loop is typically less predictable and can be a slow or rapid process leading to dispersal and release in the system (leading to decreased segmentarity). The back loop is characterised by uncertainty, novelty, and experimentation enabled by higher levels of potential, reduced levels of connectedness and controllability, and reduced consequences of failure for the system.<sup>227</sup> During the back loop there is a loss of all forms of capital. It is the time of greatest potential for the initiation of either creative or destructive change in the system.<sup>228</sup>

Here we see a relationship between Deleuze’s concept of segmentarity and phases of the adaptive cycle — the accumulation and growing rigidity typical of the forward loop contribute to rigid segmentarity, while the release and dispersal of the back loop contribute to a more supple segmentarity.

As Holling observes:

*As a consequence of the periodic, but transient, phases of creative destruction (Release phase) and renewal (Reorganisation phase), each level of a system’s structure and processes can be reorganised. This reshuffling in the back loop of the cycle allows the possibility of new system configurations and opportunities utilising the exotic and entirely novel entrants that had accumulated in earlier*

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<sup>226</sup> K Dovey, 'Informal Settlement and Assemblage Theory' in J Hannigan and G Richards (eds), *The SAGE Handbook of New Urban Studies* (Sage, 2017) 481, p487.

<sup>227</sup> C S Holling, 'Understanding the Complexity of Economic, Ecological, and Social Systems' (2001) 4(5) *Ecosystems* 390.

<sup>228</sup> *Ibid*; Walker et al, above n 186.

*phases. The adaptive cycle opens transient windows of opportunity so that novel assortments can be generated.*<sup>229</sup>

When a system crosses a threshold into a new state or regime it often occurs in a back loop; linkages that bound the system in the conservation phase are broken in the release phase. Resilience theorists argue that the back loop is the time when human actions can have the biggest impact.<sup>230</sup> Again, applying Deleuzean concepts, the back loop represents that part of the cycle that is less segmented and more molecular, compared to the front loop, which is more segmented and molar. As explained in the subsequent section, during the back loop there is likely to be less involvement of active forces from higher system scales.

Holling states:

*The conditions that occasionally foster novelty and experiment occur during periods in the back loop of the cycle, when connectedness, or controllability, is low and resilience is high (that is, during the  $\alpha$  phase). The low connectedness, or weak control, permits novel reassortments of elements that were previously tightly connected to others in isolated sets of interactions. The high resilience allows tests of those novel combinations because the system-wide costs of failure are low. The result is the condition needed for creative experimentation.*<sup>231</sup>

This is reinforced by research into social innovation by Biggs, Schlüter and Schoon who explain that potential for innovation is dependent on the timing of actions in the system.<sup>232</sup> They observe that studies of innovation have identified two categories of innovation: (1) incremental innovation, and (2) radical innovation. They also observe that most innovation is incremental, ‘representing evolutionary, stepwise improvements’, whilst radical innovation involves the development and adoption of new ideas, products, or processes that challenge or disrupt the broader institutional framework.<sup>233</sup>

Biggs, Schlüter and Schoon go on to relate the timing of innovation to particular phases of the adaptive cycle, explaining ‘the front loop of the adaptive cycle can be seen as largely characterized by incremental innovation that strengthens the current

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<sup>229</sup> Holling, above n, p397; 190.

<sup>230</sup> Ibid; Walker and Salt, above n 219.

<sup>231</sup> Holling, above n, p395; 190.

<sup>232</sup> R Biggs, F R Westley and S R Carpenter, 'Navigating the Back Loop: Fostering Social Innovation and Transformation in Ecosystem Management' (2010) 15(2) *Ecology and Society* 9.

<sup>233</sup> Ibid.

system or trajectory of change. In contrast, the back loop may be precipitated by, or create a window of opportunity for, radical innovation.<sup>234</sup> They also explain that changes and innovations that occur in the back loop may lead to fundamental reorganisation of the system, ‘so that the system functions in a qualitatively different way than it did before’.<sup>235</sup>

Holling explains that there are three main properties that shape the adaptive cycle and the future state of the system<sup>236</sup>:

1. the inherent potential of the system available for change;
2. the internal controllability of the system — this is largely a consequence of the degree of connectedness between internal controlling variables and the subsequent degree of flexibility or rigidity in the system, and relates to the extent of self-organisation or molecularity in the system;
3. the adaptive capacity, or the measure of its vulnerability to shocks.

Holling continues:

*Potential, or wealth, sets limits for what is possible — it determines the number of alternative options for the future. Connectedness, or controllability, determines the degree to which a system can control its own destiny, as distinct from being caught by the whims of external variability. Resilience, as achieved by adaptive capacity, determines how vulnerable the system is to unexpected disturbances and surprises that can exceed or break that control.*<sup>237</sup>

As explained previously, the adaptive cycle provides a gauge by which to observe change in a system, and is employed in this study to understand and describe phases of change observed in the case studies.

### ***Panarchy***

As alluded to above, adaptive capacity is an emergent outcome; it does not exist at the macro scale but rather is an aggregation of capacities within an assemblage. Importantly, assemblages form parts of other assemblages at higher, lower, and the same scales.

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<sup>234</sup> Ibid, p3.

<sup>235</sup> Ibid, 3.

<sup>236</sup> Holling, above n 227.

<sup>237</sup> Ibid, p394.



Adaptability occurs where the emergent outcomes or patterns formed from the actions at lower system scales are responsive to the environment at the emergent level. Put another way, the outcomes from individual actors affect change at the community scale system. Further, outcomes from the community scale systems affect change at the higher (e.g. city) scale.

This phenomenon — of lower scale events affecting higher scale outcomes — is the defining quality of self-organisation and emergence and is understood in relation to resilience and adaptability through the concept of “panarchy”. It is also a critical aspect of self-organisation theories such as Hagen’s synergetics, which recognises the role of fast and slow moving processes. As Portugali says, ‘the fast ones typify the local urban microlevel of building sites, streets, subways, etc., whereas the slow processes typify the macrolevel of whole regions which are often described as systems of cities’.<sup>238</sup> Panarchy reflects the distinction between what Portugali describes as “local chaos” and “deterministic chaos”. Local chaos ‘stems from the irregular motion of behaviour of the very many individual parts of a complex system’, while deterministic chaos arises when the many individual parts are suddenly attracted by a few attractors, or enslaved by a few order parameters, and consequently exhibit a coordinated motion.<sup>239</sup>

Panarchy refers to cross-scalar relationships within and beyond systems. It is an acknowledgement that any system is part of a system or systems at larger scales, and also comprises systems at smaller scales. The linkages across scales are particularly important; what happens at one scale can influence or even drive what happens at other scales (cross-scale effects). For example, the ability of a community to withstand a catastrophic event might depend on decisions and actions made at higher (governmental/city) scales, and will depend on the knowledge and memory at the higher scale. Alternatively, the resilience of the community scale systems might ultimately depend on actions and intelligence at lower scales. As the Resilience Alliance explain, ‘frequently, a challenge will involve multiple scales, so that overall resilience requires the ability to understand and take advantage of different initiatives

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<sup>238</sup> Portugali, above n, p60; 166.

<sup>239</sup> Ibid, p63.



at different levels'.<sup>240</sup> Here we see the relevance of what Deleuze describes as active and reactive forces, and of molar and molecular activity (described further below).

Whether attempting to alter the adaptability or the transformability of a system, it is important to consider the cross-scale implications of change (panarchy), because, as Walker and others point out, systems 'consist of nested dynamics operating at particular organisational scales — 'sub-systems,' as it were, of households to villages to nations, trees to patches to landscapes'.<sup>241</sup>

The concept of panarchy combines the concept of space/time hierarchy and the concept of adaptive cycles (described above). In this instance, however, the term "hierarchy" does not refer to a top-down control system, but is used as defined by Simon as semi-autonomous levels formed from the interactions of variables that share similar speeds (and, according to Holling, similar spatial attributes).<sup>242</sup>

Holling explains that the panarchy of systems determines how they can invent and experiment.<sup>243</sup> He explains that each level of the system operates at its own pace and is protected from above by slower, larger levels, and invigorated from below by faster, smaller cycles of innovation. He notes that panarchies are therefore both creative and conserving. The latitude, resistance, and precariousness defining the resilience of any system are largely influenced by what is happening in the panarchy at higher and lower scales.<sup>244</sup> Figure 9 illustrates this concept.

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<sup>240</sup> Resilience Alliance, 'Urban Resilience Research Prospectus: A Resilience Alliance Initiative for Transitioning Urban Systems Towards Sustainable Futures' (2007) .

<sup>241</sup> Walker et al, above n, p2; 176.

<sup>242</sup> H A Simon, 'The Organization of Complex Systems' in H H Pattee (ed), *Hierarchy Theory: The Challenge of Complex Systems* (Braziller, 1974) 3.

<sup>243</sup> Holling, above n 190.

<sup>244</sup> Ibid.

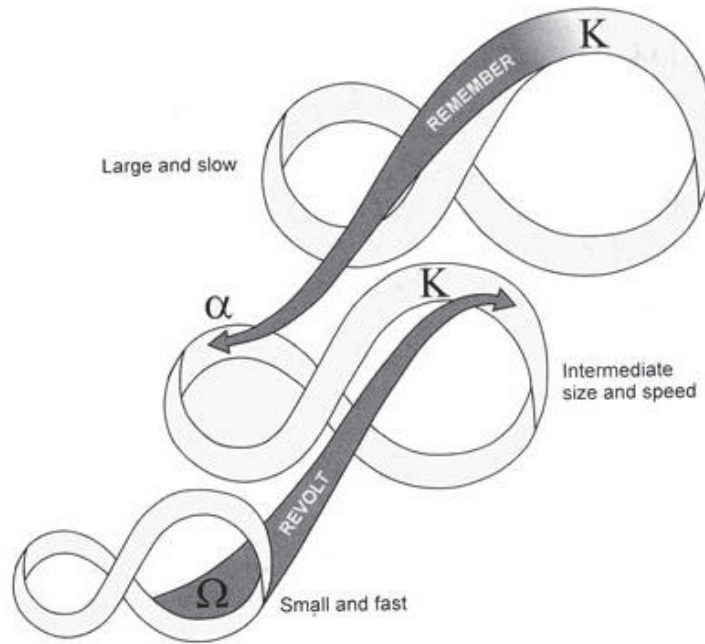


Figure 9: Conceptual illustration of panarchy. Walker et al 2004.<sup>245</sup>

The case studies presented in Chapter 5 can be considered as community scale systems, and the research considers the activity of this subject (community) system as well as higher (e.g. government) and lower (e.g. community sub-groups) systems.

Within panarchies, information (and collective intelligence) is communicated (fed back) to upper levels and, as Holling<sup>246</sup> notes, as long as the transfer of information is maintained, the interactions within each level can be transformed, or the variables changed, without the whole system losing its integrity. Holling believes that the process enables experimentation within levels, thereby greatly increasing the speed of evolution.

According to Holling<sup>247</sup>, Simon<sup>248</sup> argues that each level of a panarchy serves two functions: one is to conserve and stabilise conditions for faster and smaller levels, and the other is to generate and test innovations by experiments occurring within a level.

Holling explains that ‘there are potentially multiple connections between phases at one level and phases at another level’.<sup>249</sup> He goes on to state that there are two

<sup>245</sup> Walker et al, above n 176.

<sup>246</sup> Holling, above n 190.

<sup>247</sup> Ibid.

<sup>248</sup> Simon, above n 242.

<sup>249</sup> Holling, above n, p397; 190.

connections which are particularly significant: the “Revolt” and “Remember” connections. Figure 9 illustrates the presence of these connections within a panarchy.

According to Holling, the Revolt connection can cause a critical change in one cycle (typically during the release phase) to cascade up to a vulnerable stage at a larger, slower cycle, potentially triggering a crisis.<sup>250</sup> The Remember connection facilitates renewal by drawing on the potential that has been accumulated and stored in a larger, slower cycle. Holling explains that when a catastrophe is triggered at one level, the opportunities for, or constraints against, the renewal of the cycle are strongly influenced by the conservation phase of the next slower and larger level.<sup>251</sup> Holling observes ‘it is as if this connection draws on the accumulated wisdom and experiences of maturity; hence the word “remember”’.<sup>252</sup>

Thus, the concept of panarchy explains how adaptive cycles are connected with, and are affected by, systems at scales above and below. According to Holling, panarchy theory focuses on the critical features that affect or trigger reorganisation and transformation in a system: the back-loop where resilience and opportunity is maintained or created, by way of “release” and “reorganisation”; and the connections between levels of the panarchy where persistence (via “remembrance”) and evolvability (via “revolt”) are maintained.<sup>253</sup>

The Resilience Alliance explains that:

*The influence of the states of the system (including where they are in their adaptive cycles) at scales above and below the focal scale influence resilience at the focal scale. From above, the effects can be positive (in the form of providing “memory” and “subsidies”, but also negative (preventing actions, etc). From below, the hyper-coherence of system states or stages in the adaptive cycle can trigger a system collapse at the focal scale.*<sup>254</sup>

This is reiterated by Delanda who states that the autonomy of an emergent whole relative to the emergent individuals is guaranteed by the fact that the whole can causally affect the individuals in both a limiting and an enabling way.<sup>255</sup>

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<sup>250</sup> Ibid.

<sup>251</sup> Ibid, p398.

<sup>252</sup> Ibid, p398.

<sup>253</sup> Ibid, p398.

<sup>254</sup> Walker and Salt, above n, p70, 219.

<sup>255</sup> Delanda, above n 181.

Gunderson and Holling identify two features which distinguish a panarchic representation from traditional hierarchical ones:

*The first is the importance of the adaptive cycle and, in particular the a phase [Reorganisation phase] as the engine of variety and the generator of new experiments within each level. The second is the connections between levels. There are potentially multiple connections between phases at one level and phases at another level, but two are most significant in our search for the meaning of sustainability. Those are the connections labelled as Revolt and Remember.*<sup>256</sup>

They continue:

*The fast levels invent, experiment and test; the slower levels stabilize and conserve accumulated memory of past successful, surviving experiments. The whole panarchy is both creative and conserving. The interactions between cycles in a panarchy combine learning with continuity ... One of the essential features of the panarchy is that it turns hierarchies into dynamic structures. Individual levels have non-linear multi-stable properties which can be stabilised or destabilised through critical connections between levels.*<sup>257</sup>

### ***Causes of Change***

It is relevant at this point to expand briefly on the concepts of forces, desire, lines of flight, and plateaus. These are Deleuzian concepts which effectively describe the causes of change within assemblages – the motivating factors or events which give rise to a need for change. They can be factors internal or external to the system, which disrupt or change the system, or may be efforts to maintain certain parameters of the system.

While Silva<sup>258</sup> describes self-organisation as a process that stems from unrest and dissatisfaction, these more particular concepts of forces, desires, lines of flight, and plateaus are not comprehensively recognised in the existing research on self-organisation and, except for the notion of volition, are not identified as key characteristics. They are, however, fundamental concepts of assemblage theory, providing a means for describing the factors which motivate change in an assemblage.

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<sup>256</sup> Resilience Alliance, above n 217.

<sup>257</sup> Gunderson and Holling, above n 217.

<sup>258</sup> Silva and Farrall, above n 89.

These factors are an important consideration in understanding the process of territorialisation, particularly panarchy and cross-scale relationships.

### *Forces*

Deleuze's thoughts on force, like a number of his concepts, expand on the thoughts of Friedrich Nietzsche. According to Stagoll, Nietzsche describes the world as a chaotic web of natural and biological forces without any particular origin or goal, and without any terminal or equilibrium state.<sup>259</sup> Stagoll explains 'these forces interact ceaselessly, constituting a dynamic world-in-flux rather than a collection of stable entities'.<sup>260</sup>

Force is particularly relevant to this thesis as it refers to any capacity to produce change or becoming. Stagoll explains that Deleuze's conception of force recognises both active forces (those forces that seek dominance through self-affirmation), and reactive forces (those that deny or negate other forces).<sup>261</sup> This might include environmental or social changes and may be enacted from systems at higher or lower scales than the system of focus.

Spinks notes that, according to Deleuze, every force is related to other forces and is defined by whether it obeys or commands.<sup>262</sup> As is illustrated in the case studies, forces enacted on a system from higher or lower scales are often attempts to control or regulate the system. Deleuze says that any two forces constitute a body as soon as they enter a relationship and it is the interaction between dominating and dominant forces which defines a body.

Spinks explains that forces are dominant or dominated depending on their relative difference in quantity, but manifest themselves as active or reactive according to their difference in quality.<sup>263</sup> He continues, 'once the relation has been established the quality of forces — dominant or dominated — produces an active power (that commands the relation) and a reactive power (defined by the relation)'.<sup>264</sup> Spinks also explains that an active force affirms its difference from everything that is weaker than, and inferior to, itself, while reactive forces seek to limit active forces by imposing

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<sup>259</sup> C Stagoll and A Parr, 'Force' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, 2005) 106.

<sup>260</sup> *Ibid*, p106.

<sup>261</sup> *Ibid*; L Spinks, 'Active/Reactive' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 7.

<sup>262</sup> Spinks, above n 261.

<sup>263</sup> *Ibid*.

<sup>264</sup> *Ibid*, p8.

restrictions. An active force becomes reactive when a reactive force manages to separate it from what it can do.<sup>265</sup>

Baugh observes that active forces go to the limit of what they can do by appropriating and dominating, while reactive forces are separated from what they can do through a limitation that comes either from external dominating forces or from turning against themselves.<sup>266</sup>

### *Desire*

The concept of desire is of relevance to this thesis in that, like forces, it is a means of producing change in an assemblage — an assemblage changes in response to forces and desires. For Deleuze and Guattari, desire is productive and positive; ‘a force able to form connections and enhance the power of bodies in their connection’.<sup>267</sup> It is the primary force of life, immanent to everyday life, and not limited to the human world.<sup>268</sup> Unlike Oedipal definitions of desire, for Deleuze and Guattari, desire is immanent and productive — it is not a response to lack, but is a ‘psychical and corporeal production of what we want’.<sup>269</sup>

Colebrook explains:

*When a plant takes in light and moisture it becomes a plant through its relation to these other forces; this is one flow of desire. When a human body connects with another body it becomes a child in relation to a parent, or it becomes a mother in relation to a child; this is another flow of desire. When bodies connect and become tribes, societies or nations, they also produce new relations or flows of desire.*<sup>270</sup>

In relation to assemblages, Deleuze and Guattari say that ‘assemblages are passionate, they are compositions of desire ... The rationality, the efficiency, of an assemblage does not exist without the passions the assemblage brings into play, without the desires that constitute it as much as it constitutes them’.<sup>271</sup> Gao expands on this, stating that desire begins from connection, and that:

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<sup>265</sup> Ibid261.

<sup>266</sup> Baugh, above n 110.

<sup>267</sup> A Ross, 'Desire' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, 2005) 63, p63.

<sup>268</sup> Dovey, above n 226.

<sup>269</sup> E Holland, 'Desire + Social-Production' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, 2005) 65, p65.

<sup>270</sup> Colebrook, above n, pxvi; 137.

<sup>271</sup> Deleuze and Guattari, above n, p399; 131.

*Life strives to preserve and enhance itself and does so by connecting with other desires. These connections and productions eventually form social wholes. When bodies connect with other bodies to enhance their power they eventually form communities or societies.*<sup>272</sup>

#### *Lines of Flight*

Lines of flight are identified above as one of the three lines of connection between bodies, but they typically form a line of rupture or disruption. According to Lorraine, ‘a “line of flight” is a path of mutation precipitated through the actualisation of connections among bodies that were previously only implicit (or “virtual”) that releases new powers in the capacities of those bodies to act and respond.’<sup>273</sup>

Thus a line of flight is something that inspires or motivates change, something that upsets connectives in an assemblage, something transformative. Deleuze and Guattari state, ‘there is a rupture in the rhizome whenever segmentary lines explode into a line of flight, but the line of flight is part of the rhizome’.<sup>274</sup>

As Lorraine says,

*Although Deleuze and Guattari clearly value lines of flight that can connect with other lines in creatively productive ways that lead to enlivening transformations of the social field, they also caution against their dangers. A line of flight can become ineffectual, lead to regressive transformations, and even reconstruct highly rigid segments’.*<sup>275</sup>

#### *Plateau Seeking*

Plateaus are moments of intensity in a rhizome which do not result in some form of climax or failure. Deleuze and Guattari describe plateaus as ‘continuous regions of intensity constituted in such a way that they do not allow themselves to be interrupted by any external termination, any more than they allow themselves to build towards a climax’.<sup>276</sup> Deleuze and Guattari also describe plateaus as ‘any multiplicity connected to other multiplicities by superficial underground stems in such a way as to form or extend a rhizome’.<sup>277</sup>

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<sup>272</sup> J Gao, 'Deleuze's Conception of Desire' (2013) 7(3) *Deleuze Studies* 406, p410.

<sup>273</sup> Lorraine, above n, p143; 122.

<sup>274</sup> F Colman, 'Rhizome' in A. Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 231, p233

<sup>275</sup> Lorraine, above n, p146; 122.

<sup>276</sup> Deleuze and Guattari, above n, p175; 131.

<sup>277</sup> R Coyne, 'Wicked Problems Revisited' (2005) 26(1) *Design Studies* 5, p22.

Ballantyne describes plateaus as spaces where forces interact with each other in a relatively stable way.<sup>278</sup> He also explains that at a plateau there is an impression of perpetual stability and that while conditions may change, changes are “worked out” from within. There are obviously parallels here with the concept of a self-organising process.

The growth of a community could be an example of when multiplicities are assembled to form plateaus — where multiplicities connect and forces interact in a stable way, but where an optimal state or climax is never realised.

According to Lorraine:

*Plateaus are constituted when the elements of a region ... are not subjected to an external plan of organisation. An external plan imposes the selection of some connections rather than others from the virtual relations among the elements that could be actualised, actualising varying capacities to affect and be affected in the process. A plateau emerges when the singularities of an individual or a plane that previously only “insisted” in a concrete state of affairs are put into play through the actualisation of connections that defy the imposition of external constraints.*<sup>279</sup>

### **3.5.2 Characteristics of Self-Organising Change**

Research on self-organisation and emergence theory (covered in preceding sections) indicates that there are five key characteristics of self-organisational change: decentralised control; irreducibility; downward causation; unpredictability and novelty; and far from equilibrium tendencies. These are described further below.

#### ***Decentralised Control***

De Wolf and Holvoet state that, in self-organising systems, only local mechanisms influence the global behaviour and there is no central control, i.e. no single part of the system directs the macro-level behaviour.<sup>280</sup> This characteristic is a direct consequence of the radical novelty that is required for emergence. Further, it is generally accepted that emergent outcomes cannot be determined through the application of rules (from beyond the system), as agents in an emergent system respond to their environment and to localised rules. As noted by Tan, self-organising

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<sup>278</sup> Ballantyne, above n 35.

<sup>279</sup> Lorraine, above n, p206-207; 122.

<sup>280</sup> De Wolf and Holvoet, above n 158.



systems need dynamic rules to adjust to new constraints, but the complexity of the system (at the emergent scale) is dependent on the variety of agencies (groups and individuals affecting the system) and the interactions within the system, rather than the number of rules applying to it.<sup>281</sup>

According to De Wolf and Holvoet, ‘the need for decentralised control, and the fact that no single entity can have a representation of the global emergent, implies that such a single entity cannot be a single point of failure.’<sup>282</sup> Emergent systems are therefore relatively insensitive to perturbations or errors — part of the reason for their adaptability.

### *Irreducibility*

According to El-Hani and Pereira, irreducibility refers to the fact that emergent properties are irreducible to, and unpredictable from, the lower-level phenomena from which they emerge.<sup>283</sup> As De Wolf and Holvoet explain, properties, behaviours, structures, or patterns that are apparent at a higher macro-level arise from the (inter)actions at the lower micro-level of the system.<sup>284</sup> There is an important link between the macro and micro level agents, but often individuals operating at the lower scale are not aware of the emergent outcomes they are generating at the higher scale, or at least the generation of such outcomes is not their primary motivation for their actions.

According to Barnett, the proposition about irreducibility implies that emergence can occur at any level, and that when it does, the emergent properties cannot be attributed to or explained solely in terms of events at lower levels — they are autonomous from their base.<sup>285</sup>

Similarly, for an assemblage to be an assemblage the parts need to interact with one another in such a way as to yield a whole which has properties of its own, properties which are irreducible to the parts. The way that an assemblage comes together (or becomes) depends, among other things, on the forces acting on them (whether they are active or reactive forces), and in the case of social assemblages, on

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<sup>281</sup> E Tan, *Negotiation and Design for the Self-Organizing City: Gaming as a Method for Urban Design* (TU Delft, 2014).

<sup>282</sup> De Wolf and Holvoet, above n, p5;158.

<sup>283</sup> Barnett, above n 133.

<sup>284</sup> De Wolf and Holvoet, above n 158.

<sup>285</sup> C N El-Hani and A M Pereira, 'Higher-Level Descriptions: Why should We Preserve Them' (2000) *Downward causation: Minds, bodies and matter* 118.

the political processes (whether macro or micro political). The form and function of particular assemblages might then be more rhizomic or more arborescent, more molar or more molecular.

### ***Downward Causation***

Relating to the concept of irreducibility, Barnett describes downward causation as ‘a relation between emergent phenomena and the circumstances from which they arrive’.<sup>286</sup> He explains that downward causation addresses the question of whether higher-level entities affect their lower level constituents.

For Delanda, the autonomy of an emergent whole relative to the emergent individuals is guaranteed by the fact that the whole can causally affect the individuals in both a limiting and an enabling way.<sup>287</sup>

Downward causation might also be thought of in a historical sense. As Silva explains, by reference to van Assche and Djanibekov<sup>288</sup>, ‘the existing capacity to adapt and evolve is shaped by embedded configurations of previous choices and interactions with other agents, as well as the distribution of resources and hierarchical dependencies resulting from earlier events.’<sup>289</sup>

Barnett explains that the issue of downward causation introduces the crucial function of feedback, or autocatalysis.<sup>290</sup> Autocatalysis refers to the phenomenon of properties, events, or objects serving as their own catalysts. According to Barnett, it occurs when positive feedbacks cause outputs from one system affecting the inputs of another system.

### ***Unpredictability and Novelty***

De Wolf and Holvoet explain that the macro level behaviour is novel with regard to the individual behaviours at the micro-level.<sup>291</sup> In other words, the macro level outcomes are irreducible to micro level processes, or “the whole is greater than the sum of its parts”. ‘Radical novelty arises because the collective behaviour is not readily understood from the behaviour of the parts.’<sup>292</sup> As a consequence, emergence

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<sup>286</sup> Barnett, above n, p26; 133.

<sup>287</sup> Delanda, above n 19.

<sup>288</sup> K Van Assche and N Djanibekov, 'Spatial Planning as Policy Integration: The need for an evolutionary perspective. Lessons from Uzbekistan' (2012) 29(1) *Land use policy* 179.

<sup>289</sup> Silva and Farrall, above n, p5; 90.

<sup>290</sup> Barnett, above n, p26; 133.

<sup>291</sup> De Wolf and Holvoet, above n 158.

<sup>292</sup> *Ibid*, p4;158.

is difficult to predict, largely because complexity increases combinatorially with every new agent that emerges as part of the system.

Unpredictability is sometimes referred to as “nonlinearity”. Goldstein describes nonlinearity as the unpredictable nature of cross-scale emergent outcomes.<sup>293</sup> The magnified range of potential outcomes and the amplification of random events means emergence arises from non-linear sequences of events.

Novelty refers to the notion that emergent systems have features that are not previously observed in the system. This novelty is the reason that emergent outcomes are neither predictable nor deducible. El-Hani and Pereira point out that novel properties only occur when aggregates of material particles attain an appropriate level of organisational complexity.<sup>294</sup>

### ***Far from Equilibrium***

The concept of far from equilibrium is another important concept which relates to resilience thinking. According to Goldstein, ‘... earlier systems theories explored how systems tend toward a final state of equilibrium or homeostasis (for example, the notion of “equifinality” in general systems theory), whereas complexity sciences are far more interested in the “beyond equilibrium” conditions that foster emergence.’<sup>295</sup> It is now generally accepted that, rather than systems existing in some theoretical equilibrium, they are constantly pushed to far from equilibrium states by the perpetual forces of change, and thus changes in the flows of matter and energy through the system.

It is when systems are in these far from equilibrium states that they are most ‘vital and complex’<sup>296</sup> and when phase changes, process bifurcations, and new patterns of organisation are most likely to occur (these processes are discussed further below).

### **3.5.3 Territorialisation, Deterritorialisation, and Reterritorialisation**

As explained above, territorialisation is the main dimension by which assemblages change. It is of particular interest to this thesis because it is the manifestation of change in complex social-environmental systems, such as urban communities. Territorialisation represents the way community actors inscribe, erase

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<sup>293</sup> Barnett, above n, p26; 69.

<sup>294</sup> Ibid.

<sup>295</sup> Ibid, p27.

<sup>296</sup> Goldstein, above n 156.

and affect the community space (or territory) by way of physical changes, programs, or regulations.

Referencing Deleuze and Guattari, Dovey observes that ‘territory is a stabilized assemblage, a zone of order, a sense of home that keeps chaos and difference at bay’.<sup>297</sup> Message explains that ‘a territory manifests a series of constantly changing heterogeneous elements and circumstances that come together for various reasons at particular times ... A territory is necessarily lived and produces a vague entity ...’.<sup>298</sup> Dovey explains:

*Territories are defined not only by boundaries but also by internal uniformities ... The assemblage known as a “family” is territorialised in a “house”, a “corporation” in an “office”, a “community” in a “neighbourhood” and so on. In each case both spatial and social exclusions operate to enforce spatial boundaries and exclude non-members of the assemblage.*<sup>299</sup>

Dovey’s observations reflect the point that territorialisation does not necessarily refer to physical manifestations, nor to permanent change. In urban situations, territories may refer to a community, an occupied space, a temporary event, a building, and so on.

Delanda gives the example of a small town where there are borders which define the neighbourhoods but social communities that extend across limits of neighbourhoods.<sup>300</sup> Those communities were deterritorialised — their borders were transgressed/blurry. In instances where communities do not cross defined borders (e.g. during civil war) the communities became more territorialised. The distinctions become sharper, identities more well-defined, the space occupied more striated. Territorialisation then describes how unchanging or homogeneous is the identity of the assemblage. Deterritorialisation is the opposite, describing how many heterogeneous elements are accommodated, and how fuzzy are the boundaries.

Delanda explains that the concept of territorialisation must be first of all understood literally.<sup>301</sup> A face-to-face conversation, interpersonal networks, organisations, and other assemblages all occupy a defined spatial territory — a

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<sup>297</sup> K Dovey, *Urban Design Thinking - A Conceptual Toolkit* (Bloomsbury Academic, 2016), p263.

<sup>298</sup> Message, above n, p275; 146.

<sup>299</sup> Dovey, above n, p18; 385.

<sup>300</sup> Delanda, above n 185.

<sup>301</sup> Ibid.

particular place, a particular building, an ethnic neighbourhood, or small town with well-defined borders.

*So, in the first place, processes of territorialisation are processes that define or sharpen the spatial boundaries of actual territories. Territorialisation, on the other hand, also refers to non-spatial processes which increase the internal homogeneity of an assemblage, such as the sorting processes which exclude a certain category of people from membership of an organization, or the segregation processes which increase the ethnic or racial homogeneity of a neighbourhood. Any process which either destabilizes spatial boundaries or increases internal heterogeneity is considered deterritorialising.*<sup>302</sup>

As Dovey explains, territorialisation ‘describes the ways social and spatial boundaries are inscribed and erased, the way identities are formed, expressed and transformed’.<sup>303</sup> Assemblages are therefore defined by territorialisation and deterritorialisation: deterritorialised assemblages are poorly defined, blurred, heterogeneous, while territorialised assemblages are sharply defined, unchanging, homogeneous. Dovey goes on:

*Deterritorialisation is the movement by which territories are eroded (settlements are demolished, nations are invaded); deterritorialised elements are then recombined into new assemblages through a process of reterritorialization.*<sup>304</sup>

Delanda suggests that ‘any process which either destabilises spatial boundaries or increases internal heterogeneity is considered deterritorialisation’.<sup>305</sup>

With regard to reterritorialisation, Patton explains that:

*Deterritorialisation is always bound up with correlative processes of reterritorialisation, which does not mean returning to the original territory but rather the ways in which deterritorialised elements recombine and enter into new relations. Reterritorialisation is itself a complex process which takes different forms depending upon the character of the processes of deterritorialisation within which it occurs.*<sup>306</sup>

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<sup>302</sup> Ibid, p13.

<sup>303</sup> Dovey, above n, p264; 297.

<sup>304</sup> Dovey, above n, p264; 297.

<sup>305</sup> Delanda, above n 185.

<sup>306</sup> P Patton, 'Deterritorialisation + Politics' in A. Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 70, p70.

Parr states that:

*The relationship deterritorialisation has to reterritorialisation must not be construed negatively; it is not the polar opposite of territorialisation or reterritorialisation (when a territory is established once more). In fact, in the way that Deleuze and Guattari describe and use the concept, deterritorialisation inheres in a territory as its transformative vector; hence, it is tied to the very possibility of change immanent to a given territory*'.<sup>307</sup>

Message adds that:

*A territory does not simply hold back the process of deterritorialisation, nor does it provide it with an opposing or dichotomous term ... Neither does a territory provide a base or originary term (home) from which deterritorialisation may occur. Instead, it is a constant accompaniment to (and even proponent facilitating) the lines of flight deterritorialisation proposes*.<sup>308</sup>

Colebrook provides some useful examples of territorialising processes, explaining that 'life creates and furthers itself by forming connections or territories'.<sup>309</sup>

Colebrook observes:

*Light connects with plants to allow photosynthesis. Everything, from bodies to societies, is a form of territorialisation, or the connection of forces to produce distinct wholes. But alongside every territorialisation there is also the power of deterritorialisation. The light that connects with the plant to allow it to grow also allows for the plant to become other than itself: too much sun will kill the plant, or perhaps transform it into something else (such as sun-dried leaves becoming tobacco or sun-drenched grapes becoming sultanas)*.<sup>310</sup>

She continues:

*The human bodies that assemble to form a tribe or collective (territorialisation) can produce a whole that then allows them to be governed by a chieftain or despot (deterritorialisation, where the power for assembling has produced a collective disempowerment). There can also be reterritorialisation. The tribe*

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<sup>307</sup> A Parr, 'Deterritorialisation / Reterritorialisation' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 66, p67.

<sup>308</sup> Message, above n, p275; 146.

<sup>309</sup> Colebrook, above n, pxxii; 18.

<sup>310</sup> *Ibid*, pxxii.

*can take the deterritorialised term (such as the ruler or despot) and return it to the collective: we are all leaders, or we all govern ourselves (as in modern individualism). Territorialisation can occur at all levels of life. Genes connect or territorialise to produce species, but these same connections also allow for mutations (deterritorialisation). Such mutation can also be used, or turned back, to reinforce the territory that was initially the outcome of random mutation: say in gene therapy or genetic modification, where the motor for change and deterritorialisation (genetics) is used to arrest change and mutation (reterritorialisation).<sup>311</sup>*

This research is primarily concerned with territorialisation (which, in this thesis, encapsulates all three concepts of territorialisation, deterritorialisation, and reterritorialisation), insofar as it is a process that produces, defines, changes, or programs community space, and fundamentally refers to the relationship between community actors and space.

In relation to the concept of “emergence”, Delanda goes on to suggest that territorialisation is a necessary process for emergence: ‘the concept of territorialisation plays a synthetic role, since it is in part through the more or less permanent articulations produced by this process that a whole emerges from its parts and maintains its identity once it has emerged’.<sup>312</sup>

### **3.6 WHAT ARE THE FACTORS THAT AFFECT SELF-ORGANISED CHANGE IN COMPLEX SOCIAL-ENVIRONMENTAL SYSTEMS?**

The preceding sections provided an explanation of how systems change, the types of factors that cause change, and the characteristics of self-organisational change. The following section builds on that understanding and, through the application of assemblage theory and relevant Deleuzian concepts, identifies a set of causes and variables which appear to affect how self-organisational territorialisation occurs in complex systems. In simple terms, self-organisation territorialisation refers to how social groups engage, disengage, and re-engage with their environment, primarily by way of decisions and actions made at the level of the social group or lower. Such self-organised territorialisation reflects an assemblage with high levels of adaptive capacity.

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<sup>311</sup> Ibid, pxxii-xxiii.

<sup>312</sup> Delanda, above n, p14; 181.

The identified variables are thought to affect the processes of territorialisation in urban assemblages and consequently affect the position of the focus system in the adaptive cycle. When the identified variables express certain qualities, molecularity of the system increases, creating opportunities for self-organised territorialisation (and more adaptable urbanism); when the variables express contrasting qualities, molarity increases, creating opportunities for more top-down territorialisation (and rigid urbanism).

These variables can be categorised in terms of composition (referring to the bodies or agents that comprise the system), governance (referring to how the system is governed), and space (referring to physical and intangible qualities of the environment of the system). These categories share some similarities with those identified by Cummings and others where they identify factors that affect the identity of resilient systems, i.e. the components that make up the system, the relationships between components, the ability of components and relationships to maintain themselves, and through innovation and self-organisation of the system.<sup>313</sup>

It is expected that the identified variables can be observed in various communities as a means of understanding the process of self-organisational territorialisation. This will be tested in the next section through development of a set observations about the variables in the case studies. It is hoped that, if the propositions about the relationship of the variables to self-organisational territorialisation are confirmed, then the variables may provide a means of understanding how self-organisational capacity (and thus adaptability) can be integrated into contemporary communities.

It should be noted here that the identified variables are not the only factors affecting the way communities change or self-organise — they are simply a set of variables which feature, or at least have some resonance with the synthesised theory on assemblages, self-organisation, and adaptability.

### **3.6.1 Composition**

Composition refers to the makeup of the social-environmental system or assemblage. In particular, composition refers to the bodies that constitute the assemblage and the relationships or connections between them.

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<sup>313</sup> Cumming et al, above n 39.



### ***Bodies***

As Baugh explains, ““body” for Deleuze is defined as any whole composed of parts, where these parts stand in some definite relation to one another, and has a capacity for being affected by other bodies’.<sup>314</sup> Examples might include the human body, a social body, or a body of work such as a linguistic corpus. As noted in Chapter 4, the focus scale of the case studies is the community scale — the community being a discrete body, composed of individuals and smaller scale bodies, and forming part of a panarchy of larger bodies.

According to Baugh, a body exists when a number of parts enter into the characteristic relation that defines it.<sup>315</sup> A body is defined by the relation of its parts, and its actions and reactions within its environment (exterior milieus) and internal milieu (milieu such as cellular functions). A body is not, then, defined by its structure or form. Baugh continues:

*The parts of a body vary depending on the kind of body: for a simple material object, such as a rock, its parts are minute particles of matter; for a social body, its parts are human individuals who stand in a certain relation to each other. The relations and interactions of the parts compound to form a dominant relation, expressing the “essence” or a power of existing of that body, a degree of physical intensity that is identical to its power of being affected.*<sup>316</sup>

Baugh goes on to observe that ‘bodies are affected by different things, and in different ways, each type of body being characterised by minimum and maximum thresholds for being affected by other bodies: what can and what cannot affect it, and to what degree.’<sup>317</sup>

Of particular relevance to adaptability, diversity of a body is often related to adaptive capacity. A system with a high degree of diversity tends to have a higher capacity to respond to change, and a higher redundancy amongst actors/components. Diversity refers to the variety of system components available to respond to change and disturbance. As explained by Levin, the diversity of system components is essential for the self-organising ability as heterogeneity provides a source of variation

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<sup>314</sup> Baugh, above n, p31; 110.

<sup>315</sup> Ibid.

<sup>316</sup> Ibid, p31.

<sup>317</sup> Ibid, p32.

for adaptation.<sup>318</sup> As identified above, diversity and heterogeneity are qualities characteristic of a deterritorialised assemblage.

Stirling identifies three aspects of diversity: variety (how many different elements), disparity (how different the elements are from each other), and balance (how many representatives of each element). Redundancy is related to diversity and describes the replication of elements or connections in a system.<sup>319</sup> According to Biggs, Schlüter and Schoon, redundancy is related to disparity, being determined by the similarities rather than the differences among system elements.<sup>320</sup>

Patton explains that Deleuze and Guattari believe all bodies are composed of three kinds of line (connections)<sup>321</sup>:

1. Molar lines, which correspond to the forms of rigid segmentation found in hierarchical institutions. In *A Thousand Plateaus*, Deleuze and Guattari associate molar lines with the State and explain that they are well defined, often massive, and are affiliated with governing apparatus.<sup>322</sup>

Corresponding with the concept of arborescent schema, molar lines ‘leave no room for all that is flexible and contingent’.<sup>323</sup>

2. Molecular lines, which correspond with the fluid or overlapping forms of division characteristic of “primitive” territoriality. Compared to molar lines, molecular lines are micro-entities and ‘politics that transpire in areas where they are rarely perceived’<sup>324</sup> which ‘allow for connections that are local and singular’<sup>325</sup>. Conley explains that molecular action is a vital element in what Deleuze uses to describe the processes of things and creation. Molecular lines are critical to self-organisational capacity.<sup>326</sup>
3. Lines of flight, which are paths along which things change or become transformed into something else and which rupture the other two lines.

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<sup>318</sup> Levin, above n 111.

<sup>319</sup> A Stirling, 'A General Framework for Analysing Diversity in Science, Technology and Society' (2007) 4(15) *Journal of the Royal Society Interface* 707.

<sup>320</sup> K Kotschy et al, '3 Principle 1—Maintain Diversity and Redundancy' in R Biggs, M Schlüter and M L Schoon (eds), *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems* (Cambridge University Press, 2015) 50.

<sup>321</sup> Patton, above n 306.

<sup>322</sup> Conley, above n 170.

<sup>323</sup> Surin, above n, p162; 169.

<sup>324</sup> Conley, above n, p172; 170.

<sup>325</sup> Surin, above n, p162; 169.

<sup>326</sup> Conley, above n 170.

Also related to the concept of bodies are the concepts of “nomos” and “logos”, which describe the composition of the bodies (or how they came together). According to Roffe:

*“Nomos” is the name that Deleuze gives to the way of arranging elements whether they are people, thoughts or space itself that does not rely upon an organisation or permanent structure. It indicates a free distribution, rather than structured organisation, of certain elements.*<sup>327</sup>

A body defined more in terms of nomos, with regard to distribution and coding, is likely to have a greater self-organisational capacity.

Roffe points out that, while the Greek word “nomos” is usually translated as “law”, Deleuze references an alternative translation — “to distribute”.<sup>328</sup> Deleuze opposes “nomos” (as distribution) to another Greek work, “logos” and one of its translations, meaning “law”. Roffe explains:

*This is because the picture of the world indicated by logos is one in which everything has its right place: it is a structured and ordered conception of existence. Logos also implies, then, a conception of distribution, but one that is founded on a previous structure and is well-organised.*<sup>329</sup>

So, for Deleuze, “nomos” refers to a kind of anarchic distribution relating to the concept of “nomad”. Roffe explains:

*Rather than existing within a hierarchical structure like a city, nomadic life takes place in a non-structured environment where movement is primary ... Fixed points like dwellings are subordinated to this fundamental and lawless movement ... while there may be points of significance in nomadic life they do not form fixed references which divide up the movement of life into discrete elements.*<sup>330</sup>

### ***Relationships and Connectivity***

As previously alluded to, actors in the system can be related in a highly centralised, hierarchical or “arborescent” manner; or in a decentralised, “rhizomic” manner. A rhizomic system is more adaptable and resilient for a range of reasons,

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<sup>327</sup> Roffe, above n, p184-185; 119.

<sup>328</sup> Ibid.

<sup>329</sup> Ibid, p185.

<sup>330</sup> Ibid, p184-185.

particularly because there is no central component which could fail, and because the connectivity of feedbacks is more comprehensive, and more localised.

Deleuze and Guattari use the term “rhizome” to describe a complex of relationships which connects intensities but has no hierarchy or centre and which is perpetually changing (constructing, deconstructing, and reconstructing) and re-emerging in response to external and internal stimuli. The rhizome is a way of understanding and describing any phenomenon, from language, to social interaction, to politics. The nature of a rhizome is that of a moving matrix, composed of organic and non-organic parts, forming symbiotic and aparallel connections, according to transitory and as yet undetermined routes.<sup>331</sup>

To Deleuze, the rhizome is the counterpoint to tree-like hierarchies and structures, or “arborescent schema”. Arborescent schema have at their top an immutable concept or entity while related concepts or entities are organised under the primary in a strictly hierarchical order, from superior to subordinate, or from transcendent to particular. Once arranged, the subordinate elements are unable to move or establish productive relationships with other elements — their position and ability to establish relationships is determined by the behaviour of the superior entity.<sup>332</sup>

The hierarchical tree structure is a self-contained totality or closed system that is equal to the sum of its parts and is less capable of change; in this sense it cannot be seen to be an emergent multiplicity.<sup>333</sup> Regarding tree structures, Stagoll observes:

*They are stable or even essential in so far as, first, the superior concept is the all-powerful defining force that dictates the position or meaning of all else in the system is, second, the tendency is to think of the system either as complete in itself or else unconnected to other systems in any meaningful way. The tree is ‘fixed to the spot’ and static. Any remaining movement is minimal and internal to the system rather than exploratory or connective.*<sup>334</sup>

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<sup>331</sup> Colman, above n, p231-232; 274.

<sup>332</sup> Stagoll, above n 259.

<sup>333</sup> Ibid.

<sup>334</sup> Ibid, p14.

By contrast, ‘any point of a rhizome can be connected to anything other, and must be. This is very different from the tree or root, which plots a point, fixes an order’.<sup>335</sup> As Colebrook says:

*Whereas the tree grows upward, suggesting a hierarchical structure with a ground and elevated upper branches, the rhizome is one of Deleuze's many figures that describes movement along a single surface, that then stratifies or creates surfaces: no point elevated above any other, and no foundation or surface upon which movement and activity takes place, just movement and activity itself.*<sup>336</sup>

Deleuze and Guattari summarise the principal characteristic of rhizomes as follows:

*Unlike trees or their roots, the rhizome connects any point to any other point ... It is composed not of units but of dimensions, or rather directions in motion. It has neither beginning nor end, but always a middle (milieu) from which it grows and which it overfills ... The rhizome operates by variation, expansion, conquest, capture, offshoots ... In contrast to centered (even polycentric) systems with hierarchical modes of communication and preestablished paths, the rhizome is an acentered, nonhierarchical, non-signifying system without a General and without an organizing memory or central automaton, defined solely by a circulation of states.*<sup>337</sup>

Colman explains:

*The rhizome is any network of things brought into contact with one another, functioning as an assemblage machine for new affects, new concepts, new bodies, new thoughts; the rhizomic network is a mapping of the forces that move and/or immobilise bodies.*<sup>338</sup>

Colman continues, ‘a rhizome contributes to the formation of a plateau through its lines of becoming, which form aggregate connections. There are no singular

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<sup>335</sup> G Deleuze, *Dialogues with Clare Parnet* (H. & Habberjam Tomlinson, B. trans, Athlone Press, 1987), p10; 297; Deleuze and Guattari, above n, p7; 131.

<sup>336</sup> Stagoll, above n, p13-14; 259.

<sup>337</sup> Coyne, above n, p22; 277.

<sup>338</sup> Colman, above n, p233; 274.

positions on the networked lines of a rhizome, only connected points which form connections between things'.<sup>339</sup> Conley expands on this notion, stating that:

*The rhizome creates a web or a network; through capture of code, it increases its valences and is always in a state of becoming. It creates and recreates the world through connections. A rhizome has no structure or centre, no graph or regulation ... The rhizome is in a constant process of making active, but always temporary, selections.*<sup>340</sup>

Of particular relevance to this thesis is that, through their very lack of rigidity, rhizomic networks are more resilient than tree-like structures.<sup>341</sup> Dovey explains 'the tree-like structure produces spatial control by channelling flows of movement along spatial stems but it lacks adaptability since there is nowhere else for these flows to go'.<sup>342</sup> According to Delanda<sup>343</sup> and Dovey<sup>344</sup>, the state is generally linked to tree-like structures, explaining that its power rarely relies on connectivity between elements, but instead operates by drawing constituent parts into a tree-like structure. By comparison, markets are rhizomic because functionality depends on horizontal networks of information, goods, and people.

Connectivity refers to the structure and strength with which resources or system actors interact or move across system domains.<sup>345</sup> As Biggs, Schlüter and Schoon explain, high levels of connectivity can facilitate recovery after disturbance by increasing communication, information sharing, and resource sharing.<sup>346</sup> However, highly connected systems increase the potential for disturbances to spread.

Delanda states that one of the most important properties of assemblages is the density or intensity of connectivity among indirect links.<sup>347</sup> He uses the analogy of a social network to explain this: 'if the friends of my friends (that is, my indirect links) know the friends of your friends, and they know the friends of everybody else's friends

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<sup>339</sup> Ibid, p233.

<sup>340</sup> V Conley, 'Rhizome + Technology' in A Parr (ed), *The deleuze dictionary* (Edinburgh University Press, Revised ed, 2005) 234, p234-235.

<sup>341</sup> Dovey, above n 385.

<sup>342</sup> Ibid, p21.

<sup>343</sup> Delanda, above n 19.

<sup>344</sup> Dovey, above n 385.

<sup>345</sup> Ö Bodin and C Prell, *Social Networks and Natural Resource Management: Uncovering the Social Fabric of Environmental Governance* (Cambridge University Press, 2011).

<sup>346</sup> V Dakos et al, '4 Principle 2—Manage Connectivity' in R Biggs, M Schlüter and M L Schoon (eds), *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems* (Cambridge University Press, 2015) 80.

<sup>347</sup> Delanda, above n, p36; 181.

in a given community, the network has a high density'.<sup>348</sup> The variables that would affect the connections include the composition or structure of the network (whether it was more rhizomic or more arborescent, whether relationships were predominantly molar or molecular). Further, he explains that in a dense network in which everybody knows everybody else and people interact in a variety of roles, the information that circulates tends to be well known to all participants. On the other hand, dispersed networks are less capable of supplying other resources (e.g. trust in a crisis) that define the strength of strong links. They are also less capable of providing constraints, such as enforcement of local norms. The resulting low degree of solidarity, if not compensated for in other ways, implies that as a whole, dispersed communities are harder to mobilize politically and less likely to act as causal agents in their interactions with other communities.<sup>349</sup>

### 3.6.2 Governance

#### *Coding*

In their work on capitalism, Deleuze and Guattari describe how social formations restrict or structure flows — of money, commodities, people, matter, communication, and so on. As Roffe points out, Deleuze and Guattari's political thought 'begins with the premise that nature itself, the Whole of existence, is at once a matter of flows, and that any society must structure these flows in order to subsist'.<sup>350</sup> They describe this process of flow restriction or structuring as "coding", and regard coding as both restrictive and necessary. While Deleuze and Guattari only apply the concept to strata, Delanda expands its application to assemblages.

Coding and decoding are similar to territorialisation and deterritorialisation in that they apply to the identity of the assemblage. Animals whose behaviour is rigidly determined by their genes (i.e. animals that cannot learn by experience) are an example of highly coded assemblages. Another example is a religious group which follow rules of religion to the letter. Coding and decoding define how sharply defined an identity of assemblage is (or a stratum) and decoding defines an opening for that identity, an opening for change. The research on adaptability and assemblage theory indicates that

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<sup>348</sup> Ibid, p56.

<sup>349</sup> Ibid, p37.

<sup>350</sup> J Roffe, 'Capitalism' in A Parr (ed), *The deleuze dictionary* (2005) 40, p35.

informal, dynamic, and localised coding increases the capacity for self-organisation and adaptability.

Roffe tells us that there can be no limit to the process of decoding (as all such limits would be codes), nor could there be any prospect of absolute decoding (a totally decoded society would be a contradiction in terms).<sup>351</sup> The lack of limits to such process accounts for the sense of perpetual novelty and innovation in capitalist society, and the lack of an absolute decoding is compensated for by fragments of coded beings (societies) being put to work in the service of capitalism and decoding.

Dovey explains that ‘informal settlements are not chaotic, but embody an emergent informal order or code of the kind that all cities need in order to work.’<sup>352</sup> He continues:

*Under conditions of poverty, however, such informal codes are often insufficient and we see the result of a nasty version of the “tragedy of the commons” where incremental encroachment starves the public realm of space, light and air, as can be seen in Dharavi, Mumbai. The challenge is to develop such existing codes into a more formal code where the escalation of encroachment is contained or reversed. Any newly formalised codes that emerge need to sustain the productivity, amenity and sociality that is already embodied in the place, and acknowledge the dilemma that formalisation inevitably eradicates some of the scope for informal adaptation.*<sup>353</sup>

Closely tied to the concept of coding is governance — how codes are established and imposed, by which bodies and for what reasons. The concept of governance is, of course, expressed in relation to concepts such as molarity, molecularity, micropolitics, rhizomes and even forces.

The concept of self-organisation, and the fact that it counters concepts of central organisation and hierarchy, relate to Deleuze and Guattari’s concept of micropolitics. As Surin explains, Deleuze and Guattari conceive of micropolitics as the counter to politics of molarisation.<sup>354</sup> ‘A molecular logic of production is basically self-

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<sup>351</sup> Ibid.

<sup>352</sup> K Dovey, 'Informalising Architecture: The Challenge of Informal Settlements' (2013) 83(6) *Architectural Design* 82, p88.

<sup>353</sup> Ibid, p88.

<sup>354</sup> Surin, above n 169.



organising or auto-poetic, whereas its molar counterpart finds its generating principle in some feature or entity that is external to what is being produced'.<sup>355</sup>

Surin explains that the necessity for micropolitics for Deleuze and Guattari, stems from the current conjecture of capitalist production and accumulation.<sup>356</sup> In this conjecture, capital has become the prevailing condition, permeating through every facet of society, and leading to a blurring of the distinction between state and society, such that together they constitute an all-encompassing reality, and all capital has become social capital. Surin notes that in this situation, a molar politics with its emphasis on standardisation and homogeneity becomes increasingly irrelevant, and the more dynamic, connecting, and individualistic micropolitics will become more significant for determining lines of affiliation and action.

### ***Collective Intelligence***

According to Portugali, city dynamics (the movement of individuals and groups within a city) is informed by two forms of information: internal and external: 'Internal information is derived from the individual's memory as related to the spatial consequences of his/her cultural identity and socio-economic status', whereas external information refers to actual spatio-cultural and spatio-economic configurations in the city at a certain moment'.<sup>357</sup> Portugali's observation highlights the importance of collective intelligence in self-organising communities. Coding, the regulation of flows in an assemblage, includes regulation of intelligence and its distribution through the system.

Salingaros reinforces the importance of acknowledging the role of intentionality (volition), hermeneutics, and memory. He explains:

*Individuals in the city act and behave intentionally in line with their wishes, wants and so on. In order to act and behave intentionally, they need information about the city. This information they subjectively extract from what they see and experience in the city. They extract this information by means of logic, imagination, past experiences, knowledge and other "tools" commonly assumed to form the content of the individual's memory. This process by which the individual extracts information by means of memory, and by so doing in fact*

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<sup>355</sup> Ibid, p162.

<sup>356</sup> Ibid.

<sup>357</sup> Portugali, above n 166.

*creates and constructs his/her own and others' city, is termed hermeneutics. And to complete the picture and the feedback loop one should add that memory is also the place where intentions are created, represented and stored.*<sup>358</sup>

Related to the concept of collective intelligence, Johnson suggests that a key reason for resilience in cities is the role of cities as information storage and retrieval devices, and a 'self-organising stickiness' that results from clustering of self-organising entities. He explains that similar business and other activities cluster together to benefit from economies of agglomeration. 'Cities bring minds together and put them in coherent slots ... Ideas and goods flow readily within these clusters leading to a productive cross-pollination, ensuring that good ideas don't die out in rural isolation'.<sup>359</sup>

### ***Feedbacks***

An assemblage that is highly connected through a decentralised (rhizomic) network of connections is likely to be more informed and more responsive, and thus more adaptable. A hallmark feature of adaptable self-organising systems is the capacity for localised learning, which is dependent on localised and diverse feedback networks. Feedbacks occur when a change in a particular part of an assemblage eventually loops back to affect the original variable or process.<sup>360</sup>

The notion of feedbacks and their immediacy or 'tightness' is explored by Ostrom<sup>361</sup> in her research on the management of common resources. She observes that one of the causes for mismanagement of common resources (and thus a critical aspect of any self-organising system) is the separation between causes (the actions of individuals) and registered effects (the consequences of those actions on the system). Where feedbacks are delayed or indirect, the consequences of actions in relation to common resources may not be known or seen for some time, if at all.

If the current system configuration is considered desirable, maintaining feedbacks ensures slow variables are controlled and the system can remain in that state. If the system is in an undesirable configuration it may be necessary to weaken those feedbacks which perpetuate that condition.<sup>362</sup>

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<sup>358</sup> Ibid.

<sup>359</sup> Barnett, above n, p32; 133.

<sup>360</sup> Biggs et al, above n 232.

<sup>361</sup> Ostrom, above n 55.

<sup>362</sup> Biggs et al, above n 197.

As Johnson explains, individual agents make decisions about their actions based on what their neighbours are doing (or not doing), and based on what they can learn from their neighbours.<sup>363</sup> He continues:

*We see emergent behaviour in systems like ant colonies when the individual agents in the system pay attention to their immediate neighbours rather than wait for orders from above. They think locally and act locally, but their collective action produces global behaviour.*<sup>364</sup>

Johnson explains that often, to make an emergent system more adaptive, it is a matter of altering the kinds of feedback in the system. In most systems there is negative feedback and positive feedback and according to Johnson most automated control systems rely extensively on “negative feedback”. Johnson explains that negative feedback ‘is a way of reaching an equilibrium point despite unpredictability – and changing – external conditions.’<sup>365</sup> The “negativity” keeps the system in check, just as “positive feedback” propels other systems onward’.<sup>366</sup> He goes on to say that negative feedback is a way of indirectly pushing fluid, changeable systems towards a goal and is therefore a way of ‘transforming a complex system into a complex adaptive system’.<sup>367</sup> Johnson describes positive feedback as ‘the sort of self-fuelling cycles that cause a note strummed on a guitar to expand into a howling symphony of noise.’ For negative feedback, Johnson gives the example of a thermostat — the thermostat reads the temperature of the room and pumps in warm or cool air until the correct temperature is reached.

In basic terms, negative feedback involves pushing a system from an existing state towards a more desired state through incremental changes, whereby the difference between the existing and desired system is fed back through the process. Wiener called this process of self-regulated change “homeostasis”. In *Great American Cities*, Jacobs argued that large cities can have a kind of homeostasis through the lively street activity she advocated — that the urban actors interacting with one another form part of a negative feedback system which moves aspects of the city from an existing

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<sup>363</sup> Johnson, above n 168.

<sup>364</sup> Ibid.

<sup>365</sup> Ibid, p138.

<sup>366</sup> Ibid, p121.

<sup>367</sup> Ibid, p138.

(less satisfactory) state to a preferred state. She argued that any planning efforts that limited those interactions weakened the feedback process.

### 3.6.3 Space

Anthony Giddens argues that social self-organisation depends on the relationships between agency and structures, with each constraining or enabling the other.<sup>368</sup> In this regard, space, and the structures within it, are an important consideration for self-organisation in social-environmental systems.

Deleuze and Guattari distinguish two types of space, *logos* and *nomos*, as Roffe explains:

*Logos, the ordered conception of existence, offers a picture of space that is primordially cut up in various ways, one that includes intrinsic boundaries. This space is termed “striated”. On the contrary, not only does nomos indicate that space does not have any intrinsic organisation, and must be considered to be open, or what Deleuze and Guattari call “smooth space”, but this space itself is something that must be created. The political radicality of nomos, and of nomadic distribution, is that it proposes the dissolution of the imposed structures of logos as lawful structure, and a creation of smooth space in which encounters outside of the ordered conception of existence can become possible.*<sup>369</sup>

According to Conley, ‘a “smooth space” is one that is boundless and possibly oceanic, a space that is without border or distinction that would privilege one site or place over another’.<sup>370</sup> Roffe says that smooth space is a space without fixed points or boundaries, wherein movement is uninhibited.<sup>371</sup> Dovey points out that ‘smoothness implies a slipperiness and movement where one slides seamlessly from one identity, meaning or image to another’.<sup>372</sup> By comparison, striated space is:

*A space drawn and riddled with lines of divide and demarcation that name, measure, appropriate and distribute space according to inherited political*

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<sup>368</sup> A Giddens, 'The Constitution of Society: Outline of the Theory of Structuration' (1984) *Berkeley: U of California P* .

<sup>369</sup> Roffe, above n, p186; 119.

<sup>370</sup> Conley, above n, p258-259; 170.

<sup>371</sup> Roffe, above n 119.

<sup>372</sup> Dovey, above n p 21; 385.

*designs, history or economic conflict. Without boundaries or measure, smooth space is frequently affiliated with the unconscious.*<sup>373</sup>

As Dovey points out, ‘the term “striated” captures the etymological links to the Latin: *stringere*, “to draw tight”’.<sup>374</sup> He explains that ‘striated space is where identities and spatial practices have become stabilised in strictly bounded territories with choreographed spatial practices and socially controlled identities’.<sup>375</sup> In comparison, ‘smooth space is identified with movement and instability through which stable territories are erased and new identities and spatial practices become possible’.<sup>376</sup>

Importantly, Deleuze and Guattari explain that smooth and striated space only exist in mixture<sup>377</sup> and that ‘a smooth space allows itself to be striated, and striated space re-imparts a smooth space, with potentially very different values, scope, and signs’.<sup>378</sup> Further, Wise argues that ‘no space is ever completely smooth because all spaces will be reterritorialised by various organising procedures, becoming “striated” in varying degrees and intensities’.<sup>379</sup> This suggests that the effects of organisation and change affect the degree of striation and interruptions of space. It also suggests that it is the capacity to create smooth space that is more relevant for self-organised territorialisation, than the prior existence of smooth space.

### **3.7 SUMMARY OF THEORETICAL DEVELOPMENT OF LITERATURE**

This chapter expanded on and synthesised theory relating to adaptability and self-organisation, and through the application of assemblage theory, addressed three of the key research questions of this thesis:

1. How does self-organisation relate to adaptability generally?
2. How does self-organised change occur in complex social-environmental systems such as communities?
3. What are the factors that affect self-organised change in complex social-environmental systems such as communities?

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<sup>373</sup> Conley, above n, p258-259; 170.

<sup>374</sup> Dovey, above n p 21; 385.

<sup>375</sup> Dovey, above n, p21.

<sup>376</sup> Ibid, p22.

<sup>377</sup> Deleuze and Guattari, above n, p474; 131.

<sup>378</sup> Ibid, p486.

<sup>379</sup> P Wise, 'Australia's Gold Coast: A City Producing Itself' (2006) *Urban Spaces and Cityscapes: Perspectives from Modern and Contemporary Culture* 177, p183.

The preceding sections on theory development revealed the following:

1. Self-organisation is a dynamic and adaptive process and a term that refers to the capacity to affect change through decisions and actions at the same or lesser scale of a social-environmental system.
2. Adaptability refers to the collective capacity of the actors in a social-environmental system to manage resilience and occurs when emergent outcomes at lower or the same system scales, are responsive to the environment of the social-environmental system.
3. Self-organisation refers to the creative, self-generated, adaptability-seeking behaviour of a complex system and ‘the essence of self-organisation is an adaptable behaviour that autonomously acquires and maintains an increased order.’<sup>380</sup>
4. Fundamentally, adaptability is about being able to change the rigidity of the system, making it more or less segmented, more or less molecular or molar, and ultimately altering its capacity to deal with forces acting on the system.
5. The adaptive cycle reflects the notion that change in complex systems typically occurs through four phases of evolution: rapid growth, conservation, release, and reorganisation — usually, but not always in that sequence. The nature of the system (including its adaptive capacity) affects and is affected by the position of the system in the adaptive cycle.
6. Panarchy refers to cross-scalar relationships within and beyond systems. It is an acknowledgement that any system is part of a system or systems at larger scales, and also comprises systems at smaller scales.
7. Panarchical influences from lower scales are expected to be disruptive and innovative for the target system, while influences from higher level systems are expected to be stabilising and regulating for the target system. When system self-organisation appears high, the actions of sub-level systems are contributing to the back loop activities through a process of panarchy *Revolt*. Conversely, the actions of super-level systems are contributing to the front loop activities through a process of panarchy *Remember*.

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<sup>380</sup> De Wolf and Holvoet, above n, p9; 158.

8. A high level of self-organisation enables more adaptive change to move the system forward or back through the adaptive cycle when responding to various causes of change. There is likely to be a correlation between the levels of molecularity and molarity in a system and its position in the adaptive cycle, with greater molarity likely to occur in the front loop of the adaptive cycle and greater molecularity likely in the back loop.
9. At a primary level, systems change through processes of furcation. In social-spatial assemblages, change is fundamentally a result of territorialisation/deterritorialisation/reterritorialization, whereby the relationship between system actors and environments are altered. In assemblages, territorialisation is the dimension along which change of the assemblage is affected.
10. These changes are caused by various factors, including desires, forces, lines of flight, and plateau seeking behaviour. Desires reflect the prevailing ambition of systems and emerge at the focus scale of the system or lower to affect change in the system but do not necessarily increase molarity or molecularity of the system. Forces can be active or reactive, depending on any countering forces, and forces acting on the system from higher scales will typically increase molarity of the system. Forces acting on the system from lower systems scales will typically increase molecularity of the system.
11. The process of territorialisation leads to increasing rigidity and homogeneity (reflecting parallels with the forward loop of the adaptive cycle), while the process of deterritorialisation leads to release, heterogeneity, and novelty (reflecting parallels with the forward loop of the adaptive cycle). Assemblages are therefore defined by territorialisation and deterritorialisation: deterritorialised assemblages are poorly defined, blurred, heterogeneous, while territorialised assemblages are sharply defined, unchanging, homogeneous.

12. Processes of territorialisation or deterritorialisation can be a result of self-organisational change and can affect the adaptability of the system. Self-organised territorialisation refers to how social groups engage, disengage, and re-engage with their environment, primarily by way of decisions and actions made at the level of the social group or lower.
13. The process of territorialisation occurs while the system is in the forward loop of the adaptive cycle, or advances the system forward through the adaptive cycle. Conversely the process of deterritorialisation occurs while the system is in the back loop of the adaptive cycle, or advances the system backward through the adaptive cycle.

This chapter explained that any social-environmental system is a mixture of hierarchies of command and control and self-organising systems (rather than being entirely one or the other), but also indicated that systems that had high self-organisational capacity (a micropolitical system) had certain qualities. In particular, systems with high self-organisational capacity are those that:

1. are more molecular (defined by self-organised production);
2. are less segmented or expressed supple segmentarity (being predominantly comprised of fluid and lateral connections); and
3. are defined by relationships of exteriority (where parts interact but retain their own identity in those interactions).

Such systems have greater capacity for self-organised territorialisation (and the community is subsequently more adaptable), particularly compared to systems that are more molar (defined by external control), more rigidly segmented (predominantly hierarchical structures), and defined by relationships of interiority (relationships which result in a fusing of identities).

This chapter also indicated that certain variables affect the molarity-molecularity of social-environmental systems and subsequently affect the processes of territorialisation in those systems. Specifically, when the identified variables express certain qualities, molecularity of the system increases, creating opportunities for self-organised territorialisation (and more adaptable urbanism); and when the variables express contrasting qualities, molarity increases, creating opportunities for more top-down territorialisation (and rigid urbanism).



These variables can be categorised in terms of Composition (referring to the bodies or agents that comprise the system), Governance (referring to how the system is governed), and Space (referring to physical and intangible qualities of the environment of the system). Of particular note:

1. When an assemblage is more molecular (increasing self-organised territorialisation), the key variables reflect the following qualities:
  - a. A diverse range of bodies is present, formed by common interests and desires, expressing a common essence, with some redundancy in composition of bodies.
  - b. There is generally a free distribution of bodies, forming a decentralised and perpetually changing structure with same level feedbacks, and a prominence of molecular lines of connection.
  - c. The bodies are defined by relationships of exteriority, where parts interact but retain their own identity in those interactions.
  - d. There is a prevalence of micropolitical action and localised coding and decoding that is emergent, informal, and polyvocal.
  - e. There is common access to collective intelligence and memory with localised learning, resulting from localised and diverse feedback networks.
  - f. There is a predominance of smooth space, and a perpetual smoothing of space.
2. When an assemblage is more molar (increasing top-down territorialisation), the key variables reflect the following qualities:
  - a. A limited range of bodies is present, controlling resources and governing, with limited redundancy.
  - b. There is a defined structure and ordered distribution of bodies, forming a centralised, rigid and hierarchical structure and feedbacks, and a prominence of molar lines of connections.
  - c. The bodies are defined by relationships of interiority (relationships which result in a fusing of identities).

- d. There is a prevalence of macropolitical action and higher level coding, with a perpetual increase in codes that are imposed, formal, and univocal.
- e. There is restricted access to collective intelligence and memory with imposed instruction and learning with limited feedbacks.
- f. There is a predominance of striated space obstructing further territorialisation.

# Chapter 4: RESEARCH METHODS

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## 4.1 OVERVIEW

As previously stated, the aim of this research is **to develop a new theoretical understanding of adaptable community development by adopting assemblage theory (and Deleuzean philosophy) to advance concepts of self-organisational and adaptable territorialisation, and to then explore the relevance of that theory in established and emerging community contexts.**

This aim gives rise to the following primary research question: **In the context of assemblage theory, what factors affect self-organisational territorialisation and thus adaptability in urban communities (assemblages)?**

This primary research question suggests a number of sub-questions which were employed to frame the research.

1. How does self-organisation relate to adaptability generally?
2. How does self-organised territorialisation occur in complex social-environmental systems such as communities?
3. What are the factors that affect self-organised territorialisation in complex social-environmental systems such as urban communities?
4. How do the identified factors affect the capacity for self-organised territorialisation in complex social-environmental systems such as urban communities?
5. Are these causes and variables a relevant consideration in relation to intentional community development?

These key questions are addressed, and the aim is realised, by a mixed research approach comprising:

1. **Theory development**

This involves the synthesis of assemblage theory and theory related to system change in complex systems, with the former adopted to provide a set of concepts to understand the latter. This development of theory has been undertaken in the preceding chapter.

The development of theory (and the research generally) is aided by the application of a philosophical lens: Deleuzian philosophy relating to an ontology of becoming in general and assemblage theory in particular.

The synthesis of theory provides an understanding of how change occurs in complex systems and assemblages such as communities. It also enables identification of a set of key conceptual causes and variables which describe and predict how self-organising capacity (as reflected through territorialisation) is affected in complex social-environmental systems (assemblages). The theory development therefore enables the first three research sub-questions to be addressed.

It is first and foremost a theoretical thesis whereby the theory is developed then scrutinised by way of case studies.

## **2. Case studies**

Three application case studies were undertaken to: observe change in complex assemblages; understand how key theoretical concepts play out in real communities; observe the relationships between the identified causes and variables and better understand how the causes and variables relate to capacity for self-organisational change. The cases studied are: Christiania, Denmark; Santa Marta Favela, Brazil; and Vauban, Germany. These cases have been described as “application case studies” because they have enabled the application and testing of the theory through academic investigation, rather than purely empirical observation.

While all social-environmental systems reflect a mix of self-organisation and centralised organisation (molecularity and molarity), these three cases are prime examples of systems that have been fundamentally shaped by self-organisation and that have progressed through an adaptive cycle. The rationale for selecting the specific cases is discussed further below.

A further empirical case study was also undertaken: Narara (the Narara Eco-Village or NEV) in the Central Coast of New South Wales, Australia. This case study was of an intentional community in Australia that has a relatively high degree of self-organisation and where, as part of their wider sustainability commitment, the community are cognisant of the importance of community-level adaptability. Narara was an empirical case because documentation and archival research was complemented and verified through first-hand observation.

In contrast to the application case studies, Narara is an emerging community and so provides an opportunity to directly observe the early stages of self-organisational growth.

The case studies enable the fourth and fifth research sub-questions to be addressed.

The process of theory development was a straightforward exercise of synthesising existing theories on relevant topics, with the benefit of the philosophical lens described above. The case study research method is described further below.

## 4.2 CASE STUDY METHOD

The case study method of research was employed because, according to Yin<sup>381</sup>, it is best suited to research in which:

1. 'how' or 'why' questions are being posed;
2. the investigator has little control over events; and
3. the focus is on contemporary phenomena within a real-life context.

As Yin<sup>382</sup> explains, a case study is an empirical enquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. One of the main benefits of case study research is that it allows researchers to focus on a case but still retain a holistic perspective<sup>383</sup> — such a capacity is critical in understanding assemblages, where the parts may form part of the investigation, but the assemblage

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<sup>381</sup>R K Yin, *Case Study Research: Design and Methods* (Sage Publications Incorporated, 5th ed, 2014).

<sup>382</sup> Ibid, p16.

<sup>383</sup> Ibid.

as a whole and its part in a panarchy of assemblages must be appreciated. Case studies are also a useful approach when considering contemporary or current events<sup>384</sup>, because traditional data sources (such as archives and artefacts) can be complemented by observations (of the researcher or others).

Dovey also identifies the benefits of a case study method, arguing that ‘case studies are a testing ground for theory, but not in the normal sense that the test proves or refutes a theory. Rather, the theory proves more or less useful in making sense of place’.<sup>385</sup> This is the case with this research, where it was expected that the case studies would: help explain the process of self-organisation as it relates to adaptability; provide a ‘real-world’ context in which to observe the theoretical aspects of self-organisational change; and provide an opportunity to refine and test the validity of the identified key causes and variables.

As mentioned in Chapter 1, one of the motivations for this research was to understand how Australian communities can become more adaptable, particularly by improving self-organisational capacity. The theory development section extricates a theoretical understanding of self-organisation as it relates to adaptability. The application case studies provide an opportunity for this theory to be calibrated and reinforced or challenged through analysis of exemplar self-organising communities in different parts of the world. The subsequent empirical case study provided an opportunity to investigate whether or not the lessons learned from the application case studies and the theory development (relating to the identified causes and variables and how they relate to self-organisation) are relevant to the Australian context.

It is important to note that the case studies are not intended as a thorough testing of the theory. A credible testing of theory relating to community adaptability (and its relationship to self-organised territorialisation) would necessarily be a long-term, longitudinal study. Such a study could not be undertaken within the time constraints of this PhD research.

The case studies generally relied on documentation and archival records. The empirical case study also included field observations and interviews with key stakeholders. These interviews (combined with the other sources of evidence) provided an understanding of issues from the perspective of the specific communities,

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<sup>384</sup> Ibid.

<sup>385</sup> Dovey, above n, p8;.112.

and provided ‘rich, detailed perspectives that could not be obtained through other methodological strategies’<sup>386</sup>. Engagement by way of interviews provided an opportunity to understand if the identified causes and variables were relevant to the Australian development environment and to community scale intentional communities.

#### 4.2.1 The Cases Studied

The application cases were:

1. **Santa Marta Favela, Brazil.** Established in the 1920s and 1930s, when labourers working on a nearby church occupied the slopes of Dona Marta. The favela grew over time and today, with a population in the order of 6,000 residents it is regarded by some as a “model favela” in Sao Paulo.
2. **Christiania, Denmark.** Established in 1971 by a small group of squatters occupying vacated military barracks, Christiania developed over time by way of a unique organisational framework developed by the early squatters. It grew to become a popular neighbourhood and Copenhagen’s second most popular tourist destination. It exists today as a unique community effectively owned by a resident foundation.
3. **Vauban, Germany.** Established in 1998, Vauban is a small neighbourhood, with a population of approximately 5,000, in the city of Freiburg. Also established when squatters occupied abandoned military barracks, a community established there and, at least in part, grew through the establishment of Baugruppe — a German term meaning “building group” and referring to community groups who organise and design parts of the neighbourhood (buildings, complexes, streets, etc).

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<sup>386</sup> J Asbury, 'Overview of Focus Group Research' (1995) 5(4) *Qualitative health research* 414, p415.

The subsequent empirical case was:

4. **Narara Eco-Village, New South Wales.** NEV is an emerging eco-village located in the New South Wales Central Coast area. The village comprises some 64 hectares of land that were formally occupied by the Gosford Horticultural Institute. The eco-village is intended to become a mixed-use community with the capacity to ultimately accommodate about 400–500 people within 150–180 dwellings.<sup>387</sup> Currently there are approximately 80 members, representing 170 eligible residents.

As discussed further below, the case studies were examined with particular regard to processes of territorialisation and a set of causes and variables thought to affect the self-organisational capacity of the communities. The data collected was organised by historical narrative and structured by way of a temporal event matrix, which enabled a correlation of territorialisation/coding events against the identified causes and variables and against the adaptive cycle. The collected data was analysed by pattern matching and explanation building. Because of limits of time and resources, and because the data of interest was largely historical, physically visiting each case location was not considered a practical nor necessary.

Because of the scale at which the cases were studied (community scale) and the limits of the available data it was not possible to analyse the actions of individuals in each case. This meant that it was not possible to appreciate the role of micro-scale bodies, nor to observe the primary processes of change described in Section 4.4 (stratigraphic, furcative, and hermeneutic change processes).

#### **4.2.2 Defining and Limiting the Cases**

At the most fundamental level, each of the application cases represent a community settlement which has, or is meant to have, developed (in terms of territorialisation and coding) by way of self-organisational change (at least to a substantial degree). NEV is in a formative stage so has only partially developed, but that development to date has reflected self-organisational change to a substantial degree. Of course, as noted previously, no community is purely self-organising but develops as a consequence of a constantly changing mix of self-organisation

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<sup>387</sup> J Talbott, 'Narara Australia: Inspired by Life' in F Miller (ed), *Ecovillages Around the World: 20 Regenerative Designs for Sustainable Communities* (Simon & Schuster, 2018) .



(molecularity) and centralised control (molarity). These particular cases represent communities which, more than most, have evolved with a greater frequency of self-organisational change.

The studies were focussed at the community level assemblage because, as Leach observes, Deleuze and Guattari explain that the population, not the individual, is the matrix for the production of form.<sup>388</sup> However, because this investigation is seeking to understand cross system interactions and forces, analysis will also recognise sub-community scale systems (i.e. groups within the community), and super-community scale systems (i.e. systems of which the subject systems are a part, such as governments). A full explanation of the sub- and super- scale systems (such as the organisational structure and regulations of local governments) is not achievable within the scope of this research. While such detail would undoubtedly provide further appreciation of how self-organisation at the community scale affects and is affected by the sub- and super- scale systems, it is not critical to the aim of the research.

These cases are in different countries and political regions, and thus exist within different social and political realms. They are therefore likely to be inhabited by demographically and culturally different populations. Furthermore, each case is a different type of urban community and settlement: Santa Marta is an established informal settlement (referred to as a favela in Brazil); Christiania is an evolved squatter settlement; and Vauban, although it began as a squatted settlement, is a developed urban neighbourhood. NEV, by comparison, is an intentional community, aiming to be a highly sustainable, self-reliant community.

#### **4.2.3 Justification of the Cases**

The cases represent different types of community settlements and reflect different levels of self-organisation, or at least different levels of intentionality related to self-organisation: Santa Marta is the least intentional and exists in a less regulated, free-market context, while Vauban and NEV are the most intentional and exist in a more regulated context and mixed economy (and thus have clearer parallels to communities developed within Australia's economic and political context).

The differences and the similarities of these cases allowed replication studies where the same type of data is captured and interpreted for each case in the expectation

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<sup>388</sup> N Leach, 'Swarm Urbanism' (2009) 79(4) *Architectural Design* 56.

that, despite the differences in the cases, the analysis will reflect similar results. The differences also allowed an appreciation of how the different contexts might affect the process of self-organisation.

The cases represent various forms of self-organised communities: two informal settlements (Christiania and Santa Marta), and two intentional self-organised communities (Vauban and NEV). The two informal settlements are examples of what Dutch sociologist Hans Pruijt describes as ‘squatting as an alternative housing strategy’, with some aspects of ‘entrepreneurial squatting’ included.<sup>389</sup> They are not squats established primarily for political motives, or to conserve or activate particular urban structures. In this regard they differ from some self-organised communities which are established in response to very particular motives — such as political activism (e.g. disobedience squats such as Occupy Wall Street), social housing squats (e.g. CSOA in Italy), or artists’ communes (e.g. Bussana Vecchia). These two cases are not especially unique — there are many examples of informal settlements across the world. They are, however, cases which best meet the criteria set out below.

Vauban and NEV do not meet the commonly accepted definition for informal settlements, but still display aspects of informality. Vauban emerged as a squat and evolved under the Baugruppen model. Again, there are numerous Baugruppen projects throughout the world, particularly in Europe. What is unique about Vauban, and the reason that it was chosen, is that unlike most Baugruppen projects it is effectively a neighbourhood of Baugruppen projects (rather than a single project). It also met the criteria set out in the preceding section.

NEV is an emerging intentional community based on the eco-village model and underpinned by a system of sociocracy. According to the Global Ecovillage Network:

*An eco-village is an intentional, traditional or urban community that is consciously designed through locally owned participatory processes in terms of social, cultural, ecological and economic sustainability, to regenerate social and natural environments.*<sup>390</sup>

According to the Fellowship for Intentional Community:

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<sup>389</sup> H Pruijt, 'The Logic of Urban Squatting' (2013) 37(1) *International Journal of Urban and Regional Research* 19.

<sup>390</sup> Global Ecovillage Network, *What is an Ecovillage?* <<https://ecovillage.org/projects/what-is-an-ecovillage/>>.

*An intentional community is a group of people who have chosen to live together with a common purpose, working cooperatively to create a lifestyle that reflects their shared core values.*<sup>391</sup>

The term “intentional community” is itself an umbrella term for a range of community types, including eco-villages, co-housing, residential land trusts, communes, squats, and urban housing co-operatives.<sup>392</sup>

As an intentional community, NEV has been planned to some degree and typically abides by the regulatory framework within which it is situated. Such intentional communities are, however, something of an anomaly of self-organisation within a highly regulated development industry: they are meant to be sustainable communities with at least a focus on self-organisation or adaptability and in that regard, they are not typical urban developments by Australian standards. Rather, they are being explored by the industry as a new innovation and, for the purposes of this research, sit between the unintended informal settlements studied in the case studies (Christiania and Santa Marta), the intentional settlement studied (Vauban), and “typical” urban development projects in Australia.

There is an obvious difference between the application case studies (at least Christiania and Santa Marta) and the empirical case study. Christiania and Santa Marta are unintentional communities — they have not been planned or designed, but have simply established and evolved. Vauban, while it evolved through self-organisation, was planned to a greater degree. NEV is highly planned, and sits within a complex regulatory framework, but at the community level adopts a deliberate self-organisational structure to direct and govern the community.

Compared to some countries, urban development and communities in Australia are highly regulated, with policy- and decision-making extending across the three levels of government (local, state, and federal). Consequently there are very few urban communities which might be considered to have high levels of self-organisation or molecularity<sup>393</sup>, and while there are examples of poor quality urban housing there are

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<sup>391</sup> Fellowship for Intentional Community, *Intentional Communities: Lifestyles Based on Ideals* <<https://www.ic.org/wiki/intentional-communities-lifestyles-based-ideals/>>; A Kidd, 'Distinctives of Cohousing' (2008) <<http://www.communities.org.au/knowledgebase/introductory/distinctives-cohousing/>>.

<sup>392</sup> Kidd, above n 391.

<sup>393</sup> Some non-urban, particularly Indigenous, communities might be considered to have a high degree of self-governance or self-organisation, but these have not been considered in this research because

no informal settlements or squats of the type described elsewhere in this thesis. This limits the opportunity for translating the lessons learned from international self-organising communities to an Australian context. Certainly there is no facsimile for the likes of Santa Marta or Christiania, and while Vauban is a more contemporary urban development model incorporating self-organisation, there is no established multi-building example in Australia that could be referenced to draw direct comparisons.<sup>394</sup>

While the term “self-organised communities” is not specifically defined and can refer to a wide range of community types (such as self-build housing, community-led housing, or self-managed housing), the Australian development model which appears to have the most obvious element of self-organisation, and which describes most self-organised housing in Australia<sup>395</sup>, is that of intentional communities.

However, the vast majority of these communities (including most in Australia) are small arrangements that do not meet the requirements of this research. Key criteria for the selection of the application cases were: they were a reasonable size, but not too large to complicate analysis; they were urban communities; and they were comprehensive communities, incorporating communal facilities, commerce, and other programs beyond housing. Most intentional communities in Australia<sup>396</sup> are not substantial enough or comprehensive enough to reflect a true community incorporating community facilities (or territory), or anything more than just housing. There are some more expansive communities in Australia<sup>397</sup>, but they are still non-urban (often focussed around agriculture or permaculture) and so provide little opportunity to study urban development processes.

Because of these limitations, it was decided that the most useful approach would be to explore an emerging eco-village community. Looking more closely at the differences between each community (as is made clear in the case studies) it is evident

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they are non-urban and are the construct of very unique socio-economic and cultural conditions, which limit the potential to draw parallels with urban community development.

<sup>394</sup> There are two emerging projects in Western Australia (7 Quarry Street, Fremantle; and 125 Stevens Street, White Gum Valley) which are still in the planning phase; both are small projects with limited community territory.

<sup>395</sup> L Crabtree, 'Self-Organised Housing in Australia: Housing Diversity in an Age of Market Heat' (2018) 18(1) *International Journal of Housing Policy* 15.

<sup>396</sup> Examples include The First Fremantle Housing Collective, 14 homes in Western Australia and Decohousing in Denmark, a collective of 12 homes in Western Australia.

<sup>397</sup> Examples include Crystal Waters in Queensland, a permaculture-based community of over 200 residents, and Tuntabale Falls, a rural community of approximately 200 people and legacy of the Aquarius Festival held in the 1970s near Nimbin, New South Wales.

that: Santa Marta differs in that it is a community largely striated<sup>398</sup> by environmental (geographical) constraints (the slope of the land and adjoining environmental landscapes); Christiania differs in that it is a community largely striated by existing built form (i.e. the barracks); while Vauban differs in that it is largely striated in terms of the regulatory framework within which it exists (to a far greater extent than the other two communities). NEV, by comparison, is striated by environmental constraints, existing built form, and regulatory frameworks.

A particularly important aspect of the three application case studies is that they represent established, or at least well developed (in terms of longevity) communities. Because of the need to analyse a reasonable process of change in each community, it is necessary to study communities that have substantially evolved, and to be able to make comparisons between different stages of development over time. The critical similarity between the application case studies is that they have all substantially advanced through an adaptive cycle (from initial establishment, through a process of growth). Having moved through the adaptive cycle they are also settlements where the expression and importance of self-organisation has given way (to varying degrees) to a more hierarchical macropolitics, and in this regard the cases are also unique (many self-organising and informal settlements have not evolved through the adaptive cycle).

As well as these common qualities (a high degree of self-organisation and substantial progression through the adaptive cycle), there are a number of other similarities and qualities which have determined the suitability of the application case studies:

1. Each case is geographically discrete (well defined) and of a modest scale (generally up to 5,000 inhabitants at their largest). Such a size reflects a manageable and understandable study scale and allows for comparability between the cases.

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<sup>398</sup> The term “striated” is discussed more in Section 3.6.3 below. It refers to space that is highly defined, divided and interrupted.

2. Each is a community in the true sense of the concept — established to provide housing and at least some measure of communal territory (recreation, community facilities, or even commercial endeavours). They are communities because they comprise a collection of structures, open spaces, and infrastructure (in contrast to squats in a single building for example), including common territory.
3. In each case, the self-organisation of the community has primarily occurred at the community (small group scale) level, as opposed to a level below (the individual, as is the case in many informal settlements) or a level above (such as the local government authority).
4. There was a reasonable amount of existing documented data and research about each case (in English), and each case was still extant, making it easier to collect and interpret necessary data.
5. While not without shortcomings, each case now reflects aspects of what might be normally regarded as good urban outcomes. To varying degrees, the cases are vibrant, socially engaging, and accessible, with measures of environmental and social sustainability..

While there are numerous examples of informal settlements, or communities that display self-organisation, these cases were chosen because they most completely met the criteria set out above.

NEV is different from these application cases in the following important ways:

1. The community is in the establishment phase and as such, is much smaller than the application case study communities. NEV also has a much shorter history but it is sufficiently evolved to provide insights into processes of self-organisation and territorialisation.
2. Whilst also geographically discrete, NEV comprises a much smaller area and is as yet substantially undeveloped.
3. It is an urban community, located at the edge of an expanding suburban area, but is substantially characterised by rural and natural landscape. The ultimate intention is for the community to provide housing and at least some forms of communal territory (recreation, community facilities, and commercial endeavours).

Despite these differences, the empirical case study provides an appropriate comparison of findings with the application case studies, particularly because:

1. It is discrete and of a comprehensible size and geographic scale.
2. Like the application case studies, NEV comprises a collection of structures, open spaces, and infrastructure, including common territory.
3. The self-organisation of the community has primarily occurred at the community level, as opposed to a level below or a level above.
4. NEV incorporates programs and infrastructure normally regarded as contributors to good urban outcomes.
5. The differences are not factors that necessarily affect the propositions about organisation and territorialisation.

#### **4.2.4 Data Collection for Case Studies**

##### ***Key Inquiries***

In order to realise the research aim, the following questions were asked of the case studies (by way of research into documentation, observations on the ground, and interview questions):

1. How has the community territorialised over time, particularly in relation to the adaptive cycle?
2. What motivated or caused changes that resulted in territorialisation?
3. What were the key moments of self-organised change?
4. How do the identified variables change in relation to the processes of territorialisation? Specifically:
  - a. how has composition changed, particularly in terms of bodies and relationships?
  - b. how has governance changed, particularly in terms of coding, feedbacks and collective intelligence?
  - c. how has space changed, particularly in terms of smoothness and striation?

### *Data Sources*

Answers to these questions arose from a combination of archival records and documentation. Given the informal nature of the cases there are limits to the extent of academic research or official records about the communities. Consequently, where appropriate, background information has been taken from non-academic sources (such as community websites, newspaper articles, and non-peer reviewed works) Such information has only been incorporated where it assists in providing context but is not critical to the testing of theory, or where it aligns with or is corroborated by other sources. Nevertheless, in some instances (such as material from community websites) the information referenced may incorporate a degree of bias.

The empirical case study also included interviews with key stakeholders and involved data collection from a guided tour of the site and an educational presentation led by community founder Lyndall Parris.

The project stakeholders interviewed in relation to the empirical case study (NEV) were:

- Lyndall Parris: Project Founder and Director. Lyndall comes from a background in accounting and teaching.<sup>399</sup> Lyndall started generating interest in the eco-village from 1997 and is instrumental in its ongoing establishment.
- John Talbott: Project Director for the NEV since its founding in 2012. Previously he was the Director of the Findhorn Eco-Village Project (in Scotland) for more than twenty years.<sup>400</sup>
- Scilla Sayer: Leader of the Community Circle. Scilla was a founding member of the Tasman Eco-Village and has been involved with seven other eco-village projects which were never realised, as well as a number of community building projects.<sup>401</sup>

The focus of the data collection was on how the assemblages changed (territorialised) in relation to the identified causes and variables. The following table

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<sup>399</sup> Interview with Lyndall Parris at Narara Eco-Village on 26/08/2018.

<sup>400</sup> Interview with John Talbott at Narara Eco-Village on 25/08/2018.

<sup>401</sup> Interview with Scilla Sayer by phone on 27/08/2018.



(Table 1) identifies the indicators for change for parameters related to the identified causes and key variables.

Table 1: Change Indicators for Case Studies

CONDITION VARIABLE	CHANGE INDICATOR
Territorialisation / Deterritorialisation / Reterritorialisation	<ul style="list-style-type: none"> <li>• Territorialisation occurs when an assemblage occupies, shapes, inscribes, or defines its setting through socio-material change.</li> <li>• Deterritorialisation occurs when spatial boundaries or features are vacated, eroded, erased, or destabilised.</li> <li>• Reterritorialisation occurs when deterritorialised elements are recombined.</li> </ul>
Composition	<ul style="list-style-type: none"> <li>• Where a whole formed by related parts changes. Change could be material or expressive. Change could be of the parts or the relationships between the parts.</li> <li>• Where the relationship between the bodies in an assemblage change or are created or erased. In particular, whether the molarity/molecularity of the relationships change.</li> </ul>
Governance	<ul style="list-style-type: none"> <li>• Where the implicit or explicit rules affecting the assemblage change. Coding may affect the material or expressive aspects of the assemblage.</li> <li>• Where relationships or the flow of information or intelligence is critical to subsequent change in the assemblage.</li> </ul>
Space	<ul style="list-style-type: none"> <li>• Where the physical milieu of the assemblage is changed, either by the assemblage, or in a way that affects the assemblage. Change could be in terms of the identity, composition or distribution of the space, or the relationship of the space to the bodies of the assemblage. Change could be actual or virtual.</li> </ul>
Causes	<ul style="list-style-type: none"> <li>• Where stated desires reflect ambition to change and territorialise, or to otherwise affect the composition or governance of the system.</li> <li>• Where actions from bodies affect change in the assemblage. Forces will be observed in terms of whether they are active or reactive.</li> <li>• Where moments or points of stability or intensity are formed and observed in the assemblage (plateaus).</li> <li>• Where bodies in the assemblage substantially disrupt the relationships or trajectory of the assemblage (Lines of Flight).</li> </ul>

The collected data was presented as an overarching historical narrative for each case (providing an overall understanding of the assemblage and how it has territorialised and coded over time), and a temporal event matrix, which is correlated with:

1. phases of the adaptive cycle — to illustrate the relationship of territorialisation and the adaptive cycle;
2. specific observations on the key variables; and

3. specific observations on the causes of change.

### ***Data Analysis Strategy***

The collected data was analysed by way of pattern matching and explanation building. Pattern matching was employed by investigating any congruence between the empirical data of the case studies (particularly the behaviour of the dependent variables in the temporal mapping) and the anticipated patterns or behaviour of the identified causes and variables. When the pattern matching process showed that the variables behaved as anticipated, then the expectations were confirmed. When they did not, then the expectations were challenged. This pattern matching exercise across the four case studies allowed for a degree of literal replication, accounting for the differences in each of the cases.

Yin<sup>402</sup> describes explanation building as a special type of pattern matching, where the goal is to analyse the case study data by building an explanation about the outcomes. The process involves identifying causal links between the processes of territorialisation and coding on the one hand, and the identified variables on the other. The temporal mapping undertaken for each of the case studies provides a means for identifying these causal links. The mapping was examined by way of analytic generalisation, to corroborate, modify, reject or advance concepts developed in theory development. If the causal links reinforced the expectations then the expectations were confirmed. If they did not, then the expectations were challenged.

### **4.3 VALIDITY OF RESEARCH STRATEGY**

The research design satisfies the “tests” that Yin sets out relating to case study research, for the following key reasons:

- Construct validity was met because concepts that could be subjectively interpreted have been specified and supported with third party theory, and because the data collection parameters are substantively objective and correlate to the specific concepts identified in the theory development. While the theory development relies heavily on published works, bias of the research and background information relied on has been addressed by reliance on multiple sources of evidence and due consideration of divergent research.

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<sup>402</sup> Yin, above n, p147; 381.

- Internal validity was met because clear inferences between causal relationships among identified causes and variables (as set out in the theory development) were made by way of pattern matching, and the consideration of contrasting cases provides an opportunity to undertake literal replication to confirm or challenge the expectations about causal relations. Further, where inferences were made, they have relied on the convergence of evidence and data as much as practically possible.
- External validity was met through the reliance on analytical generalisation (i.e. generalizable findings that support or challenge the theory) to explain the findings (rather than on statistical generalisation). Undertaking two rounds of case studies provided the opportunity to test the applicability of the findings from the application case studies to a different context (i.e. to test whether the findings are generalizable beyond the case studies).
- Reliability was met through the documentation of data collection methods and sources.



# Chapter 5: APPLICATION CASE STUDIES

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This chapter discusses the application case studies. The cases are three different types of communities which have substantially developed by way of community level self-organisation. The case studies have primarily been undertaken to allow observations to be made about the propositions set out in the preceding chapter. This chapter addresses the fourth key research question: How do the qualities of the identified causes and variables affect the capacity for self-organised change in complex social-environmental systems such as communities?

The cases studied were: Christiania, Denmark; Santa Marta Favela, Brazil; and Vauban, Germany. While all social-environmental systems reflect a mix of self-organisation and centralised organisation (molecularity and molarity) these three case are prime examples of systems that are fundamentally shaped by self-organisation and which have progressed through an adaptive cycle.

## 5.1 CASE STUDY 1: CHRISTIANIA, DENMARK

### *Overview*

Christiania is a neighbourhood of approximately 1,000 residents on the site of a former military barracks of Bådsmandsstræde in Copenhagen. The ramparts and the borough of Christianshavn were established in 1617. The ramparts were subsequently reinforced from 1682-1692. The barracks housed the Royal Artillery Regiment, the Army Materiel Command and ammunition laboratories and depots. The barracks were abandoned between 1967 and 1971.



Figure 10: Location of Christiania (red outline). Base map from Google Earth Pro. Retrieved 08/08/2017.



Figure 11: Aerial view north across Christiania. Image from Google Earth Pro. Retrieved 08/08/2017.

In 1971 (September 4<sup>th</sup>), after the military had abandoned the base, Christiania was autonomously settled by a small group of people from surrounding neighbourhoods. Initially these settlers were looking for green space and a playground



for their children. They knocked down a fence at the corner of Prinsessegade and Refshalevej. During the summer and autumn of 1971, following a local exhibition catering to hippies and alternative movements, squatters moved in and started using the barracks buildings, and the 26th of September 1971 became the official birthday of Freetown Christiania.

At that time, the following vision for Christiania was formulated:

*Christiania's objective is to create a self-governing society, whereby each and every individual can thrive under the responsibility for the entire community. This society must economically rest in itself, and the joint efforts must continue to be about showing that psychological and physical destitution can be diverted.*<sup>403</sup>

According to the Danish Building and Property Agency, the idea was to create a self-governing society, where the economy was based on recycling and sustainability, and where creativity and energy had free rein.<sup>404</sup> Capitalist norms (such as property ownership) were shunned in favour of a communal, share economy. Thornburgh, referring to the entry of early residents says, 'they just climbed through the gates to start a new life inside'.<sup>405</sup> Early resident Tanya Fox explains:

*It was very different then because all of the houses were empty, and if you saw a house that you liked, you could just sort of put a sign up that said "occupied" ... In the beginning, people wanted to do everything together ... They would eat together, sleep together, wear the same clothes. Everything was shared.*<sup>406</sup>

Giving an insight into life in the early settlement, H el ene Claire-Jensen explained that when they first inhabited the base 'it was empty – there were rooves and walls but not more. We had to make it alive. We could put our spirit in there.'<sup>407</sup>

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<sup>403</sup> Bygningsstyrelsen - The Danish Building and Property Agency, 'History of the Christiania Area' (2013) (20 December 2016)  
<[http://www.bygst.dk/\(X\(1\)S\(b2ld1hlcgrrvxsixbrorxsbv\)\)/english/knowledge/christiania/history-of-the-christiania-area/?AspxAutoDetectCookieSupport=1](http://www.bygst.dk/(X(1)S(b2ld1hlcgrrvxsixbrorxsbv))/english/knowledge/christiania/history-of-the-christiania-area/?AspxAutoDetectCookieSupport=1)>.

<sup>404</sup> Ibid.

<sup>405</sup> N Thornburgh, 'Christiania For Sale' (2012) *Roads and Kingdoms*  
<<http://roadsandkingdoms.com/2012/christiania-for-sale/>>.

<sup>406</sup> Ibid.

<sup>407</sup> Interviewed at 7'34' in R Jackman and R Lawson, 'Christiania - 40 years of occupation' (2011)  
<<http://www.busno8.com/about>>.

Claire-Jensen explained ‘We slept when we were tired and woke when we were fresh. We shared food, clothes...’<sup>408</sup>

Police initially made a number of attempts to remove the squatters, but soon gave up due to the size of the area to be policed and because the squatters easily evaded capture or reinhabited the area.

At the time, Jacob Ludvigsen, a journalist who published a magazine called *Hovedbladet* (‘The Main Paper’) and who co-authored the above vision for Christiania wrote an article about ‘The Forbidden City of the Military’ (referring to Christiania). The article proclaimed the free town, and included the following:

*Christiania is the land of the settlers. It is the so far biggest opportunity to build up a society from scratch — while nevertheless still incorporating the remaining constructions. Own electricity plant, a bath-house, a giant athletics building, where all the seekers of peace could have their grand meditation — and yoga center. Halls where theater groups can feel at home. Buildings for the stoners who are too paranoid and weak to participate in the race ... Yes for those who feel the beating of the pioneer heart there can be no doubt as to the purpose of Christiania. It is the part of the city which has been kept secret to us — but no more.*<sup>409</sup>

Initially, it was only the barracks and military buildings that were inhabited, but soon mobile huts were introduced, and were preferred by many as a mobile form of inhabitation that could be moved if tenancy was not maintained. Over time, through a process of incremental urbanism, the mobile huts and other makeshift shelters were embellished and the military buildings were improved and extended.

Today, Christiania is regarded as one of the world’s longest-lasting communes or informal settlements.<sup>410</sup> It is the second most popular tourist site in Copenhagen, with up to a million visitors each year.<sup>411</sup>

It comprises an area of nearly 34 hectares and incorporates a commercial area (anchored by Pusher Street) where almost all the businesses, shops, public houses and

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<sup>408</sup> Interviewed at 9’30’ in *ibid*.

<sup>409</sup> Christiania.org, *Christiania Home page* Christiania.org, <<https://web.archive.org/web/20160617065342/http://www.christiania.org/>>.

<sup>410</sup> T Freston, ‘You Are Now Leaving the European Union’ (2013) *Vanity Fair* <<http://www.vanityfair.com/news/politics/2013/09/christiana-forty-years-copenhagen>>.

<sup>411</sup> *Ibid*.



facilities are located. There are bars, cafés, grocery shops, a communal bathhouse, a museum, art galleries, a concert hall, a skateboard park, tour guides, beer clubs, recording studios and performing art centres. It also includes established social structures and facilities, such as childcare centres and a free planning and advice service, over fifty different collectives, as well as two free newspapers and Radio Christiania. Some businesses are located within existing buildings, and many occupy mobile market stalls.

### *Environment*

Notably, there are almost no advertisements, but an abundance of public art.<sup>412</sup> Businesses pay voluntary rent — the amount based not on profit, but an agreement between the business and the collective about what the business can afford.<sup>413</sup> This makes it easy for new businesses to establish, paying little rent when they start, and paying more as they grow and can afford more. As Thornburgh says, ‘it is not a squat or a sit-in, but an entire occupied city’.<sup>414</sup>

Beyond this core area, Christiania extends along the ramparts on both sides of the moat (see Figure 10 and Figure 11), almost to Refshalevej. Land along the moat generally comprises residential dwellings and green space. In total there are approximately 200 free-standing self-made houses.<sup>415</sup> On the other side of the moat is Amagerbro and to the west of Christiania is Christianhaven, now a wealthy inner suburb of Copenhagen. To the north is Papirøen (Paper Island), a former paper factory recently gentrified to incorporate food markets, a gallery, offices, and luxury apartments. Next to Papirøen is Holmen, which was Denmark's main naval base until the 1990s but is now an area undergoing renewal and is home to the new Copenhagen Opera House. Beyond Papirøen to the north is Nyhavn harbour, which in 2016 was connected to Christiania by a bridge.

According to Jackman and Lawson there has been a moratorium (imposed by the government) on new buildings since the 1990s.<sup>416</sup> More accurately, the government allows new buildings, but only if they are in accordance with the city's

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<sup>412</sup> Jackman and Lawson, above n 407.

<sup>413</sup> Ibid.

<sup>414</sup> Thornburgh, above n 405.

<sup>415</sup> Jackman and Lawson, above n 407.

<sup>416</sup> Ibid.

regulations and policies. Many saw this as an effort by the government to “normalise” Christiania.

In 2003, the government's Christiania commission arranged a competition calling for ideas about the future use of the area. The aim was to facilitate a more typical development outcome.<sup>417</sup> Simultaneously, within Christiania, a large environmental station opened and a new café opened in the building housing Loppen with arts and crafts. Christiania's biggest cultural venue, Den Grå Hal, was also updated with 33 new public toilets.

Freston describes it as a ‘cool, verdant little village in a corner of Copenhagen’.<sup>418</sup> Describing the settlement when he visited in 2013, he says ‘they have built an entire settlement of spare, humble, Hobbit-like homes that surrounds a lake and runs along gravel paths and cobblestone roads that wind through woods to the seaside. Older buildings have been restored and are often covered in murals ...’.<sup>419</sup> Riley observes that:

*The territory varies in its adherence to the dream and in its attractiveness. Some houses display genuine architectural flair and loving craftsmanship while others are in a state of disrepair surrounded by refuse and scrap-heaps. Verdant gardens flourish, but they are littered by the burned-out shells of buildings and bonfires where rubbish is torched.*<sup>420</sup>

### ***Legal Status***

The legal status of Christiania has been dynamic and has often been a source of conflict with the Danish government. The main entry into Christiania today (for non-residents) is through a gate inscribed with the words ‘You Are Now Leaving the European Union’.

Christiania was granted semi-legal status in 1972, following an agreement to pay a collective tax in return for water and electricity.<sup>421</sup> In 1973 this agreement was confirmed by an undertaking from the Danish Ministry of Defence, for a period up to

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<sup>417</sup> Spatial Agency, *Christiania* The Useful Arts Organisation  
<<http://spatialagency.net/database/christiania>>.

<sup>418</sup> Freston, above n 410.

<sup>419</sup> Ibid.

<sup>420</sup> H Riley, 'Farewell to Freetown' (2007) *The Guardian*  
<<https://www.theguardian.com/commentisfree/2007/sep/18/farewelltofreetown>>.

<sup>421</sup> Spatial Agency, above n 417.

March 1976.<sup>422</sup> In April 1976, the Danish Ministry of Defence filed a stay of proceedings. This stay was ended in February 1978 by a Supreme Court decision approving the immediate clearing of Christiania.<sup>423</sup> However, clearing never proceeded and in 1978 the Danish Parliament decided that a district plan would be prepared and that until it was, Christiania could continue under special conditions.<sup>424</sup>

In 1982, the government hired a private development firm to make a future plan for the area. They produced a report which suggested that Christiania was developed as an experimental city within wide frames of self-government.<sup>425</sup>

In 1987, the government published an action plan concerning the ‘legalization of Christiania’, and established a management group, whose work was to effect a dialogue between Christiania and the different levels of government.<sup>426</sup>

In June 1989, a majority in the Danish Parliament voted for the Christiania Law. The main aim of the law was to allow Christiania's continued use of the area in accordance with a special planning directive and a district plan. The plan divided Christiania in two: one part, the less developed part, was to be cleared of inhabitants; the other part, the more developed part, was to continue the experiment within a legal framework.<sup>427</sup> The law was also structured to prevent illegal construction. In response to the plan, local residents protested against parts of the plan and a manifesto, ‘Kærlighedserklæringen’ (‘Declaration of Love’), was prepared in 1990. All the citizens of Copenhagen were invited to see with their own eyes what kind of lifestyle the Christianites were fighting for, and what everyday life was like in this part of the city.<sup>428</sup> In addition, a paper, called ‘Nitten’, was released, informing the people of Denmark about the reality of Christiania: that of an ecologically oriented city, based on a modest economy and extensive self-government.<sup>429</sup>

Following ongoing discussions with the Ministry of Defence, Christiania released ‘Den Grønne Plan’ (The Green Plan) as a visionary alternative to the government’s local plan. It proposed ‘a town maintaining an ecological balance with

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<sup>422</sup> Bygningsstyrelsen - The Danish Building and Property Agency, above n 403.

<sup>423</sup> Ibid.

<sup>424</sup> Ibid.

<sup>425</sup> Christiania.org, *Christiania Guide* Christiania.org, <<https://web.archive.org/web/20120115135729/http://www.christiania.org/modules.php?name=NukeWrap&page=/inc/guide/>>.

<sup>426</sup> Ibid.

<sup>427</sup> Ibid.

<sup>428</sup> Ibid.

<sup>429</sup> Ibid.

nature by recycling water and garbage, using renewable energy sources and creating new housing in houseboats on the canal, and youth accommodation made from turf and soil'.<sup>430</sup>

In October 1991, the Danish Ministry of Defence entered into a framework agreement on the right of use of the Christiania area with Christiania as a collective. This was extended several times, up until July 2004.<sup>431</sup>

In 1995, the number of children in Christiania had grown so high that parents and activists constructed the fourth institution for children in the area, the Raisen House for children, with a composting toilets.<sup>432</sup> It was the first new building in Christiania for a public purpose.<sup>433</sup>

In 1996, the Ministry of Defence and Christiania agreed on a “development plan” as a compromise between the local plan from 1989 and Christiania's Green Plan. In 1997, Christiania introduced its own local currency, the Løn. The Christiania currency could be used for any transaction in local shops, businesses, bars, and places of culture, and as payment to local institutions.<sup>434</sup>

In 2004, the Christiania Law was revised with the aim of allowing a development of the Christiania area as a sustainable neighbourhood in Copenhagen. As part of this, there was to be a change in ownership of the area (from the semi-legal ownership of the residents, to state or private development entities), and a phasing out of the existing Christiania scheme.<sup>435</sup>

In 2006, the government proposed that Christiania be turned into a mixed alternative community and residential area adding condominiums for 400 new residents.<sup>436</sup> Current residents were allowed to remain but would have to pay normal rent for the facilities. Christiania rejected this approach and it was never properly adopted. Christiania countered the Government's proposals for normalisation with its own community-driven planning proposal, which gained consensus at the common meeting before being published in early 2006.<sup>437</sup> In 2007, the representatives of

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<sup>430</sup> Ibid.

<sup>431</sup> Bygningstyrelsen - The Danish Building and Property Agency, above n 403.

<sup>432</sup> Christiania.org, above n 409.

<sup>433</sup> Ibid.

<sup>434</sup> Ibid.

<sup>435</sup> Bygningstyrelsen - The Danish Building and Property Agency, above n 403

<sup>436</sup> Christiania.org, above n 409.

<sup>437</sup> Ibid.

Christiania and Copenhagen's City Council reached an agreement to cede control of Christiania to the city over the course of 10 years for the purposes of business development.<sup>438</sup> In May 2009, the Eastern High Court upheld a 2004 Act of Parliament which reaffirmed the state's legal claim to control of the base.<sup>439</sup>

In June 2011, Christiania and the state entered into an agreement concerning the future ownership of the Christiania area.<sup>440</sup> This agreement formed the basis for the buildings and land in the Christiania area having been transferred to a foundation, the Foundation Freetown Christiania, on 1 July 2012.<sup>441</sup>

Through this agreement, the government offered to sell most of Christiania to the residents at a price well below market rate (US\$13mn), and they made guaranteed loans available to facilitate the purchase.<sup>442</sup> The Foundation (with a Board of Directors) are the official owners of the land and shares have been sold to help raise funds to buy the land.<sup>443</sup>

The agreements have resulted in a lasting solution for the area and a change in ownership, which forms the basis for the Christiania area being able to be developed into an open, recreational, car-free and sustainable neighbourhood in Copenhagen, where there is space to live in a different way.<sup>444</sup> The agreements mean that, for the first time since 1989, Christiania was no longer subject to legislative special rules relating to the use of the area.

In March 2013, Denmark's Minister for Climate, Energy and Building, introduced a legislative proposal to repeal the special law for the Christiania area.<sup>445</sup> The legislative proposal was adopted by a large majority in the Danish Parliament on the 4<sup>th</sup> of June 2013 meaning that, from 15 July 2013, the same laws and rules that apply to the rest of Denmark also applied to Christiania.<sup>446</sup> Since this time, the government has attempted to "normalise" the settlement, with Christiania residents

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<sup>438</sup> Riley, above n 420.

<sup>439</sup> F Lassen, 'Christiania Loses Court Challenge' (2009) *Jyllands-Posten News in English* <<http://jyllands-posten.dk/uknews/article4147585.ece>>.

<sup>440</sup> Bygningsstyrelsen - The Danish Building and Property Agency, above n 403.

<sup>441</sup> Ibid.

<sup>442</sup> Freston, above n 410.

<sup>443</sup> To date only 13 million Kroner of the 76 million Kroner target have been raised through share sales. The shares are not official shares but are more a show of support for Christiania's land deal (<http://www.christianiafolkeaktie.dk/>).

<sup>444</sup> Bygningsstyrelsen - The Danish Building and Property Agency, above n 403.

<sup>445</sup> Ibid.

<sup>446</sup> Ibid.

claiming the government's motivations are tied to the private development potential of the land.

Christiania has always incorporated the trade of illicit drugs (particularly cannabis), with activity focused on the infamous Pusher Street, which is effectively the high street of the community and accommodates some 40 shops selling drugs.<sup>447</sup>

In 1969-1979, the hard drugs trade became a problem for Christiania. The response from the Christiania community was the "Junk Blockade" which involved the outlawing of hard drugs, expulsion of hard drug dealers, and conditional expulsion of addicted residents (residents were given the opportunity to return after 1 year if they were sober).<sup>448</sup> The blockade efforts continued for 40 days and included daily patrols of "The Arc of Peace," a building within Christiania that had become a haven for hard drug addicts.

The cannabis trade was initially led by small-scale local dealers, but was subsequently controlled by large drug organisations (such as the Danish branch of the Hell's Angels).<sup>449</sup> This is despite the requirement that only residents of Christiania can officially own stalls and businesses in Christiania. Ironically, greater efforts by police to control the drug trade over the last 15 years have meant that the smaller traders have disappeared (being unwilling to take the risks and deal with police) and the larger traders have subsequently gained greater control.<sup>450</sup>

In 2004, stands along Pusher Street were demolished by the cannabis dealers the day before a large-scale police operation.<sup>451</sup> The police made more than 20 arrests in the following weeks, and a large part of the organised dealer network of *Pusher Street* was then eliminated for a while, but the open cannabis trade returned to Pusher Street after the 2004 raids. The escalation of the drug trade of recent years has resulted in increased anti-social and criminal activity, culminating in a shooting in August 2016 where three people were injured (including one police officer).<sup>452</sup> In a telling example of Christiania's self-governance process, the evening after the shooting, 400 of

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<sup>447</sup> Freston, above n 410.

<sup>448</sup> Jackman and Lawson, above n 407.

<sup>449</sup> A Cathcart-Keyes, 'Paradise Lost: Does Copenhagen's Christiania Commune Still have a Future?' (2016) *The Guardian* <<https://www.theguardian.com/cities/2016/sep/23/copenhagen-christiania-drugs-commune-future>>.

<sup>450</sup> *Ibid.*

<sup>451</sup> *Ibid.*

<sup>452</sup> *Ibid.*

Christiania's 700 residents (at the time) held a community meeting.<sup>453</sup> By the end of the meeting the residents had decided to demolish all the stalls in Pusher Street and reclaim the area from those large scale drug organisations which were not seen as part of the Christiania community.

Soon after the drug raids, the residents agreed to allow increased police surveillance of the area. As explained at the time by community resident of seven years Risenga Manghezi, 'The whole vibe around Pusher Street has really sucked a lot of energy out of Christiania. Police confrontation around Pusher Street has halted a lot of the great things that could go on. I hope that what we've done will now release some new energy so we can focus on the cool things happening'.<sup>454</sup>

Thornburgh has undertaken research into Christiania's drug trade and identifies a pronounced contrast between the anarchic, organic structure of Christiania's ideas of itself and the rigid top-down structure of Pusher Street.<sup>455</sup>

### ***Organisation***

The above history illustrates how Christiania has evolved through its own particular adaptive cycle, from release and re-organisation of the space, through a period of growth, and ultimately into a period of conservation (where it now sits).

*Although Christiania is still considered a "Free State", the first decade of its existence was the most radical, both politically and socially. An interesting experiment in self-governance, the community devised its own rules and regulations with decisions being made collectively on the basis of unanimity; forums for the whole community discussed larger issues, whilst neighbourhood meetings were for day-to-day concerns.*<sup>456</sup>

Throughout its existence, but particularly in the early years, Christiania has been well known for its gay activism, parties and theatre, using performances, actions and the carnivalesque as modes of social experimentation and interaction.<sup>457</sup>

*The context of the commune thus became a breeding ground for new social and political movements as well as functioning as a support system for those*

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<sup>453</sup> Ibid.

<sup>454</sup> Ibid.

<sup>455</sup> Thornburgh, above n 405.

<sup>456</sup> Spatial Agency, above n 417.

<sup>457</sup> Ibid.

*struggling in regular society such as the homeless, the unemployed and drug addicts, whom Christiania welcomed and supported.*<sup>458</sup>

The community has always placed particular emphasis on self-governance and regulation. On Christiania's website is the following explanation of their approach to self-governance:

*We work with a flat and manageable decision structure, [that supports] and strengthens the grassroots foundation. This way it is reasonable [sic] easy for a group, there is burning for an idea, to describe it and seek support and economical support from the community, for a realisation of the project. After that, it is the responsibility of the group to use, manage and maintain the project — this is activism and self-management... The starting point is always, that the resident's [sic] decide for them self [sic], why, when, and how we will develop our town.*<sup>459</sup>

Initially, the community was organised and governed by a group of ten committees, then by dedicated work groups.<sup>460</sup> Ultimately, the area was divided into 15 geographic areas. The areas were each very different, both in terms of physical size and in the number of residents. The largest area accommodates more than 80 people, and the smallest 9 people. The areas may consist of a single large house with many residents, or several houses spread over a greater area.<sup>461</sup>

All important decisions (those that affected the community) were made in “town hall” style meetings (The Common Meeting) with less significant decisions made in Area Meetings, Housing Meetings, Business Meetings, and so on.<sup>462</sup> Each type of meeting is briefly described below.<sup>463</sup> At the time of study, Christiania employed the decision making principles of a consent democracy, meaning that everyone can be heard and decisions are made by the consent of all residents.

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<sup>458</sup> Ibid.

<sup>459</sup> Christiania.org, *Myths and Facts of Christiania* Christiania.org, <[https://web.archive.org/web/20111012055325/http://christiania.org/modules.php?name=FAQ&myfaq=yes&id\\_cat=5&categories=>](https://web.archive.org/web/20111012055325/http://christiania.org/modules.php?name=FAQ&myfaq=yes&id_cat=5&categories=>)>.

<sup>460</sup> Christiania.org, above n 409.

<sup>461</sup> Ibid.

<sup>462</sup> Ibid.

<sup>463</sup> Based on descriptions provided at <https://web.archive.org/web/20120115135729/http://www.christiania.org/modules.php?name=NukeWap&page=/inc/guide/>



1. The Common Meeting dealt with matters that concerned all residents and business operators, (such as the annual budget and negotiations with the government). The Common Meeting was also used to settle disputes that could not be resolved within Area Meetings (e.g. disputes between businesses). In such cases, the Common Meeting functioned as a kind of law-court, and provided a judicial role. Participants at the Common Meeting were also obligated to decide how various decisions were to be carried out in practice. The Common Meeting was also used to inform residents about important issues (e.g. updates on negotiations with the government). It also provided a forum for a general debate about any issues concerning the community. The Common Meetings were open to all residents in Christiania, but generally closed to outsiders. Decisions were made by consensus.
2. Area Meetings were typically held once a month. These were intended to address local problems which concerned any of the 15 geographic areas of Christiania (such as building maintenance, applications for vacant dwellings, and payment of utilities). More general affairs concerning all of Christiania were also discussed. Each area had a treasurer who looked after payment of rents and financial planning of the Area Meeting.
3. The Treasurer's and Economy Meetings were held once a month to exchange information about Christiania's economy, as well as to discuss matters relating to structure and housing policy. Institution accounts, business payments, and business agreements were also discussed. At the Economy Meeting, Christiania's Common Purse was administered. This included budgets for children's institutions, renovations, utilities, building maintenance, infrastructure, post office, and so on.
4. The Business Meeting was arranged by the Economy Group and was held once a month offering opportunities to discuss issues affecting businesses in Christiania. Payments to the Common Purse were decided on. Agreements on rights of use for new businesses were discussed. Business operators in Christiania's market place also met once a month to make decisions about logistics, what they were allowed to sell, and how much they had to pay in fees to the Common Purse.

5. The Building Meeting was held once a month with representatives of the 15 areas. At the Building Meeting, decisions were made regarding how the budget provided was to be expended and how tasks were to be prioritised.
6. The Associates' Meeting involved the running of the businesses. Typically, the Associates' Meeting was held once a week, and upcoming tasks were planned.

One of the first structures to appear in Christiania was the Common Purse.<sup>464</sup> This was created at one of the first Common Meetings. Over time, as both the communal functions of Christiania and the demands of the authorities became more complicated, the common economy also became a more comprehensive and complicated affair.<sup>465</sup> Residents of Christiania paid into the common purse for renovation, electricity and water consumption, upkeep of the children's institutions and other public facilities. They also paid a common internal VAT as well as municipal rates and taxes. The distribution of the common purse money was decided at the annual budget Common Meeting.<sup>466</sup>

Christiania employed and accommodated an ethos of experimentation and subversion. As Cathcart-Keyes explained, 'there have always been a lot of positive lessons to learn from this alternative urban enclave. The community continuously experiments with green building techniques, stormwater management, solar energy and water-treatment systems to reduce their ecological footprint'.<sup>467</sup> Cathcart-Keyes also said that this freedom to experiment had always been at the core of Christiania's principles. She quoted long term resident Ole Lykke, who said 'You'd have a good idea, you'd go ahead with it, and if somebody complained, you'd deal with it. If not, you'd just go ahead'.<sup>468</sup>

While Christiania had always been policed by Copenhagen's police force, there was a unique set of rules governing Christiania, which were independent of the Danish government. While the rules evolved over time, at the time of study they forbade stealing and stolen goods, private cars, violence, guns, knives, bulletproof vests, hard

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<sup>464</sup> Christiania.org, above n 409.

<sup>465</sup> Ibid

<sup>466</sup> Ibid.

<sup>467</sup> Cathcart-Keyes, above n 449.

<sup>468</sup> Ibid.

drugs and bikers' colours.<sup>469</sup> Any disputes between neighbours were resolved through negotiations.

Increases and changes to the population were controlled. When a dwelling became vacant, it was announced in a local publication.<sup>470</sup> Applicants were invited to a meeting with the residents of the area in question, and those deemed most suitable for the vacant rooms were chosen.<sup>471</sup>

The built form of the community was maintained through a self-administration program which spent 29 million kroner on maintaining common property and infrastructure.<sup>472</sup> Buildings employed rainwater recycling, materials recycling, solar collectors and PV panels, windmills, community heating systems, and decentralised composting of home materials.<sup>473</sup> The Reuse Station was a recycling centre, which enabled recycling of all materials. The Green Hall provided for reuse of donated, recycled, and salvaged building materials for construction. The architectural aesthetic was therefore less driven by design, and more by what materials were available.

The Building Office provided guidance and advice on building and renovation projects.<sup>474</sup> Funding for private renovations could be borrowed from the collective, interest free, and renovations typically used materials that were 1/3rd provided by the Building Office, 1/3rd sourced from the local area, and 1/3rd purchased by the resident. The houses, though, were not owned by individuals, but by the collective. Over time, there have been more than 400 houses renovated and upgraded in Christiania.<sup>475</sup>

In 1998, Christiania's Girl Guard opened the newly renovated Dyssebro (the Cairn bridge). Christiania's friends, the Navers (Travelling Journeymen) improved the old military bridge. The Ramp on Prærien (the Prairie) was built and managed by young residents and became Copenhagen's first covered meeting-place for both local and international skaters. In 2000, Loppen was recognized and supported as a regional

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<sup>469</sup> SirRagnar, 'Guide to the Alternative Copnehen' (2011)

<<https://insideflyer.com/forums/threads/guide-to-the-alternative-copenhagen.2246/>>.

<sup>470</sup> Christiania.org, above n 409.

<sup>471</sup> Ibid.

<sup>472</sup> Cathcart-Keyes, above n 449.

<sup>473</sup> A Bates, 'Christiania: Copenhagen's Funky Jewel of Sustainability' (2009)

<<http://www.resilience.org/stories/2009-12-21/christiania-copenhagens-funky-jewel-sustainability/>>.

<sup>474</sup> Ibid.

<sup>475</sup> Christiania.org, above n 409.

musical venue by the Ministry of Culture. CSC, the Christiania Sports Club, had its own clubhouse in the bottom of Stjerneskipet (the Star Ship).

### *Analysis*

Table 2 below summarises the analysis of the case study in relation to the propositions set out in Chapter 3. Specifically, the table identifies key moments of territorialisation (and deterritorialisation and reterritorialisation) and identifies any apparent correlation between those moments and the adaptive cycle of the focus system, against the identified key variables, and against the apparent causes for change.

As explained in Chapter 4, the focus system is the community scale system. The following table employs the abbreviation ‘C’ to denote this scale, while ‘C-1’ refers to lower/smaller system scales (such as sub groups or individuals), and ‘C+1’ refers to higher/larger system scales (such as local government or authorities). The table also employs abbreviations for territorialisation (‘TER’), deterritorialisation (‘DET’), and reterritorialisation (‘RET’).

Table 2: Summary Table for Case Study 1: Christiania.

<b>KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION</b>	<b>ADAPTIVE CYCLE (of focus community) and PANARCHY</b>	<b>CHANGE TO KEY VARIABLES</b>	<b>CAUSES OF CHANGE</b>
<p>Military base abandoned in 1969 (DET of another assemblage).</p> <p>Municipality starts planning for public housing on military base (TER).</p> <p>A squat at Sofiegården (established in 1965 and in another part of the city) is cleared by police (DET of another assemblage).</p>	<p>The preceding system (military base) has effectively gone through process of transformative change (Release) due to slow moving variables. Resources have been released and linkages broken, the space has been deterritorialised, largely due to forces from higher scale. The government (C+1) attempt to capture resources through process of territorialisation (on paper).</p> <p>The closing of another squat motivated Revolt</p>	<p>None — focus community not yet established.</p>	<p>Active force at C+1.</p>

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
	activity amongst certain community groups across city.		
1971: Christiania established by a small group of squatters. The squatters occupied barracks, ramparts, and canals of the abandoned military base (TER).	Focus community (C) established in Release phase, when resources and capital are free following DET of military base. Community established from Revolt forces from lower scale (C-1) individual action.	Focus community (C) comprises small collection of bodies (motivated by shared desires and common forces). Assemblage is almost too small to be regarded as an assemblage, but molecular activity predominates. C level behaviour is strongly nomos, with a free distribution and lack of codes directing activity. Space is striated in terms of infrastructure and built form, but smooth in terms of control and access. Initial inhabitation of striated spaces leads to some segmentation of the assemblage. Few documented codes at inception (other than social norms and shared values) and little collective intelligence. Organisation and governance would have been relatively free (nomos). Likely to be tight feedbacks at community scale, mainly due to the limited size of the group.	The formation of the group reflects a plateau in an emerging rhizome. The occupation of the barracks is a clear line of flight leading to significant innovation.
1972: Christiania was granted semi-legal status, following	Government (C+1) activity (Remember) an attempt to stabilise	Interim growth of community (C) likely to expand rhizomic	C+1 scale forces acting on assemblage but not

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
<p>agreement to pay a collective tax for water and electricity (TER).</p> <p>1973: Social Democratic Government gave Christiania official temporary status of “social experiment”, allowing Christiania to persist (TER).</p>	<p>assemblage through territorialisation of identity.</p>	<p>structure and molecular lines — this continues throughout the history of the assemblage.</p> <p>Unclear if C+1 activity had any impact on the composition of the assemblage but may have resulted in intangible striation of space.</p> <p>Growth of community (C) likely to have resulted in establishment of codes and collective intelligence.</p> <p>Status imposed by C+1 scale reflected increase in coding and logos.</p>	<p>generating significant reaction.</p>
<p>1975: A bathhouse, nursery and kindergarten established. Garbage removal, shops, and factories established (TER).</p>	<p>Community scale (C) territorialisation moves assemblage forward through adaptive cycle (Reorganisation) — assemblage is organised and capital stored.</p>	<p>Molecular activity driving territorialisation.</p> <p>Increased territorialisation resulting in increased spatial striation and segmentation.</p> <p>Coding and collective intelligence necessarily increases to enable establishment of built form and social conventions (such as garbage removal).</p> <p>Institutions embody collective intelligence of the assemblage and contribute to its status at C+1 scale.</p> <p>Institutions also reflect molarity and logos.</p>	<p>Institutions reflect plateau providing points of intensity and stability in the assemblage.</p>
<p>1976: The Ministry of defence extended the special “social experiment” status.</p>	<p>C+1 intervention (Court ruling) almost results in absolute deterritorialisation (and</p>	<p>Apart from ongoing growth of the assemblage, no substantial change to</p>	<p>C+1 scale active forces not immediately countered with reactive forces from C scale.</p>

<b>KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION</b>	<b>ADAPTIVE CYCLE (of focus community) and PANARCHY</b>	<b>CHANGE TO KEY VARIABLES</b>	<b>CAUSES OF CHANGE</b>
<p>1978: Supreme Court upheld High Court ruling allowing demolition of Christiania. However, the government instead decided that a District Plan was required and that in the meantime Christiania could remain (TER).</p>	<p>reversion to Release phase). Avoided through some Reorganisation and identity territorialisation imposed from C+1 scale (Remember).</p>	<p>composition and relationships, except that district planning reflects further striation of space. District plan reflects increase of imposed coding and logos — whereby molar lines intersect with the rhizomic assemblage.</p>	
<p>1976-1979: The hard drugs trade became a problem for Christiania. The response was to outlaw hard drugs, remove hard drug dealers, and expel addicted residents (DET).</p>	<p>First significant instance of deterritorialisation at C scale caused by rejection of Revolt activity (from drug traders at C-1 scale). Deterritorialisation likely caused some destabilisation of assemblage and movement back through adaptive cycle (but still in Reorganisation phase).</p>	<p>Some smoothing of space resulting from physical deterritorialisation of Pusher Street. Molecular relationships and strong feedbacks enable line of flight resulting in increased coding and collective intelligence.</p>	<p>Expulsion of drug trade a line of flight and reflection of active forces at C scale countering reactive forces from C-1 scale.</p>
<p>1980s: Christiania's planning office established and Green Masterplan established (TER). Reuse Station established to encourage recycling of materials (TER). School and post office established within Christiania (TER).</p>	<p>Spatial and identity territorialisation at C level moving community into Growth phase (front loop). Institutions lead to increased stability.</p>	<p>Increased striation of space and segmentation of assemblage. Planning office evidence of some molar connections within rhizomic assemblage. Increased coding and feedbacks as well as establishment of institutions resulting in centralisation of collective intelligence (memory) and innovation. Institutions also reflect molarity and logos.</p>	<p>Institutions reflect plateaus providing points of intensity and stability in the assemblage.</p>

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
1987: Government grants 20 million Kroner for restoration work (TER).	C+1 scale intervention effectively increases territorialisation of space and stored capital moving assemblage forward through Growth phase.	Increased molar activity. Unclear if investment precipitated increased coding.	No apparent change.
1989: All pubs closed down. Many re-opened after obtaining relevant licenses (DET and RET).	Close interplay between C-1 and C scale seeing a process of deterritorialisation followed by a process of reterritorialisation.	New rules reflect C+1 scale coding effectively striates and segments the assemblage.	C+1 scale active forces with C scale forces clearly reactive. Reterritorialisation constitutes new plateaus in assemblage.
1989: Majority vote in Parliament voted for the Christiania Law, effectively legalising the squat and “social experiment” (TER). Government’s local plan presented (TER).  1991: The Ministry of Defence and Christiania collective entered into a framework agreement on the right to use the area. This agreement extended until 2004 (TER). This agreement included the payment of taxes in exchange for water, electricity, trash removal, etc.	Significant C+1 level (Remember) intervention seeking to stabilise assemblage and progressing it through Growth into Conservation phase.	Molar territorialisation of assemblage resulting in increased segmentation and striation. C+1 level coding affecting coding at community scale.	Apparent alignment of active forces at C+1 and C scale.
1991: Christiania releases its Green Plan (Grønne Plan) — its vision for the future of Christiania (TER).	Spatial and identity territorialisation through strong self-organisation, potentially moving community back from Conservation phase into Growth phase.	Space becomes more striated and community more segmented. Molecular lines and strong rhizomic activity. Increased coding, feedbacks, and collective intelligence. Increased logos.	Green Plan reflects either a significant plateau (point of stability in assemblage) or line of flight (rupture of assemblage).



<b>KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION</b>	<b>ADAPTIVE CYCLE (of focus community) and PANARCHY</b>	<b>CHANGE TO KEY VARIABLES</b>	<b>CAUSES OF CHANGE</b>
1997: Christiania introduces its own local currency (the Løn) (DET and RET).	Significant deterritorialisation and subsequent reterritorialisation of identity. Effectively moves system towards Conservation phase.	Smoothing (desegmentation) of assemblage. Strong molecular lines strengthening rhizome. Likely increase in coding and collective intelligence.	Currency reflects line of flight rupturing molar and molecular lines in assemblage.
2003: Former stall from Pusher Street gifted to the National Museum as part of exhibition of Copenhagen (TER).	Significant territorialisation of identity (beyond community).	No apparent change.	Exporting identity is a means of territorialising identity through a plateau in the assemblage.
2004: Christiania Law revised with the aim of allowing development of the area as a sustainable neighbourhood, including a change of ownership structure (TER).	C+1 efforts to territorialise, moving system further into Conservation phase with diminished capacity for self-organisation.	Increased molarity and logos resulting in increased segmentation. Molar lines through rhizome, potentially converting to more of a hierarchical structure. Increased coding and macro-level governance.	Apparent alignment of active forces at C+1 and C scale. Growth of status plateau.
2004: Open drug trade ended when stands along Pusher Street were demolished (DET). Trade returned to Pusher Street in subsequent years (RET).	Deterritorialisation and reterritorialisation at C-1 level. Destabilising but prompt reterritorialisation means regression through adaptive cycle unlikely.	Increased coding and feedbacks facilitated line of flight.	Line of flight causing smoothing of space followed by subsequent striation.
2011: Christiania and the state entered into an agreement concerning the future ownership of the Christiania area. This agreement effectively meant that Christiania's residents could buy Christiania (TER).  2013: Minister for Climate, Energy and Building introduced a	C+1 level territorialisation increasing stabilisation and rigidity of the system. System clearly within Conservation phase and arguably no longer predominantly self-organising.	Predominance of molar activity converting rhizomic connections. Transition to more hierarchical structure and more molar lines.	C+1 scale forces dominate.

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
<p>legislative proposal to repeal the special law for the Christiania area (TER). The legislative proposal was adopted by a large majority in the Danish Parliament in June 2013 meaning that, from July 2013, the same laws and rules that apply to the rest of Denmark also applied to Christiania.</p>			
<p>2016: 3 people injured (including 1 police officer) by gun shots, in relation to cannabis trade. Christiania's residents decided to evict large scale traders and reclaim Pusher Street (DET). Increased police surveillance allowed (TER).</p>	<p>Deterritorialisation at C scale followed by reterritorialisation at C+1 scale.</p>	<p>Increased coding and feedbacks facilitated line of flight.</p>	<p>Line of flight causing smoothing of space followed by subsequent striation.</p>

## 5.2 CASE STUDY 2: FAVELA SANTA MARTA, BRAZIL

### *Overview*

Santa Marta, also referred to as Dona Marta, is a relatively small favela in the district of Bontafogo in Rio de Janeiro. The favelas of Rio de Janeiro are a well-known urban condition and have been a prominent part of the city's identity since the latter part of the 19th century.<sup>476</sup> Carvalho and Silva state that 'the emergence of the slum as a form of urban settlement in Rio de Janeiro is linked to the housing crisis of the 19th century and political crises such as the Armed Revolt (1894-1895) and the War of Canudos (1896-1897)'.<sup>477</sup> Kure, Usto and Manickum note that 'the term favela was first used to describe a spontaneous settlement in the late 19th century, when government soldiers returning from the Canudos Campaign, a civil war in northern Brazil, settled down at a hill called Morro de Castelo. They were left with no place to live and thus erected their houses on the hill and nicknamed the settlement Favela'.<sup>478</sup>

According to Kure, Usto and Manickum, the main growth in the favelas occurred between the 1940s and 1970s as a result of substantial migration from rural to urban areas.<sup>479</sup> Minoja explains that between the 1940s and 1990s, the percentage of people in Brazil living in cities increased from 26% to 80%.<sup>480</sup> Today, almost 1.5 million people live in more than 900 Favelas in Rio de Janeiro.<sup>481</sup>

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<sup>476</sup> T Skidmore, 'Favelas in Rio de Janeiro, Past and Present' in *Brazil: Five centuries of change* (Oxford University Press, 2010) .

<sup>477</sup> F Caixeta Carvalho and F Damasio Silva, 'Tourism and Slums: A Study About Favela Santa Marta and the Role of the Pacification Police Units in Rio de Janeiro' *Cadernos Proarq19*, p255.

<sup>478</sup> J Kure, K Usto and T Manickum, 'Favela Cloud: Experiments on the Potentials of the Favela to Generate New Spatial and Social Possibilities' (2012) Masters *AD:MT* <[https://issuu.com/manickam/docs/favela\\_cloud\\_program](https://issuu.com/manickam/docs/favela_cloud_program)>, p17.

<sup>479</sup> *Ibid.*

<sup>480</sup> L Minoja, 'Favelascape: Tools for Integration of the Favela Santa Marta in Rio de Janeiro' (2011) *Facolta di Architettura e Societa* <<https://issuu.com/livia.minoja/docs/favelascape-part1>>.

<sup>481</sup> *Ibid.*



Figure 12: Location of Santa Marta (red outline). Base map from Google Earth Pro. Retrieved 08/08/2017.



Figure 13: Aerial view north across Santa Marta. Image from Google Earth Pro. Retrieved 08/08/2017.

While the evolution of the favela over time is not well documented, largely due to the reluctance of authorities to recognise or map informal settlements in the earlier decades of their existence,<sup>482</sup> there is some information available to give a sense of how the favelas generally, and Santa Marta in particular, developed. Santa Marta's development is similar to many other favelas, insofar as it was a favela established to provide affordable housing, and grew by way of "incremental urbanism," whereby favela residents gradually upgraded their homes and started businesses, before the authorities ultimately contributed infrastructure and community facilities.

Favela Santa Marta was established around the 1920s or 1930s. The first "settlers" of the area now occupied by the favela were labourers working on the *Colégio Santo Inácio*. This project started in the late 1910s and continued for 30 years. The priests organising the improvements to the college allowed the workers to build shelters on the Santa Marta hill, amongst the forest.<sup>483</sup>

Today Santa Marta accommodates around 4,000 to 5,000 residents within around 1,370 homes.<sup>484</sup> It has four kindergartens, two sports fields, a samba school, a number of small shops, bars, and a small market. Most of the non-residential uses are located at the base of the favela, near the main square (Canton Square). At the top of the favela is the station of the Pacifying Police Units (*Unidades de Polícia Pacificadora* — UPP), a football field, and a handful of additional houses. There is also a predominance of street art, including a well-known rainbow colour scheme extended across some 34 buildings at the lower part of the favela. Organised in 2010 by two Dutch artists, Haas & Hahn, the project employed local youths to paint the buildings on a daily basis, providing them with a salary and practical painting skills.

Santa Marta is a particularly steep favela, occupying the slopes of Morro Dona Marta (Dame Martha's Hill). There is an elevation difference of approximately 390 metres, and there are some 1,300 steps from the bottom to the top of the favela.<sup>485</sup> A funicular tram was constructed in May 2008 to provide public transport up the steep favela. The tram has five stops from the bottom to the top and ascends at a 45 degree

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<sup>482</sup> Earlier maps of the city showed favelas as undeveloped space. Since the 1960s, there has been a greater effort to map favelas, but until the 2000s little had been published, either because authorities preferred not to acknowledge what was seen as an embarrassing aspect of the city, or preferred not to be responsible for the provision of service to these areas or because mapping such idiosyncratic spaces proved too complex or the lack of formal land titling confounded standard mapping processes.

<sup>483</sup> Minoja, above n 480.

<sup>484</sup> Caixeta Carvalho and Damasio Silva, above n 426.

<sup>485</sup> *Ibid.*



incline. The favela is also particularly confined, occupying approximately 5.4 hectares.<sup>486</sup> As Carvalho and Silva observe:

*On one side, the Funicular Railway establishes a physical boundary; on the other side of the favela, a wall was built in 2009, supposedly to protect the remaining native vegetation. Expansion, therefore, occurs via greater housing density and vertical growth, with buildings containing up to five floors.*<sup>487</sup>

According to José Mário, President of the Residents Association and the Community Union, it is estimated that some 10,000 tourists (3,000 of them foreigners) visit the favela each month.<sup>488</sup> There are a number of official bus and walking tours of the favela and, as Carvalho and Silva observe, some residents, on noticing the increasing number of touristic visits to their community, ‘decided to organize themselves and also offer the service in a more authentic manner and in line with the expectations of tourists’.<sup>489</sup>

Carvalho and Silva say that, over the last ten years, Favela Santa Marta has hosted a number of social and cultural projects, and has served as a stage for ‘events that unite the community and residents from surrounding neighbourhoods’.<sup>490</sup> They continue ‘there are projects such as a jazz festival, samba, funk week and graffiti art. In turn, the project Costurando Ideais encourages local crafts. Recently a project was approved for the return of Hip-hop Santa Marta, through the notice Micro-projects for the Territories of Peace.’<sup>491</sup> There is also a popular Samba school and a music school in the favela, both attended by residents from and beyond the favela. Carvalho and Silva also note that there are regular dance and music parties held throughout the favela, particularly in the main court.<sup>492</sup> They observe that parties which used to take place in the South Zone of the city have also started renting the venue, which has boosted its image as an attractive location.

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<sup>486</sup> M Peregrino, ‘Tram, Tourism, History & Resistance in Santa Marta: Each Brick Has Its Story’ (2015) (05/01/2017) *Rio On Watch* <<http://www.rioonwatch.org/?p=20388>> and Caixeta Carvalho and Damasio Silva, above n 477.

<sup>487</sup> Caixeta Carvalho and Damasio Silva, above n, p256; 477.

<sup>488</sup> Peregrino, above n 486.

<sup>489</sup> Caixeta Carvalho and Damasio Silva, above n, p261; 477.

<sup>490</sup> *Ibid*, p259.

<sup>491</sup> *Ibid*, p259.

<sup>492</sup> *Ibid*.

## ***Environment***

Carvalho and Silva observe that:

*The particular way in which the favelas and illegally occupied areas in Rio de Janeiro are distributed is quite different from other large cities, in that they are conspicuously located in the downtown and south zone of the city, amid neighbourhoods with high property values. As the lucrative drug trafficking trade grew, these informal urban spaces became extremely closed and increasingly segregated from the formal city, even though, space-wise, they permeated the heart of the city itself.*<sup>493</sup>

As with other favelas, Santa Marta occupies a conspicuous yet challenging space in the city, being located on an extremely steep hillside. As with other steep favelas, the first homes were located on more favourable slopes, following “paths of least resistance,” with subsequent homes located in the leftover or “interstitial” spaces. Public spaces comprise the pathways and leftover spaces between the irregularly shaped buildings. Over time, buildings were upgraded (particularly from timber and scrap metal to more solid brick and concrete structures); retrofitted (some to accommodate small business); or replaced with larger houses or state-funded housing projects.

Santa Marta therefore meets the general description of many favelas, including that provided by Lesmeister, who describes them as:

*...areas with irregular self constructed housing without permits and lacking the amenities of urbanization. Infrastructure like a road system, water and sanitation structure is not planned in advance: it's implemented years after the construction of housing, usually due to urbanization projects of the (local) government. Dwellings are using almost every available empty space; a minimum of streets and alleys is kept open. The result will be a very dense, overcrowded area with narrow streets and a lack of public space ... Often the exterior of the houses is raw and unfinished. The interior got often more attention of the occupant: rooms' [sic] surfaces are finished off and the house is*

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<sup>493</sup> Ibid, p257.

*furnished completely. Some houses are also finished with plasters [sic] on the exterior, but this all depends from [sic] the income of the occupant.*<sup>494</sup>

Lesmeister continues, observing:

*Self construction of a small individual houses [sic] is the first step for migrants to establish themselves in the megalopolis. Self-constructed housing is built with the most inexpensive materials: in the beginning with weak insufficient materials that quickly becomes [sic] replaced by the more durable cast-in-place concrete and hollow brick. The houses are directly formed by the specific needs of the end user, who is directly involved in the building process. Size of the houses depends on family size and available money; the houses are ever-changing and expand with each generation ... absence of zoning enables the residents to transform the ground floor facing the street to a workshop or retail space.*<sup>495</sup>

He also observes that people make building limits in continuous negotiation with their neighbours. 'When a resident needs a new room or a terrace he consults his neighbours where to expand the house, where to place windows and where to built [sic] other required spatial elements'.<sup>496</sup>

Kure, Usto and Manickum observe that:

*The urban fabric of the favela has a complexity which is not present in the modern city. It is a complex organization which revolves around paths and connections, a high density building mass which is scattered as dots in a seamlessly unplanned, uncontrolled but still coherent and organized.*<sup>497</sup>

They also state that:

*The favela is an agglomeration of units, a large multi programmed building on an urban scale, consisting of many separate volumes. ... But the logic of the favela is more organic, more controlled by the flow of the landscape, a multi-sensory and attractor-based system controlled by the relation to fellow dwellers and accessibility.*<sup>498</sup>

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<sup>494</sup> C Lesmeister, 'Growth and Evolution of the Favela' (2011) <[https://issuu.com/clesmeister/docs/paper\\_merged](https://issuu.com/clesmeister/docs/paper_merged)>, p6.

<sup>495</sup> Ibid, p7.

<sup>496</sup> Ibid, p7.

<sup>497</sup> Kure, Usto and Manickum, above n, p21; 478.

<sup>498</sup> Ibid, p48.



Brillembourg and Klumpner observe that:

*If one looks from a distance, one sees sprawling, rhizome-like shapes; one searches in vain for an ordering principle, a clear beginning and end, for ways to separate the whole into comprehensible elements. But close up, patterns begin to emerge and a certain logic — unlike that taught by conventional architecture or planning — can be discerned.*<sup>499</sup>

Kure, Usto and Manickum also observe that in typical favelas — and this is certainly the case with Santa Marta — the dwellings are clustered along primary access routes, which they see as a controlling parameter for the layout of favelas; and that there are secondary connections between the dwellings and primary access routes, some connections, and some dead-ends.<sup>500</sup>

De La Hoz characterises the result as something of a collage, comprised of many layers upon and within one another:

*Each favela is a mini city comprising of homes, schools, small businesses, eateries, and in recent years, a permanent police station. As a city that has developed in sections, the urban fabric of the favela does not follow the pattern of traditional zoning, with districts or quarters sanctioned as residential, commercial, business, etc. Instead, various building types have sprung up due to demand and the entrepreneurship of residents.*<sup>501</sup>

Importantly, as Fabricius notes, ‘the infrastructures do not officially come until much later, when the favela is urbanized and partially absorbed by the city’.<sup>502</sup> De La Hoz describes this as *posteriori* planning, whereas the norm of the formal city is *priori* planning.<sup>503</sup> Obviously, planning after the fact leaves little opportunity for implementing substantial infrastructure (such as roads) and so the defining structure of the favelas is generally set once the initial paths and housing are established.

Before infrastructure was officially provided, residents provide their own “fixes” for accessing water and electricity, and usually find localised solutions for waste removal. This was the case with Santa Marta, with infrastructure such as water

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<sup>499</sup> A Brillembourg and H Klumpner, 'Roles of Engagement: Caracas and the Informal City' (2010) *Rethinking the Informal City: Critical Perspectives from Latin America*, p119.

<sup>500</sup> Kure, Usto and Manickum, above n 478.

<sup>501</sup> C De La Hoz, 'The Favela Typology: Architecture in the Self-Built City' (2014) <[https://issuu.com/carlydelahoz/docs/delahoz\\_thefavelatypology](https://issuu.com/carlydelahoz/docs/delahoz_thefavelatypology)>, p15.

<sup>502</sup> D Fabricius, 'Resisting Representation' (2008) 28 *Harvard Design Magazine* 4, p5.

<sup>503</sup> De La Hoz, above n 501.

tanks being constructed by residents to improve water supply for the community. Whilst effective for the individual residents, such approaches tend to ignore the impacts of “negative externalities” (such as downstream pollution) and increases the risk profile (particularly in terms of public health, safety, and amenity) of these settlements.

De La Hoz points out that whilst lack of open space would be considered a problem in contemporary urban planning and design, it is seldom a critical concern within the favelas.<sup>504</sup> Santa Marta includes a number of key open spaces (in addition to the streets and paths), including a main square at the bottom of a hill (Praça Cantão), some plaza spaces on the slopes, and two football fields. As De La Hoz points out, ‘residents congregate in the streets, on roofs, in alleys, at corners and in homes. The boundaries of public and private space are much more fluid than in the formal city. Residents do not experience a “lack” of public space, but rather have a different understanding of what public space means’.<sup>505</sup>

As with most favelas, Santa Marta was developed with materials that were cheap and which are easy to erect — particularly timber, masonry, and sheet metal. The buildings look similar because they use the same construction techniques, the same materials, and are roughly the same size. Leech explains ‘the houses are generally built on a 3m x 4m grid because that is about the maximum that they can calculate using simple concrete beams filled with steel reed bars’.<sup>506</sup> Once the structure is built, the walls are infilled with clay blocks, bricks, or a type of breezeblock, or they are left open. He notes that ‘while many of the inhabitants work in the construction industry, few are construction experts and repeating a known method is the safest way to be assured of success. And even though they are highly resourceful, imitation seems to be favoured over radical new solutions.’<sup>507</sup>

Minoja notes that Santa Marta was originally established on the uppermost slopes of the hillside.<sup>508</sup> Today, this part of the favela is the least dense part of the favela, is the most diverse in terms of housing types, and is predominantly occupied by the longer-term residents and their families. There are two sports fields in the upper

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<sup>504</sup> Ibid.

<sup>505</sup> Ibid, 22.

<sup>506</sup> O Leech, *Hidden Rules: Are there Rules and Regulations Even in Informal Settlements?* (2013) <<https://issuu.com/olileech/docs/thesis>>, 25.

<sup>507</sup> Ibid, 31.

<sup>508</sup> Minoja, above n 480.

part of the favela, as well as the UPP station. According to Minoja, the middle part of the favela is relatively dense, except for parts which are built on a large rock base (houses in this area tends to be smaller huts), and accommodates a higher extent of upgraded housing (mainly because it is a highly visible part of the favela and is accessible by the tram).<sup>509</sup> There is a sports field and a number of community facilities in this part of the favela. The lower part of the favela is dominated by larger buildings (3-5 storeys) and has the highest density and building intensity. There are more public spaces in this area, including the main square.

Dom Phillips provided a brief insight on the favela from his visit there, observing that:

*... the alleyways got narrower as we descended. Chickens clucked in a drain. Purple flowers sprouted near bags of gravel. Children in flip-flops pushed past talking football. An old woman was carried past on a chair. Humanity teemed in the narrow alleys. Everything was tiny: a barber shop, an electrical products stall, a bedroom with three small bunk beds ... The building behind which traffickers used to hide is now used for boxing and judo. At the foot of the favela, outside the Bar Cheiro Bom (Good Smell Bar) Pedro pointed out bullet holes in a wall.*<sup>510</sup>

In addition to the various interventions mentioned above, the following summarises some of the more notable events in the evolution of Santa Marta:

- In 1979, the favela was connected to the city's electricity network, with power distribution managed by a residents committee.<sup>511</sup>
- In 1987, a week-long "war" between rival drug organisations was waged in the favela.<sup>512</sup>
- In 1988, heavy rains cause landslide and collapse of 43 homes.<sup>513</sup>

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<sup>509</sup> Ibid.

<sup>510</sup> D Phillips, 'Favela Tourism in Rio de Janeiro' (2013) *The Guardian* <<https://www.theguardian.com/travel/2013/nov/04/rio-de-janeiro-brazil-favela-tourism>>.

<sup>511</sup> M Dammann, 'Governance in the Pacified favelas of Rio de Janeiro' (2012) <<https://www.researchgate.net/publication/303209221>>.

<sup>512</sup> B McCann, 'The Political Evolution of Rio de Janeiro's Favelas: Recent Works' (2006) 41(3) *Latin American Research Review* 149, 156.

<sup>513</sup> J Brooke, 'Rio Journal; A Most Unlovely Slum (Even if the View Is Nice)', *The Times* (New York), 1990

- In 1996, Michael Jackson recorded parts of the video for his song “They Don’t Care About Us” in the favela. Fourteen years later (in 2010), a bronze statue of the musician was erected within the favela. According to Carvalho and Silva<sup>514</sup>, the Terrace (Lage Michael Jackson) is one of the main tourist attractions in the community.
- In 2003, Rio de Janeiro won the bid to host the 2014 Football World Cup. In 2007, the city won the bid to host the 2016 Summer Olympics. Winning these two mega-events prompted a range of city-wide investment, some of it benefitting the favelas, some of it causing funds to be diverted from the favelas.
- In 2007, the Acceleration of Growth Program (Programa de Aceleração do Crescimento) was launched. This program sought to accelerate the economic growth of Brazil through federal funding.
- In 2008, the favela started to benefit from the State Urban Development Program, through infrastructure projects (including sewerage, drainage and water distribution networks), improvements in the road system, paving of public areas, slope retention works, construction of housing units, and improvements to existing ones.<sup>515</sup> Carvalho and Silva explain that the works were stopped in 2010, due to the concentrated efforts of the state government to assist areas devastated by the heavy rains in the city.<sup>516</sup> The favela upgrade works were resumed in 2012.
- In 2009 Light S.A. removed illegal electricity connections, renovated the mains supply grid and installed electricity meters in the houses. Light S.A. also mapped the favela, labelled paths and numbered the houses. In this way, it could assign temporary addresses to residents and bring electricity bills directly to the homes.<sup>517</sup>
- In 2010 the Rio Top Tour was established in Santa Marta as a partnership between the Ministry of Tourism and the city government.<sup>518</sup>
- The House of Culture Dede was initially built to house a clinic, but was abandoned because of violence. In 2004, it was reopened as the Reading

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<sup>514</sup> Caixeta Carvalho and Damasio Silva, above n 426.

<sup>515</sup> Ibid.

<sup>516</sup> Ibid.

<sup>517</sup> Dammann, above n, 19.

<sup>518</sup> Peregrino, above n 486.

Room. In 2007, it was transformed into a School of Music, and in 2010, it was recognized as a Culture Spot at the Feet of Santa Marta by the Ministry of Culture.

- In 2010, an Ecomuseum was established in the favela. Although small, the establishment is intended to help to develop the favela territory, not only by valuing its history and local culture, but also by respecting its natural environment.<sup>519</sup>

### *Legal Status*

The favelas of Rio de Janeiro were largely ignored by the authorities for much of the first half of the twentieth century, but received greater attention from the mid-1940s, when various political campaigns set a precedent for widescale favela eradication efforts in the 1960s and 1970s.<sup>520</sup> According to Carvalho and Silva, the census of 1948 indicated that a total of 138,837 inhabitants lived in some 105 slums across the city.<sup>521</sup> However, because favela removal efforts failed to address the root cause of Rio de Janeiro's housing shortage, the favela population continued to grow during the 1950s-1970s.<sup>522</sup> Skidmore notes 'as a result, government officials eventually determined that eradication was not a viable solution to the favela problem, abandoning it as an official policy in the late 1970s.'<sup>523</sup>

Santa Marta was one of several communities which managed to resist eradication efforts, largely as a result of "grass-roots" organisation within the favela.<sup>524</sup> Skidmore states that 'these resistance efforts, whether successful or not, attest to the power of community organizing and coalition building, and firmly established a foundation for the thriving grassroots political culture that exists in many favelas today'.<sup>525</sup>

During the 1980s, the new challenge for the favelas was crime, particularly associated with the trade of illicit drugs.<sup>526</sup> With the growing drugs trade and associated violence came increased police presence, as well as police repression.<sup>527</sup>

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<sup>519</sup> Ibid.

<sup>520</sup> Skidmore, above n 476.

<sup>521</sup> Caixeta Carvalho and Damasio Silva, above n, 255; 426.

<sup>522</sup> Skidmore, above n 476.

<sup>523</sup> Ibid.

<sup>524</sup> Ibid.

<sup>525</sup> Ibid.

<sup>526</sup> Ibid.

<sup>527</sup> Ibid.

In 1992, a Master Plan for the city included the favelas on city maps and records, and efforts were launched to integrate the slums into the neighbourhoods of Rio, and from 1994-2000 the Favela-Neighbourhood program of the City of Rio de Janeiro sought to integrate the favelas into the rest of the city through works involving urbanization, sanitation and access to urban facilities and furniture.<sup>528</sup> There remained a range of challenges to upgrading the favelas, including government resources. As Dammann observes, ‘the state generally lacks the resources to improve the electricity network, the precarious infrastructure and the access to public services and goods across the favelas to the level of the adjacent neighborhoods. The formalization of Internet and TV connections is also a big challenge.’<sup>529</sup>

As Skidmore explains, the change in public policy and political attitudes continued, and in November 2008, ‘the government of Rio de Janeiro launched the UPP, a state-run operation to disarm the drug trade and reclaim the city’s favelas from the gangs that had controlled them since the mid 1980s’.<sup>530</sup> Since this time, the UPP program, a collaboration between the State Security Secretariat and the Military Police to regain territorial control of the favelas<sup>531</sup>, has “pacified” nearly one hundred communities through the establishment of twenty-six community policing bases.<sup>532</sup> Santa Marta was the first community to have UPP installed, and today is hailed as a model of favela pacification.<sup>533</sup> In Santa Maria, the UPP building is located at the top of the favela, providing surveillance across almost the entire favela.

Carvalho and Silva say that:

*Setting up the UPP in Santa Marta has brought benefits, such as different investments in infrastructure, housing and improved access to the community and public spaces ... as part of the State Urban Development Program. Furthermore, institutions operating in the community are growing, such as technical schools and NGOs. As a result of these changes – opening up the territory to visitors and residents from the formal city, as well as government involvement – electricity and water services are regularised, for example, taxes*

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<sup>528</sup> Caixeta Carvalho and Damasio Silva, above n, 255; 426.

<sup>529</sup> Dammann, above n, 5.

<sup>530</sup> Skidmore, above n 476.

<sup>531</sup> Caixeta Carvalho and Damasio Silva, above n 477.

<sup>532</sup> Skidmore, above n 476.

<sup>533</sup> Peregrino, above n 486.

*and fees are increasingly paid, and, as would be expected, there is greater interest in the potential of the community and property values.*<sup>534</sup>

Skidmore explains:

*The UPP's unique fusion of security and social welfare measures bodes well for future development. Before the UPP, the Military Police focused on apprehending criminals and the Municipal Housing Secretariat took care of urbanization projects, but there was no coordination between the two government organs. Police operations terrorized communities and were rarely fruitful, due to the resourcefulness of drug traffickers and the widespread corruption of policemen. Urbanization projects only addressed half the problem, as the presence of armed gangs discouraged community cooperation with the government and prevented residents from achieving their true collective social potential. Now, communities with UPPs are the recipients of holistic development projects, intended to both introduce state law enforcement and build community institutions. For the first time in the history of the city of Rio de Janeiro, favelados are able to participate in civil society in ways previously beyond their reach.*<sup>535</sup>

### **Organisation**

In relation to favela community structures, Skidmore states:

*Initially, these communities were loosely incorporated squatter settlements that sprang up organically in order to house internal migrants and itinerant labourers. As they became more numerous and increasingly populated by a burgeoning urban underclass, favela residents began to organize internally, forming associações de moradores, or residents' associations. These organizations served as forums for deliberating matters of community governance, in addition to acting as liaisons between favelados (favela residents) and the prefeitura (city hall). Since the city and state governments failed to extend many public services to the favelas, community members, led by their local associations, banded together to provide sanitation, medical care, and transportation to their friends and neighbours.*<sup>536</sup>

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<sup>534</sup> Caixeta Carvalho and Damasio Silva, above n, 259; 477.

<sup>535</sup> Skidmore, above n 476.

<sup>536</sup> Ibid.

At the time of this study, much of the activity in the favela (such as electricity and water distribution, health issues, and legal issues) was organized and coordinated by the Residents Association. The Residents Association (the ‘Associação dos Moradores’) was established in 1965. It was the official organisation representing the residents of the favela. It also kept the housing register and regulated property rights in the favela. Its statute stipulated that it was responsible for public illumination, garbage, health and legal issues in the community.<sup>537</sup> The Residents Association maintained four nurseries, a library and a radio station. When external actors organised events in Santa Marta, they had to inform the association, which communicated it to the inhabitants via notice boards and speakers.<sup>538</sup> The Residents Association and the UPP are together responsible for the mediation of disputes between residents.

As well as the Residents Association, there were a number of other local (within the favela) and external (outside of the favela) actors involved in the organisation of the favela. Of particular note are<sup>539</sup>:

- **Grupo ECO**, which was the most important actor besides the Residents Association.<sup>540</sup> It was founded in 1976. It articulated and defended the interests of the residents, published a local newspaper for information about political events, and stimulated discussion about the role of the Residents Association.
- **Drug traffickers**, who were extremely powerful within most of Rio de Janeiro’s favelas, including Santa Marta, at least between the 1980s and 2008, when they were largely cleared out by the UPP.
- **Light S.A.**, a private service provider operating the public electricity and public illumination network within the favela. They were also attempting to legally connect residents to the electricity network. Dammann states:
- **The UPP**, described above. The UPP was a project of the Military Police of Rio de Janeiro, and was subordinated to the State Secretariat of Public Security. The UPP in Santa Marta was established in December 2008.<sup>541</sup> At

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<sup>537</sup> Dammann, above n 511.

<sup>538</sup> Ibid.

<sup>539</sup> As set out in *ibid.*

<sup>540</sup> Ibid.

<sup>541</sup> Ibid.



the time of this study, there were 125 policemen based in five stations patrolling the favela.<sup>542</sup>

- **State actors responsible for the urbanisation of Santa Marta.** The governments of the state and the city of Rio de Janeiro were substantially involved in social consolidation and pacification. They were also responsible for urbanisation and infrastructure upgrades for parts of the favela, although most infrastructure upgrades were undertaken by residents. Also, as Dammann explains, there was a centre for professional training maintained by external foundations, and a free internet cafe located inside the building of the Residents Association. Children of the favela could attend a municipal primary school in the district of Botafogo, where the residents could also use the services of a small general medical hospital at no charge.<sup>543</sup>

Dammann explains that the Municipal Secretary for Housing (SMH) established an office of the Program for Urban and Social Orientation (POUSO) in Santa Marta in 2009 ‘to consolidate the urban planning through technical assistance and regulation of construction activities and to prevent the building of further illegal buildings’.<sup>544</sup> She continues, ‘the goal is that the buildings in Santa Marta will one day meet the official building criteria, so that they can be considered as buildings with legitimate owners and be assigned an official address’.

### *Analysis*

Table 3 below summarises the analysis of the case study in relation to the propositions set out in Chapter 3. Specifically, the table identifies key moments of territorialisation (and deterritorialisation and reterritorialisation) and identifies any apparent correlation between those moments and the adaptive cycle of the focus system; against the identified key variables; and against the apparent causes for change.

As explained in Chapter 4, the focus system is the community scale system. The following table employs the abbreviation ‘C’ to denote this scale, while ‘C-1’ refers

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<sup>542</sup> Ibid.

<sup>543</sup> Ibid.

<sup>544</sup> Ibid, 17.

to lower/smaller system scales (such as sub groups or individuals), and ‘C+1’ refers to higher/larger system scales (such as local government or authorities). The table also employs abbreviations for territorialisation (‘TER’), deterritorialisation (‘DET’), and reterritorialisation (‘RET’).

Table 3: Summary Table for Case Study 2: Santa Marta.

<b>KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION</b>	<b>ADAPTIVE CYCLE (of focus community) and PANARCHY</b>	<b>CHANGE TO KEY VARIABLES</b>	<b>CAUSES OF CHANGE</b>
<p>1910s: Collegio Santo Inacio project commenced, attracting labourers to the area, many of whom built temporary shelters on Santa Marta Hill.</p> <p>1920s: Santa Marta favela established, becoming a long-term residential community following the establishment of labourers’ dwellings in the area (TER).</p> <p>1950: 1,632 residents in Santa Marta Favela (TER).</p>	<p>The provision of access to Santa Marta effectively commenced the adaptive cycle at the Release stage, with a release of resources (land) and the Revolt activity of individuals.</p> <p>The growth of the favela reveals linear growth and passage through the adaptive cycle.</p>	<p>Pure nomos over smooth space (although topographically striated). Few documented codes at inception (other than social norms and shared values) and little collective intelligence.</p> <p>Organisation and governance relatively free (nomos).</p>	<p>Small collection of bodies motivated by shared desires. Need for accommodation reflects line of flight.</p>
<p>1959: Residents of Santa Marta built water tank on top of hill. Other local infrastructure upgrades continued around this time (TER).</p>	<p>C and C-1 scale territorialisation move assemblage through to Reorganisation phase.</p>	<p>Space becomes more striated and assemblage more segmented. Increased coding and collective intelligence in relation to shared resources.</p>	<p>Organisation of resources reflect plateau providing points of intensity and stability in the assemblage.</p>
<p>1965: The Residents Association of Dona Marta founded. It is officially recognised by the Social Secretary in 1967 (TER).</p>	<p>Spatial and identity territorialisation at C level moving community into Reorganisation phase.</p>	<p>Increased striation and segmentation of assemblage.</p> <p>Residents Association evidence of some molar connections within rhizomic assemblage.</p> <p>Increased coding and feedbacks as well as establishment of</p>	<p>Institutions are a type of plateau and lead to increased stability.</p>

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
		institutions resulting in centralisation of collective intelligence (memory) and decision making.	
1965: Drug trafficking becomes problem in the favela (DET).	C-1 destabilising forces (Revolt) deterritorialises identity of the assemblage.	No apparent change.	C-1 scale active forces destabilise assemblage.
1976: Group Eco was established (TER).	Spatial and identity territorialisation at C level moving community further through Reorganisation phase. Institutions lead to increased stability.	Increased striation of space and segmentation of assemblage. Evidence of some molar connections within rhizomic assemblage. Increased coding and feedbacks as well as establishment of institutions resulting in centralisation of collective intelligence (memory) and decision making.	Institutions are a type of plateau and lead to increased stability.
1977: The city's Governor (Marcos Tamoyo) adjusts strategy from favela eradication to favela upgrading (TER).	Significant C+1 level (Remember) intervention seeking to stabilise assemblage and progressing it through Growth into Conservation phase.	Molar territorialisation of assemblage resulting in increased segmentation and striation. C+1 level coding affecting coding at community scale.	C+1 scale forces aligned with C scale desires.
1979: Santa Marta Favela connected to city's electricity and water network (TER). Power distribution managed by Residents Association  1982: Light SA starts installing electricity in Santa Marta (TER).	C+1 scale territorialisation moving assemblage into Growth phase. Increased stability with reduced capacity for self-organisation.	Increased logos and molar activity. Increased coding.	C+1 scale forces acting on assemblage but not generating significant reaction. Medical centre reflects plateau providing points of intensity and stability in the assemblage.

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
1985: A medical centre is installed at the top of Santa Marta Favela (TER).			
1987: A week long war waged between rival drug organisations in the favela (DET). Police presence within the favelas consequently grew towards the end of the decade (TER).	Deterritorialisation at C-1 scale, leading to reterritorialisation at C+1 scale. Revolt followed by Remember influences. Possible regression into Reorganisation phase.	Increased molar activity to stabilise resulting in increased segmentation and striation of space. Increased coding and feedbacks.	Expulsion of drug trade a line of flight and reflection of active forces at C+1 scale countering reactive forces from C-1 scale.
1988: Heavy rains cause landslide and collapse of 43 homes, causing nine deaths (DET).	Failure in system leads to regression into Release-Reorganisation phase for C-1 scale. Subsequent reterritorialisation as houses rebuilt.	Nomos, increased molecularity and rhizomic connection following incident. Feedbacks and collective intelligence increased.	No apparent change.
1992: A Master Plan for the city identified favelas — one of the first instances of official maps recognising favelas across the city (TER). The city's Mayor promotes plans to regularise favelas, encouraging favela residents to participate in process of integration with formal areas (TER).	Spatial and identity territorialisation at C+1 level stabilising assemblage and moving into Growth phase (front loop).	Increased striation of space and segmentation of assemblage. Master Plan reflects molar intervention. Increased coding and feedbacks as well as establishment of institutions resulting in centralisation of collective intelligence (memory) and decision making.	Apparent alignment of active forces at C+1 and C scale.
1994-2000: City-wide Favela-Neighbourhood (Favela-Bairro) Program sought to integrate favelas in the city through upgrade programs and infrastructure investment (TER).	C+1 scale intervention effectively increases territorialisation of space and stored capita forward through growth phase.	Increased molar activity. Unclear if investment precipitated increased coding.	As above.

<b>KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION</b>	<b>ADAPTIVE CYCLE (of focus community) and PANARCHY</b>	<b>CHANGE TO KEY VARIABLES</b>	<b>CAUSES OF CHANGE</b>
1996: Michael Jackson music video filmed in favela (TER).	Increased territorialisation of identity. Potentially increasing stability of favela.	No apparent change.	No apparent change.
<p>2004: Favela upgrade works progressed in Santa Marta, with new water and sewer infrastructure, and new retaining walls (TER). Two apartment blocks (15 units each), housing upgrades (eventually 100 renovated houses), and two football fields also constructed (TER).</p> <p>Construction of tram line and station also commenced (TER).</p> <p>2006: Government constructed child care centre in favela, as well as a leisure centre and new water tank (TER).</p>	Significant C+1 scale interventions stabilise assemblage and effectively move into Conservation phase through significant capital investment and changes to identity and governance of assemblage.	Predominance of molar activity converting rhizomic connections. Transition to more hierarchical structure and more molar lines.	Institutions reflect plateaus providing points of intensity and stability in the assemblage.
2008: Government launched UPP to disarm drug trade and control gang activities. Santa Marta Favela was first in the city to have UPP program. UPP station located at the top of Santa Marta Favela with checkpoint at bottom of favela (TER).	Significant C+1 scale intervention and Remember activity to stabilise assemblage and retain in Conservation phase.	Significant change to composition likely resulting in molar lines dominating molecular lines. Space significantly striated. Increased coding and feedbacks.	C+1 scale active forces creating line of flight causing smoothing of space followed by subsequent striation.
2008: Tram line and stations completed providing public transport from bottom to top of favela (TER).	Further C+1 scale interventions increase stability and rigidity of assemblage.	Predominance of molar activity converting rhizomic connections. Transition to more hierarchical structure and more molar lines.	C+1 scale forces active with no reactive forces from C scale.

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
<p>2009: Wall constructed along western boundary of favela, ostensibly to protect further intrusion into forested slopes (TER).</p> <p>2009: Light SA removes most illegal electricity connections in the favela, and renovates the main supply grid (TER). Projeto Santa Marta Digital installs wi-fi in favela (TER).</p> <p>2009: Government delivered new apartment building (24 units) near 3<sup>rd</sup> tram station (TER).</p>			
<p>2009: Office of the Program for Urban and Social Orientation established to consolidate urban planning for the favela, and prevent building of further illegal structures (TER).</p>	As above.	As above.	As above.
<p>2009: Favela residents hold protests over lack of consultation in upgrade programs (DET).</p>	Line of flight from C-1 (Revolt) an attempt to deterritorialise aspects of assemblage.	No apparent change.	Reactive forces at C-1 scale leading to line of flight.
<p>2010: Haas &amp; Hahn organised 'Favela Painting' project (TER). Statue of Michael Jackson erected on the Terrace (TER).</p>	Territorialisation of identity.	No apparent change.	No apparent change.
<p>2010: Rio Top Tour established and launched by President Lula (TER).</p>	Further C+1 scale interventions increase	Predominance of molar activity converting rhizomic connections.	No apparent change.

<b>KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION</b>	<b>ADAPTIVE CYCLE (of focus community) and PANARCHY</b>	<b>CHANGE TO KEY VARIABLES</b>	<b>CAUSES OF CHANGE</b>
Later in the year the tour and other partners launched a jazz festival within favela (TER).	stability and rigidity of assemblage.	Transition to more hierarchical structure and more molar lines.	
2010: Ecomusem established.	As above.	As above.	Institutions reflect plateaus providing points of intensity and stability in the assemblage.





### 5.3 CASE STUDY 3: VAUBAN, GERMANY

#### *Overview*

Vauban (sometimes referred to as Vauban District or Quartier Vauban) is located approximately one kilometre south of Freiburg, Germany. Previously a French military barracks, it developed into a compact (35 hectare) urban community from 1994, largely through collaboration between the local authorities (the City of Freiburg being owners of the land) and local community groups, with a substantial number of developments realised through the Baugruppen (which translates as ‘building groups’) model.

As Coates explains ‘Vauban grew from the grass roots up and was largely designed and developed (within city guidelines and with technical assistance provided by the city) by many Baugruppen, small ecologically and socially progressive homeowner cooperatives organized under the auspices of the Vauban Forum’.<sup>545</sup>

When the soldiers decamped in 1992 the barracks became vacant. The abandoned barracks were subsequently occupied by a group of squatters while local authorities considered development strategies for the site. In 1994, the University of Freiburg’s Student Services Department were given permission to convert six of the barracks into student apartments<sup>546</sup>. Another group, the Selbstorganisierte Unabhängige Siedlunginitiative (SUSI, translated as Independent Settlement Initiative) also indicated a desire to develop an alternative housing community on the site and they were eventually allowed to develop four of the barracks. Some of the original squatters were integrated into the SUSI project<sup>547</sup>, other former squatters have subsequently decided to live in vehicles parked around the land, forming what has been named Wagenplatz (or ‘box car village’).<sup>548</sup>

The squatters and other stakeholders staged a number of protests against some of the redevelopment strategies put forward by the Council — a process which ultimately established a dialogue between the squatters and the local authorities,

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<sup>545</sup> G Coates, 'The Sustainable Urban District of Vauban in Freiburg, Germany' (2013) 8(4) *International Journal of Design & Nature and Ecodynamics* 265, p265.

<sup>546</sup> Ibid.

<sup>547</sup> Ibid.

<sup>548</sup> Vauban de, *An Introduction to Vauban District*

<[http://www.vauban.de/en/com\\_admin/tools/topics/history/276-an-introduction-to-vauban-district](http://www.vauban.de/en/com_admin/tools/topics/history/276-an-introduction-to-vauban-district)>.

eventually leading to the establishment of a community group, Forum Vauban, in 1994 (discussed further below).<sup>549</sup> According to Fraker:

*Forum Vauban was founded not only to organize far-reaching citizen participation but also to support the implementation of community-based building projects called Baugruppen... the City of Freiburg set up a special committee, the City Council Vauban Committee, to be the forum of discussion with Forum Vauban and to prepare recommendations for city council approval.*<sup>550</sup>

In 1994 a competition was held for the design of Vauban, calling for design of a high-density housing district that would include spaces for small businesses, public facilities, and recreational areas. Hamiduddin and Daseking note that at the heart of the idea for this ‘sustainable living quarter’ were three important principles: to limit traffic by separating vehicles from homes, to create land uses patterns that favour pedestrian and cycle traffic; and to capture a broad range of housing tenures.<sup>551</sup> The master plan competition was won in 1995 by the team of Kohlhoff and Kohlhoff (architects), Luz and Partners (landscape architects), and Hans Billinger (transportation planners).<sup>552</sup>

In collaboration with the City of Freiburg, and within the parameters established by the masterplan, Forum Vauban developed an alternative development strategy for the land — one that was ultimately adopted by the authorities and one that was based on a type of intentional self-organisation. As Coates explains:

*With this basic design in place, the city invited citizens to actively participate in the further development of the new quarter under the auspices of Forum Vauban. The Forum then formulated its own goals and began organizing citizens for greater participation... The Forum strongly advocated goals not originally formulated by the city and, in addition, put forward a proposal for a self-administered community center with offices for various organizations as well as a locally owned restaurant. This idea involved saving and renovating one of the former barracks and the creation of a plaza in front of this proposed ‘city hall’*

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<sup>549</sup> Ibid; Coates, above n 545.

<sup>550</sup> H Fraker, *The Hidden Potential of Sustainable Neighborhoods: Lessons from low-carbon communities* (Island Press, 2013), p550.

<sup>551</sup> I Hamiduddin and W Daseking, 'Community-based Planning in Freiburg, Germany: the case of Vauban' (2014) *Community Action and Planning* 237.

<sup>552</sup> Coates, above n. p269; 545.

to be used for farmers markets, flea markets, and various community gatherings.<sup>553</sup>

The land was subdivided and the majority sold to Baugruppen, with a preference for groups that included multi-generational demographics.<sup>554</sup> Part of the barracks land was developed for student dormitories for the University of Freiburg and parts for alternative housing.



Figure 14: Location of Vauban (red outline). Base map from Google Earth Pro. Retrieved 08/08/2017.

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<sup>553</sup> Ibid.

<sup>554</sup> Vauban de, above n 549.



Figure 15: Aerial view north across Vauban. Image from Google Earth Pro. Retrieved 08/08/2017.

Today, Vauban is home to approximately 5,500 residents (2,000 homes) and approximately 600 jobs.<sup>555</sup> A tramway connects Vauban to the Freiburg city centre and over 70% of residents do not have a private automobile.

As described on the district's official website:

*The main goal of the project has been to implement a city district in a co-operative, participatory way which meets ecological, social, economical [sic] and cultural requirements. The citizen's [sic] association 'Forum Vauban e.V.' (which has NGO-status) applied to coordinate the participation process and was recognized as its legal body by the City of Freiburg in 1995.<sup>556</sup>*

Vauban is also frequently recognised as a successful “sustainable model district,” because of the following factors: all houses are built with improved low energy standards, plus at least 100 units have “passive house” (Passivhaus) or “plus energy” (Plusenergy) status; there is a highly efficient co-generation plant operating on wood-chips; solar collectors and photovoltaics are present on most of the district's roofs; an ecological traffic/mobility concept has been implemented with a reduced

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<sup>555</sup> Ibid. Coates, above n 545. T Schroepfer and L Hee, 'Emerging Forms of Sustainable Urbanism: Case studies of Vauban Freiburg and Solarcity Linz' (2008) 3(2) *Journal of Green Building* 65.

<sup>556</sup> Vauban de, above n 549.



number of private cars to be parked in the periphery (about 40% of the households agreed to live without an own car), good public transport, and a convenient car sharing system; streets and other public spaces are regarded as playgrounds for children and places for social interaction.<sup>557</sup>

By most accounts, Baugruppen projects tend to be substantially cheaper (15-25% on average) than typical developer-led projects.<sup>558</sup> This, according to Eliason, is mainly due to avoidance of developer profit margins, avoidance of marketing and realty costs, discounts on land taxes and sometimes on the cost of land (when sold by local governments), and sometimes access to lower-interest loans.<sup>559</sup> The Baugruppen projects are much more tailored to the residents' needs as they can decide what features they wish to include (for example a crèche, a studio or rehearsal space, community kitchen and dining areas; shared guest units, and so on).

*Once formed, a large amount of community buy-in must take place. To actually build a baugruppe is no small feat. Like co-housing, the design process of many baugruppen is driven by future tenants. Concepts, themes and ideas are developed, processes are formulated to move project planning forward. The land situation must be worked out. Architects work with the owners on the design — both groups bringing needs and constraints to the table.*

*This is not usually the case with developer-initiated projects. However, on the best projects, it is this close collaboration with clients that really drives success. There has to be consensus amongst the members to move forward, schedules have to be maintained. This is a process of give and take — actual democracy in action!*<sup>560</sup>

While there is no standard model, most Baugruppen start through the amalgamation of individuals wishing to build, with a shared ambition for the type of project they wish to build. The group typically engages an architect or building professional to guide the process and act as facilitator. The facilitator ensures that the

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<sup>557</sup> Ibid.

<sup>558</sup> For example: Ellen MacArthur Foundation, 'Vauban: A Pioneering Community in Germany' (2015) (16/04/2017) <<https://www.ellenmacarthurfoundation.org/news/vauban-a-pioneering-community-in-germany>>, M Eliason, 'Baugruppen: To Form a More Affordable Urbanism' (2014) <<https://www.theurbanist.org/2014/05/20/baugruppen-to-form-a-more-affordable-urbanism/>>, Self Build Portal, *Vauban, Germany* <<http://www.selfbuildportal.org.uk/vauban-freiburg/>>.

<sup>559</sup> Eliason, above n 558.

<sup>560</sup> M Eliason, 'Baugruppen: Instant Community (Just Add Water)' (2014) <<https://www.theurbanist.org/2014/06/10/baugruppen-instant-community-just-add-water/>>.

brief, design, process, and funding are agreed and viable. The group then establishes articles of association to enable them to purchase the land, engage contractors, engage mortgage lenders and borrow money.

As Eliason notes, however, the affordability and the individualisation of the designs comes at a cost: time.<sup>561</sup> ‘It can take several years to form a group, make decisions, find land and then finalize construction. Though developer-driven models can be delayed, that process has little effect on future tenants/owners’.<sup>562</sup> However, Eliason adds that the highly democratic decision-making process typical of most Baugruppen, while it takes time, often enhances the cohesiveness and community spirit of the groups (individuals who ultimately become neighbours).

### ***Environment***

As noted above, the land use master planning and the establishment of the community took place in 1998. In 2000, the first development section of the new district was completed. The new district with its new buildings and refurbished building of the SUSI and the Students Organisation already provided a home to 2,000 residents. The building process in the second development section started in late summer 2000.<sup>563</sup>

Coates offers the following description of the community:

*The final master plan was derived from the layout of the old military garrison. Vaubanallee, a central avenue running roughly east–west through the center of the district, connects to Merzhauserstrasse... The light rail line in Vauban runs down this corridor and is set in a grassy swale in order to muffle sound and contribute to the district’s overall ecological storm water management system. Automobile, pedestrian and bike paths also run along this central corridor and it is lined on both sides by local businesses...*

*Opening off the pedestrian and bike paths that line the north edge of Vaubanallee is Alfred- Döblin- Platz, the central square in front of Haus 37, the former barrack converted into a community center. Also to the north of Vaubanallee are: sites for future housing; the CHP plant; additional housing (including social housing), and more retail space and a small business*

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<sup>561</sup> Eliason, above n 560.

<sup>562</sup> Ibid.

<sup>563</sup> Vauban de, above n 549.

*incubator. While not a formal part of the Vauban development, the area north of Vaubanallee also includes the student housing village, the SUSI housing units and an area for the former squatters to continue living in their box car village.*

*Branching off Vaubanallee, both to the north and south, are seven neighbourhoods framed by 4- to 5-storey housing blocks (net density of 95 units/ha) built around narrow U-shaped 'play streets', which cannot be used either for traffic or for parking (Fig. 9). Only deliveries and service vehicles are allowed, and even then vehicles must be driven at a walking pace.*

*These neighborhoods are separated (and also joined) by five resident designed parks running roughly north–south that connect with the walking trail along Dorfbach creek, a natural area bordering the south edge of Vauban. Not only do these parks serve as play and recreational areas that provide visual connections to the rural landscape beyond but they also serve as ventilation corridors, bringing cooling breezes from the hills to the south into the heart of the whole district.<sup>564</sup>*

The community now also comprises a district centre with shops, banks, a primary school (which was designed to provide a variety of rooms for use by the community after hours), four kindergartens and extensive public spaces (including a large central square, Alfred-Döblin Platz). In front of the school In front of this school is Paula-Modersohn-Platz, which connects the school to a major transit stop as well as a grocery store and other businesses meaning that children in Vauban are placed in the middle of urban life. There is a community centre (House no.037), which functions as the social and cultural hub of Vauban, and is home to a number of the district associations and community groups, as well as a children's activity centre. Residents also have access to city car share schemes, and a tram service which passes through Vauban and connects to the Freiburg city centre.

As Fraker observes:

*The urban form of Vauban that emerged can best be understood as a T shape made by its primary public spaces: a one-sided commercial street at the head of the east entry to the site connected to a long green spine running east–west through the heart of the development as the tail. The commercial street at the*

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<sup>564</sup> Coates, above n, p269; 545.

*entry is the main connection to the city and the region. It has commercial space on the first three floors, with a unique design of solar townhouses above. It is served by a solar parking garage on the opposite side of the street.*

*The green spine has an unusual hybrid urban form. It could be thought of as a boulevard with two-way traffic on one side of a linear green space that incorporates the tracks of a tram and a storm-water swale or as a linear green park in which the tram and cars are a necessary but minor intrusion. The experience and interpretation of the spine as a park is reinforced by several additional urban design elements.<sup>565</sup>*

In the eastern part of the city is the notable Sonnenschiff (‘Solar Ship’) and the Solarsiedlung (‘Solar Settlement’) district. This district, which is designed to passive house standards, produces more energy than it consumes by means of rooftop photovoltaic panels. The commercial block Sonnenschiff lines Merzhauserstrasse and protects the 58 two- to three-storey row houses from street noise. It is occupied on the ground floor by a bank and a variety of retail tenancies, such as an organic grocery store and a pharmacy. Offices are located on the upper floors.<sup>566</sup> This district typifies the high degree of focus on sustainable energy generation and use that is a benchmark throughout Vauban.

The commercial and industrial areas in Vauban are modest and not substantial enough to provide employment for all residents, but Vauban is close to Freiburg city centre and other employment centres.

There is a low reliance on car use and it is illegal to build parking spaces on private property. Instead, parking is provided in four multi-level parking garages at the edge of the residential areas.<sup>567</sup> According to Coates, as of 2009 around 70% of households have chosen to live without owning a car.<sup>568</sup> Residents do however have access to a car sharing club, and the light rail service has three stops in the district, meaning each residence is within a 300 metre walk of a stop.<sup>569</sup> The filtered grid layout of the community effectively filters cars out of the network and keeps them at the periphery. As Coates explains ‘while there are discontinuities of access for cars, the

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<sup>565</sup> Fraker, above n, p102; 550.

<sup>566</sup> Coates, above n 545.

<sup>567</sup> Fraker, above n 550.

<sup>568</sup> Coates, above n 545.

<sup>569</sup> Fraker, above n 550.



network of walking and bicycling paths permeate every part of Vauban and connect directly to the rest of Freiburg'.<sup>570</sup>

Vauban enjoys a high proportion of green space. As Fraker explains:

*As a result of the goal to make Vauban “densely built, yet green”... the public open space of Vauban has one of the greener feelings of almost any neighbourhood built to urban densities. This is achieved by a remarkable range of design strategies, from the most subtle to the most obvious. In the park-boulevard spine, the tramway tracks are not in a paved roadway but in grass, and the existing mature trees have been maintained... The three green spaces that cross the park boulevard at right angles not only open the boulevard to the north and south neighborhoods but also provide linkage and access to the “regenerated biotope,” the Sankt-Georgen stream, a key greenbelt and nature preserve along the entire length of the south edge.*

*The greening of the public spaces is further enhanced by the way the semipublic space, attached to the ground level of the Baugruppen, has been used for private gardens and custom-designed bicycle sheds, with all paving being permeable. The greening of the public space is not limited to the ground. Many of the Baugruppen employ vertical greening—vines and plants maintained by residents create a “living facade” that provides cooling in the summer and beauty year-round. To top it off, over 50 percent of the buildings have some sort of green roof to provide insulation and rainwater retention or solar collectors for hot water or electric generation. The overwhelming sense is that this urban neighborhood, as defined by its density, mixed use, and transit orientation, has become a multiple-level park.<sup>571</sup>*

### ***Legal Status***

The squatting of the barracks, after they were vacated by the military, was illegal, but the subsequent redevelopment program in conjunction with established community groups reflected a legal and sanctioned process of territorialisation.

While the City of Freiburg was committed to a community-led development model which recognised the need for flexibility and limited regulation (in order to foster tailored design approaches and innovation), there were some key regulations

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<sup>570</sup> Coates, above n, p275; 545.

<sup>571</sup> Fraker, above n, p105; 550.

imposed on the community by the City, including in relation to housing form, retention of street trees, energy outcomes, and private transport and parking. Of particular note: single detached dwellings were prohibited; buildings could not exceed 4 storeys (13 metres); there were limits on setbacks; the majority of existing mature street trees were retained; there were high standards set for energy generation and waste management, and the district was to be largely car free, with private cars parked in community parking areas on the periphery of the residential area.

Many of these regulations gave rise to new innovations, such as<sup>572</sup>:

- New standards in passive house and plus energy housing (where homes generate excess energy that can be stored or returned to the grid), including a “Solar Settlement” of 59 homes which became the first community in the world to generate a positive energy balance<sup>573</sup>, the first Plus Energy commercial building in the world (Sunship), and Germany’s first passive apartment block (Passive House Working and Living).
- Car-free living and car-sharing schemes.
- A “district of short distances” where schools, kindergartens, markets, and recreation areas are located within walking distance of residential areas.
- A number of pilot and experimental schemes, such as sewage conversion processes.

### ***Organisation***

Planning for the community started in 1993, and after three development phases, was essentially completed in 2006.<sup>574</sup> From the outset, the detailed planning incorporated participatory grassroots community involvement, effectively driving a self-organised community building model in close collaboration with the local authorities, particularly the City of Freiburg and ultimately with their dedicated engagement committee (Vauban Committee). The outcomes were reflective of the co-evolution outcomes described by Silva and referenced at Section 3.5 above, whereby parties benefit from and evolve through co-operative engagement. Despite the close and ongoing involvement of the City of Freiburg, the development of Vauban still reflected a highly self-organised process of territorialisation, where the ultimate

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<sup>572</sup> Vauban de, above n 549.

<sup>573</sup> Ellen MacArthur Foundation, above n 558.

<sup>574</sup> Self Build Portal, above n 558.

decisions about territorialisation were made at the community and sub-community levels, and where ‘the community is formed in space, even before the first building is erected’.<sup>575</sup>

As Hamiduddin and Daseking observe:

*The architectural diversity and expression encouraged by this process resulted in a highly distinctive neighbourhood environment: a ‘common wealth’ produced by the collective community input of households intent on attaining dwelling in a physical setting that they themselves have shaped, and in strong social relations catalysed by the collaborative build process.*<sup>576</sup>

As noted above SUSI and Forum Vauban, both formed in 2003, were instrumental in the advocacy, planning, and development of the community.

SUSI was the first group to begin construction in Vauban, refurbishing four barracks as affordable housing. Ultimately, SUSI ended up building approximately half of the housing stock after state level funding fell through.<sup>577</sup> In the first SUSI developments, housing for 260 residents was created in two- and ten-room apartments. These apartments provided accommodation for workers, students, artist and homeless people. The apartments were built with a minimum of 105 hours of unpaid labour from each of the future residents.

Forum Vauban emerged from grassroots groups with about 33 initial members.<sup>578</sup> It was chosen as the main engagement group by the City of Vauban and received funding and grants from organisations such as the European Union. Forum Vauban is principally responsible for: organizing citizen participation and providing advisory and counselling services; supporting the implementation of community-based building projects (including Baugruppen), co-housing and co-operative building; realisation of the sustainable model district outcomes; and co-ordination of the social work and implementation of a neighbourhood centre.<sup>579</sup> Forum Vauban’s priority was to develop Vauban through an exemplary participatory process. Amongst its stated goals, it sought ‘the advancement and support of the citizens participation through community work ... the formation and support of private building groups and

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<sup>575</sup> Schroepfer and Hee, above n, p68; 555.

<sup>576</sup> Hamiduddin and Daseking, above n, p244; 551.

<sup>577</sup> N Szibbo, 'Vauban Study' (2009)

<[https://issuu.com/nicolaszibbo/docs/249\\_vauban\\_finaltxt2009\\_small2](https://issuu.com/nicolaszibbo/docs/249_vauban_finaltxt2009_small2)>.

<sup>578</sup> Vauban de, above n 549.

<sup>579</sup> Ibid.

dwelling projects ... [and] the realization of exemplary ecological standards emphasising traffic concepts and energy use'.<sup>580</sup> Forum Vauban was wound down once the urban planning outcomes had been realised (around 2004), but many of the sub-community scale groups remain.<sup>581</sup>

As Caputo et al explain, although Forum Vauban became the main reference point for the local communities and the Vauban Committee, it also allowed smaller groups (described below) to form cooperatives, acquire residential blocks, and determine the design of buildings. These cooperatives also had the capacity to determine the use and character of open spaces.<sup>582</sup> The Buergerbau AG (Citizens' Building Stock Corporation) was initially established by Forum Vauban and was responsible for the co-ordination of community building projects. The Corporation offers a range of services, including: site identification, building group advertisement and establishment, project advice, including project management and cost control services, assistance with project financing.

Subsidiary organisations were later established, including: 'Projektgruppe Vauban' (Project Group Vauban), which deals with and co-ordinates projects with the local authorities; 'Gemeinderätliche AG' (GRAG), which was a committee of the City Council established to specifically engage with the Vauban community and Forum Vauban; and a district association responsible for promoting social and cultural activities (such as markets, charity events, arts shows, and the like). A number of smaller community committees and institutes were also established to deal with particular interests and issues, including:

- Oeko-Institut - Institut für angewandte Oekologie (Institute for Applied Ecology);
- Freiburger Energie- und Wasserversorgungs-AG (Freiburg's public utilities FEW);
- Freiburger Auto-Gemeinschaft FAG (Freiburg's car sharing association);

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<sup>580</sup> Szibbo, above n, p16; 577.

<sup>581</sup> Si Caputo, F L De Oliveira and D Blott, 'Values for Self-build Urbanism' (2019) *European Planning Studies* 1.

<sup>582</sup> Ibid.

- Passivehouse Wohnen & Arbeiten (co-housing initiative “Living and Working”) was the first multi-family passive house in Germany.<sup>583</sup>

In conjunction with these organisations, much of the development was delivered by Baugruppen – small, legally constituted cooperatives comprised of future homeowners. As Coates explains ‘a Baugruppe could be formed in one of the two ways: a group of citizens could apply to the city to develop a site or the city could announce its desire to develop a district using Baugruppen, along with a call for expressions of interest’.<sup>584</sup>

Schroepfer and Hee observe:

*The “Baugruppen” model (groups of future builders) proved to be crucial for Vauban. The extended citizen participation in Vauban led to a large number of workshops in that participants discussed topics like designing residential streets, green spaces and energy consumption that often led to suggestions, which were presented to the official planners and often became part of the planning and design of the new district.*<sup>585</sup>

Land was sold to each Baugruppen by the City. To improve affordability, most of the housing sites were relatively small. The involvement of the Baugruppen is a key difference between the Vauban development process and more traditional “developer-led” processes. Baugruppen were typically established by individuals interested in building a home, and typically comprised 10-20 families in each group.<sup>586</sup> The groups often involved a dedicated architect and a project manager to guide the design process. They also relied on extensive engagement with the City Council and Forum Vauban. Each Baugruppen was typically responsible for the design, funding, contractor engagement, and project management of their particular housing project. Szibbo argues that ‘by articulating needs and expectations, a community is formed in space even before the first building is erected’.<sup>587</sup> That way people could decide (as a group) on what features and outcomes they want and what they do not want in their project.

Coates explains that considerable design freedom was afforded to Baugruppen as long as their proposals achieved density targets, kept below height limits and

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<sup>583</sup> vauban Der Freiburger Stadtteil mit Flair und Lebensqualität, *Welcome to Vauban district's website* <<http://www.vauban.de/en/>>

<sup>584</sup> Coates, above n, p276; 545.

<sup>585</sup> Schroepfer and Hee, above n, p69; 555.

<sup>586</sup> Self Build Portal, above n 558.

<sup>587</sup> Szibbo, above n 577.

ensured that minimum energy standards would be met. As Hamiduddin and Daseking observe ‘although each building design had to comply with an overall framework set out in the site masterplan... the detailed design elements... were left to the discretion of each group’.<sup>588</sup>

According to Coates, ‘including all three phases of development between 1998 and 2009, more than 45 Baugruppen developed the majority of the housing in Vauban.’<sup>589</sup> Two notable and influential examples of Baugruppen in Vauban were Genova and Sonnenhof.

The Genova Building co-operative, founded in 1997 from Forum Vauban, was one of the first Baugruppen. It was an affordable housing co-operative set up to deliver affordable housing through cost sharing — residents shared the financial risks, but stable rents and home ownership could be achieved in return. The co-operative built 76 housing units, (10 of which are publicly co-financed flats), with the first buildings completed in August 2009.<sup>590</sup> This first building comprised 36 dwelling units, a communal house, a rentable guestroom, and a communal laundry, as well as semi-public spaces such as gardens and a laneway.<sup>591</sup>

According to the Vauban community website:

*Genova sees itself in the tradition of the classic co-operative goals of responsibility and self-organisation, collective building and living as well as the creation of communal property ... People of different ages and life-styles as well as socially and financially disadvantaged people are all integrated into the project. The residents actively participate in the planning process — both where the architecture (orientation and design of the buildings, facades, colors, etc.) and the basic plans for the individual apartments are concerned. The participation takes the form of residents' meetings, workshops, a co-operative council, and also residents' representatives on the management team. The financial risks involved in the project are shared by all members from the very beginning.*<sup>592</sup>

Coates observes:

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<sup>588</sup> Hamiduddin and Daseking, above n, p244; 551.

<sup>589</sup> Coates, above n, p276; 545.

<sup>590</sup> Vauban de, above n 549.

<sup>591</sup> Ibid.

<sup>592</sup> Ibid.

*Genova is: the largest project in Vauban with apartments for rent; a multi-generational barrier-free community with an elevator and exterior galleries providing access to the great majority of dwelling units. To encourage a sense of community, Genova also has shared guest rooms, a shared clothes washing and drying room, a communal house and garden, and a popular whole foods store on the pedestrian/ bicycle lane that runs along Vaubanallee.*<sup>593</sup>

Sonnenhof ('Sun Court') evolved around the idea that a truly living community should be tailored to residents (and their pets) as well as people of all ages, incomes, and abilities, all of whom are committed to helping each other.<sup>594</sup> Sonnenhof embodies this idea as a mixed use community, comprising 30 dwelling units, offices, 13 subsidised apartments for elders and single parents with children, as well as a self-contained residential wing for 10 residents with dementia. As Coates explains:

*As a result of this layout, residents with dementia are visually connected to both the larger Sonnenhof community as well as the surrounding Vauban community. Children from the nearby kindergarten, volunteers and family members, a number of whom live in Vauban, make sure that residents are also functionally, as well as visually, integrated into the world beyond by visiting Woge on a regular basis.*<sup>595</sup>

These notions of community participation, dialogue, and information sharing were recognised as key to the overall Vauban development process<sup>596</sup>:

- The principle of 'Learning while Planning' pervaded the entire development process and resulted in an accumulation of collective intelligence in the community.
- The social work involved in the developing process helped to set up stable community and neighbourhood structures, and provided a catalyst for further initiatives within the district (e.g. the co-operative food store, the farmers' market initiative, the mothers' centre, and many others).

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<sup>593</sup> Coates, above n, p278; 545.

<sup>594</sup> Ibid.

<sup>595</sup> Ibid, p278.

<sup>596</sup> Vauban de, above n 549.



- Neighbourhood and community structures became visible in public and semi-public spaces (such as access-galleries, community gardens, the neighbourhood centre, and parks) created by the building groups.
- Forum Vauban provided advice and support to Baugruppen and was the main engagement group between Baugruppen and Council. Between 1996 and the end of the year 2000, Forum Vauban, as legal body of the participation process, organised about 40 major workshops and excursions, three district festivals and the international conference “UrbanVisions” as a pre-event of the UN “Urban 21” conference in Berlin.
- Working group meetings of special projects or Baugruppen/co-housing groups were common, dealing with issues such as: traffic/mobility, energy, coordination of Baugruppen, social life, and business.

### *Analysis*

Table 4 below summarises the analysis of the case study in relation to the propositions set out in Chapter 3. Specifically, the table identifies key moments of territorialisation (and deterritorialisation and reterritorialisation) and identifies any apparent correlation between those moments and the adaptive cycle of the focus system; against the identified key variables; and against the apparent causes for change.

As explained in Chapter 4, the focus system is the community scale system. The following table employs the abbreviation ‘C’ to denote this scale, while ‘C-1’ refers to lower/smaller system scales (such as sub groups or individuals), and ‘C+1’ refers to higher/larger system scales (such as local government or authorities). The table also employs abbreviations for territorialisation (‘TER’), deterritorialisation (‘DET’), and reterritorialisation (‘RET’).

Table 4: Summary Table for Case Study 3: Vauban.

<b>KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION</b>	<b>ADAPTIVE CYCLE (of focus community) and PANARCHY</b>	<b>CHANGE TO KEY VARIABLES</b>	<b>CAUSES OF CHANGE</b>
1992: The military vacate the Schlageter barracks (DET) and squatters move in (TER).	The preceding system (military base) has effectively gone through process of transformative change (Release) due to	Focus community (C) comprises small collection of bodies (motivated by shared	The formation of the group reflects a plateau in an emerging rhizome. The occupation of the barracks is a clear line of



KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
<p>The local community and City of Freiburg contemplate development strategies for the barracks site, motivated by recognised housing shortage and heightened interest in sustainable development. Following protests and activism, squatters are granted rights to occupy four of the twenty barracks (TER).</p>	<p>slow moving variables. Resources have been released and linkages broken, the space has been deterritorialised, largely due to forces from higher scale. The government (C+1) attempt to capture resources through process of territorialisation (on paper). Focus community (C) established in Release phase, when resources and capital are free following DET of military base. Community established from Revolt forces from lower scale (C-1) individual action.</p>	<p>desires and common forces). Combination of molecular and molar activity at outset. C scale behaviour is strongly nomos, with a free distribution and lack of codes directing activity. Space is striated in terms of infrastructure and built form, but smooth in terms of control and access. Initial inhabitation of striated spaces leads to some segmentation of the assemblage. Few documented codes at inception and little collective intelligence. Likely to be tight feedbacks at community scale, mainly due to the limited size of the group.</p>	<p>flight leading to significant innovation.</p>
<p>1993: SUSI and Forum Vauban established (TER).</p>	<p>Community scale (C) territorialisation moves assemblage forward through adaptive cycle (Reorganisation) — assemblage is organised and capital stored.</p>	<p>Diversity of bodies and size of rhizomic assemblage increases. Molecular activity and potential minor lines of flight driving territorialisation. Increased territorialisation resulting in increased spatial striation and group segmentation. Coding and collective intelligence necessarily increases to enable establishment of built form and social conventions (such as garbage removal).</p>	<p>Institutions reflect plateau providing points of intensity and stability in the assemblage.</p>

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
1993: The City of Freiburg decides to acquire the remaining 38 hectares of the barracks land and, following engagement with Forum Vauban and other community groups, decides to create a new community with a strong emphasis on civic participation and sustainability (particularly low-energy consumption).	C+1 scale intervention increases territorialisation of space and stored capital moving assemblage forward through Reorganisation phase.	Combined molar and molecular activity. Unique rhizomic assemblage combined with arborescent schema. Unclear if investment precipitated increased coding.	Apparent alignment of active forces at C+1 and C scale.
1994: A planning competition is launched for the barracks land, by the City of Freiburg.	As above.	Increased molar activity. Increased coding and feedbacks.	As above.
1995: Gemeinderätliche AG was established in the City Council to coordinate the development of Vauban and engage with community developers (TER).	Significant C+1 level (Remember) intervention seeking to stabilise assemblage and progressing it into Growth phase.	Molar territorialisation of assemblage resulting in increased segmentation and striation. C+1 level coding affecting coding at community scale.	As above.
1995: Demolition of some existing structures to make way for Baugruppen projects (DET).	C+1 activity deterritorialises assemblage.	Smoothing of space.	As above.
1995: Seven barracks buildings are converted into affordable student accommodation and SUSI low cost environmental housing (TER).	Community scale (C) territorialisation moves assemblage forward through adaptive cycle (Growth) — assemblage is organised and capital stored.	Molecular activity and potential minor lines of flight driving territorialisation. Increased territorialisation resulting in increased spatial striation and group segmentation.	C-1 scale forces generating plateau.

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
		Coding and collective intelligence necessarily increases to enable establishment of built form and social conventions (such as garbage removal).	
<p>1998: Construction begins on first Baugruppen residential projects and new roads are constructed.</p> <p>2001: Second construction phase begins.</p>	As above.	As above.	No apparent change.
<p>2002: Following campaigning by community groups, House 037 (a former barracks) is renovated and becomes the self-governing community centre (TER).</p>	<p>Spatial and identity territorialisation at C level moving community through Growth phase. Institutions lead to increased stability.</p>	<p>Increased number of bodies. Increased striation of space and segmentation of assemblage. Community centre evidence of some molar connections within rhizomic assemblage. Increased coding and feedbacks as well as establishment of institutions resulting in centralisation of collective intelligence (memory) and decision making.</p>	No apparent change.
<p>2002-2003: Solar District of 210 Plus Energy homes is constructed (TER).</p>	<p>Community scale (C) territorialisation moves assemblage forward through adaptive cycle (Growth) — assemblage is organised and capital stored.</p>	<p>Molecular activity. Increased territorialisation resulting in increased spatial striation and group segmentation. Coding and collective intelligence necessarily increases to enable establishment of built</p>	No apparent change.

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
		form and social conventions.	
2004: Co-generation plant constructed – (TER).	As above.	As above.	No apparent change.
2004: Forum Vauban wound down (DET).	Significant deterritorialisation of assemblage effectively converts assemblage from rhizomic to arborescent. Effectively moves system towards Conservation phase.	Increased segmentation of community. Strong molecular lines strengthening rhizome. Likely increase in coding but loss of collective intelligence.	C scale forces result in line of flight.

## 5.4 FINDINGS OF APPLICATION CASE STUDIES

As noted at the start, the application case studies presented in this section have been undertaken to allow observations to be made about the hypotheses and the findings from the chapter on theory development. The application case studies are intended to address the fourth key research subquestion: How do the qualities of the identified causes and variables affect the capacity for self-organised change in complex social-environmental systems, such as communities?

Among other findings, the chapter on theory development (Chapter 3) found that systems with high self-organisational capacity were those that were more molecular, were less segmented or expressed supple segmentarity, and were defined by relationships of exteriority. Such systems have greater capacity for self-organised territorialisation compared to systems that are more molar.

The theory developed also indicated the following:

1. There is a correlation between the levels of molecularity and molarity in a system and its position in the adaptive cycle, with greater molarity apparent in the front loop of the adaptive cycle and greater molecularity apparent in the back loop.
2. When system self-organisation appears high, the actions of sub-level systems contribute to the back loop activities through a process of panarchy Revolt, and conversely the actions of super-level systems contribute to the front loop activities through a process of panarchy Remember.
3. Changes within systems are caused by various factors, including desires (the prevailing ambition of the system), forces (active or reactive and with the potential to stabilise or destabilise), lines of flight (ruptures in the system), and plateau seeking behaviour (attempts to stabilise or centre the system).
4. Certain variables appear to affect the molarity-molecularity of social-environmental systems and subsequently affect the processes of territorialisation in those systems.

It was expected that when the identified variables expressed certain qualities, molecularity of the system would increase, creating opportunities for self-organised territorialisation (and more adaptable urbanism); and when the variables expressed contrasting qualities, molarity increased, creating opportunities for more top-down

territorialisation (and rigid urbanism). These variables could be categorised in terms of Composition (referring to the bodies or agents that comprise the system), Governance (referring to how the system is governed), and Space (referring to physical and intangible qualities of the environment of the system).

This chapter, summarising the application case studies, has generally confirmed the findings of the theory developed in Chapter 3 relating to the relationship between territorialisation and the adaptive cycle, the causes of change in system, and the key variables. Particulars about the findings of the application case studies are set out under relevant headings below.

#### **5.4.1 Relationship between Territorialisation and the Adaptive Cycle**

From the theory developed, it was expected that the process of territorialisation would mainly occur while the system is in the forward loop of the adaptive cycle, or would advance the system forward through the adaptive cycle. Territorialisation would therefore reflect an increase in segmentarity of the assemblage. Conversely, it was expected that the process of deterritorialisation would mainly occur while the system was in the back loop of the adaptive cycle, or would advance the system backward through the adaptive cycle. Deterritorialisation would therefore reflect a decrease in segmentarity of the assemblage.

Further, it was expected that when system self-organisation appeared high, the actions of sub-level systems were contributing to the back loop activities through a process of panarchy Revolt. Conversely, it was expected that the actions of super-level systems would contribute to the front loop activities through a process of panarchy Remember.

The application case studies revealed, at the community scale of the cases, that change typically moved the system forward through the through the adaptive cycle (i.e. from Release phase, through to Conservation Phase) — more so than was anticipated. With few exceptions, there was little apparent regression back through the cycle from deterritorialisation or failure. This points to an inherent difficulty in achieving adaptability — the higher level market and political forces appear to drive a linear evolution through the adaptive cycle (towards stability and predictability), overriding the capacity for regression back through the adaptive cycle.

The case studies did, however, produce a greater understanding of the differences in activity at different scales, and indicated that the lower scale

assemblages (such as Pusher Street stall holders in Christiania) experienced much more “flux” (in terms of deterritorialisation and reterritorialisation) as they moved through the adaptive cycle. The deterritorialisation and reterritorialisation of these lower scale assemblages did not appear to affect the more stable community scale assemblage. This also points to an inherent tension reflected in the concept of panarchy — forces from some scales seek to create change, while forces from other scales seek to stabilise.

There was, however, an apparent correlation between the process of territorialisation and the adaptive cycle. Notably, there was more molar activity when the assemblage was in the front loop, leading to the assemblage to move through the front loop, and there was more molecular activity when the assemblage was in the back loop, indicating a more rhizomic structure. This aligns with the theory, which indicates there is greater flexibility and capacity for innovation in the back loop. This suggests that encouraging self-organisation would require the enabling of Revolt connections and the countering of Remember connections.

Furthermore, when deterritorialisation did happen, it was in response to C-1 scale Revolt, such as the expulsion of drug traders in Christiania. The only instances of regression through the adaptive cycle at the C scale was when there was significant deterritorialisation. This indicates that regression through the adaptive cycle could be achieved through substantial deterritorialisation, and this would usually require decoding and/or de-segmentation of the composition of the system.

#### **5.4.2 Causes of Change**

It was expected that self-organised territorialisation/deterritorialisation would occur in response to forces, lines of flight, or plateau seeking behaviour in the system.

It was found that desires and forces were typically the most substantial causes of change in the assemblages and the scale at which the forces were active was an important factor. Of particular note:

1. Desires were the most common cause for change, typically emerging at the community scale or lower. However, desire did not always generate substantial change or territorialisation — often, desire was a consequence of plateau seeking behaviour.

2. When forces from higher scales were active they often led to reactive forces at the community scale, in the form of territorialisation or deterritorialisation and changes to coding.
3. In conflict situations (such as when government authorities sought to remove Christiania) active forces were met with reactive forces and resulted in unproductive expenditure of resources. By contrast, in co-operative situations, active forces were met with active forces to generate more productive outcomes. Vauban was a clear example of this, where the government and community desires were aligned and so the forces enacted by both were aligned and more productive.

It was also found that lines of flight were not common, and generally occurred when there was a strong desire for change. When they did occur they tended to affect the process of territorialisation but were not necessarily destabilising. For example, the creation of a local currency in Christiania represents a line of flight which provided some stability to the community. Vauban was again an exception, insofar as there were no obvious lines of flight affecting the assemblage — rather, there was an orderly progression through the adaptive cycle with little disturbance.

Finally, it was found that plateaus frequently formed in the assemblage from activity at the focus scale and higher and lower scales. When they occurred they typically had a stabilising capacity. The production of physical institutions (such as the Planning Office in Christiania) or organising bodies (such as the Residents Association in Santa Marta) served as plateaus, which stabilised largely because they embodied the collective intelligence of the assemblage. Plateaus and lines of flight were important processes for change and innovation within the assemblages studied. Plateaus in particular appeared to manifest in a spatial context that enabled congregation (spaces for protest or meeting).

### **5.4.3 Regarding the Key Variables**

It was expected that the key variables would reflect different qualities depending on the self-organisational capacity or activity of the system. Specifically, the following trends were anticipated:

1. When an assemblage is more molecular (increasing self-organised territorialisation), the key variables would reflect the following qualities:



- a. a diverse range of bodies formed by common interests and desires, expressing a common essence, with some redundancy in composition of bodies.
  - b. generally, a free distribution of bodies, forming a decentralised and perpetually changing structure with same level feedbacks, and a prominence of molecular lines of connection.
  - c. a prevalence of micropolitical action and localised coding and decoding that is emergent, informal, and polyvocal.
  - d. common access to collective intelligence and memory with localised learning, resulting from localised and diverse feedback networks.
  - e. a predominance of smooth space, and a perpetual smoothing of space.
2. Conversely, when an assemblage is more molar (increasing top-down territorialisation), the key variables would reflect the following qualities:
- a. a limited range of bodies controlling resources and governing, with limited redundancy.
  - b. a defined structure and ordered distribution of bodies, forming a centralised, rigid and hierarchical structure and feedbacks, and a prominence of molar lines of connections.
  - c. a prevalence of macropolitical action and higher level coding, with a perpetual increase in codes that are imposed, formal, and univocal.
  - d. restricted access to collective intelligence and memory with imposed instruction and learning with limited feedbacks.
  - e. a predominance of striated space obstructing further territorialisation.

The observations about the variables in the case studies are set out under separate headings below.

### ***Composition***

#### ***Bodies***

As anticipated, when self-organisation was most obvious, the bodies comprising the social-environmental systems (the communities) were formed and acted through a common interest and essence. These small bodies were directly responsible for

territorialisation (for example, the small groups that first established each community directly settled dwellings and started shaping the environment). The small size of the community bodies (and the common interests) appeared to make community level decision making easier.

Over time the communities grew and, while they became more diverse in some sense, the community as a whole became more segmented, typically forming small and distinct groups to take responsibility for certain aspects of the community existence (for example the Building Office and the Garden Group in Christiania).

This process ultimately reduced the effective diversity of the community and tended to restrict the flow of information and intelligence through the community. As a result, formalised coding tended to increase to manage territorialisation, and the territory itself became more segmented (more rules, more structures, and more formalised rights). This process aligns with the evolution of the adaptive cycle, with the community becoming more rigid and segmented as it evolves.

#### *Relationships and Connectivity*

With regard to relationships of the communities, there was a noticeable difference between the communities of Christiania and Santa Marta, compared to Vauban. All three established through something of a free distribution of individuals (along the lines of *nomos*), but Vauban became more formalised in the early stages (resulting from a process of restricting involvement in the community, and reflecting more *logos*). However, even in Christiania and Santa Marta, the free distribution was tempered to some extent by the spatial striation of the environment. People inhabited the existing houses and spaces quickly, with little apparent nomadism thereafter.

Connections within the assemblage were one of the most dynamic and perpetually affected variables. When the communities appeared to have a high degree of self-organisation (typically in the earlier stages) the communities were defined by rhizomic relationships (decentralised, lateral, and dynamic), although some interaction with hierarchical structures was common (usually structures at higher levels, such as the UPP in Santa Marta). As the community established, and moved forward through the adaptive cycle, molar structures were introduced at the community level (such as community decision-making groups in Christiania). The influence of these structures on the processes of territorialisation and deterritorialisation increased as they became

more established, particularly by way of increased coding. Connections within and beyond the assemblage increased as forces from other scales became more active.

The interaction of molecular lines and molar lines was common, but tended to increase as the community became more established and less self-organising. Molecular lines dominated when the assemblage was most actively self-organising, while molar lines dominated when C+1 scale forces were active and when the controlling forces of the assemblage were consolidated, which was most obvious in the later phases of each assemblage.

Notably, there were threshold moments for each community, when it transitioned from being more rhizomic to being more arborescent or stratified. These thresholds occurred when molar relationships became the dominant relationship, over molecular relationships. An example is the establishment of the ownership structure for Christiania — at the point the assemblage was no longer predominantly self-organising, because molar relationships and forces dominated, the assemblages became strata.

### ***Governance***

#### *Coding*

When self-organisation in the communities appeared to be greatest, coding was limited and informal, making territorialisation easier. But coding increased quickly as the bodies of the community grew, transitioning the communities from molecular relationships to more molar ones. As the composition of the communities changed, the codes changed from being more informal to being more formal, from being polyvocal to being more univocal. This evolution of coding and increase in logos typically resulted in alignment of the codes at the community scale with the more molar codes of higher levels, particularly those imposing active forces on the community.

With regard to coding in the assemblages, it was revealed that significant change in the assemblage typically accompanied changes in coding, and that significant territorialisation came in the form of C+1 level intervention in terms of coding. Coding appeared to increase as forces from C+1 scale became more active. Again, Vauban was an exception because the codes were established at the outset through collaboration between the community and higher scale bodies.

It was clear also that coding was affected by collective intelligence and feedbacks, which were dependent on connections. While intelligence and feedbacks may more often be virtual (i.e. by way of social media), institutions within the communities appeared to reinforce these processes by enabling congregation and exchange (i.e. forming plateaus); symbolising collective intelligence; and legitimising decision making.

#### *Collective Intelligence and Feedbacks*

Feedbacks were directly related to the composition of the community. Feedbacks generally increased as rhizomic connections increased and decreased as the system became more segmented and molar. While each community established groups to harvest and maintain collective intelligence and apply it to territorialisation, as connections and feedbacks decreased, access to collective intelligence tended to become more restricted (often held by C-1 scale groups). Social media was however a critical tool to feedbacks, often countering restriction in connections.

#### *Space*

The hypothesis about the nature of the space was not clearly confirmed. The hypothesis was that when an urban community system is progressing through the back loop of the adaptive cycle there is a high capacity to self-organise, due in part to a predominance of smooth space, and a perpetual smoothing of space. What was observed was that the spaces forming the assemblage were smooth in some aspects but often physically striated. Notably, Christiania established on a former military barracks, while Santa Marta established on steep vegetated slopes. Vauban was again an exception, insofar as the space (a former military barracks, like Christiania) was smoothed prior to territorialisation. In all cases, the space was physically striated, but smooth in terms of ownership and codes. With the benefit of the case studies, this evaluation is understandable insofar as it has demonstrated that self-organisation at the community level is inherently adaptable and allows different responses to space. It is expected that if the molarity of a system increased, the ability to adapt to the current striations of a space would diminish.

Notably, however, deterritorialisation often led to a smoothing of the space. For example, landslides in Santa Marta were a form of deterritorialisation and led to a smoothing of previously striated space.

#### 5.4.4 Other Findings

The application case studies generally confirmed the expectations about how the variables would change in relation to self-organisation in the cases (as set out in the hypothesis in Chapter 1). The cases also provided further insight into the effect of the identified causes and behaviour of the key variables. Critically, the case studies provide a better understanding of the relationships between the variables — how each affected the others. Figure 16 below provides a visual representation of how the relationship between the variables was demonstrated in the case studies. Of particular note:

1. Coding (and by extension Governance) was found to be the primary variable directly affecting the process of territorialisation.
2. Composition of the assemblage indirectly affected territorialisation by affecting Governance.
3. Space affected the ease or speed with which territorialisation could occur.
4. Coding was the factor that most influenced, and was most influenced by, the progression of the community through the adaptive cycle.

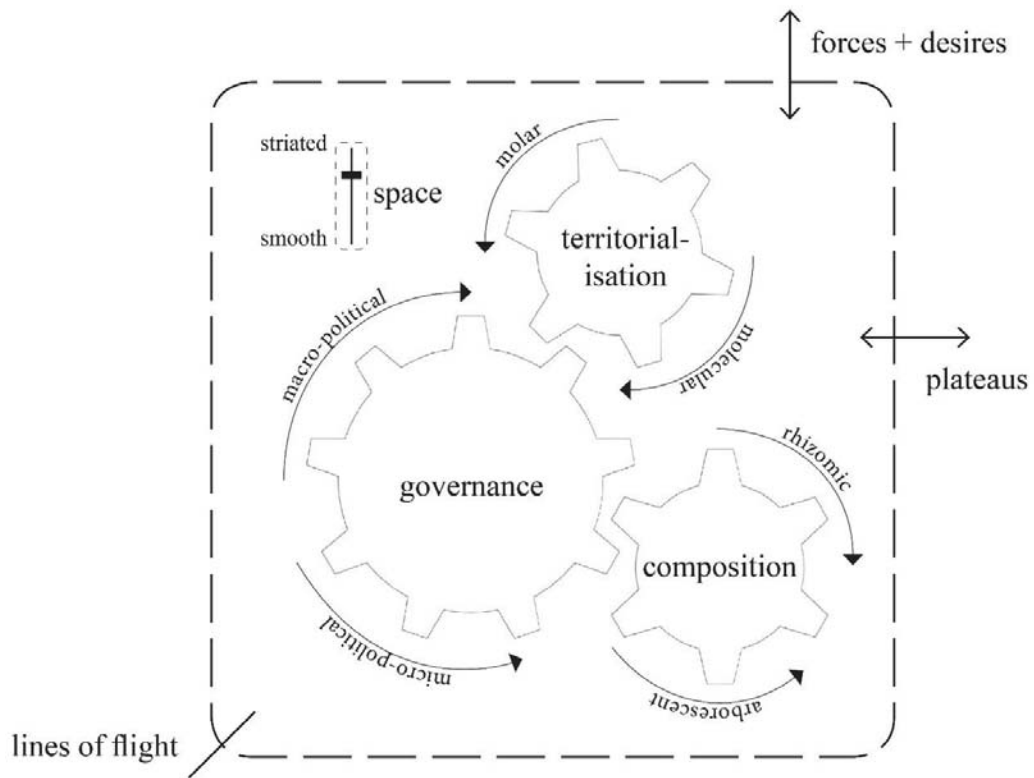


Figure 16: Diagram representing the relationship between the identified variables and the process of territorialisation.

# Chapter 6: EMPIRICAL CASE STUDY

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## 6.1 CASE STUDY 4: NARARA ECO-VILLAGE, AUSTRALIA

### *Overview*

The background and history of Narara Eco Village (NEV) is far more concise than the communities considered in the application case studies, because NEV is a community in its infancy, while the other cases had evolved for some time.

NEV is an emerging eco-village located at the edge of emerging urban development in the New South Wales Central Coast area (at Research Road, Narara). The village comprises some 64 hectares of land that was formally occupied by the Gosford Horticultural Institute. When operating on the site, the Institute occupied approximately 50 structures and buildings, many of which have since been demolished.<sup>597</sup> A number of buildings have been retained, however, and are intended to form part of the village (see Figure 19 below). These include:

- two houses, one of which is heritage listed;
- the main facilities building and a community building;
- a number of sheds and greenhouses.

The property also includes an existing dam, a creek, orchards, and some 40 hectares of bushland. Currently, only two families occupy the two existing houses on the site, and the main facilities building is utilised by a number of the NEV members.

According to community founder Lyndall Parris (one of three stakeholders interviewed as part of the case study), the community is underpinned by the ideals of co-housing, where the design process is participatory and resources are shared, and sociocracy — a form of governance (discussed further below) which places the emphasis on the “we”, rather than the “I”.<sup>598</sup> This is indicative of what Scilla Sayer sees as a basic tenet of community living — a shift in thinking from “me” to “we”.<sup>599</sup> Self-organisation is also a fundamental concern of the community, as is reflected in their governance model, but also in the mentality of a number of members, such as

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<sup>597</sup> Narara Ecovillage, *The Site* <<https://nararaecovillage.com/masterplan/location/>>.

<sup>598</sup> Interview with Lyndall Parris at Narara Eco-Village on 26/08/2018.

<sup>599</sup> Interview with Scilla Sayer by phone on 27/08/2018, personal communication.



Scilla Sayer, who reasoned that the only way human presence on earth will continue is if people learn to self-organise and adapt.<sup>600</sup>

The eco-village is intended to become a mixed-use community with the capacity to ultimately accommodate about 400-500 people within 150-180 dwellings.<sup>601</sup> Currently there are approximately 80 members, representing 170 eligible residents. Only two families currently live on the site, with the remaining members preparing to build their houses following the recent achievement of relevant development approvals.

The NEV land is owned through a Community Title scheme, where subscribed members fund and maintain the community infrastructure (roads, services, and civil works), rather than the local council. Roads and infrastructure for the entire NEV have been completed. Stage 1 of the village has been substantially sold, and Stage 2 is currently being sold. There are no plans for further stages at this time.

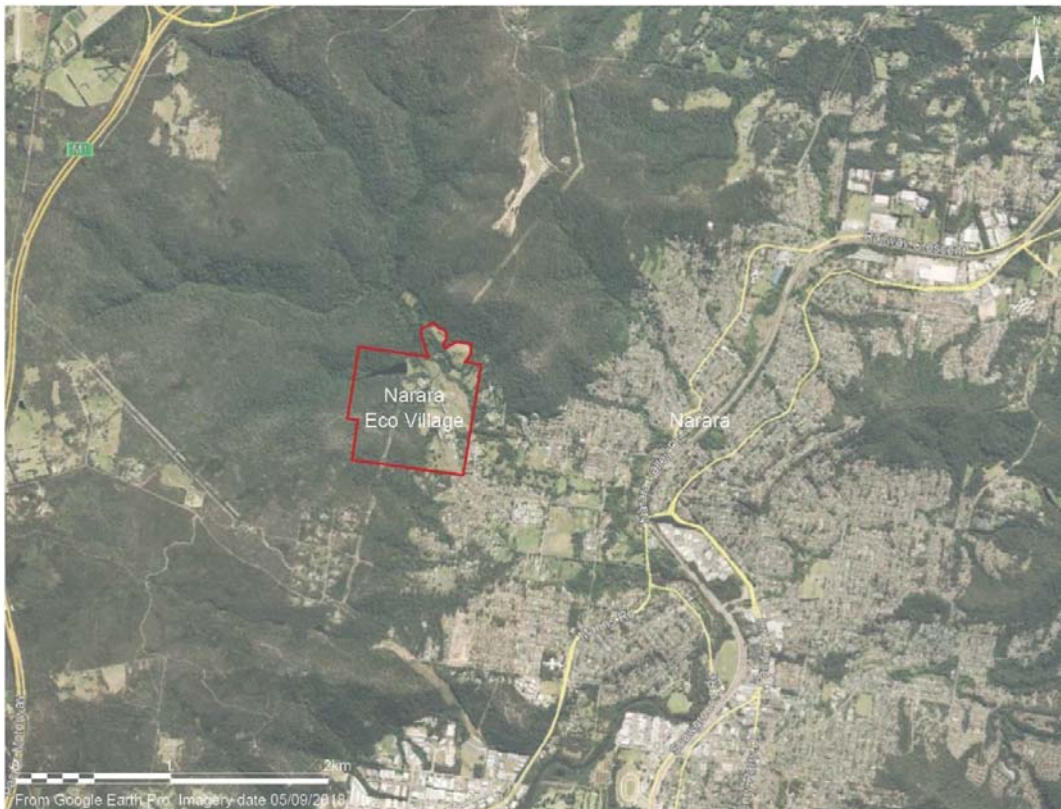


Figure 17: Location of Narara Eco-Village (red outline). Base map from Google Earth Pro. Retrieved 05/09/2018.

<sup>600</sup> Ibid, personal communication.

<sup>601</sup> Talbott, above n, personal communication; 604.





Figure 18: Aerial view north-west across NEV. Image from Google Earth Pro. Retrieved 05/09/2018.



Figure 19: Aerial view of village showing key facilities.<sup>602</sup>

<sup>602</sup> Narara Ecovillage, *Our Vision* <<https://nararaecovillage.com/masterplan/our-vision/>>.



Figure 20: Entrance to Narara Eco-Village.



Figure 21: View across Narara Eco-Village.





Figure 22: Existing community facilities building at Narara Eco-Village.



Figure 23: NEV members building an outdoor kitchen.

The NEV website<sup>603</sup> sets out a number of visionary aims for the village, including, inter alia: encouraging neighbourly interaction, building social infrastructure, sharing facilities and resources, building positive relationships with neighbouring development, preserving natural habitats, adopting ecologically and

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<sup>603</sup> Ibid.

socially sustainable development practices, employing permaculture principles, and encouraging and nurturing enterprises set up within the village.

### *The Urban Environment*

As noted above, the current built environment mainly comprises a number of the former Gosford Horticultural Institute buildings and structures. These buildings and structures are spread across the central area of the site. In 2004, approximately 25 founding members raised money to purchase the land.<sup>604</sup> However, due to difficulties associated with the global financial crisis in 2008, it was not until 2012 that the community were able to successfully purchase the land.<sup>605</sup>

Following the purchase of the land, it took approximately six years to obtain approval from the local council to undertake infrastructure and subdivision works and to obtain a Subdivision Certificate. In 2017, the installation of trunk roads, drainage, and civil works for the community were completed.<sup>606</sup> These were installed by external contractors in accordance with designs from external designers and engineers.

To date, the majority of the development has been self-funded by the community through membership fees and contributions (amounting to AU\$5 million for the land and AU\$8 million for infrastructure).<sup>607</sup> This provides the community with greater economic independence.<sup>608</sup>

Approximately 12 hectares of the site are zoned for residential development, with another 12 hectares available for agriculture and community gardens.<sup>609</sup> The remaining 40 hectares of native forest and bushland are to be dedicated to conservation. Cars and parking are intended to be kept to the periphery, with pedestrian and bike priority. The community will also incorporate business and cottage industries, agriculture and food production.<sup>610</sup>

Stage 1 of the community comprises 60 homes, with 18 townhouses and 42 detached houses. Stage 2 is currently being planned with inputs from future lot owners. It is expected that Stage 2 will comprise approximately 45 lots and will accommodate detached houses and dual occupancy housing, as well as two common houses, wherein

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<sup>604</sup> Interview with John Talbott at Narara Eco-Village on 25/08/2018, personal communication.

<sup>605</sup> Narara Ecovillage, *History* <<https://nararaecovillage.com/about-us/timeline/>>.

<sup>606</sup> Open Day Presentation at Narara Eco-Village on 26/08/2018, personal communication.

<sup>607</sup> Interview with John Talbott at Narara Eco-Village on 25/08/2018.

<sup>608</sup> Open Day Presentation at Narara Eco-Village on 26/08/2018, personal communication.

<sup>609</sup> Narara Ecovillage, above n 605.

<sup>610</sup> Talbott, above n, personal communication; 604.

a number of common facilities will be located (such as laundries, toy rooms, workshops, etc.) offsetting the need for such uses within each house.

A number of non-residential area uses are anticipated in the village, including: short-term accommodation, community rooms, a gallery/museum/exhibition space, farmers markets, a general store and a café, commercial offices and some retail, a playground and swimming pool; and orchards and community gardens. These intended facilities would be planned and designed by the community, and some would be retrofitted into existing structures.

A wastewater treatment plant has been installed and commissioned. The treatment plant operates under New South Wales' first community-owned water license.<sup>611</sup> The treatment plant recycles water for use throughout the community for non-drinking purposes, for use in homes and businesses, and for irrigation. The eco-village currently sources its drinking water from the local council supply, but has permission to utilise the treatment plant and source its drinking water from an existing on-site dam. It is also intended that a “green transport” scheme be adopted, as well as “Smart Grid” energy technology.<sup>612</sup>

The design of future houses will be guided and regulated by a set of controls and guidelines developed by Project Architect Hill Thalix and the Building Standards Working Group.<sup>613</sup> According to the Village Hub website:

*The standards seek an outcome based on inclusive decision making, good design, good health and the wellbeing of all community members. They encourage small and inexpensive houses knowingly designed to provide thermal comfort, low water use and low energy consumption. The standards also seek innovation from community members in the design of their homes and the use of recycled and locally sourced materials wherever possible ...*

*We aim for standards equal to the current best practice, and which incorporate higher sustainability and performance outcomes than those set by other commonly used rating tools. In addition, we seek cost-effective outcomes for all sustainability elements incorporated into the homes of community lot owners.*<sup>614</sup>

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<sup>611</sup> Narara Ecovillage, *News* <<https://nararaecovillage.com/news/>>.

<sup>612</sup> Talbott, above n, personal communication; 604.

<sup>613</sup> Open Day Presentation at Narara Eco-Village on 26/08/2018, personal communication.

<sup>614</sup> Narara Ecovillage, *Building Standards* <<https://wiki.nararaecovillage.com/display/NBLS/Schedule+1+of+CMS+--+Building+Standards>>.

The controls target a number of sustainable building standards, including BASIX, NaTHERS, and the State of Victoria's Built Environment Sustainability Scorecard (BESS), and incorporate lessons learned from other eco-villages and community associations.<sup>615</sup> Development is also contingent upon some neighbourhood agreements, whereby house designs need agreement from neighbours.<sup>616</sup>

When I attended the site, a number of community members were in the process of constructing a community camp kitchen. It was being made with cob and rammed earth techniques and provided some members with the opportunity to experiment with building materials they may adopt for their homes.

### *Organisation*

The community was initially established by a small group of members. According to Lyndall Parris, during the early part of the community establishment, there were few rules and the growth of the community was innovative and organic.<sup>617</sup>

The founding members subsequently adopted a co-operative structure and elected a board comprising seven members.<sup>618</sup> The co-operative entitles members to a share in the land and common facilities, as well as requiring a commitment from them to the management and maintenance of common assets.<sup>619</sup> This provided a more effective means of financing and planning the growth of the community, and provided a vehicle for introducing new community members.

As the community membership grew, a number of other organisational entities were established, including four teams: Community Development, Land, Buildings and Infrastructure, and Business Development. Working groups were also established and charged with particular projects and maintenance activities. Relevantly, the community describes the organisational structure as '[a] pattern more like a flower than a pyramid with inter-connected circles passing information and feedback between different areas of responsibility'.<sup>620</sup>

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<sup>615</sup> Ibid.

<sup>616</sup> Open Day Presentation at Narara Eco-Village on 26/08/2018, personal communication.

<sup>617</sup> Interview with Lyndall Parris at Narara Eco-Village on 26/08/2018, personal communication.

<sup>618</sup> Interview with Scilla Sayer by phone on 27/08/2018, personal communication; Interview with John Talbott at Narara Eco-Village on 25/08/2018, personal communication.

<sup>619</sup> Open Day Presentation at Narara Eco-Village on 26/08/2018, personal communication.

<sup>620</sup> Narara Ecovillage, *Sociocracy* <<https://nararaecovillage.com/community/sociocracy/>>.



Over time, more rules and procedures were established, governing the way the community territorialised the land.<sup>621</sup> It was soon determined and agreed that the governance of the community would be based on sociocratic principles and the sociocracy model (also referred to as dynamic governance).<sup>622</sup> According to the NEV website, sociocracy is:

*A governance model based on the insistence that everyone has the opportunity to be heard and that processes are transparent. When all members' needs and concerns are heard and taken into account, and decisions are made in a way that is truly collaborative, there is high "buy-in" and acceptance from all. This also generally ensures high quality, creative decisions, as the wisdom of the group is pooled and solutions do not depend on just one or two leaders "getting it right".*<sup>623</sup>

Here we see recognition of the value of collective intelligence, as discussed in the chapters of this thesis concerning theory development. We also see parallels with Silva's concept of co-evolution (described at Section 3.4 above).

Buck and Endenburg explain that the sociocratic model was based on theories of individuals such as Norbert Wiener (founder of cybernetics) and Ilya Prigogine (who did pioneering work in self-organising systems).<sup>624</sup> Buck and Endenburg explain that dynamic governance theory continues to grow by incorporating new scientific insights, such as 21st century mathematical modelling of the decision-making behaviour of flocks of birds, schools of fish, and swarms of bees.<sup>625</sup>

The Sociocracy Group explains that sociocracy is 'an effective way for groups to self-organise and cooperate to accomplish shared objectives'.<sup>626</sup> The Sociocracy Group explains that at the core of sociocracy are four key principles<sup>627</sup> that derive from the science of cybernetics, systems theory, self-organization theory, and fractal mathematics.<sup>628</sup> The principles are:

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<sup>621</sup> Interview with Lyndall Parris at Narara Eco-Village on 26/08/2018, personal communication.

<sup>622</sup> J Buck and G Endenburg, 'The Creative Forces of Self-Organization' (2012) *Sociocratic Center, Rotterdam, The Netherlands, Tech. Rep.*

<sup>623</sup> Narara Ecovillage, above n 620.

<sup>624</sup> Buck and Endenburg, above n 622.

<sup>625</sup> Ibid.

<sup>626</sup> The Sociocracy Group, *How It Works - 4 Principles* <<http://thesociocracygroup.com/home/basic-principles/4-principles/>>.

<sup>627</sup> Ibid.

<sup>628</sup> Buck and Endenburg, above n 622.

Consent: The Principle of Consent dictates that each policy decision is made by consent. But consent is not the same as consensus. It does not mean that everyone must agree; it means that nobody is aware of a risk that ought not be taken. If each participant in the meeting indicates they do not see any unacceptable risks, then there is a decision by consent to try out the experiment described in that proposal.

Circles: A sociocratic organisation is made up of circles — semi-autonomous, self-organising teams that each make their own membership decisions, decide on their own working methods, and manage their own budgets. Each circle defines its policy by consent, and uses other decision-making methods as appropriate to its operational work. Each circle is organised around delivering a specific type of value to a specific client (inside or outside the organisation).

Feedback: The Principle of Feedback requires the use of feedback processes, especially in the power structure of the organisation. The principle recognises that while most companies have a top-down organisational structure, with managers providing links from one level of the organisation down to the one below, those “single links” are often chokepoints for key information that people on the front lines know and the “top management” do not. Sociocratic organisations use “double links” to connect each circle with the one above it. The operational leader role provides guidance and prioritisation from the higher circle to one below it, especially during normal operations. The representative role provides feedback and guidance from the lower circle to the one it reports to.

Election: The Principle of Election by consent provides an important counter-balance. While the community can delegate almost any decision to operational roles or processes, the election of an important role cannot be delegated. Representatives must be chosen by consent of the circle which they represent. This ensures that the organisation is woven together by a web of consent, and that power flows in circles through the entire organisation.

This sociocratic approach reflects a number of key features of self-organisation established throughout this research. Of particular note:



- The notion of shared rounds of exchange during the decision-making process reflects a recognition of the value of collective intelligence.
- The notion of double linkages reflects a recognition of the value of feedbacks.
- Diversity is valued, and countered with a consent approach and by establishment of agreed goals and ideals.

According to the NEV website, the eco-village is currently the largest intentional community in Australia to be using the principles and practices of sociocracy.<sup>629</sup> In describing the application of the sociocratic model, the NEV website explains<sup>630</sup>:

- *we generally meet in a circle, to represent that we all have a valid contribution to make;*
- *all sociocratic circles have an appointed facilitator, whose job it is to maintain the integrity of the process;*
- *we hear one another in rounds, and give each other the opportunity to question, clarify and object to a proposal;*
- *we reach “consent” around ideas that support our agreed overall vision (a sustainable world) rather than our individual preference;*
- *we welcome creative and constructive input through ‘picture forming’;*
- *we see considered objections as opportunities to refine a suggestion and add ideas that otherwise may not have emerged;*
- *we use predictable, respectful ways to navigate difficult issues;*
- *we seek solutions that are “Good Enough for Now” and “Safe Enough Try”;*
- *we insist on being open to new information and learning by building in a review plan with a timeframe for each decision made;*
- *we struggle against our old habits, and keep trying; and*

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<sup>629</sup> Narara Ecovillage, above n 620.

<sup>630</sup> Ibid.

- *we are committed to continuous learning ourselves, and hope to share our learning with other individuals, groups and organisations who are interested in Sociocracy.*

In addition to the sociocratic governance method, the community members are acutely aware of their obligations to a raft of higher order legislation regulating their development, including council bylaws, and community title legislation.<sup>631</sup> This was particularly evident in obtaining approval for mixed uses with the rural zoning of the land. After the community had spent some time working with the local council officers, there was a merging of local councils (Gosford and Wyong), and the community's contacts with the council were lost, forcing a new approach to obtaining approval. This panarchical influence led to substantial delays for the territorialisation of the community.

According to Lyndall Parris, the notions of shared visions and common interests and ideals have been a critical and challenging aspect of the growth of the community.<sup>632</sup> She explained that the tension between the need for diversity and the need for "like-minded" people was a dilemma for the community. There was a sense amongst the stakeholders that shared visions and ideals appear to assist with ensuring that the interests of people attracted to the community aligned with the community interests, thereby reducing the potential for conflict with the community.<sup>633</sup> The establishment of communal vision and ideals also helped to rationalise the decision-making process under the sociocratic approach (which justifies decisions based on the extent to which they realise the community goals). This was reiterated by Scilla Sayer, who explained that, in her experience, a lot of communities lose their "heart" by becoming monotonous or homogeneous and no longer sustainable communities.<sup>634</sup> She also observed that community size is a concern, arguing that if communities become too large they tend to "fissure".<sup>635</sup> In countering these challenges, Scilla<sup>636</sup> reflected on the importance of allowing for "new blood" into the community, to

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<sup>631</sup> Interview with Lyndall Parris at Narara Eco-Village on 26/08/2018, personal communication; Interview with John Talbott at Narara Eco-Village on 25/08/2018, personal communication; Interview with Scilla Sayer by phone on 27/08/2018, personal communication.

<sup>632</sup> Interview with Lyndall Parris at Narara Eco-Village on 26/08/2018, personal communication.

<sup>633</sup> Interview with Scilla Sayer by phone on 27/08/2018, personal communication; Interview with Lyndall Parris at Narara Eco-Village on 26/08/2018, personal communication.

<sup>634</sup> Interview with Scilla Sayer by phone on 27/08/2018, personal communication.

<sup>635</sup> Ibid, personal communication.

<sup>636</sup> Ibid, personal communication.

facilitate change in the community structure whilst maintaining stability, and avoiding limits to “buy in” into the community.

A further tension identified by Scilla Sayer was that between the notion of a contained community and the need to be part of the wider community — to appreciate what is “beyond the gate”.<sup>637</sup> This tension is directly reflective of the notion of panarchy discussed in the theory sections of this thesis.

In describing the wider decision-making and governance approach of the community, Lyndall Parris offered the metaphor of the community as people on a bus heading to an agreed destination — while the destination is known, the route is to be determined by the people on the bus.<sup>638</sup>

### *Analysis*

Table 5 below summarises the analysis of the case study in relation to the propositions set out in Chapter 3. Specifically, the table identifies key moments of territorialisation (and deterritorialisation and reterritorialisation) and identifies any apparent correlation between those moments and the adaptive cycle of the focus system; against the identified key variables; and against the apparent causes for change.

As explained in Chapter 4, the focus system is the community scale system. The following table employs the abbreviation ‘C’ to denote this scale, while ‘C-1’ refers to lower/smaller system scales (such as sub groups or individuals), and ‘C+1’ refers to higher/larger system scales (such as local government or authorities). The table also employs abbreviations for territorialisation (‘TER’), deterritorialisation (‘DET’), and reterritorialisation (‘RET’).

Table 5: Summary Table for Case Study 4: NEV.

<b>KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION</b>	<b>ADAPTIVE CYCLE (of focus community) and PANARCHY</b>	<b>CHANGE TO KEY VARIABLES</b>	<b>CAUSES OF CHANGE</b>
2004: The Sydney Coastal Eco-village (SCEV) Incorporated Association is set up.	Community established from Revolt forces from lower level (C-1) individual action.	Focus community (C) comprises small collection of bodies (motivated by shared desires and common forces).	Line of Flight gives rise to new community. The formation of the group reflects plateau seeking behaviour.

<sup>637</sup> Ibid, personal communication.

<sup>638</sup> Interview with Lyndall Parris at Narara Eco-Village on 26/08/2018, personal communication.

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
		<p>Combination of molecular and molar activity at outset. Coding and collective intelligence necessarily increases to enable establishment of group.</p>	
<p>2008: The Gosford Horticultural Institute property at Narara is advertised for sale (DET). Tender submitted to the NSW State Property Authority.</p> <p>First Open Day on the NEV property, held soon after tender submitted (TER).</p> <p>First presentation of ‘A Taste of Sociocracy’.</p> <p>The Global Financial Crisis hits and development partner’s company fails. Negotiations for the land abruptly end and the property is taken off the market.</p>	<p>The preceding system (horticultural institute) has effectively gone through process of transformative change (Release). Resources have been released and linkages broken, the space has been deterritorialised, largely due to forces from higher level.</p> <p>Focus community (C) promoted in Release phase, when resources and capital are free following.</p> <p>C+1 level system failure causes widespread deterritorialisation and C level regression through adaptive cycle (Release).</p>	<p>Smoothing of space due to removal of some structures.</p> <p>Community promotion reflects molecular activity. C level behaviour is strongly nomos, with a free distribution and lack of codes directing activity.</p> <p>Space is striated in terms of infrastructure and built form, but smooth in terms of control and access. Initial inhabitation of striated spaces leads to some segmentation of the assemblage. Few documented codes at inception and little collective intelligence. Likely to be tight feedbacks at community level, mainly due to the limited size of the group.</p>	<p>Active force at C+1. Submission of tender continues LoF from establishment of community.</p> <p>Community promotion reflects plateau seeking behaviour and attempts to spread C level desires.</p> <p>GFC is LoF that ruptures systems at a range of levels and causes numerous flow-on effects.</p>
<p>2012: NEV co-operative is set up. Bylaws established. The NSW Government returns the property to the market</p>	<p>Community level (C) territorialisation moves assemblage forward through adaptive cycle (Reorganisation) –</p>	<p>Diversity of bodies and size of rhizomic assemblage increases. Molecular activity and potential minor lines of</p>	<p>Institutions reflect plateau providing points of intensity and stability in the assemblage.</p>

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
for sale. The NEV Co-op lodges an application to purchase the land and is successful (TER).	assemblage is organised and capital stored.	flight driving territorialisation. Coding and collective intelligence necessarily increases to enable establishment of community. Space is striated in terms of infrastructure and built form, but smooth in terms of control and access. Initial inhabitation of striated spaces leads to some segmentation of the assemblage.	C level desire driving purchase.
2013: The co-operative lodges a Development Application (DA) with Gosford Council for Stage 1 (TER).  Working parties start work on the property (TER).	C+1 level intervention increases territorialisation of space and stored capital moving assemblage forward through Reorganisation phase.  Community level (C) territorialisation moves assemblage forward through adaptive cycle (Growth).	Further striation of space (on paper) and segmentation of assemblage. Molar territorialisation of assemblage resulting in increased segmentation and striation. C+1 level coding affecting coding at community level.  Molecular activity and potential minor lines of flight driving territorialisation. Increased territorialisation resulting in increased spatial striation and group segmentation.	Interface between C+1 level forces seeking to regulate and stabilise C level activity.
2014: The current NEV co-operative memberships exceed 50, with a community of 120 people.	Significant deterritorialisation of assemblage effectively converts assemblage from rhizomic to arborescent. Effectively	Increased segmentation of community. Strong molecular lines strengthening rhizome. Likely increase in coding	C level forces driving plateau seeking behaviour.

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
<p>The SCEV is replaced by the NEV Co-op (DET).</p> <p>The NEV Eco Living Network Inc organises regular outreach events including the inaugural Ecoburbia held at Narara Valley High School (TER).</p>	<p>moves system towards Conservation phase.</p> <p>C level territorialisation of identity beyond community boundaries</p>	<p>but loss of collective intelligence.</p> <p>Expansion of rhizome.</p>	<p>Desire driven activity intended to increase bodies and expand rhizomic relationships.</p>
<p>2015: Board of seven members established (TER). Four teams also set up to help organise the community: Community Development, Land, Buildings and Infrastructure and Business Development. Working Groups set up to help the teams.</p> <p>The Members' Annual Contribution Hours Working Group was set up to determine how each membership might contribute their annual 52 hours of community work.</p> <p>The Steering Circle Implementation Working Group was set up to interface between the Board and the Teams.</p> <p>Working party where 24 people contributed over 100 hours of their collective time (TER).</p> <p>Grant for AU\$70,000 to research a "smart grid"</p>	<p>Identity territorialisation at C level moving community through Growth phase.</p> <p>C+1 level intervention effectively increases territorialisation of space and stored capital moving assemblage forward through Growth phase.</p>	<p>Increased striation and segmentation of assemblage. Community groups evidence of molar connections within rhizomic assemblage. Increased coding and feedbacks as well as establishment of institutions resulting in centralisation of collective intelligence (memory) and decision making.</p> <p>Increased molar activity. Unclear if investment precipitated increased coding.</p>	<p>Institutions are a type of plateau and lead to increased stability.</p>

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
for NEV received from Government.			
<p>2016: Commercial dishwasher donated and renovation of the Visitor Centre kitchen commences.</p> <p>The Wellbeing Working Group is established.</p> <p>Nine people are elected to form the inaugural Steering Circle.</p> <p>Infrastructure construction begins (TER).</p> <p>An AU\$1.2m grant from the Federally established Australian Renewable Energy Agency to establish a smart power network.</p>	<p>Community scale (C) territorialisation moves assemblage forward through adaptive cycle (Growth) – assemblage is organised and capital stored.</p> <p>Government grant reflects C+1 scale intervention seeking to capitalise on back loop potential of community.</p>	<p>Molecular activity. Increased territorialisation resulting in increased spatial striation and group segmentation. Space becomes more striated and assemblage more segmented. Increased coding and collective intelligence in relation to shared resources.</p> <p>Combined molar and molecular activity. Unique rhizomic assemblage combined with arborescent schema. Unclear if grant precipitated increased coding.</p>	<p>Organisation of resources reflect plateau providing points of intensity and stability in the assemblage.</p> <p>Apparent alignment of active forces at C+1 and C scale.</p>
<p>2017: Infrastructure is complete (TER).</p> <p>A council amalgamation occurs — Gosford Council and Wyong Council have become the Central Coast Council. Most of the relationships with Gosford Council have been lost (DET).</p>	<p>Community scale (C) territorialisation moves assemblage forward through adaptive cycle (Growth) – assemblage is organised and capital stored.</p> <p>C+1 level system failure causes deterritorialisation and C level regression through adaptive cycle (Reorganisation).</p>	<p>Increased territorialisation resulting in increased spatial striation and group segmentation. Coding and collective intelligence necessarily increases to enable establishment of built form and social conventions.</p> <p>Loss of collective intelligence due to rupture in connections with C+1 level system.</p>	<p>C scale forces generating plateau.</p> <p>C+1 scale active forces creating line of flight causing deterritorialisation and smoothing.</p>

KEY MOMENTS OF SELF-ORGANISED TERRITORIALISATION	ADAPTIVE CYCLE (of focus community) and PANARCHY	CHANGE TO KEY VARIABLES	CAUSES OF CHANGE
<p>2018: Subdivision Certificate received from Central Coast Council. Titles are issued to members. Lots are settled and house construction gets underway (TER).</p>	<p>C+1 scale intervention increases territorialisation of space and stored capital moving assemblage forward through Growth phase.</p>	<p>Combined molar and molecular activity. Unique rhizomic assemblage combined with arborescent schema. Unclear if investment precipitated increased coding.</p>	<p>Apparent alignment of active forces at C+1 and C scale.</p>



## **6.2 FINDINGS OF EMPIRICAL CASE STUDY**

This case study was undertaken to confirm whether the findings from the application case studies hold true for intentional self-organisational communities. In so doing, the empirical case study, in conjunction with the application case studies, addresses the fourth and fifth research sub-questions:

1. How do the identified factors affect the capacity for self-organised change in complex social-environmental systems such as communities?
2. Are these causes and variables a relevant consideration in relation to intentional community development?

The following summarises the extent to which the NEV Case Study reflects the main findings from the application case studies with regard to the identified causes and variables, and discusses the relevance of these causes and variables to the Australian context.

### **6.2.1 Regarding the Relationship between Territorialisation and the Adaptive Cycle**

With the application case studies it was found that, at the community scale of the cases, change typically moved the system forward through the through the adaptive cycle (i.e. from Release phase, through to Conservation Phase). With few exceptions, there was little apparent regression back through the cycle from deterritorialisation or failure. While NEV is still an emerging community, its evolution thus far has generally been linear (with the exception of some regression resulting from system failures at higher levels), such that the community is partly within the Growth phase (Stage 1) and partly within the Reorganisation Phase (Stage 2).

The application case studies gave a greater appreciation for the differences in activity at different scales and indicated that the lower scale assemblages experienced much more “flux” (in terms of deterritorialisation and reterritorialisation) as they moved through the adaptive cycle. The deterritorialisation and reterritorialisation of these lower scale assemblages did not appear to affect the more stable community scale assemblage. This is consistent with the evolution of NEV, which until recently has essentially been a lower scale assemblage, defined by flux, innovation, and instability. However, this flux and instability did not affect the community scale assemblage because there was no higher scale assemblage in place. This is changing now, as the community is actively attempting to grow and stabilise, and is achieving

this through expansion of coding and through panarchical forces acting on the community from higher scales (particularly in the form of local government regulation).

With the application case studies, there was an apparent correlation between the process of territorialisation and the adaptive cycle. Notably, there was more molar activity when the assemblage was in the front loop, leading to the assemblage to move through the front loop; and there was more molecular activity when the assemblage was in the back loop, indicating a more rhizomic structure. It is too early to know if that will be the case with NEV. Certainly, now that the community is in the Growth phase (i.e. the start of the front loop) there is an increase in territorialisation and in molarity. This appears likely to continue, and will ultimately progress the community through the front loop, eventually into the Conservation phase. There was however some concerns about this process making the community too homogeneous and segmented, and so community desire may counteract this process and drive some regression through the adaptive cycle.

### **6.2.2 Regarding Causes of Change**

The application case studies revealed that desires and forces were typically the most substantial causes of change in the assemblages and the scale at which the forces were active was an important factor. Of particular note (from the application case studies):

1. Desires were the most common cause for change, typically emerging at the community scale or lower. However desire did not always generate substantial change or territorialisation – often desire was a consequence of plateau seeking behaviour.
2. When forces from higher scales were active they often led to reactive forces at the community scale, in the form of territorialisation or deterritorialisation and changes to coding.
3. In conflict situations active forces were met with reactive forces and resulted in unproductive expenditure of resources. By contrast in co-operative situations active forces were met with active forces to generate more productive outcomes.

4. Lines of flight were not common, and generally occurred when there was a strong desire for change. When they did occur they tended to affect the process of territorialisation but were not necessarily destabilising.
5. Plateaus frequently formed in the assemblage from activity at the focus scale and higher and lower scales. When they occurred they typically had a stabilising capacity.
6. Plateaus and lines of flight were important processes for change and innovation within the assemblages studied. Plateaus in particular appeared to manifest in a spatial context that enabled congregation (spaces for protest or meeting).

Some of these observations were confirmed with the empirical case study. In particular:

1. Desires were the most common cause for change. The role of desires was made more apparent, potentially because of the first-hand experiences recalled by the stakeholders, or potentially because the community is still emerging and desires appear to play a significant role in 'getting things off the ground', more so than other causes. Desires were often driven by activity at lower scale systems (such as individuals driving innovations around building techniques).
2. A number of lines of flight have caused change in the system. These have generally occurred from high activities at higher scale systems (such as financial problems resulting from the GFC).
3. Active forces from higher scales appear to have been met with active forces at the community scale, setting up co-operative situations to generate more productive outcomes. These active forces from higher scales generally regulated the system and promoted territorialisation, but in some instance failures of higher scale systems (such as Council amalgamations) disrupted and deterritorialised the system.
4. Having evolved through the Reorganisation phase into the Growth phase, the community appears to be seeking plateaus to stabilise the community. This is largely being sought through more stratification of the community governance and increases in coding.

### 6.2.3 Regarding the Key Variables

Regarding the composition of the system, the application case studies revealed that when self-organisation was most obvious, the bodies comprising the social-environmental systems (the communities) were formed and acted through a common interest, desires, and essence. It was also found that as the communities grew they became more diverse but the community as a whole became more segmented, typically forming small and distinct groups to take responsibility of certain aspects of the community existence.

This was true of the empirical case study also. The notion of common desires was specifically identified as an important factor for enabling territorialisation of the community and the inherent challenge of maintaining community diversity and aligning community desires was reflected by the stakeholders. In particular, the stakeholders stressed the difficulty of archiving and maintaining diversity within the body of the community, whilst still attracting ‘like-minded’ individuals (i.e. people with desires that aligned with the community). Concern was also voiced over the segmentation of the community that was resulting from the increased stratification and moralisation in the governance of the community (represented by an increase in community sub-groups).

However, unlike the application case studies, the empirical case study benefitted from a more formalised sociocratic structure. This structure ensured an improved flow of information and collective intelligence through the system, despite the increased stratification. The establishment of formal groups has been done in such a way as to form something of a hybrid rhizome/arborescent structure, where some measure of hierarchy was integrated with an otherwise acentred and dynamic structure. The double-linking principle of sociocracy was an important factor in achieving this integration and in maintaining clear feedbacks through the system. Further, the established desire to maintain and improve connections with systems beyond the community results in maintenance of feedbacks beyond the system. This structure is likely to also enable a more effective interface with the hierarchical structures of higher level systems (such as the local Council).

As with the application case studies it is intended that the molar aspect of the community structure will direct the processes of territorialisation and

deterritorialisation and it is already apparent that this will principally be achieved by way of increased coding.

Unlike the application case studies, there is not a reverse correlation between coding and self-organisation (with self-organisation most apparent when coding is limited). Rather, it is the coding that directs the self-organisation at the community scale and while the extent of codes and notions of logos have increased substantially since the community began, because of the sociocratic approach, much of the coding remains localised, polyvocal, and dynamic (all important qualities for self-organisation). Furthermore, while the codes of the community have, to some extent, aligned with the codes of more active systems at higher scales (particularly the local government), there remains an independence of the coding (particularly in terms of the community setting its own standards for building and community design) made possible by the fact that the coding remains localised.

So, while there has been a clear progression through the adaptive cycle for the community, and subsequent increases in segmentation, molar activity, and territorialisation, the community has employed a governance structure which integrates molarity within what remains a predominantly rhizomic structure, and where lateral connections and feedbacks are maintained, and localised, dynamic coding and decoding can be achieved. Of some importance as well, the structure in place at NEV has proven to facilitate relationships of exteriority, where individuals interact with the community scale assemblage but retain their own identity in those interactions and can subsequently disengage without substantially altering the identity of themselves or the community. This is a critical quality of self-organising assemblages. While it might have been apparent in the application case studies, it could not be observed.

Regarding space, the empirical case study confirmed the findings of the application case studies. The physical space of the community was striated (in terms of existing structures and features) but once it became smooth in terms of ownership and codes the physical striation did not hamper self-organised territorialisation. Further, the ongoing territorialisation of the community is increasing the striation of the space and to date there has been no substantial physical deterritorialisation of the space.

Finally, the empirical case study also confirmed the further findings of the application case studies:

1. Coding (and by extension Governance) was found to be the primary variable directly affecting the process of territorialisation.
2. Coding was also the factor which most influenced and was most influenced by the progression of the community through the adaptive cycle. Of note, the empirical case study made clear that it was not the absence of codes that was critical to self-organisation, but an ability for the codes to be dynamic at a local scale, and for them to be polyvocal.
3. Composition of the assemblage indirectly affected territorialisation by affecting Governance, and in this case a novel form of governance allowed accommodation of hierarchical structures without affecting capacity for self-organisation.
4. Space was found to be more like a variable that affected the ease or speed with which territorialisation could occur.

# Chapter 7: CONCLUSIONS

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## 7.1 OVERVIEW

This research has been motivated by an apparent need to better relate resilience research to urban communities; and a need to unpack the concept of self-organisation, both with regard to its relationship to resilience and adaptability, and with regard to city-making (or more specifically, to territorialisation of social-environmental assemblages). This motivation and preliminary research led to the following research aim: **To develop a new theoretical understanding of adaptable community development by adopting assemblage theory (and Deleuzian philosophy) to advance concepts of self-organisational and adaptable territorialisation, and to then explore the relevance of that theory in established and emerging community contexts.**

This aim gave rise to the following primary research question: **In the context of assemblage theory, what factors affect self-organisational territorialisation and thus adaptability in urban communities (assemblages)?**

The research aim is underpinned by a number of preliminary observations:

1. adaptability refers to the collective capacity of the actors in a social-environmental system to manage resilience and is intrinsically (although not entirely) dependent on the capacity for self-organisation in those systems; self-organised change, as it relates to urban community development, is fundamentally a process of territorialisation caused by actions at the community scale or lower;
2. the capacity for self-organised change (territorialisation) affects and is affected by the position of the community in the adaptive cycle, which is an indication of the relative molarity and segmentarity of the system.

This primary research question gave rise to a number of sub-questions, which were employed to frame the research:

1. How does self-organisation relate to adaptability generally?

2. How does self-organised territorialisation occur in complex social-environmental systems such as communities?
3. What are the factors that affect self-organised territorialisation in complex social-environmental systems such as urban communities?
4. How do the identified factors affect the capacity for self-organised territorialisation in complex social-environmental systems such as urban communities?
5. Are these causes and variables a relevant consideration in relation to intentional community development?

The research aim and the research questions were addressed by way of a mixed research strategy, comprising:

1. Theory development through synthesis of existing knowledge on self-organisation, adaptability, system dynamics, and assemblage theory, and assisted through the application of a philosophical lens (based on Deleuzian ontology).
2. Three application case studies to test and expand on the developed theory and understand the potential relevance of the identified causes and variables affecting self-organised territorialisation.
3. A subsequent empirical case study (including interviews with stakeholders), to confirm the relevance of the theoretical framework to an emerging community (within the Australian context) and to further observe the behaviour of the identified causes and variables.

The research was intended to expand on new knowledge by illuminating the relationship between self-organised change and adaptability in urban communities, and by improving the understanding of how self-organised change occurs, and can be affected in urban communities.

Initial research indicated that self-organised change in urban communities is affected by three groups of factors: the position of the system in the adaptive cycle; a number of causes; and in accordance with a set of key variables. More specifically, it was hypothesised that:



1. The molarity and molecularity of assemblages affects and is directly affected by the position of the assemblage in the adaptive cycle. In particular:
  - a. molarity will be most apparent through the front loop of the adaptive cycle, and will contribute to the stabilisation and rigidity of the system; while
  - b. molecularity will be more apparent through the back loop of the adaptive cycle and will contribute to the destabilisation and desegmentation of the system.
2. There will be a number of factors causing self-organised change in systems, including factors generating change from within the system and factors acting on the system from beyond the system.
3. A set of key variables affect the processes of territorialisation in urban assemblages, determining whether it is more or less self-organised, and consequently affecting the adaptive capacity of the system. It was expected that when the identified variables express certain qualities, molecularity of the system increases, creating opportunities for self-organised territorialisation (and more adaptable urbanism); alternatively, when the variables expressed contrasting qualities, molarity increased, creating opportunities for more top-down territorialisation (and rigid, less adaptable urbanism).

## **7.2 FINDINGS**

### **7.2.1 Theoretical Development of Literature**

The theory development led to a number of findings and ultimately confirmed: that there is a correlation between self-organised capacity and the position of the system in the adaptive cycle; that there are a number of factors that cause self-organised change; and that there are a number of variables that affect the capacity for self-organisation to respond to those causes. Ultimately, the theory development addressed the first three research sub-questions.

More particularly, and relating to the first and second research sub-questions, the theory development revealed that self-organisation within a social-environmental system is related to the adaptability of that system, and that self-organised change is

fundamentally a process of territorialisation/deterritorialisation/reterritorialisation caused by decisions and actions at the community scale or lower. High levels of self-organisation enables more adaptive territorialisation to move the system forward or back through the adaptive cycle when responding to various causes of change.

Relating to the second and third research sub-questions, the theory development also revealed that the causes of change in a system can be described in terms of desires, forces, lines of flight, and plateau seeking behaviour. Desires reflect the prevailing ambition of systems and emerge at the focus scale of the system or lower to affect change in the system but do not necessarily increase molarity or molecularity of the system. Forces can be active or reactive, depending on any countering forces and forces acting on the system from higher scales will typically increase molarity of the system. Forces acting on the system from lower systems scales will typically increase molecularity of the system.

Also relating to the second and third research sub-questions, the theory development indicated that there were a number of variables affecting the capacity for self-organised change, and that fundamentally these variables affected the molarity-molecularity of social-environmental systems and subsequently affected the processes of territorialisation in those systems. It was found that when the identified variables expressed certain qualities, molecularity of the system increased, creating opportunities for self-organised territorialisation (and more adaptable urbanism); and when the variables expressed contrasting qualities, molarity increased creating opportunities for more top-down territorialisation (and rigid urbanism). These findings began to address the fourth research sub-question and provided a frame of inquiry for the subsequent case studies.

These variables were categorised in terms of: Composition (referring to the bodies or agents that comprise the system); Governance (referring to how the system is governed); and Space (referring to physical and intangible qualities of the environment of the system). The theory development indicated that:

1. When an assemblage is more molecular (increasing self-organised territorialisation), the key variables generally reflect the following qualities:
  - a. A diverse range of bodies formed by common interests and desires, expressing a common essence, with some redundancy in composition of bodies.

- b. Generally a free distribution of bodies, forming a decentralised and perpetually changing structure with same level feedbacks, and a prominence of molecular lines of connection.
  - c. The bodies would be defined by relationships of exteriority, where parts interact but retain their own identity in those interactions.
  - d. A prevalence of micropolitical action and localised coding and decoding that is emergent, informal, and polyvocal.
  - e. Common access to collective intelligence and memory with localised learning, resulting from localised and diverse feedback networks.
  - f. A predominance of smooth space, and a perpetual smoothing of space.
2. Conversely, when an assemblage is more molar (increasing top-down territorialisation), the key variables generally reflect the following qualities:
- a. A limited range of bodies controlling resources and governing, with limited redundancy.
  - b. A defined structure and ordered distribution of bodies, forming a centralised, rigid and hierarchical structure and feedbacks, and a prominence of molar lines of connections.
  - c. The bodies would be defined by relationships of interiority - relationships which result in a fusing of identities.
  - d. A prevalence of macropolitical action and higher level coding, with a perpetual increase in codes that are imposed, formal, and univocal.
  - e. Restricted access to collective intelligence and memory with imposed instruction and learning with limited feedbacks.
  - f. A predominance of striated space obstructing further territorialisation.

### **7.2.2 Application Case Studies**

The case studies provided an opportunity to test whether these findings from the theory development were true of real communities, and to then revise or expand on the developed theory. The application case studies (Christiania, Denmark; Favela Santa Marta, Brazil; and Vauban, Germany) generally confirmed the main findings from the theory development relating to: the relationship between territorialisation and the adaptive cycle; the causes of change in system; and the key variables.

Regarding the relationship between territorialisation and the adaptive cycle, the application case studies revealed that, at the community scale, change typically moved the system forward through the adaptive cycle (i.e. from Release phase, through to Conservation Phase) – more so than was anticipated. With few exceptions, there was little apparent regression back through the cycle from deterritorialisation or failure. This points to an inherent difficulty in achieving adaptability – the higher level market and political forces appear to drive a linear evolution through the adaptive cycle (towards stability and predictability), overriding the capacity for regression back through the adaptive cycle.

The application case studies gave a greater appreciation for the differences in activity at different scales and indicated that the lower scale assemblages (such as Pusher Street stall holders in Christiania) experienced much more ‘flux’ (in terms of deterritorialisation and reterritorialisation) as they moved through the adaptive cycle. The deterritorialisation and reterritorialisation of these lower scale assemblages did not appear to affect the more stable community scale assemblage. This also points to an inherent tension reflected in the concept of panarchy – forces from some scales seek to create change, while forces from other scales seek to stabilise.

The application case studies also indicated an apparent correlation between the process of territorialisation and the adaptive cycle. Notably, there was more molar activity when the assemblage was in the front loop, leading to the assemblage moving through the front loop; and there was more molecular activity when the assemblage was in the back loop, indicating a more rhizomic structure. This aligns with the theory, which indicated that there is greater flexibility and capacity for innovation in the back loop. This suggests that encouraging self-organisation would require the enabling of Revolt connections (subversive or disrupting connections from lower scales) and the countering of Remember connections (stabilising connections from higher scales).

Furthermore, it was found that when deterritorialisation did happen it was in response to Revolt at sub-community scales, such as the expulsion of drug traders in Christiania. The only instances of regression through the adaptive cycle at the community scale was when there was significant deterritorialisation. This indicates that regression through the adaptive cycle could be achieved through substantial deterritorialisation, and this would usually require decoding and/or de-segmentation of the composition of the system.

Regarding the causes of change in self-organising systems, the application case studies found that desires and forces were typically the most substantial causes of change in the assemblages, and that the scale at which the forces were active was an important factor. Of particular note:

1. Desires were the most common cause for change, typically emerging at the community scale or lower. However, desire did not always generate substantial change or territorialisation — often desire was a consequence of plateau seeking behaviour.
2. When forces from higher scales were active they often led to reactive forces at the community scale, in the form of territorialisation or deterritorialisation and changes to coding.
3. In conflict situations (such as when government authorities sought to remove Christiania), active forces were met with reactive forces and resulted in unproductive expenditure of resources. By contrast, in co-operative situations active forces were met with active forces to generate more productive outcomes. Vauban was a clear example of this, where the government and community desires were aligned and so the forces enacted by both were aligned and more productive.

It was also found that lines of flight were not common, and generally only occurred when there was a strong desire for change, or a failure of the system. When they did occur they tended to affect the process of territorialisation but were not necessarily destabilising. For example, the creation of a local currency in Christiania represents a line of flight which provided some stability to the community. Vauban was again an exception insofar as there were no obvious lines of flight affecting the assemblage — rather, there was an orderly progression through the adaptive cycle with little disturbance.

Furthermore, it was found that plateaus frequently formed in the assemblage from activity at the focus scale and higher and lower scales. When they occurred they typically had a stabilising effect. The production of physical institutions (such as the Planning Office in Christiania) or organising bodies (such as the Residents Association in Santa Marta) served as plateaus which stabilised largely because they embodied the collective intelligence of the assemblage. Plateaus and lines of flight were important processes for change and innovation within the assemblages studied.

Plateaus in particular appeared to manifest in a spatial context that enabled congregation (spaces for protest or meeting).

Regarding the key variables, the following observations were made from the application case studies.

### *Composition*

Composition refers to the arrangement of the bodies that comprise the system, as well as the relationships between those bodies.

As anticipated, when self-organisation was most obvious, the bodies comprising the social-environmental systems (the communities) were formed and acted through a common interest and essence. These small bodies were directly responsible for territorialisation (for example, the small groups that first established each community, directly settled dwellings and started shaping the environment). The small size of the community bodies (and the common interests) appeared to make community level decision making easier.

Over time the communities grew and, while they became more diverse in some ways, the community as a whole became more segmented, typically forming small and distinct groups to take responsibility of certain aspects of the community existence (for example, the Building Office and the Garden Group in Christiania).

This process ultimately reduced the effective diversity of the community and tended to restrict the flow of information and intelligence through the community. As a result, formalised coding tended to increase to manage territorialisation, and the territory itself became more segmented (more rules, more structures, and more formalised rights). This process aligns with the evolution of the adaptive cycle, with the community becoming more rigid and segmented as it evolves.

With regard to relationships within the communities, there was a noticeable difference between the communities of Christiania and Santa Marta, compared to Vauban. All three established through something of a free distribution of individuals (along the lines of *nomos*), but Vauban became more formalised in the early stages (resulting from a process of restricting involvement in the community, and reflecting more *logos*). However, even in Christiania and Santa Marta, the free distribution was tempered to some extent by the spatial striation of the environment. People inhabited the existing houses and spaces quickly, with little apparent nomadism thereafter.

Connections within the assemblage were one of the most dynamic and perpetually affected variables. When the communities appeared to have a high degree of self-organisation (typically in the earlier stages) the communities were defined by rhizomic relationships (decentralised, lateral, and dynamic), although some interaction with hierarchical structures was common (usually structures at higher levels such as the UPP in Santa Marta). As the community established, and moved forward through the adaptive cycle, molar structures were introduced at the community level (such as community decision-making groups in Christiania). The influence of these structures on the processes of territorialisation and deterritorialisation increased as they became more established, particularly by way of increased coding. Connections within and beyond the assemblage increased as forces from other scales became more active.

The interaction of molecular lines and molar lines was common, but tended to increase as the community became more established and less self-organising. Molecular lines dominated when the assemblage was most actively self-organising, while molar lines dominated when higher scale forces were active and when the controlling forces of the assemblage were consolidated, which was most obvious in the later phases of each assemblage.

Notably, there were threshold moments for each community, when it transitioned from being more rhizomic to being more arborescent or stratified. These thresholds occurred when molar relationships became the dominant relationship over molecular relationships. An example is the establishment of the ownership structure for Christiania; at that point the assemblage was no longer predominantly self-organising because molar relationships and forces dominated. The assemblages became strata.

### ***Governance***

Governance refers to the means by which the system is governed, and includes the codes that regulate the system and the ways that collective intelligence is stored and fed back through the system.

When self-organisation in the communities appeared to be greatest, coding was limited and informal, making territorialisation easier. But coding increased quickly as the bodies of the community grew, transitioning the communities from molecular relationships to more molar ones. As the composition of the communities changed, the codes changed from being more informal to being more formal, from being polyvocal

to being more univocal. This evolution of coding and increase in logos typically resulted in alignment of the codes at the community scale with the more molar codes of higher levels, particularly those imposing active forces on the community.

With regard to coding in the assemblages, it was revealed that significant change in the assemblage typically accompanied changes in coding, and that significant territorialisation came in the form of higher level intervention in terms of coding. Coding appeared to increase as forces from higher scales became more active. Again, Vauban was an exception because the codes were established at the outset through collaboration between the community and higher scale bodies.

It was clear also that coding was affected by collective intelligence and feedbacks, which were dependent on connections. While intelligence and feedbacks may more often be virtual (i.e. by way of social media), institutions within the communities appeared to reinforce these processes by enabling congregation and exchange (i.e. forming plateaus), symbolising collective intelligence, and legitimising decision making.

Feedbacks were directly related to the composition of the community. Feedbacks generally increased as rhizomic connections increased and decreased as the system became more segmented and molar. While each community established groups to harvest and maintain collective intelligence and apply it to territorialisation, as connections and feedbacks decreased, access to collective intelligence tended to become more restricted (often held by sub-community scale groups). Social media was, however, a critical tool to feedbacks, often countering restriction in connections.

### *Space*

Space refers to the physical and intangible qualities of the environment of the system.

It was expected that self-organisational capacity would be greatest when there was a predominance of smooth space (i.e. when space did not hinder the process of territorialisation). However, it was discovered that the spaces forming the assemblage were smooth in some aspects but often physically striated. Notably, Christiania was established on former military barracks; Santa Marta had established on steep vegetated slopes; and Vauban was a former military barracks but was smoothed prior to territorialisation. In all cases the space was physically striated, but smooth in terms of ownership and codes.



With the benefit of the case studies (and hindsight), this finding is understandable because it confirms that self-organisation at the community level is inherently adaptable and allows different responses to space. It is however pertinent to note that, for all communities, the community space was smooth in terms of ownership and codes, indicating that self-organised territorialisation for community building can overcome physical striation of space so long as there is an adequate degree of permission to occupy the space in the first instance.

Regarding the nature of space, it is also relevant to note two further observations:

1. deterritorialisation often led to a smoothing of the space while territorialisation usually resulted in an increase in the striation and stratification of space; and
2. the nature of the space affected the ease or speed with which territorialisation could occur.

Ultimately, the application case studies confirmed the expectations about how the variables would change in relation to self-organisation. The cases also provided further insight into the effect of the key variables. Most importantly, the case studies provided a better understanding of the relationships between the variables, and in so doing ultimately addressed the fourth research sub-question. Of particular note:

1. Coding (and by extension Governance) was found to be the primary variable directly affecting the process of territorialisation.
2. Composition of the assemblage indirectly affected territorialisation by affecting Governance.
3. Space affected the ease or speed with which territorialisation could occur.
4. Coding was the factor which most influenced and was most influenced by the progression of the community through the adaptive cycle.

### **7.2.3 Empirical Case Study**

The empirical case study (Narara Eco-Village, or NEV) provided an opportunity to confirm whether the findings from the application case studies held true for intentional self-organisational communities, and for the Australian context.

Because the NEV is an emerging community (emerging from the Growth phase into a Reorganisation phase) progression through the adaptive cycle could not be

observed, and so observations from the application case studies regarding co-relation with the adaptive cycle could not be confirmed. It was clear, however, that the progress through the adaptive cycle that had occurred broadly reflected the progress observed in the application cases. Certainly, now that the community is in the Growth phase (i.e. the start of the front loop) there is an increase in territorialisation and in molarity. This appears likely to continue, and will ultimately progress the community through the front loop, eventually into the Conservation phase. There were, however, some concerns about this process making the community too homogeneous and segmented, and so community desire may counteract this process and drive some regression through the adaptive cycle.

Regarding the causes of change, the empirical case study revealed that, as for the application case studies, desires were the most common cause for change. The role of desires was made more apparent, potentially because of the first-hand experiences recalled by the stakeholders, or potentially because the community is still emerging, and desires appear to play a significant role in “getting things off the ground” — more so than other causes. Desires were often driven by activity at lower scale systems (such as individuals driving innovations around building techniques).

Differing, however, from a number of the application case studies, at NEV active forces from higher scales appear to have been met with active forces at the community scale, setting up co-operative situations to generate more productive outcomes. These active forces from higher scales generally regulated the system and promoted territorialisation, but in some instances failures of higher scale systems (such as council amalgamations) disrupted and deterritorialised the system.

It was also observed that, having evolved through the Reorganisation phase into the Growth phase, the NEV community appeared to be seeking plateaus to stabilise the community. This was largely being sought through more stratification of the community governance and increases in coding.

Regarding the behaviour of the key variables, the empirical case study confirmed that, like the application case studies, the bodies comprising the social-environmental systems (the communities) were formed and acted through common interests and desires. It was also found that as the communities grew they became more diverse but the community as a whole became more segmented, typically forming

small and distinct groups to take responsibility of certain aspects of the community existence.

The notion of common desires was specifically identified as an important factor for enabling territorialisation of the community and the inherent challenge of maintaining community diversity and aligning community desires was reflected by the stakeholders. In particular, the stakeholders stressed the difficulty of achieving and maintaining diversity within the body of the community, whilst still attracting “like-minded” individuals (i.e. people with desires that aligned with the community. Concern was also voiced over the segmentation of the community resulting from the increased stratification and moralisation in the governance of the community (represented by an increase in community sub-groups).

However, unlike the application case studies, the empirical case study benefitted from a more formalised sociocratic governance structure. This structure ensured an improved flow of information and collective intelligence through the system, despite the increased stratification. The establishment of formal groups was done in such a way as to form something of a hybrid rhizome/arborescent structure, where some measure of hierarchy was integrated with an otherwise acentred and dynamic structure. The double-linking principle of sociocracy was an important factor in achieving this integration and in maintaining clear feedbacks through the system. Further, the established desire to maintain and improve connections with systems beyond the community resulted in maintenance of feedbacks beyond the system. This structure is likely to also enable a more effective interface with the hierarchical structures of higher level systems (such as the local council).

As with the application case studies, it was the intention of the members that the molar aspect of the community structure would direct the processes of territorialisation and deterritorialisation, and it was already apparent that this would principally be achieved by way of increased coding. However, unlike the application case studies, there was not a reverse correlation between coding and self-organisation (with self-organisation most apparent when coding is limited). Rather, for NEV, it was the coding that directed the self-organisation at the community scale, and while the extent of codes and notions of logos had increased substantially since the community began, because of the sociocratic approach, much of the coding remained localised, polyvocal, and dynamic (all important qualities for self-organisation). Furthermore,

while the codes of the community had, to some extent, aligned with the codes of more active systems at higher scales (particularly the local government), there remained an independence of the coding (particularly in terms of the community setting its own standards for building and community design) made possible by the fact that the coding remained localised.

Thus, while there had been a clear progression through the adaptive cycle for the community, and subsequent increases in segmentation, molar activity, and territorialisation, the community had employed a governance structure which integrated molarity within what remained a predominantly rhizomic structure, and where lateral connections and feedbacks were maintained, and localised, dynamic coding and decoding could be achieved. Of some importance as well, the structure in place at NEV was proven to facilitate relationships of exteriority, where individuals interacted with the community-scale assemblage but retained their own identity in those interactions and could subsequently disengage without substantially altering the identity of themselves or the community. This is a critical quality of self-organising assemblages. While it might have been apparent in the application case studies, it could not be observed.

Regarding space, the empirical case study confirmed the findings of the application case studies. The physical space of the community was striated (in terms of existing structures and features) but once it became smooth in terms of ownership and codes, the physical striation did not hamper self-organised territorialisation. Further, the ongoing territorialisation of the community is increasing the striation of the space and to date there has been no substantial physical deterritorialisation of the space.

Finally, the empirical case study also confirmed the further findings of the application case studies:

1. Coding (and by extension Governance) was found to be the primary variable directly affecting the process of territorialisation.
2. Coding was also the factor which most influenced and was most influenced by the progression of the community through the adaptive cycle. The empirical case study made clear that it was not the absence of codes that was critical to self-organisation, but an ability for the codes to be dynamic at a local scale, and for them to be polyvocal.

3. Composition of the assemblage indirectly affected territorialisation by affecting Governance, and in this case a novel form of governance allowed accommodation of hierarchical structures without affecting capacity for self-organisation.
4. Space affected the ease or speed with which territorialisation could occur.

Ultimately, the empirical case study, in combination with the application case studies, revealed that the causes and variables that were determined in the theory development were observable and of relevance in the processes of self-organisation in intentional communities, and in the Australian context. As such, the case studies effectively addressed the fifth research sub-question.

#### **7.2.4 Summary**

The aim of this research was to develop a new theoretical understanding of adaptable community development by adopting assemblage theory (and Deleuzian philosophy) to advance concepts of self-organisational and adaptable territorialisation, and to then explore the relevance of that theory in established and emerging community contexts.

Based on these findings, the aim of the research has been met, for the following reasons:

1. Application of assemblage theory and Deleuzian philosophy enabled an advancement of understanding of self-organisational change and adaptability in urban communities.
2. There was a general consistency in the observations about the identified factors (co-relation to the adaptive cycle, causes, and variables) between the theory, the application case studies, and the empirical case study, indicating the theory holds true for real-life situations and for the Australian context.
3. There were some notable observations from the empirical case study, particularly in relation to the governance structure that was employed in that community. The adoption of sociocracy appeared to allow the community to adopt some molarity to engage comfortably with higher level, more molar systems, but at the same time to accommodate key qualities of self-organisation (such as localised and dynamic coding, effective feedbacks, and rhizomic structures).

4. The case studies also provided further insight into the effect of the identified causes and behaviour of the key variables. Critically, the case studies provided a better understanding of the relationships between the variables — how each affected the other. Of particular note:
  - a. Coding (and by extension Governance) was found to be the primary variable directly affecting the process of territorialisation.
  - b. Composition of the assemblage indirectly affected territorialisation by affecting Governance.
  - c. Space affected the ease or speed with which territorialisation could occur.
  - d. Coding was the factor which most influenced, and was most influenced by, the progression of the community through the adaptive cycle.

### **7.3 CONTRIBUTION TO KNOWLEDGE**

By addressing the identified research question and the research aim, this research has expanded on current knowledge relating to self-organisation and adaptability of social-environmental systems such as urban communities. The theory developed enables an improved understanding of how self-organisation occurs in complex social-environmental systems such as urban communities, and the identification of the key variables in particular presents opportunities for understanding, engaging with, and potentially incorporating notions of self-organisation into community development. These variables form a framework by which to analyse and potentially affect the process of self-organisation in social-environmental systems.

Furthermore, this research has expanded on current knowledge in the following ways:

1. It has made a contribution to theory resulting from the application of assemblage theory (and Deleuze's wider social ontology) to theory related to systems change. Deleuze's ontology, and assemblage theory in particular, has proven to be a potent means for understanding and describing change in complex systems. More succinctly, this thesis is substantially an exploration of how assemblage theory can make sense of, and provide a conceptual vocabulary for, self-organisation in social-environmental systems.

Whilst there is existing research and knowledge on assemblage theory and system change, they are either relatively narrow experimentations, limited in their contemporary application, or are not specifically related to urban design or associated disciplines of city-making.

There is also an apparent lack of research that relates self-organisation theory to resilience theory in the broader context of social-environmental systems. This lack extends to the understanding of how self-organisation affects adaptability. Moreover, the application of assemblage theory (and Deleuzian philosophy generally) to urbanism, whilst advanced, still offers much in the way of theoretical opportunity. Simply by understanding the relationship between these areas of theory more explicitly, this research is developing new knowledge and, it is believed, will ultimately advance knowledge in relation to self-organising change in social-environmental systems, and potentially in relation to resilience theory.

2. By illuminating the relationship between self-organisation theory and resilience theory in the broader context of social-environmental systems, this research has advanced knowledge in relation to self-organising change in social-environmental systems, and potentially in relation to resilience theory.
3. The analysis of the case studies has further enhanced understanding of how self-organising social-environmental systems behave and change generally, and has also provided insights into how self-organisational change in social-environmental systems affects adaptability. By identifying a set of causes and variables that affect and are affected by the process of territorialisation, the research forms a framework by which to analyse and potentially affect the process of self-organisation in social-environmental systems. Such a vocabulary could assist in the analysis of territorialisation historically and as it occurs. It may even offer a means of better estimating future change by clarifying the effects of certain variables.

This method of analysis, manifested in the Summary Tables for each case study, is of particular value because it facilitates a type of observational analysis of communities. The thesis demonstrates the value of such an approach when analysing current and past communities, which are often characterised by a lack of historical data and records.

4. The analysis of the case studies has improved understanding of how self-organising social-environmental systems behave and change generally, and also provided insights into how self-organisational change in social-environmental systems affects adaptability. By contributing to this elemental understanding of how territorialisation occurs in self-organising social-environmental systems, the research will ultimately inform how cities can be differently planned and designed to make them more adaptable and resilient. By paying closer attention to the identified causes and variables of self-organising territorialisation, planning and design efforts could better realise, or even counter such processes.

This contribution falls within a wider contribution towards research relating to adaptability and resilience of communities. While much research has been undertaken on resilience at the scale of the individual, there is limited research on resilience as an outcome of community scale interaction<sup>639</sup>.

5. The empirical case study also provided a unique opportunity to test and expand upon the findings of the research in a “real-world” situation: a community-scale social-environmental system with ambitions for sustainability and resilience. The nexus of the theoretical research with this case study project provided an empirical scaffold for the theory and allowed a novel consideration of a unique community and community building program.

## **7.4 OPPORTUNITIES FOR FURTHER RESEARCH**

The following sets out some opportunities for further research arising from this research:

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<sup>639</sup> Thornley et al, above n 198.



1. The research has highlighted the importance of localised, polyvocal coding to self-organisational capacity. Each of the case studies also highlighted a persistent interaction between the localised coding of the community, and the more molar coding of higher level systems. In some instances, the coding at each level was at odds, ultimately leading to the diminishment of the community-level coding. However, in other instances (particularly Narara Eco-Village) the community level coding appeared to co-exist within the high level coding framework. Better appreciation of how molecular and molar coding can productively co-exist would undoubtedly inform more effective self-organisation. The adoption of sociocracy at NEV would be a useful inclusion into such research.

Similarly, there appear to be opportunities to further explore how active forces from higher level systems can be met with active (rather than reactive) forces at the community scale or below. Such an outcome was realised in both Vauban and Narara Eco-Village and proved effective in delivering self-organised outcomes that did not conflict with high level activity or requirements. Such research could find connections to Silva's research on co-evolution.

2. It was noted in the theory development that, according to Deleuze and Guattari, assemblages are defined along two dimensions — the first defines the roles of entities in an assemblage, and the second describes how assemblages change, and refers to the processes of territorialisation/deterritorialisation/reterritorialisation.<sup>640</sup> Delanda adds a third dimension: an extra axis defining processes in which specialised expressive media intervene to rigidify or make more flexible the identity of the assemblage.<sup>641</sup> It is the second dimension (describing how assemblages change) that is the focus of this thesis. However, there is undoubtedly much value in exploring the first and third dimensions further, in order to understand how, if at all, they might affect the capacity for self-organisation within social-environmental assemblages.

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<sup>640</sup> Wise, above n 22.

<sup>641</sup> Delanda, above n 142.

3. The research also confirmed observations from Biggs, Schlüter, and Schoon<sup>642</sup> that innovation, and indeed self-organisational capacity, is greatest when the system is in the back loop of the adaptive cycle. This suggests that encouraging self-organisation would require the enabling of Revolt connections and the countering of Remember connections. Further research could explore whether or not this is a viable approach to promoting community self-organisation, within the constraints of concepts such as panarchy.
4. The research (particularly of the Narara Eco-Village) revealed that, when self-organisation in the system was most obvious, the bodies comprising the social-environmental systems (the communities) were formed and acted through a common interest (desires). Over time the communities grew and, while they became more diverse in some sense, the community as a whole became more segmented and homogenised. This appeared to be an inevitable trend in emerging communities, and substantially stifled the capacity for ongoing self-organisation. Research into measures for countering this social segmentation would be of value to emerging communities such as Narara.
5. The research confirmed that connections within the assemblage were one of the most dynamic and perpetually affected variables. When the communities appeared to have a high degree of self-organisation (typically in the earlier stages) the communities were defined by rhizomic relationships (decentralised, lateral, and dynamic), although some interaction with hierarchical structures was common. In order to achieve such structures, there would be some merit in identifying measures to map the rhizomatics of social-environmental assemblages, as a means of measuring the connectivity and self-organisational capacity.

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<sup>642</sup> Biggs, Schlüter and Schoon, above n 111.

Unlike the application case studies, the empirical case study benefitted from a more formalised sociocratic structure. The establishment of formal groups has been done in such a way as to form something of a hybrid rhizome/arborescent structure, where some measure of hierarchy was integrated with an otherwise acentred and dynamic structure. The sociocratic approach aligned with ambitions for self-organisation and reflected a number of the factors identified in the research. Research into the potential for wider and more mainstream adoption of sociocratic principles within urban communities would be of value.

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