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**Planning Urban Places:
A Small World Network Paradigm for Dynamic Urban Placemaking**

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Abstract

This research is about masterplanning people-places; in particular the focus is on large scale inner city redevelopment sites because such places are used by high concentrations of people and are where change is more rapid and profound. The research question asks: *How can places be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place?* Complexity theory of cities (CTC) potentially offers an adaptive and resilient framework for masterplanning urban change. However, some CTC simulation models of urban change have been criticised because they are devoid of the input of human cognition and perception. This research begins with human cognition and perception of place and its role in masterplanning urban change.

The research framework takes a tripartite perspective of placemaking: conceived space; perceived space; and adaptive space. The key research method used is Multidimensional Scaling analysis (MDS) because this method enables the integration of qualitative and quantitative analyses in the interpretation of the results. The case study area for the research is Brisbane's South Bank, Australia, a forty-two hectare inner city redevelopment site. Brisbane's South Bank was selected as a case study because it has been intensively masterplanned for over two decades and has a well recorded sequence of masterplans proposed and implemented in response to various urban changes and crises.

The results of the research showed that the South Bank redevelopment site between the years of 1990 to 2012 retained its WS (Watts-Strogatz) small world distributed network characteristics. Importantly, this outcome was the result of the qualitative and quantitative MDS analysis of human perception, cognition and adaptation as well as a metric Network Analysis of the built form changes. The significance of the results is that in masterplanning of large scale urban redevelopment sites such as South Bank, a WS small world distributed network offers a masterplanning framework that is open to the opportunities for rapid change within a context of order and coherence. Placemaking over time needs to embrace the unpredictability of randomness to foster creative and dynamic places as well as the certainty of order to embed the continuity of the place phenomenon. Small world networks offer a dynamic paradigm that accommodates these qualities, potentially useful as a masterplanning framework.

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Contributor	Statement of contribution
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ABBREVIATIONS

WS	Watts Strogatz small world
BA	Barabasi Albert small world
O	Order
R	Random
MDS	Multidimensional scaling analysis
CA	Cluster Analysis
PCFA	Principal Components Factor Analysis
NA	Network Analysis
ST	Short Term timeframe
LT	Long Term timeframe
TP	Technical Preparation stage
DP	Design Preparation stage
D	Designing stage
M	Monitoring stage
CTC	Complexity Theory of Cities
SBC	South Bank Corporation

CHAPTER ONE

THE RESEARCH

1.1 INTRODUCTION

The core of the research is the problem of planning people-places in a context of urban change. This is important because people's relationship with their place consists of a complex network of imperatives that impact upon their lives including the interrelated demands of economic desires, social and ethical mores, psychological and behavioural actions, cultural and symbolic needs, environmental and climatic crises and many other factors that make life liveable (or not) for people individually and collectively. The effect of this complex network of imperatives is to create a 'place'. The idea of 'place' is thus, the outcome of phenomena that involve both people and locality and placemaking which is the intent of much urban design and planning effort. Importantly, the idea of place and consequently, of placemaking cannot be static because the people-place relationship necessarily changes as people and their network of imperatives mature and change over time. This is particularly important in urban areas where there are higher concentrations of people and where change is more rapid and profound. This research seeks a way to enable the planning of people's places in a way that is a relevant part of the changing processes of urban placemaking.

1.2 THE PLANNING CONTEXT OF THE RESEARCH

Often, a plan is used to give certainty or guidance to placemaking particularly in an urban context of intense and significant change. Urban change can be rapid or slow, short term or long term, critical or incremental, perceptual or contextual. Placemaking that is meaningful for people needs to consider most, if not all of these aspects of change. As such, this makes the process of planning urban places a broad and complex enterprise, open to many definitions and interpretations by diverse design professionals, politicians, community groups and others who contribute to placemaking. For clarification the meanings of some basic terms as they are used in this discussion are explained briefly.

In the context of this discussion the idea of 'planning' is seen as a set of interrelated imperatives and processes that can be clustered into certain disciplines but the boundaries of these disciplines

are porous. This means that processes of the ‘planning’ categories described here are not intended to be strictly distinctive, but absorptive. All plans at all scales can address conceptual ideas such as policies, programs or actions or contextual objects such as regions, urban centres, suburbs and parts of places. ‘Planning’ itself is a generic activity that both practitioners and academics find hard to define succinctly, although the discussion by Susan Thompson (2007) provides some guidance. Her discussion refers to earlier conceptualisations of planning, such as those by Keeble (1959), Brown and Sherrard (1951) and Abercrombie (1959) – planning was within the physical shaping of a city or part of a city to achieve beauty, harmony and functionality, as well as with the related intellectual pursuits that supported this physical shaping. Recent approaches give greater emphasis to the active shaping of social and environmental visions as well as the physical (Sandercock, 2006; PIA, 2014; APA, 2014). For example, the American Planning Association states: “Planning ... works to improve the welfare of people and their communities by creating more convenient, equitable, healthful, efficient and attractive places for present and future generations” (APA, 2014). The idea of ‘masterplanning’ fits as a component or specialised approach within this broad concept of planning. It is particularly significant in approaching ideas about placemaking.

Masterplanning is a specialised form of planning that focuses particularly on large-scale urban projects and particularly, on a project’s overall conceptual design. For example, Elizabeth Rapoport (2014) describes the work of a ‘global intelligence corps’ of architects, engineers and planners who consult on masterplanned projects around the world. Husam Al Waer shows how masterplanning has moved from masterplans being “site- and form-based development control mechanisms” (Al Waer, 2013, p26) to being something that “combines collaborative framing of a realistic vision of the planned development of a community; the provision of an enabling infrastructure and the setting out and delivery of the built form” (Al Waer, 2013, p26). It is at this masterplanning level that the implementation of placemaking intentions are realised and yet the changing complex of imperatives of all planning processes percolate throughout.

Masterplanning is a process leading to a product that represents the complex aspects of urban change either overtly or covertly. Design professionals often intuitively, tackle this complex masterplanning context of change in a variety of ways. Masterplans can take many forms from notional strategies to specifically delineated and detailed documents. Yet planning urban places through the vehicle of a masterplan can be about making places that are either adaptive to urban change or resilient to urban change.

The difference between the definitions of 'adaptation' and 'resilience' is subtle but important. Many disciplines have acquired these terms and may use them in various ways and even interchangeably. Here, adaptation is defined as something that changes to be a good-fit with its environment (Latin *adaptare*, from *ad-* 'to' + *aptare* from *aptus* 'fit'). Resilience is defined as something that resists its changed environment and bounces back after the stress of unfitted-ness (Latin *resilire* 'to recoil,' from *re-* 'back' + *salire* 'to jump'). In a planning sense, an adaptive plan is one that accommodates changes in the people-place phenomenon (Latin *accommodat-* 'made fitting,' from the verb *accommodare*, from *ad-* 'to' + *commodus* 'fitting') and a resilient plan assimilates changes into the people-place phenomenon (Latin *assimilat-* 'absorbed, incorporated,' from the verb *assimilare*, from *ad-* 'to' + *similis* 'like') (New Oxford American Dictionary, 2007). Assimilation and accommodation are processes at the interface between individual and environment. In the context of this discussion, the key definitions of assimilation and accommodation are: "The filtering or modification of the input is called assimilation; the modification of internal schemes to fit reality is called accommodation" (Piaget and Inhelder, 1969, p6). As such, assimilation and accommodation are processes of adjustment. "Their difference lies in the fact that in assimilation, it is the conception of reality that is adjusted to fit existing schemes, whereas in accommodation, the existing scheme is adjusted to fit the reality" (Ayman-Nolley, 1999, p268). This means for adaptive plans to accommodate or to be a good-fit to the changed urban environment they need to have a degree of flexibility that enables adjustments in the light of random or unpredictable contextual change. For resilient plans to assimilate changes in the urban environment they need the capacity to bounce back to a planning intent having integrated those changes. A resilient plan's 'capacity to bounce back' is enabled by a degree of predictability, certainty or order. Understanding adaptive plans and resilient plans is a first step in clarifying the complexity of planning urban places. Further to this, a planning approach is predicated by the kind of change such as rapid or slow change, short term or long term, critical or incremental, perceptual or contextual. These offer a construct that can give some order to the complexity of planning.

Some might say, "The planner has become the victim of planning; his own creation has overwhelmed him. Planning has become so large that the planner cannot encompass its dimensions" (Wildavsky, 1973, p127). Imagine the massive mosaic of disciplines that have something to say about a city and a cacophony of academic, professional and community voices resound. From the ranks of economists, architects, urban designers, planners, politicians, developers, artists, environmentalists, shopkeepers, housewives and a host of others come those who seek to realise their specific needs and desires whether for greed or altruism. Simultaneously, planning theories are

buffeted by the ongoing onslaught of philosophical opinions and fashions (Allmendinger, 2009) that impact this “messy, contentious field...The multiplicity of technical, social and aesthetic...blend of design, civil engineering, local politics, community organisation and social justice” (Campbell and Fainstein, 2003, p5) not to mention the imperatives of climate change, environmental degradation and the almost ubiquitous cyberspace. As both a profession and an academic discipline planning blends both practice and theory, where theory is regarded as shaping at least part of practice, but with these many issues and aspects to juggle, some audaciously ask, “What, then, is ‘planning theory’ for?” Jean Hillier and Patsy Healey (2008) continue to explain: “It may be thought of in the metaphor of a ‘template’ for action, as an a priori source of principles and criteria for practice...as a basis for evaluating the messy worlds of actualities...[or]...as a kind of practical reasoning rather than a kind of template or primal rationale...principles to guide action are not developed a priori, but rather in the flow of action relevant to the particularities of circumstances ” (Hillier and Healey, 2008, pp xvi, xvii). Each of these philosophical positions indicates the power of the planner and planning: “Planning is the attempt ...to control the future by current acts. Instead of discovering his fate in the future, man plans to make it in his own image. But the present may be reluctant to give birth to the future” (Wildavsky, 1973, p128). Simply, we might even say that planning for some, is a way to control the future and for others a way to midwife the future.

To ‘control the future’ and to ‘midwife the future’ are fundamentally different attitudes to urban change and the role of the planner. Planners who implement change need to know the outcome ‘a priori’ whereas planners who facilitate change need to understand the trajectory of the possibilities (Hillier and Healey, 2008). An attitude that the future is ours to control is one based on ownership – place becomes an object of desire that is separate from the ‘messy worlds of actualities’ and the design professionals’ role is to predict, plan and deliver the envisioned place. Conversely, midwifery of the future facilitates the trajectory of a place and is based on stewardship rather than leadership in the sense that the place trajectory is managed (i.e. stewardship) rather than controlled (i.e. leadership). Place becomes a ‘participant’ in the ‘flow of action’ entrusting the design professional to deliver or ‘midwife’ a relevant place over time. As such, control of the future implies that there is a fixed expectation for a place and midwifery of the future implies that there is no fixed expectation for a place; rather, the place becomes what it needs to be.

There may be times when planning expectations need to be realised and other times when the unexpected needs to be embraced. “The truth is that there are different types or kinds of theories, answering different kinds of questions, and not only one type of theory is relevant ...” (Taylor,

1998, p16). If a short-term planning agenda is required, such as for a building project, planning needs to be meticulous and expeditious - in a building project, development approvals need to be gained, critical paths need to be followed, deadlines met, progress payments made and celebratory drinks organised. However, "...what would long-range 'planning' look like that does not necessarily terminate in visions, frameworks, and policy guidance for day-to-day decision making?...what sort of 'guidelines' can a plan provide that is already incongruent with the realities of the region by the time it is officially adopted?" (Friedmann, 2004, p54). The relevance of long-range planning is dissipated because of "the inevitably static nature of strategic spatial plans, frozen at the time of their finalisation" (Balducci, et al 2011, p481). Some have even admitted: "The perfect planning system does not exist. We would go further, and say that it cannot exist" (Van Assche et al, 2012, p191). Nevertheless, others go forth boldly to right wrongs and change the future (Allmendinger, 2009; Hillier and Healey, 2008; Campbell and Fainstein, 2003; Hall, 2002; Taylor, 1998). Some argue that "Planning needs to respond to the changing and uncertain social environment but is also a process for changing that social environment and creating more certainty" (Abbott, 2005, p237). Karen Christensen (1985) explained the dimensions of the planning context (Figure 1.1):

If people agree on what they want and how to achieve it, then certainty prevails and planning is a rational application of knowledge. If they agree on what they want but do not know how to achieve it, then planning becomes a learning process; if they do not agree on what they want but do know how to achieve alternatives, then planning becomes a bargaining process; if they agree on neither means nor ends, then planning becomes part of the search for order in chaos (Christensen, 1985, p63).

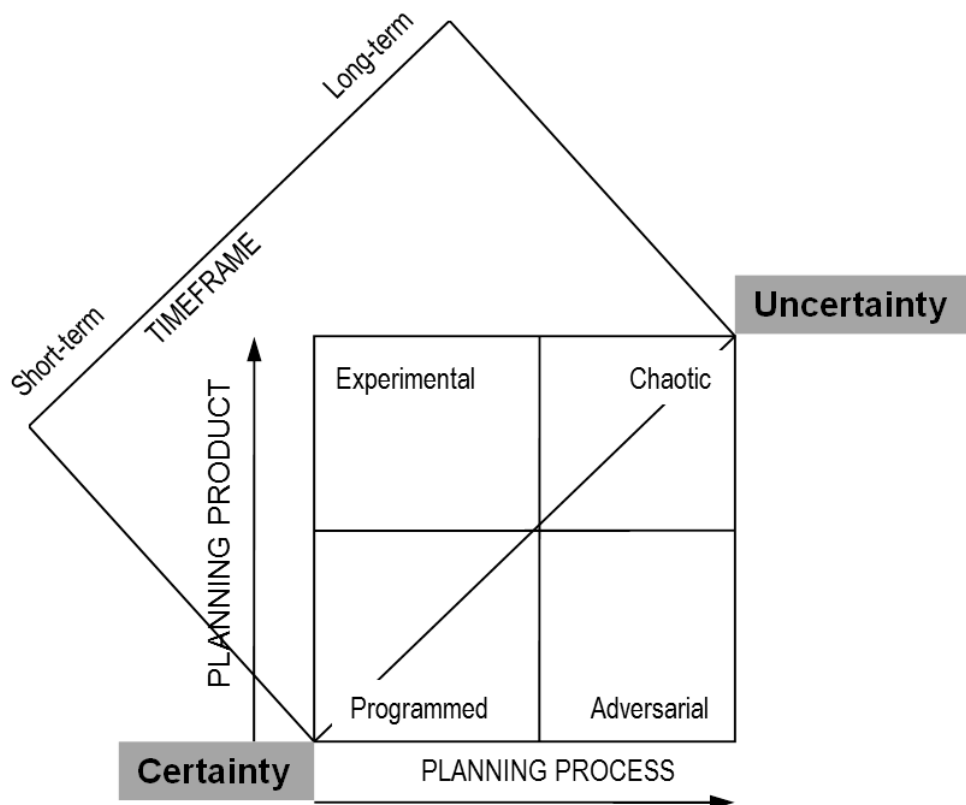


Figure 1.1: Dimensions of Planning; based on Christensen (1985).

Despite an assessment of the ‘knowns and unknowns; means and ends’ the people, place and planning paradigms may change over time and require a reassessment of the dimension of the planning context. As such Christensen (1985) alluded to the many and varied approaches to planning as well as the multiple viewpoints that perplex planners and urban designers.

Research into planning urban places needs a focus within the multiple views of masterplanning approaches within this more generalised view of the messy and complex elements of planning itself. Of singular importance for the current research is the identification of the critical issues that face masterplanning for people-places in a context of urban change and as a sub-component of this, the selection of a relevant case study for investigation. The research will seek to explore and understand these critical issues in the context of the various qualities of change. The significance of the problems that arise with planning urban places is illustrated here through a brief overview of three real urban masterplanning developments. These illustrate the problems involved and highlight the critical role of change in the masterplanning process. These three projects have been selected because of their complexity and high impact on city centres. One of the key intentions of these

places (apart from the capacity to maximise an economic return) is their symbolic value and impact on people's perception of their city. The importance of this impact is demonstrated by the often, passionate controversy that arises with the public revelation of the proposed development outcome of these high profile masterplanned places. These sites are typically, large-scale urban redevelopment sites that were instigated by an inner city urban crisis and consist of an area of many hectares of 'brownfield' opportunities that have been subjected to varying masterplanning approaches as well as various unforeseen crises that impacted upon the placemaking process.

1.3 THE PROBLEM: THREE URBAN DEVELOPMENTS IN CRISIS

The problem is that despite sometimes, rigorous masterplanning that raises people's expectations many large-scale urban developments are fraught with community dissatisfaction and adversarial negotiations before, during and after implementation. Often, masterplans that are expected to create a place with long-term significance need to be scrapped and reviewed because the context as time passes has changed. At times, more radical measures such as the demolition of infrastructure or of entire precincts can occur because of crises such as catastrophes, economic failure or redundancy. Such outcomes to masterplanning are a massive cost to a city on many levels. The following examples of large-scale developments in Melbourne, Sydney and Brisbane illustrate the problematic role of masterplanning in urban contexts of change and crises.

The masterplanning of urban redevelopment projects attract big money. Billions are invested in significant parts of a city in close proximity or within the CBD. The investment is not only fiscal – often, there is huge public and private investment of psychological and symbolic processes and products attached to an urban precinct that a masterplan promises to deliver. The problem is that many such masterplans end up as fodder for adversarial negotiations between developers, authorities and community (if included) or simply as aspirational publicity. Masterplans heading towards this end often require significant revision on implementation and the planning process cycles through again apparently shored up by hope and sales pitch. This somewhat desultory and expensive process questions the purpose and relevance of current approaches to masterplanning.

This overview of three Australian large-scale urban redevelopment precincts describes projects that have been masterplanned to varying degrees of certainty in a context of crises, change and chance. First of all, let us define the use of the word 'crisis' in the context of this discussion. Crisis is used to signify a point where a decision must be made to change the direction of the planning trajectory

(from Greek *krisis* 'decision,' from *krinein* 'decide'). Change occurs at the point of criticality indicating a transition from one state to another (New Oxford American Dictionary, 2007).

The planning trajectory of each of these three redevelopment sites illustrates different points of criticality and types of change based on initial masterplanning decisions. The initial 1991 masterplan for Brisbane's South Bank was a highly detailed delineation of a specific outcome whereas Melbourne's Docklands 1997 masterplan offered a somewhat pliable vision of what should happen with the site and finally, Sydney's Darling Harbour masterplan of 2011 offered an aspirational document, which the highest bidder would infill with their masterplan 'blueprint'. Each of these masterplanning examples is considered within the qualities that define the criteria of change: rapid or slow, short term or long term, critical or incremental, perceptual or contextual and the masterplanning responses of adaptive or resilient, random or ordered or a combination of responses.

All three sites are large-scale and long-term urban redevelopments intended to become significant city centre places. The Melbourne Docklands and the Sydney Darling Harbour developments were the response to the initial crisis of shipping containerisation that rendered traditional wharves inadequate worldwide; Brisbane's South Bank was the response to an area in decline for many years that finally, was inundated by the devastating Brisbane flood of 1973-74 sealing its fate. Each of these examples was a planning response to an initial crisis, but some developments were drawn into a cycle of crises before, during and after its masterplanning.

The Melbourne docklands slid into obsolescence when in the 1950s and 1960s, shipping containerisation demanded the shift of the docks to a larger site (Oakley and Johnson, 2011). The original docklands were abandoned leaving behind a blight of empty industrial buildings and contaminated land. Today, the Melbourne Docklands is an urban development area of about two hundred and twenty hectares and seven kilometres of waterfront, located within walking distance to Melbourne's city centre and rail network. This huge area adjacent the Melbourne CBD was derelict by the 1990s although intermittently revived as a notorious venue for the underground rave dance scene (Tomazine et al, 2002).

This derelict urban industrial site that was attracting an anarchic youth scene in close proximity to sophisticated Melbourne's CBD almost inevitably found itself on a political agenda. Architects were summoned in 1989 to focus their design attention on the area. By 1990 a Docklands Task Force was commissioned to establish an infrastructure strategy and to commence public

consultation. Ideas were raised from an Olympic Games bid to a Multifunction Polis, both of which came to naught. The State government of the day was in debt and in 1992 lost the election. A change in government inspired the revival of a rebranded Docklands as Melbourne's Millennium Mark, a deadline set to stimulate developers to begin works by the year 2000.

The Docklands Authority (which evolved from the Docklands Task Force) thought it was expeditious to hand over all design and infrastructure development to the developers because it was believed that this would be more efficient. The Docklands site was divided up into precincts for which private developers tendered. To expedite the development process, the Victoria state government divested the development approval powers of the City of Melbourne council in favour of the Docklands Authority to which developers addressed their proposals. Despite this special treatment and control of the site, the various developers of each precinct were reluctant to pass on the benefits of their infrastructure investment to a neighbouring and competing development precinct. Coordination and money of the type that governments can muster was sought and an arrangement whereby developers could negotiate for government infrastructure funding was struck.

In 1997 a Docklands masterplan was commissioned: "Today, Docklands is the under-utilised western edge of the city...with no life. Tomorrow...the Docklands waterfront should become the city's showpiece – a liveable, high technology entertainment and recreational precinct with few parallels around the world...a playground, a workplace, a tourism destination, and an incomparably beautiful place to live" (Docklands Authority, 1997, p5) (Figure 1.2).

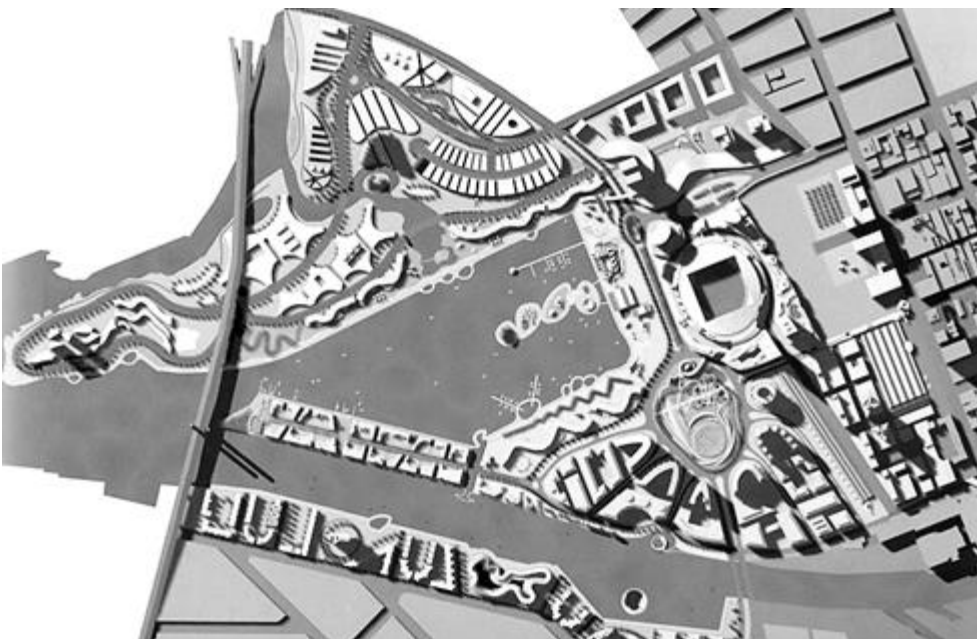


Figure 1.2: Melbourne Docklands masterplan (Ashton Raggatt McDougall, ARM, 1997)

Confidence exuded as the masterplan was seen to be in good hands: "...there is a consensus that Melbourne has more top quality architects, urban designers and landscape architects than any other Australian city" (Procter, 1997, p1). The masterplan by architects Ashton Raggatt McDougall (ARM) described a proposal for how Docklands should be developed without the hindrance of prescriptive rules. The ARM masterplan was not a final product but represented a possible vision and framework. A key element of the masterplan was that the vision and framework could be decoupled enabling developers to explore unencumbered the 'expressive possibilities' of the site although developers were encouraged to strive for 'consistency, coordination and complementarity' in their own precinct masterplans (Procter, 1997). It was to be an iterative design process in concert with an advisory panel that (perhaps idealistically) encouraged developers to stand firm against the temptation of windfall profits for their 9 billion-dollar investments. Furthermore, "American models of laissez-faire development enterprise zone, business improvement districts and so on – are not sought in the Docklands. Neither is a repeat of London's Docklands, where it was noted in 1987, with embarrassing candour by former Chief Executive... that 'no masterplan or detailed framework has been produced, no coherent framework or development thesis has been elaborated'" (Procter, 1997, p2). The ARM masterplan was described as "...something like mutations in 'Silly Putty' that suggest a diverse morphology and hybrid use as not only feasible but desirable. This puts [the ARM masterplan] outside the conventions of locational zoning, which recently has been resurgent in Australia as New Urbanism" (Procter, 1997, p1).

With the 'Silly Putty' masterplan in place and the publicity machine enthused, there was a flurry of developmental false starts; for example, the Batman's Hill precinct development proposal (a prime precinct adjacent the city centre) boasted the tallest building in the world as well as Paramount Studio's movie theme park and studios. Both of these schemes fell through. A Docklands Village was planned as a mixed-use residential precinct but this fell through too. A football stadium intended to 'seed' the Village area and encourage development was felt to diminish the residential amenity and to pose a huge obstruction to the connectivity of the Village to the city centre (Dovey, 2005). These and other grandiose development proposals fell through because of the economic recession of the 1990s and housing fluctuations (Dovey and Sandercock, 2002; Dovey 2005; Wood, 2009). Only one development proposal was realised as the Millennium Mark loomed; the residential Yarra Waters bid (now called Yarra's Edge).

By 1999 the disconnection with the city centre either by tram or particularly by pedestrians was targeted as a ‘serious flaw’ (ABC, 1999). However, the disconnection may have begun within the masterplanning itself with each precinct being designed by the separate developer’s own masterplanners. Most offered a wide range of high profile commercial, retail and residential uses in uber-designed buildings (some of which have even won awards) to a relatively narrow demographic. Each precinct masterplan needed to establish an edge over the other: for example, Batman’s Hill precinct extended Melbourne’s prime business address of Collins Street into the precinct; Collins Square formerly Docklands Village) also gained access to the desirable Collins Street address; Stadium Precinct enhanced its links to the city centre via a pedestrian bridge and links to Southern Cross Station; Victoria Harbour precinct (the centrepiece of Docklands) extended the prestigious Collins Street and the popular Bourke Street retail, both of which terminate at the waterfront; Waterfront City, an intensive entertainment, shopping and café lifestyle area (and dotted with statues of local entertainment icons like songstress’ Kylie Minogue, Dame Nellie Melba and Dame Edna) was topped off with the infamous Melbourne Star Ferris Wheel (yet another London-Eye-style structure) that malfunctioned within forty days of installation and stayed that way (Houston, 2009) (Figure 1.3).

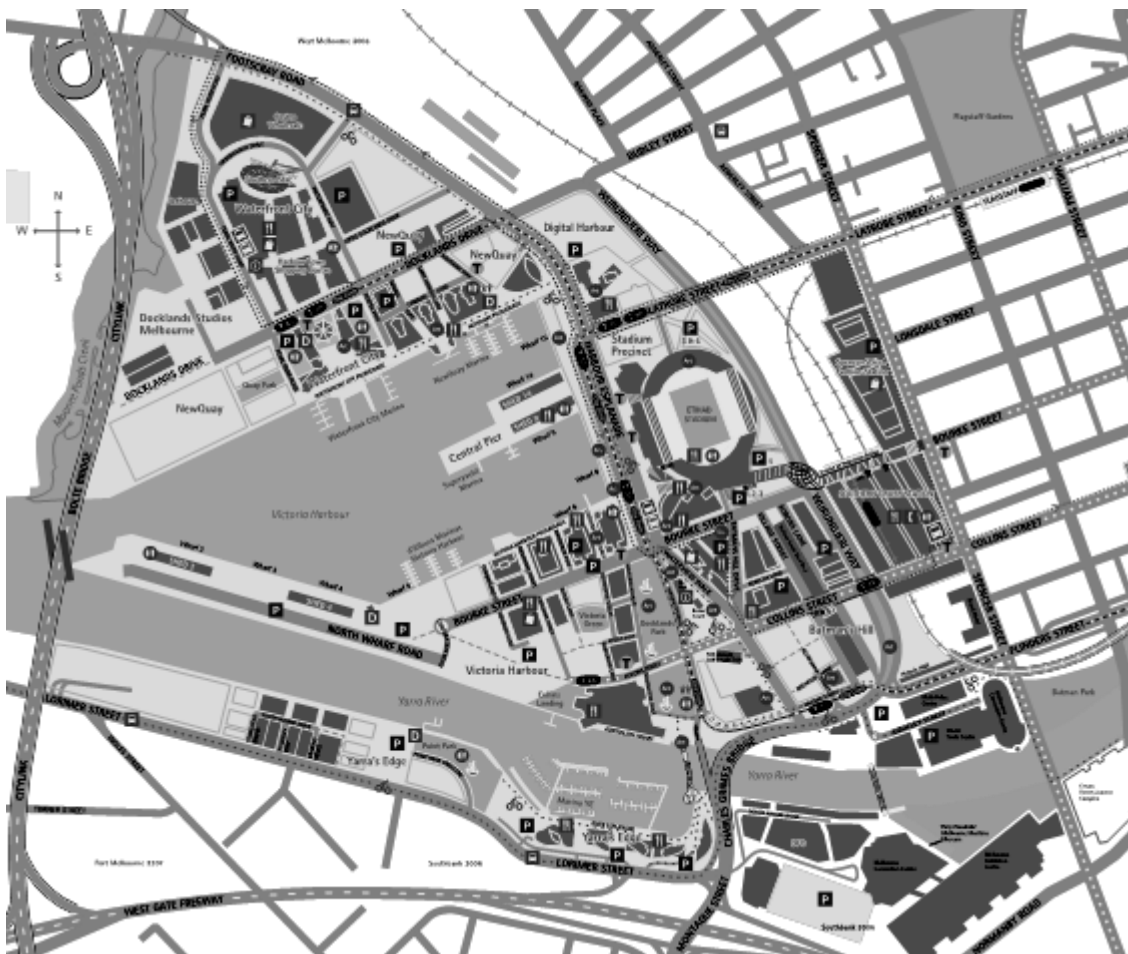


Figure 1.3: Melbourne Docklands visitors’ map 2010 (Docklands Master Map, 2014)

All these and more appeared as a scattering of relatively well-designed buildings in a context that failed to “deliver good planning, well designed environments, social equity and an engaged citizenry” (Oakley and Johnson, 2011). Despite some individual building design successes that pertained to sustainability and energy efficiency, the public critique highlighted the lack of transport and the wind tunnel effect; lack of green spaces and community facilities (Lucas, 2008); whilst the Lord Mayor stated that the development lacked ‘social glue’ (Dowling and Lahey, 2009); academics declared that Melbourne’s Docklands was ‘so badly done’ that it required a ‘major rethink’ (Cooke, 2010). Kim Dovey protested: “... it’s a place where urban planning was suspended and where there was absolutely no inclusion of affordable housing. It lacks diversity. And it didn’t get the kind of international investment that it was originally intended to get. It was a failure of public vision. It was utterly unintegrated, deeply unsustainable and car based” (ABC 2008) and summing up the thoughts of academia: “...the many vague visions for the site were translated into private sector bidding wars and ultimately into a set of un-coordinated precincts, often wind-blown open areas, irregular connections to the adjacent CBD and a hotch potch of retail, residential and office developments” (Oakley and Johnson, 2011).

Although this academic critique of Docklands as a ‘hotch potch’ may be valid, from the point of view of Places Victoria (bearing in mind their development agenda) the Docklands precincts are described attractively: “...each with its own distinct character and mix of residential, retail and commercial activities. This approach ensures that Docklands develops as a vibrant and diverse community while enhancing its attraction as a local and visitor destination” (Places Victoria, 2014, p1). Despite the hopes and promises Docklands is, “Often maligned for its architecture, lack of human scale amenities and cultural life, Docklands has, in many eyes, not fully engaged with Melbourne’s potential as a waterfront city – to be at least as successful as Brisbane, whose inner-city river buzzes with boats around its Southbank” (Stephens, 2013, p1). The desire to make Melbourne a waterfront city is a good idea despite the less than spectacular Yarra River compared with say, Brisbane’s meandering, wide river or with the magnificence of Sydney Harbour – however, not even waterfront access guarantees success or longevity.

The site of Sydney’s Darling Harbour has spectacular harbour views and access and yet the Darling Harbour Conference, Exhibition and Entertainment precinct that skirts the waterfront of Sydney Harbour and is adjacent the Sydney CBD and sprinkled with award winning architecture “...will be

dug up again to make way for Australia's largest convention and exhibition space as part of a billion-dollar facelift...almost 25 years after its reopening for the bicentennial" (McKenny and Hasham, 2012, p1). To be precise, this is no billion-dollar 'facelift' but a 2.5 billion-dollar 'transplant'. More to the point, as was proclaimed in *The Australian*: "...it is hoped [this development] will rival glossy complexes such as those in Singapore" (Allen, 2012). Such aspirations raise public expectations not to mention the stakes because these are high profile, high-risk projects open to political and economic vicissitude. Nevertheless, razing significant, large-scale infrastructure after twenty-five years at a time when the 'sustainability' mantra resounds is at least questionable.

Leading architects John Andrews International, who had returned to Australia with a portfolio that included the Harvard Graduate Design School and the like, designed the Convention Centre and Cox Richardson Taylor and Partners with Ove Arup engineers designed the Exhibition Centre upon which the highest Architectural honour in the land was bestowed (Andersons, 2013). The Darling Harbour precinct consisted of large-scaled modern buildings that sported steel framed suspended structures reminiscent of ships' masts. So, when the New South Wales (NSW) state government announced in 2012 that these buildings were to be demolished to make way for a 'memorable new precinct and public space on Sydney's harbour foreshore' the architectural fraternity was affronted.

John Andrews, regarding the pending demolition of one of his iconic buildings said: "Does it make any sense to pull down a \$120 million worth of [building] that's perfectly all right?" (Andrews, 2013, p5). Phillip Cox who won the prized Architectural medal for his Exhibition Centre lamented on its pending demolition: "[Its] a great tragedy for architecture...an act of vandalism" (Hasham and McKenny, 2012, p1). The Australian Institute of Architects (AIA) called for a public consultation process to support an appropriate masterplanning process: "The government has contracted out its responsibility to prepare a masterplan for the use of public land, as well as the rights to demolish and develop it...The Institute's view is that city development is better served by a multiplicity of players in the development industry, not just one...What we question is the muddled brief to which they are responding and the out-dated and wasteful demolish and rebuild strategy underlying the whole proposal" (AIA, 2013) and further critics of the process: "The government should have prepared a separate masterplan for the precinct, taking public opinion into account, rather than wrapping the masterplan into the tender process...Instead of allowing feedback as the proposal was developed we are presented with almost a fait accompli" (Webber, 2013, p5) (Figure 1.4).



Figure 1.4 Proposed Darling Harbour precinct design (Rem Koolhaas OMA, 2012)

Bids were sought. A consortium headed by Lend Lease one of the leading development enterprises in the country won the tender. The consortium called ‘Destination Sydney’ but later changed the name to the more effusive ‘Darling Harbour Live’, prepared the masterplan through the international design firm Rem Koolhaas’ OMA (The Office for Metropolitan Architecture) and Hassells, Australia. The NSW state government set up a Public-Private Partnership (PPP) through which Darling Harbour Live would design, build, finance, operate and maintain the whole site and its activities for twenty-five years (McKenny and Hasham, 2012).

It was the public’s response that had most impact. The *Daily Telegraph* headlined: “Darling Harbour’s \$1 billion revamp toned down after original plans labelled ugly” (Campion, 2013). A scathing public called them ugly, offensive and unbearable. People complained about the ‘unbearable reflectivity’ of the ‘ugly’ metallic cladding and called for the original convention centre to be heritage listed and not demolished. The design was revised: “...the height has been lowered

and the facades broken down...and the cladding switched for a perforated look to slimline the building” (Campion, 2013) (Figure 1.5 and 1.6).



Figure 1.5: Revised Darling Harbour precinct design (Hassells, 2014)

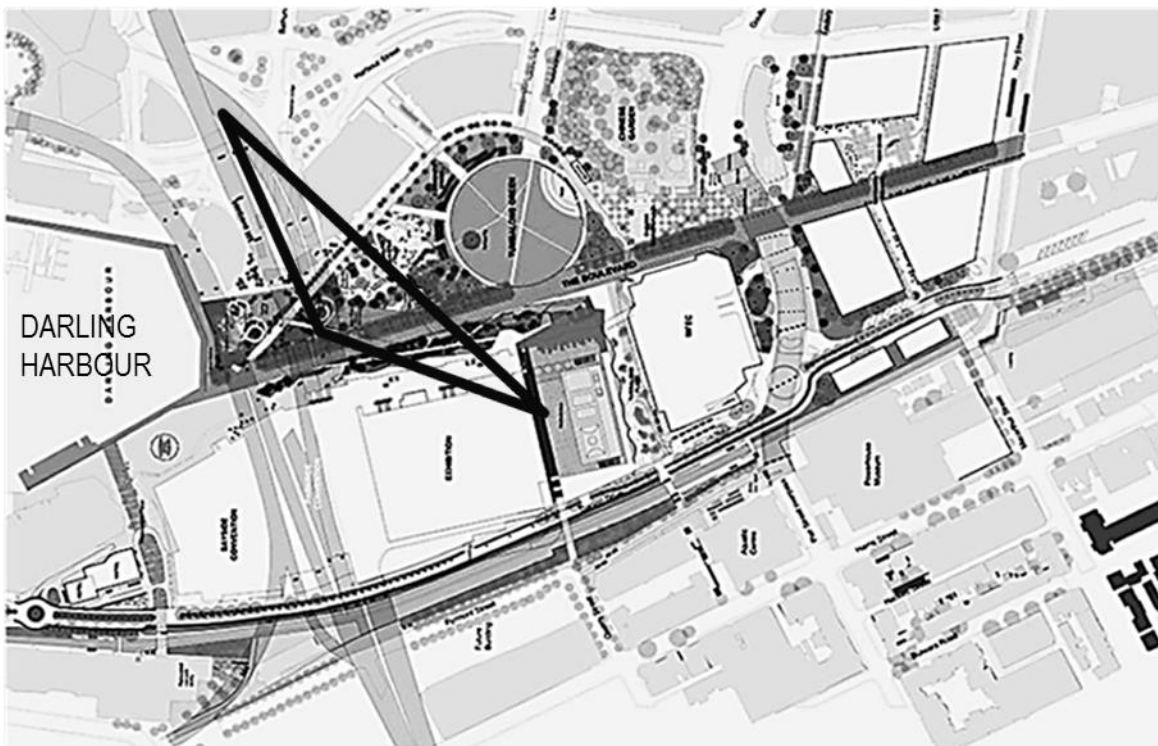


Figure 1.6: Revised Darling Harbour masterplan (view elevation Figure 1.5) (Hassells, 2014)

The problem and justification for a ‘clean sweep’ approach to the site was that “2011 was the first time that Sydney was not Australia’s first choice destination for conferences and over the last five years Sydney has lost \$150 million of direct conference revenue...Both Melbourne and Brisbane have already significantly improved their facilities and Sydney needs to as well” (Darling Harbour Live 2014). Perhaps this was a commercial crisis, but the response to demolish a 20 hectare precinct is one usually reserved for catastrophes.

One aspect of Australia that has changed since the 1980s is the focus of the Asia Pacific region – China, South Korea, Indonesia, and south-east Asia as well as India and as always the USA and Japan are key players in the social, cultural and particularly the economic fate of Australia in the twenty-first century. As was stated in the document ‘A Masterplan for Darling Harbour South’ prepared by the Sydney Harbour Foreshore Authority (SHFA) in March 2011: “The vision is for Darling Harbour South to expand its position as one of the leading international convention, exhibition and entertainment facilities in the Asia Pacific region, fostering the development of new business connections for Sydney and confirming Sydney as Australia’s foremost ...” and so forth (SHFA, 2011, p1). And who better to create this ‘leading international convention, exhibition and entertainment facilities in the Asia Pacific region, but one of the foremost members of the global intelligence corps (GIC) of the internationalisation of urban planning but, Rem Koolhaas, OMA . However, as Rapoport explains: “ The GIC’s status gives it a disproportionate influence on large-scale urban redevelopment projects in major cities” (Rapoport, 2014, p2). Nevertheless, attracting the huge Asia-Pacific market with ‘shiny and new’ developments by prestigious ‘starchitects’, is one way to exploit these regional opportunities. Alternatively, as noted by a critic of the new precinct plan: “A mature and self-confident city builds on its existing legacy. It doesn’t need to erase its heritage...always desperately striving for the shiny and the new...great cities retain or adapt the best of their buildings to contribute towards a legible narrative of their history and it is this narrative that endows richness and a unique character” (Jones 2013). The added complication of direct citizen participation in the masterplanning was avoided initially, but as reported in the *Daily Telegraph* in 2013 when the plans were revealed, the public response was ‘scathing’ and the revisions began. Considering the twenty-five year life span of the original Darling Harbour, the discontinuity of the pivotal role of Darling Harbour Live in twenty-five years seems to render the life span of the proposed Darling Harbour precinct, uncertain.

Brisbane's South Bank in contrast to Melbourne's Docklands and Sydney's Darling Harbour has finally attained - after a number of crises - a sense of relative completion. Prior to the South Bank development, the site was the venue for the Australian bicentennial event, Expo 88. The site consisted of forty-two hectares of resumed private and public land across the Brisbane River from the CBD. The inception of the masterplanning of South Bank was in 1986-1988 so that immediately after the end of the Expo 88 festivities the site would be cleared for its redevelopment as South Bank. The Queensland state government intention was to redevelop the site to deliver the economic return to cover the costs of Expo 88 which had blown-out significantly. The first masterplan proposal was devised by the River City 2000 consortium and announced in late 1988.

Almost immediately there was community outrage. The announcement as a *fait accompli* of this post-Expo 88 River City masterplan for the new South Bank was at a time when the Queensland state government was under a pall of police corruption and suspicion over the integrity of its leading politicians. The River City 2000 consortium's successful development proposal was perceived by the community to be an act of 'cronyism'. The masterplan was quickly withdrawn to avert a political crisis and in late 1988 the South Bank Development Corporation (SBC) instituted community consultation for the masterplanning process.

With the community vision in hand, the SBC opened up the South Bank redevelopment masterplanning to competition in 1989. Detailed masterplans were prepared with comprehensive visionary constructs, which offered certainty to a cynical community of what they were getting. The winner was the Hawaii and Gold Coast architectural firm Media 5 with their 'Park within the buildings within the park' concept. A detailed masterplan was prepared and finally gazetted in 1990 (Figure 1.7). Order and certainty seemed to prevail.

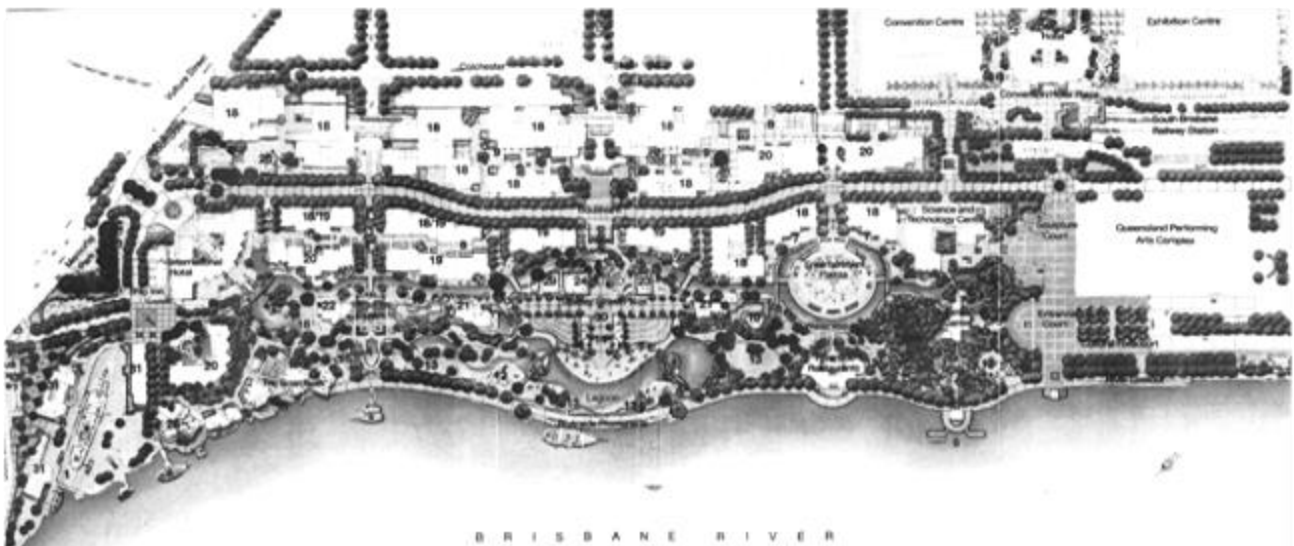


Figure 1.7: Brisbane's South Bank (Queensland government, 1990).

Despite or because of the detailed vision that appeared to align with community expectations the masterplan was inflexible. Economic failure threatened, as the development industry saw no future for a site that was expensive to build, had no viable business address on the street and had been designed as a precinct largely separated from the street life and surrounding suburbs. The South Bank 1991 masterplan that had offered certainty at a time of political crisis failed in the face of real life economic uncertainty.

The problem was that the South Bank masterplan illustrated a future that was stuck in an Expo 88 fantasy that was fast receding from the public mind. By 1997, a new masterplan was prepared. However, the new masterplan required the demolition of several million dollars' worth of new construction so as to implement the revised vision. The 1997 Denton Corker Marshall (DCM) masterplan was designed to establish coherent connectivity and flexible activity clusters. This redesign opened up the site for the potentiality of changing activities within the consistency of its designated pathways and connections (Figure 1.8).

“Can you imagine the grid lock getting on and off the peninsula when the population goes from 20,000 to 50,000 people?” quipped one town planner in the audience.

“And it’s on a flood plain,” thundered [Councillor] Helen Abrahams as the first microphone failed under the excitement.

Professor Heywood reminded residents of the people-power that overthrew a deal between the BJP [Bjelke Petersen] government and developer Theiss on the Expo site on the south bank of the Brisbane River.

“Do you remember River City 2000? The islands in the river bursting with sky scrapers?”

Professor Hayworth’s [sic] rhetoric conjured up past visions of a gloriously crowded future.

“It was the people of Brisbane who put a stop to that.” (Ebbs, 2014).

The repetition of this controversy for the extension of the South Bank precinct through the vehicle of the Kurilpa riverfront renewal masterplan 2014 (this time after several community consultation meetings since 2008) is evidence of the significance of this research problem. It remains to be seen whether some of the lessons of South Bank’s masterplanning from 1991-2012 that will be discussed in Chapter Seven and Chapter Eight have taken root, but as this community outcry implies this is to date, not promising.

The three redevelopments discussed here have much in common in that they are urban renewal sites developed as a result of an urban blight crisis. The three developments describe different approaches to masterplanning large-scale, urban sites with a developer-centric strategy in a public-private partnership. All of these developments have had a mixed reception by the community at large who were not comprehensively consulted until seen to be politically expedient. As the masterplanning of these three high profile and important redevelopments illustrate, the many aspects of change are part of the process either by intent or accident. The three examples described masterplanning scenarios from authoritarian to laissez-faire and a combination of both, with and without community involvement, but nevertheless were open to unforeseen internal and external change, not the least of which is people’s perception of place.

The crises of these three urban redevelopment projects hinged upon urban change criteria: the pace of the redevelopment as rapid or slow; the time scale as short-term or long-term; change as crisis driven or gradual; and, change as perceptual and/or contextual. As Al Waer points out: “The traditional view was that masterplanning was a design led activity concerned with the architectural form of buildings, spaces and infrastructure...the masterplanning process has been criticised for

focusing on the end state and as using a command approach. Ironically, the subsequent implementation of the plan has often been disjointed and incomplete as implementation was tackled as a sequential and fragmented process” (Al Waer 2014, p25). A masterplanning focus on an end state using a ‘command approach’ refers to a fixed masterplan using a static paradigm usually termed a ‘blueprint’ approach. A static paradigm gives certainty to the user as well as those commissioned to deliver a building in a timely and effective manner. And importantly: “A masterplan approach is considered essential so that investors can realise their commitment to a particular scheme, whereas an incremental approach is unlikely to stimulate private sector investment in urban regeneration locations to the same degree [because] investment is likely to occur where risks and returns are transparent and the developer can demonstrate the financial viability of the project” (Adair et al, 2000, in Bell, 2005, p98). This motivation towards the static paradigm of a ‘blueprint’ approach is evident particularly in the masterplanning of Sydney’s Darling Harbour and the initial South Bank masterplan 1991. As such, the delivery of ‘architectural form of buildings, space and infrastructure’ in the relatively immediate fiscal future offers assurances for investors, users and implementers. However, placemaking for a large scale urban redevelopment scenario as those described previously, takes time and are embedded in the inevitable dynamic of change and crisis. Al Waer (2014) suggests that such projects end up ‘disjointed and incomplete’ if masterplanning neglects or ignores this dynamic as will be described more fully in Chapter Seven. Darren Bell describes masterplanning that implies a more dynamic paradigm as: “...a framework for managing change over a wider area (and over a lengthy time period) rather than just the spatial rendering of a property development on a site” (Bell, 2005 in Al Waer, 2014, p28). Melbourne’s Docklands initial masterplan 1997 was intended to be open to various iterations possibly because of the huge scale of this two hundred and twenty hectare brownfield site and the relatively long timeframe for completion. And yet, criticism has not been avoided towards the outcome of this more flexible masterplanning process. Such contradictions and controversies that arise despite intense discussion in the theory and practice of masterplanning flags the need for further investigation into the complex aspects of masterplanning large scale urban redevelopment sites. This investigation offers an opportunity to examine masterplanning in a particularly intense scenario and for reasons of visibility, intensity and impact on people and places this investigation may glean valuable insights for a wider scope of planning for people-places in a context of urban change. These are the issues that lie at the heart of this research that will be addressed through the following research question:

How can places be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place?

1.4 CONTRIBUTION OF THE RESEARCH

The inspiration for the research was this thought: "It is interesting to see how many of our ideal forms are rationalisations of what are only momentary stages in evolving urban landscapes. It is difficult for us to conceive of form-in-process as a prototype model" (Lynch, 1981, p381). This thought was elaborated by the query, "How can a continuous force be captured for observation and analysis? Because culture is a conditional equilibrium, or even a periodic chaos, different systems are at work at different times" (Vance, 1999, p6). And this is the dilemma. Building cities is a concrete business that is trapped in a shifting context. These thoughts led the investigation towards a paradigm for a masterplanning framework that could address the notions of 'form-in-process as a prototype model' and the 'periodic chaos of different systems at work at different times'. Furthermore, the import of people's perception of place extends the boundary of research interest to include the relationship between people and place. The originality of this research is in the integration of the people-place phenomenon for placemaking in a context of urban change. A brief overview of some categories of urban design and planning approaches illustrate the limits and gaps in some well-established ideas for planning urban places.

Most approaches for planning urban places are methods for simplifying the complexity of urban placemaking. Many of these approaches offer a static paradigm for urban design and planning with most categorising architectural and urban forms into typologies. More recently, fractal geometry has emerged that attempts to demonstrate the growth of places using a more dynamic paradigm. This is a very promising area but currently, it appears to be a demonstration of computational algorithms devoid of the complexity of people and places. At the other extreme, there are volumes that focus on people and places but they do not offer a framework for urban design and planning much beyond a philosophical stance. Finally, sustainability has initiated a particular type of urban form that purports to produce low energy urban places and as worthwhile as this is, it is essentially the presentation of appropriate building typologies.

Cities are inherently complex environments and the categorisation of city forms into such stylistic descriptors or patterns such as organic or artificial, realistic or idealistic, random or regular, authoritarian or democratic is well established but perhaps problematic. Categorising urban or architectural forms may be a largely futile exercise because it is an attempt to cast a static paradigm

on a dynamic urban context (Lang, 2005; Bentley et al 1985; Gosling & Maitland, 1984; Alexander, 1980; Alexander, 1977; Lynch, 1960, 1981).

Analogies and algorithms can be useful to escape the stylistic confines of architectural and urban typologies. One approach suggests that the typology of cities may be categorised as three normative theories: firstly, cosmic, magical or religious forms; secondly, machine or regular forms; and finally, biological or organic growth forms. Although these categories tend to tap into particular building styles (that is, symbolic, minimal and modular respectively) or the organic growth pattern of fractal cities there is a hint of a more systemic and in the case of fractal geometry, dynamic paradigm. Although these systems from analogy to algorithm are useful for urban design and planning, there is limited or nil reference to people or their perception of place (Marshall, 2009; Batty, 2007; Batty & Longley, 1994; Lynch, 1981).

People and the idea of place is emphasised in seminal texts that offer a way of seeing places beyond the built form. How people use places and the human scale has been put on the design agenda because of these texts. Despite this valuable contribution to the discussion a framework that underpins the relationship between people and places is missing. It is the missing piece that this research attempts to infill. A framework that offers a metaphor for planning that embodies the characteristics of adaptability and resilience – the key processes towards urban form-in-process – is at the heart of this present discussion (Gehl, 2010, 1987; Seamon, & Mugerauer, 1985; Buttimer & Seamon, 1980; Relph, 1976; Tuan, 1974)

Sustainability has been a major influence in the direction of urban design and planning in recent years and in Australia at least retains an important role in planning from architecture, urban design to regional planning. However, this seems to be another form of presenting architectural, urban design and planning models that are deemed appropriate, but generally sourced from a Neo-traditional American context such as the influential New Urbanism (Duany and Plater-Zyberk, 2012; Duany & Speck with Lydon, 2009; Calthorpe & Fulton, 2001; Calthorpe, 1993).

What is missing is people. People complicate the planning of urban places because not only do they come with their perceptions of place but also they are key change agents within the collective dynamic of time, space and action that fashions urban form-in-process. The integration of people's perception of place in an urban context of change is the missing piece in much urban design and

planning discussion. The originality of this research is its contribution towards a planning framework that integrates people and place-change in a self-organising approach to placemaking.

1.5 RESEARCH FRAMEWORK AND CORE CONCEPTS

The integrated nature of the research framework was adapted from Lefebvre's urban triad of three notional spaces: conceived space; perceived space; and lived space (Lefebvre, 1991, Shields, 1999; Elden, 2004; Merrifield, 2006). The outcome of the 'trialectic' between these three 'spaces' was urbanity. Firstly, conceived space is the representations of space usually produced by urban professionals such as architects, planners, engineers and so on, usually commissioned by developers or government authorities. Secondly, perceived space (in the context of Lefebvre's interpretation) is the 'as built' urban form of a place as sensed. As such, Lefebvre uses a traditional meaning of perception as the outcome of physical sensation (such as vision, touch, smell and so on). Thirdly, 'lived space' is, "...alive: it speaks. It has an affective kernel or centre..." These are places (such as a house, street or neighbourhood) where we form attachments and build place identity and a sense of belonging. "It embraces the loci of passion, of action and of lived situations...it is essentially qualitative, fluid and dynamic" (Lefebvre, p42, 1991a). Lefebvre's 'lived space' is the grounding of everyday life as experienced physically and emotionally. It is the place where ordinary folk put down roots and experience a space through their senses, memories, pleasure or discomfort, amenity, acceptance or alienation. In effect, Lefebvre's interpretation of 'lived space' as the 'loci of passion, of action and of lived situations' is that which we call here, 'place'.

An adaptation of Lefebvre's urban triad is applied in this discussion and to the intent of the research question. An important piece of evidence that this research seeks is that of how places adapt to or resist change. To this end, the research framework explores 'conceived space', 'perceived space' and 'adaptive space' in the context of the research question about masterplanning adaptable and resilient urban places that are relevant to people's perception of place. Importantly, it is the areas of interaction of the notional 'spaces' that is of more interest here, rather than the differentiation between these 'spaces' as illustrated later in this section

The research framework illustrates how the literature and the empirical studies are embedded in the concepts of the perception of place, small world network theory and placemaking (Figure 1.9).. The empirical research study was motivated by the challenge issued to complexity theory of cities (CTC) by Juval Portugali (2012). He challenged: "The potential that has yet to be realized is to develop a better balance between the qualitative and quantitative messages of complexity theories

and their application to the study of cities... A better link between CTC [complexity theory of cities] and social theory oriented urban studies will provide a good context to realize the potential of a CTC approach to urban planning and design.” (Portugali 2012, pp60-61). This present research will address this challenge by injecting human perception and cognition into the study of the people-place phenomenon.

Three core concepts underpin the research framework and empirical studies which are original developments by this present author:

CORE CONCEPT 1: PERCEPTION OF PLACE The adaptive perceptual cycle was developed as the cognitive mechanism of the change inducement of criticality or the perceptual misfit between human cognition or schemata and real world experience. The adaptive perceptual cycle as a driver of placemaking was conceived by this author and is a synthesis of the work by key theorists in complexity theory, cognitive psychology and place philosophy (Neisser, 1976; Gibson, 1979; Portugali, 1996; Bak, 1997; Malpas, 2013). This concept will be discussed in detail in Chapter Two and underpins the empirical studies in Chapters Six, Seven and Eight.

CORE CONCEPT 2: SMALL WORLD NETWORK THEORY Small world network theory is proposed as an innovative application in masterplanning because it can express the shifts of adaptation and resilience. This research applied small world network theory to self-organising adaptive systems such as cities and in this study specifically, as a planning instrument for large-scale urban redevelopment projects. The examination of small world network theory as it applies to masterplanning of such sites is supported by multidimensional scaling analysis (MDS) that introduced human agency through people’s conception of place, perception of place and their adaptation of place is an innovative application of MDS analysis in the context of placemaking. These ideas will be explained in detail in Chapter Three and referred to in Chapters Four and Five and are part of the empirical studies discussed in Chapters Six, Seven and Eight.

CORE CONCEPT 3: PLACEMAKING Although limited to the built form of placemaking over time a Network Analysis approach was tested in the case study site. The metric Network Analysis algorithm by Somwrita Sarkar (2013) was modified by this present author. The modified algorithm sought evidence of small worldliness through ‘neighbourhoods’ and ‘intersection connectivity’ and applied the algorithm in a preliminary study. The intent was to test if the modified algorithm would

retain its integrity and elicit evidence of small world networks in ‘as built’ places. The algorithm will be explained in Chapter Five and empirically tested in Chapter Eight.

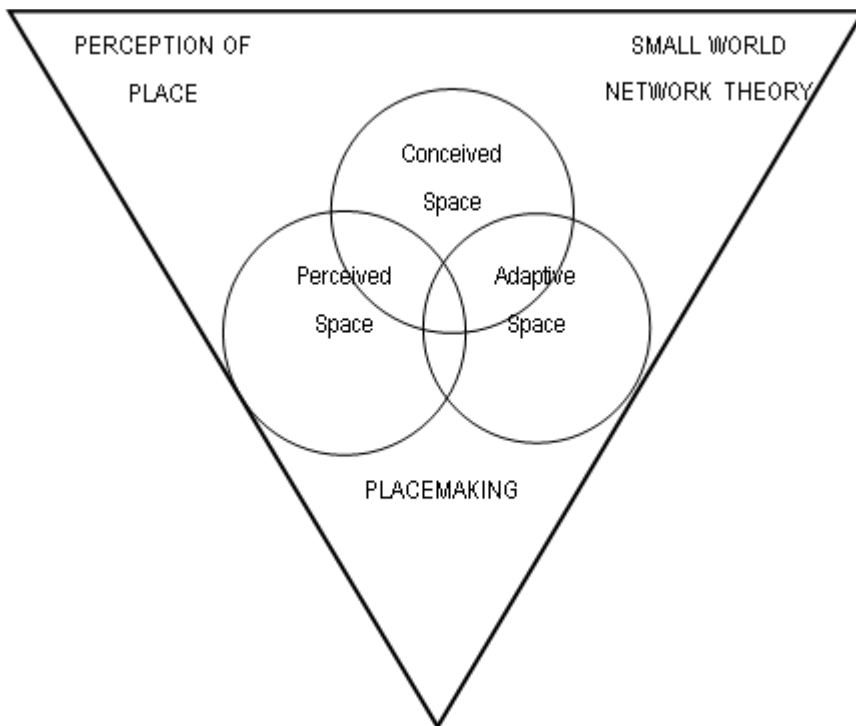


Figure 1.9 Research framework

1.6 SYNOPSIS OF THE CHAPTERS

CHAPTER ONE: THE RESEARCH This chapter provided an overview of the research by introducing the planning context and the problem tackled by this research. The problem was revealed through a brief examination of three Australian examples of high profile and large scale urban redevelopment projects. The review of these redevelopments illustrated the significance of the research problem as a real world phenomenon in the context of the research question. The rationale for the research framework integrated ideas about the people-place phenomenon illustrated by a construct consisting of people’s conceived space, perceived space and adaptive space. The brief review of prominent urban design and planning themes indicated the gaps in the knowledge. The three original core concepts developed through this research were introduced: the adaptive perceptual cycle; small world network theory and a preliminary study of a network analysis algorithm intended to elicit small world networks in real urban places.

CHAPTER TWO: THE PERCEPTION OF PLACE

This chapter will introduce a relational approach to the perception of place advanced by place philosophy and cognitive psychology. In particular, place philosophers Jeff Malpas and Edward

Casey establish the ground work to the relational placemaking agenda of this discussion. The notion of the perceptual cycle by cognitive psychologist Ulric Neisser along with complexity theory concepts from physicists and human geographers will be synthesised by this present author in the notion of the adaptive perceptual cycle that underpins much of the research.

CHAPTER THREE: SMALL WORLD NETWORK THEORY

This chapter will explain the principles of small world network theory and self-organised criticality. The discussion will outline the beginnings of social network theory that were the foundations of small world network theory and also more recent research into brain networks. The principles of adaptation and resilience will be examined through contrasting approaches to evolution – gradualism and punctuated equilibrium. This will be posed as a background to explain the dynamic of small world network theory. Small world network theory is relevant to masterplanning because it may enable us to envisage the distribution of clusters of activities, the connectivity between those clusters and the likely impact on the organisation and vulnerability of an urban network.

CHAPTER FOUR: SELF-ORGANISED PLACEMAKING

Chapter Four will focus on placemaking in the context of small world network theory and the adaptive perceptual cycle. Small world network theory will be considered in its application to fractal cities, a concept that explained the morphology of cities. The adaptive perceptual cycle based on the notion of place as the interdependency between schemata and experience as presented by place philosophy and cognitive psychology (Neisser, 1976; Malpas, 1999) will be discussed in relation to Christopher Alexander's experimental 'new theory of urban design' process. This specific examination of an antecedent of urban placemaking theory reveals some problems with the perception of place and placemaking via the San Francisco new urban design theory experiment (Alexander et al, 1987) as well as its descendant fractal cities approach (Portugali, 2012; Batty, 2013).

CHAPTER FIVE: RESEARCH METHODS

This chapter will explain the key research methods to be used in the empirical studies. A mixed methods approach will be taken so as to incorporate the advantages of qualitative and quantitative methods. Along with descriptive statistics, the key research method will be multidimensional scaling analysis (MDS) that was developed from sociology as was described in Chapter Two. Although this technique has statistical rigour, the interpretations of the MDS plots are open to researcher interpretation. This enables the richness of a qualitative approach which will be

supported by content analyses of the urban design literature and the participants' written data responses. Interview data will be an adjunct to a metric Network Analysis technique (Sarkar, 2013) that has been further developed by this present author.

CHAPTER SIX: CONCEIVED SPACE RESULTS

This chapter will discuss the results of the empirical study of conceived space. The conceived space study will present firstly, the results of the study of the perception of place elicited through the sub-question: *How do design professionals and others perceive urban places?* Secondly, the results of the study of the masterplanning process will be discussed which were elicited through the sub-question, *How are urban places masterplanned in a context of change, certainty and uncertainty?* The combined results of the conceived space study are intended to be exploratory and to refine the focus of the research question for testing in a case study. The case study of Brisbane's South Bank will be the focus of the perceived space and adaptive space study discussed in Chapter Seven and Chapter Eight.

CHAPTER SEVEN: PERCEIVED SPACE RESULTS

This chapter will study perceived space by examining the design professionals' South Bank Concept 2007 masterplan against the visitors' on site experience of the South Bank Context 2012. The perceived space will be studied in a similarity ranking task and analysed through multidimensional scaling analysis (MDS) plots. The perceived space study is based on the outcome of the conceived space results of the perception of place revealed in Chapter Six. The perceived space MDS plot will integrate the design professionals' responses to the South Bank masterplan 2007 and the visitors' responses to their on-site experience of South Bank 2012. The intent is to illustrate the possible perceptual shifts based on the notion of the adaptive perceptual cycle as explained in Chapter Two. The importance of the outcome of the perceived space MDS plot is that it will test the effect of the masterplanning model as a Concept 2007 against the Context 2012 of a real world experience and perhaps, indicate a masterplanning framework that illuminates part of the research question: *How can places be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place?*

CHAPTER EIGHT: ADAPTIVE SPACE RESULTS

This chapter will build upon the conceived space results revealed in Chapter Six and be supported the perceived space results from Chapter Seven. The adaptive space study will investigate the adaptive shift of the masterplan concept of the case study urban redevelopment site of Brisbane's

South Bank. Furthermore, a network analysis will illustrate the adaptive shift of the built urban network of the South Bank site using graph theory (Sarkar, 2013). The network analysis will be supported by interviews with the leaders of the re-design and redevelopment of South Bank 1997 - 2012.

CHAPTER NINE: CONCLUSIONS

This chapter will be a discussion of the results of the empirical research in the context of the overall research framework. To begin, the core concepts that underpinned the empirical research will be revisited and the originality of the contribution explained. The rationale for the study will explain the research challenge and the key theoretical motivation that steered the design of the research framework. The implications of the results of the empirical research will be discussed in the context of the research question and sub-questions. Finally, the potential for future research will be outlined.

CHAPTER TWO

THE PERCEPTION OF PLACE

2.1 INTRODUCTION

The idea of place seems to dodge definition. Place is both elusive and deceptively simple because our perception of place is so intuitive; this sends a warning to beware of quick and easy assumptions for urban design and planning solutions. Peoples' ideas about place are revealed through an understanding of the relationship between themselves and their place as exemplified in notions of perception of place.

This chapter will introduce a relational approach to the perception of place advanced by place philosophy and cognitive psychology. In particular, place philosophers Jeff Malpas and Edward Casey establish the groundwork to the relational placemaking agenda of this discussion. The notion of the perceptual cycle by cognitive psychologist Ulric Neisser along with complexity theory concepts from physicists and human geographers will be synthesised in the notion of the adaptive perceptual cycle.

2.2 A RELATIONAL APPROACH TO PLACE

If you were lying unconscious in the street the first thing a medic would ask you on your revival would be: *Who are you?* and: *Where are you?* And (if you had not lost your mind) you would know this. The answers to these questions establish your awareness of self and of place. Although these are deceptively simple questions and the answers are essentially intuitive it is for this reason that self and place have become concepts that are hard to pin down and yet are 'owned' (or at least, claimed) by many. A sense of place is known intuitively and explanations of place sometimes seem unnecessary. Intuition works fast and is automatic, effortless and associative. The power of intuition is that it is based on emotional memory (Kahneman 2002, 2011). A sense of place or 'spirit' of place may fit this description and yet intuition and emotional memory are complex, so that assuming we know what place means (not to mention the perception of place) is potentially precarious; this creates a strong argument to examine place and perceptions of place carefully.

Most of us know about (but few of us really understand) the indigenous Australian concept of 'country'. A scant interpretation might describe the concept of country as a fusion between self (or community) and place. A way of understanding the indigenous perception of country is purportedly through 'songlines' (Chatwin, 1986; Norris et al 2014). Although knowledge of the path of the lines is 'secret men's business', it has been revealed that songlines are the complex network of unseen pathways that connect the country not only in a topographic sense but also in time, culture and concept. Ancestral songlines created places by singing of places in 'country' that were formed by journeying mythical animals and spirits who sang the name of things that they encountered: mountain ranges and rivers created with a swish of a rainbow serpent's tail; waterholes filled by the tears of an unrequited lover; islands formed by the head of a decapitated warrior and so on. The mythology of creation, country and culture is inherited and retained through the ritualistic singing of songlines, that those who belong to the country 'sing the world into being afresh' (Chatwin, 1986). Some songlines are said to follow the dreaming tracks left behind during Yijana, the creation or 'dreaming' time, while others are sung during certain ceremonies, particularly those during initiation and death; of becoming and of passing, "sing him for young boy and...for dead man's bones" (Bradley et al 2010, p73).

It is said that each indigenous group across the land would sing the part of the songline that told of their country's landmarks, sacred places and ownership. In this way, traditional groups (even though each may have had their own language and territory) were imbued with the connection between their tribal territory, cultural identity and topography. As such, the idea of 'country' means that people and place are one. With this idea in mind, if you asked a traditional indigenous Australian, *Who are you?* and: *Where are you?* would you be asking the same question?

Some place philosophers say: "...place is not constituted independently of subjectivity - just as it is not constituted independently of the physical world...place is instead that within and with respect to which subjectivity is itself established - place is not founded *on* subjectivity, but is rather that *on which* subjectivity is founded [his emphasis]" (Malpas, 1999, p35). Following this argument, if we decouple 'place' from 'self' this could mean that the self becomes a void.

If decoupling the self from place does result in a void this may explain the emptiness felt by people who feel bereft of their place in the world. Certainly, the sense of loss and disorientation when familiar places are demolished has often stimulated controversy and stirred community passions. For example, the significance of country to indigenous Australians is impassioned by a history of

the removal of indigenous people from their country to mission stations. This process adopted by the Australian government in the first half of the twentieth century consisted of the forced removal of indigenous tribal groups from their country and the consequent dissociation from their land, the mixing of traditionally taboo tribal groups and finally, the forced removal of children from their families (Wilson, 1997). All these events are a root cause of what might be described as inter-generational depression and all that it entails (Silburn et al, 2006).

The forced removal of people from their place is only one way to sever the self from place. Another way is to remove the place from its people. War is often a deliberate process of the destruction of meaningful places that strike at the heart of the relationship between the self and place: "I felt like a part of my body had been torn off" (Butina-Watson and Bentley 2007, p3). Bernaid, a man who had lived in the town Mostar all his life reflected upon the personal impact of the destruction of the Old Bridge that spanned the Neretva River in Mostar, Bosnia-Herzegovina during the civil war between the Croats and Bosniak Muslims in 1993. The destruction of such places as the Old Bridge has intent on several fronts. Not only was the Old Bridge of Mostar the only physical crossing between the two halves of the town, but it was the only link between the ethnically and culturally distinct Mostarians and its destruction was part of a deliberate strategy of 'ethnic cleansing': "The meanings associated with the form itself also mattered in this evil enterprise: the bridge's pointed Islamic arch stood for an Ottoman heritage, itself part of what was to be rooted out in the so-called 'cleansing' process. 'It is not enough to cleanse Mostar of the Muslims' said one of the attacking militiamen: 'the relics must also be destroyed' "(Butina-Watson and Bentley 2007, p6). Such is the significance of the relationship of the self and place that its severance is seen as an 'evil enterprise' that translates into community consternation during well intentioned planned changes to places even in peaceful neighbourhoods in sleepy cities.

This idea of place fuses the subjective self and objective place. Place is an imperative in the formation of the subjective self as described by Malpas (1999): 'that *on which* subjectivity is founded'. So without being in a place 'I' cannot 'be'. Place may be seen as a subjective-objective construct, but if we shift our view to *between* the subjective and objective, the between-ness of this relationship may be represented in many ways: through narrative or songlines; social mores or culture; architecture or the arts and so on. These representations between the subjective and objective capture the connections between people and places (Entrikin, 1991; Davidson in Malpas 2013). If we consider that each of us creates our own narrative by our actions in a place the autobiographical nature of that relationship with a place is significant.

The between-ness of place as concept and context was represented through the 9,000 year old Neolithic wall painting of Çatalhoyuk in Anatolia, Turkey. Çatalhoyuk is one of the first identified urban mounds developed in the Neolithic period, approximately 7500 BCE to 5700 BCE and flourished around 7000BCE with a population estimated at up to 10,000 people with an average population between 5,000 to 8,000 people (Hodder, 2011; personal communication 2011). This was an agrarian conurbation with a significant symbolic and economic relationship with the land. The wall painting found in Çatalhoyuk is usually interpreted as a representation of the plan of Çatalhoyuk with the volcano Hasan Dag erupting obsidian down its slopes represented by the dots (Hodder, 2011) (Figure 2.1). The realistic geographic distance between urban Çatalhoyuk and the volcano Hasan Dag is meaningless, but the conceptual distance is meaningful.



Figure 2.1: Neolithic wall painting of Çatalhoyuk and Hasan Dag, Anatolia, Turkey (Herzog, 2011)

The Neolithic wall painting of Çatalhoyuk and Hasan Dag represents what were possibly the most salient urban and topographic features for this particular artisan: firstly, notice how each building is drawn as a separate unit showing the typical double walls as one building abuts another; secondly, the distance between Çatalhoyuk and Hasan Dag has been reduced to nothing; thirdly, the rocks (obsidian) on the slopes of the volcano have been emphasised beyond a realistic size. Notice also how the importance of each of these urban and topographic features is represented with relatively equal emphasis - buildings, volcano and obsidian.

We can only guess at what this Neolithic mind was thinking when the painting was being executed. We might interpret the wall painting as an illustration of the powerful relational effect *between* Çatalhoyuk and the obsidian that Hasan Dag provided. Also, the buildings are drawn as separate units perhaps indicating a sense of individual identity of the Neolithic Çatal community members.

Yet, the clustered Çatal urban mound might represent an individual's sense of being one with the community. We might imagine that the various groups of this community had a sense of neighbourhood and more importantly, neighbourliness because they had to - after all, just to build, rebuild or renovate one's house (which these Neolithic mud-walled buildings required regularly) needed a good deal of negotiation with several direct neighbours about boundaries, inconvenience, amenity, assistance, equipment, accessing building materials and so on. The evidence so far indicates that this was achieved in a peaceful and cooperative manner (Hodder, 2011).

Furthermore, the dots on the volcano, which we may interpret as the obsidian that litters the ground in parts of Anatolia to this day, indicate the importance of this resource to at least this member of the Çatal community. Interestingly, this artisan overlooked the mapping of other resources like domesticated and wild animals, the beginnings of agriculture, the forest timber or clay pits or even the river or water channels that dominated the landscape and all of which contributed to the viability of the settlement. It may be that this wall painting represented this Çatalhoyuk member's perception of the place of Çatalhoyuk and what that meant.

Now imagine the importance to the community (or at least to this member) of Hasan Dag, which is in reality a barely visible volcano on the horizon. It is represented as a physical extension of the Çatalhoyuk urban conurbation with the geographical distance between the two places reduced to nothing. It is as if Çatalhoyuk includes Hasan Dag in its urban boundary making it part of its domain rather than a distant feature on the horizon. This is an interesting aspect of the painting as it shifts the idea of a map from the spatially precise location of points, lines and topographic features to a cognitive map of a space that spans from metrics to metaphor. As a metric spatial map this wall painting is useless, but as a metaphor for the salient relationships that describe the place of Çatalhoyuk it opens an intriguing door on this Neolithic perception of place. The Çatalhoyuk wall painting is not only a representation of the between-ness of the perception of place, but a relational analogy can be made in a geographic sense.

The city-country nexus offers a down-to-earth way of understanding what a relational approach to place means; Chicago and its relationship with nearby rural Wisconsin is a powerful example of the co-dependency between places that superficially, do not appear to have anything in common. Indeed, within the usual place identity terminology such as sense of place, built form and landscape character and so on, big city Chicago and rural Wisconsin seem poles apart:

“I wondered whether it made sense - historically or environmentally - to treat city and country as isolated places. Might I not be fooling myself to think that I could choose between them? I began to see that the word ‘city’ depended on its meaning on its opposition to the word ‘country,’ and vice versa...My passion for rural and wild landscapes would have lost at least some of its focus without my dislike for Chicago to serve as counterpoint. The city was what the country was not: in loving the one, I expressed certain contempt, but also a certain need, for the other (Cronon 1991, p8)

Cronon goes on to contemplate the necessary relationship between Chicago and rural Wisconsin. Would the Wisconsin farmers survive without the city in which to sell their produce? And could Chicago survive if the crops failed? Cronon replies: “The answer to both questions is surely no, but then why did it make sense, in trying to understand rural nature, to draw a boundary between it and the urban world next door?” Cronon observes: “If that wall was more a habit of thought than a fact of nature, then decrying the ‘unnaturalness’ of city life in a place like Chicago was merely one more way of doing what my environmental ethic told me to oppose: isolating human life from the ecosystems that sustain it. Putting the city outside nature meant sending humanity into the same exile.” (Cronon, 1991, p8).

If each of the two places depends for its very survival on the relationship between them a study of either the city or the country in isolation is not only incomplete but also meaningless. It is the sustained flow of the relationship that supports a city-country nexus that gives both places their living and meaning.

Each of these representations - the indigenous Australian sense of country, the Old bridge in Mostar, the Neolithic Çatalhöyük wall painting, and the Chicago-Wisconsin nexus – illustrate that the effect of the relationship between entities is more meaningful than each in isolation. In the case of the indigenous Australians and Mostarians who had their self and place severed, the loss of meaning was socially and psychologically damaging; the Neolithic artisan painted a meaningful relationship of life in Çatalhöyük and the obsidian from the volcano Hasan Dag; and the narrative describing the Chicago and rural Wisconsin nexus tells of a necessary co-dependency for the survival of both places. However, this between-ness also implies that the objective world is meaningless without a subjective ‘us’ to engage with and interpret it. Nature, as we must surely know by now, is indifferent. After all, whether we exist or not or whether we bestow meaning or not, the indifferent planet still spins. One answer is: “the potency of place must be a marvellous thing, and take precedence of all other things...for that without which nothing else can exist, while

it can exist without the others, must needs be first” (Aristotle in Casey, 1997, p37). Alternatively, Plato’s idea of place is explained: “...to that of a dream...at once locatory and yet not itself located, permanent and yet invisible, underlying and yet nonsubstantial...it stands between, even as it combines, myth and science” (Plato in Casey, 1997, p37). There may be subtle shifts in the idea of place from subjective-objective-between, but fundamentally place is not necessarily only a ‘locatory’ space. It is a process of *being-in-the-world* in which people become participants in a world, which they resist, adapt or assimilate and find an alignment between the self and place. So, the answer to the questions: *Who are you?* and: *Where are you?* might be this: *I* (subjective) *am* (being) *here!* (objective) (Figure 2.2).

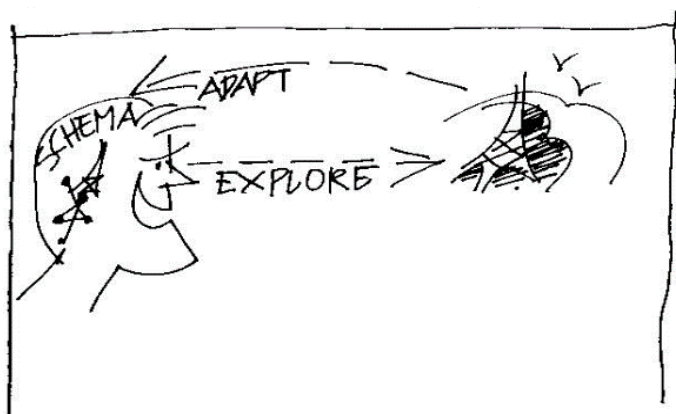


Figure 2.2: *I am here!*

I am here! implies that ‘I’ perceive ‘here’. Although there is significant debate about the division between subjectivity and objectivity for simplicity here, perception can be described as the relationship between a subjective mental construct (or schema) and an objective context (or the real world).

2.3 THE IDEA OF PLACE

The idea of place was sourced from the Achytian Axiom: “Place is the first of all things, since all existing things are either in place or not without place” (Simplicus (trans.) Sambursky, 1982, in Casey, 2014, p16). This pronouncement was initiated by the ancient Greek philosophers Archytas and Aristotle, but was neglected as a result of the later focus on absolute, infinite and homogeneous space and time and scientific objectivity. Western post-modern philosopher Heidegger revived this emphasis on the abstraction of space and time to refocus on the concrete human experience of place; this approach was absorbed into ideas about placemaking and place identity and resuscitated

interest in the philosophy of place (Heidegger, 1962; Relph, 1976; Tuan, 1977; Buttimer and Seamon, 1980; Casey, 1993, 1996, 1997, 2000, 2001; Malpas, 1999, 2012, 2013).

Phenomenology and ontology have emerged as approaches in western musing of the philosophy of place, spearheaded by Edward Casey and Jeff Malpas who are possibly at the core of the philosophical discussion currently. Casey offers a phenomenological approach while Malpas an ontological perspective and although there are several points of agreement there are differences. Both align with Heidegger's notion of 'place' (or *dasein*) also called, *being-there* or *being-in-the-world*: "...the very possibility of the appearance of things – of objects, of self, and of others – is possible only within the all embracing compass of place. It is, indeed, in and through place that the world presents itself" (Malpas, 1999, p15). Their differences lie in their emphasis on the respective roles of self and place. Casey says:

Where his [Malpas'] stress is on place as a transcendental (albeit material) condition of possibility, mine is on the concrete description of place...[Malpas argues] for the primacy of place as necessary to all appearances – whereas I [Casey] proceed from the ground up...I go from appearances to place, he from place to appearances...where he argues for possibility conditions, I describe the phenomena that these conditions make possible...my interest in the bare particularity of place gives way in Malpas to place as a necessary frame for experience. And yet we are both talking about place...as in the case of being-in-the-world we meet in the middle: between phenomenology and ontology, the experience and transcendental. If I pursue description to the last capillary, he seeks the tell-tale heart, the ontological centre, of any such description (Casey, 2001, p227).

Firstly, let us get our philosophical bearings. Phenomenology is defined as the study of consciousness and the objects of direct experience from the ground up (Latin from Greek *phainomenon* 'thing appearing to view,' based on *phainein* 'to show' + *logia* 'subject of study') (New Oxford American Dictionary, 2007). Ontology is defined as a metaphysical philosophical approach concerned with more abstract notions of the nature of being (Latin *ontologia*, from Greek *ōn*, *ont-* 'being' + -logy) (New Oxford American Dictionary, 2007). Such categorical definitions are a starting point for the trajectory of a discussion about the self and place and the perception of place; however, some porosity between these categories might be useful. The extreme dichotomy of phenomenology or ontology can banish either the self (or subjectivity) or the place (objectivity) which neither of these place philosophers professes.

Casey and Malpas plot their phenomenological and ontological paths respectively, in contrast to a purely scientific approach, which conceives of places from a detached and abstract perspective - like a spectator who views a 'location' that is measured and plotted from on high, rather than as a 'locale' in which something happens (Buttimer, A 1976; Dovey, 1993; Casey, 1996, 2001). In contrast to the scientific approach, Heidegger's principle of *being-there* to which Casey and Malpas adhere, invites the conscious role of people as participants and interpreters in the understanding of places. A phenomenological position is: "...any perception of a thing ...any perceptual constancy refers back to the positing of a world and of a system of experience...But the system of experience is not arrayed before me as if I were God, it is lived by me from a certain point of view; I am not the spectator, I am involved" (Merleau-Ponty, 2003, pp354-355). This means that every person's perception and interpretation of a place is their unique reality. We might all be standing in the same place, but not only our sensations but also our intentions, expectations, memories and fantasies are different (Hung et al, 2014). Malpas' ontological argument explains:

...[T]he very possibility of content – understood in Kant [sic] terms of the possibility of knowledge or meaningful experience – is dependent on the capacity to distinguish oneself as the one who knows and experiences from that which is known or experienced...a similar notion is expressed in terms of the necessary interdependency of knowledge of oneself with knowledge of others and of the world – the subjective is interdependent with the intersubjective and the objective – and this structure of interdependence is also explicitly elaborated in explicitly topographical terms...[This structure of interdependence] is an absolutely crucial one...[It] is fundamental to the very possibility of content [meaning]... by creatures capable of genuine contentful thought [human beings one assumes]... 'objective thought' or experience....What is at issue is rather that broader *topos* within which both subjective and objective, internality and externality, mind and world, emerge only in contrast to, and interdependently with, one another, and in which the possibility of representation first comes into view" (Malpas, 2013, p5).

Malpas targets a subtle and difficult concept; it is easy to understand dichotomies like left-brain and right-brain, analysis and creativity, but how the step of interdependency takes place as an integrated process is a more difficult concept. 'Representation' or knowledge or understanding is explained as *topos* (or place) and is found in the domain of the interdependence (or between-ness) of 'both subjective and objective, internality and externality, mind and world' (Malpas, 2013). This

argument establishes *topos* as the realm of meaningful thought through the interdependency of the subjective and objective.

Interdependency of the subjective and objective is in contrast to phenomenological stance in which the emphasis is on subjective human experience of phenomena: "...all my knowledge of the world, even my scientific knowledge, is gained from my own particular point of view or from some experience of the world without which the symbols of science would be meaningless" (Merleau-Ponty, 2003, p*ix*). A phenomenological path towards making sense of the world is: "...every experience has its own horizon" (Husserl, in Casey, 1996, p17) and as our experiences are what happen to us in some place, this supports the notion that we are and always have been embedded in 'perceptual horizons' – the 'internal horizons' of our immediate surroundings and the 'external horizons' of a landscape or place. These 'perceptual horizons' of place phenomena rescue us from, "a confusing kaleidoscope of free-floating sensory data" that has no place context; rather, phenomenology says that we are, "...in the midst of an entire teeming place-world" (Casey, 1996, p17).

Phenomenology and ontology to varying degrees both suggest that human beings are embedded in a place from the very beginning and that the extraction of our consciousness from our *being in* a place is to create a void into which no human being can be, not even for an illusory nanosecond. This is because neither the *being* nor the *there* in *being-there* can exist as a void. Malpas might say that peoples' memories 'fix' the 'free-floating sensory data' in place or *topos*, whereas Casey's argument is that the phenomena of place give 'fixity' to peoples' memories (Malpas, 2013; Casey, 2000).

Both of these arguments are place-dependent, but Casey's phenomenological approach derives place from the subjective perception of objects or phenomena, while Malpas' ontological approach derives place from the interdependency of subjective and objective perception of phenomena in time and space. If this is so, then from both approaches, place or *topos* is the territory of perception.

Perception has been thought of as an entry to knowledge and understanding derived through the senses as sensory data, sensations or impressions. This meaning of perception emphasised the stimuli of our various senses to surfaces that surround us as our first response. These primary sensory stimuli are called the 'occasions of perception' that eventually become knowledge (Kant, in

Casey, 1996). However, if perception is considered more than primary sensory stimuli, but as a *process of being-in-the-world* we emerge in the *topos* that philosophers of place ponder.

2.4 THE PROCESS OF PERCEPTION

Perception (Old French *perçoivre*, from Latin *percipere* ‘seize, understand,’ from *per-* ‘entirely’ + *capere* ‘take’) is how people come to be aware or conscious of something (New Oxford American Dictionary, 2007). In cognitive psychology it is defined as the organisation, identification and interpretation of sensory information in order to represent and understand the environment (Schacter, 2011). From the perspective of cognitive psychology, perception and cognition have a strong interdependency. Perception and cognition (Latin *cognitio(n-)*, from *cognoscere* ‘get to know’) (New Oxford American Dictionary, 2007) are so interdependent that information seems to be shared between both abilities – perceptual information guides our actions and beliefs and simultaneously, cognition provides the knowledge that influences those actions and beliefs (Brewer and Lambert, 2001; Tacca, 2011). However, there is no strict division between perceptual abilities and cognitive abilities.

Debates about the relationship between perception and cognition have a long history. The mind-body dualism proposed by René Descartes and Immanuel Kant considered that human thought included innate knowledge whereas empiricists such as George Berkley and John Locke believed that experience was the basis of human thought. Debates still rage as to whether perception is an active process of hypothesis testing or whether the vast array of sensory data is enough information with which to perceive the world (Gregory, 1987). James J. Gibson proposed that perceptions were not simply sensory data. He said that perception was a process of relating one’s actions and intentions to contextual information. As an object is viewed the object affords or facilitates one’s actions. This was Gibson’s idea of ‘affordances’ by which the thing or context in itself has information that enables appropriate actions or the realisation of intentions. Some of this contextual information (depending on one’s intent) is ‘variant’ or changes in a different context and some is ‘invariant’ or does not change in a different context. Invariant contextual information for a particular action or intent is fine-tuned over time as fitting an action or context. Gibson’s approach did not use representations or memories or past knowledge against which to test a good-fit with the context; rather, representations are created in an active process of attunement with contextual phenomena (Gibson, 1979, in Noë and Thompson, 2002; Casey, 2000).

Ulric Neisser, ‘the father of cognitive psychology’ translated Gibson’s ideas into his idea of the perceptual cycle. The perceptual cycle had at its core the process of understanding place through exploration and interpretation. The perceptual cycle is a process defined by intentionality (an action directed by a schema) and experience (the testing of the schema) and adaptation or resilience (modification or retention of the schema). Many theorists have contributed to the understanding of the process of perception and the synthesis of these ideas is the adaptive perceptual cycle based on concepts offered by Neisser (1976), Gibson, (1979) Portugali (1996), Bak (1997) and Malpas (2013). (Figure 2.3).

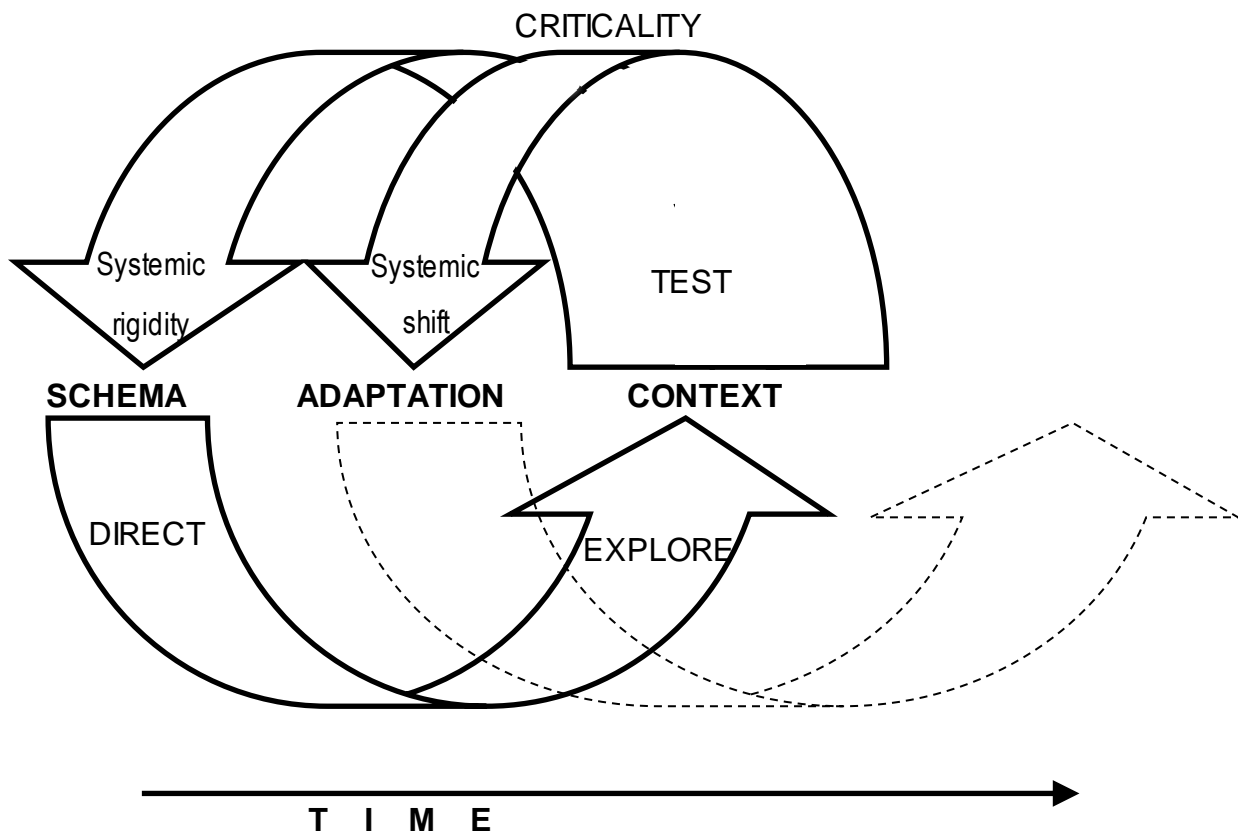


Figure 2.3: Adaptive perceptual cycle (based on Neisser, 1976; Gibson, 1979; Portugali, 1996; Bak, 1997; and Malpas, 2013).

As we explore the world we are under a constant barrage of information in time and space. Our experience of the world impacts upon us in numerous ways - sensations and thoughts, consciously, unknowingly, intuitively and from countless avenues (physical, social, psychological, economic, cultural and so on). In light of Malpas’ ontological approach we might say that peoples’ schemata ‘fix’ the ‘free-floating sensory data’ in place or *topos*, whereas Casey’s phenomenological argument is that the phenomena of our world experience give ‘fixity’ to our schemata (Malpas, 2013; Casey, 2000).

According to Neisser our concepts, expectations or schemata guide us as we explore the world. A schema is defined as a representation of a plan or theory in the form of an outline or model (from the Greek *skhēma* 'form, figure') (New Oxford American Dictionary, 2007). As we experience the world our abstract schema is tested in that real world context for a 'good-fit'. If our real world context has changed or alternatively our schema has changed, a good-fit between our schema and our real world context may elude us. This is a crisis of relevance. In placemaking terms a bad-fit between a schema (or 'representation of a plan') can lead to community dissatisfaction towards urban change, a sense of loss of place identity or alienation. A bad-fit between a schema and the real world context triggers a point of self-organising criticality in the adaptive perceptual cycle and the schema either remains resilient or adapts.

At the point of criticality, either the context needs to adjust or the schema needs to adjust. If the context is adjusted or adapted, this means that the schema is resilient; for example, a masterplan determines how a place will be changed or adapted. If the schema is adjusted or adapted, this means that the context is resilient; for example, a masterplan is changed or adapted by the intention of a place. As such, adaptation and resilience are the mechanism for the self-organisation of our perception of place.

Schematic resilience works if the context can be changed to be a good-fit with the schema. Schematic adaptation works if the schema can change to be a good-fit with the changed context. Either way, structural changes need to be made to our internal schema or to our external context. Schematic resistance eventually can threaten our relevance in an inevitably changing context. We may become inflexible in our thinking (systemic rigidity) and most likely irrelevant, confused or even dysfunctional in the changed world context. If we adapt to the changed context our acceptance is enabled through a change our thinking (systemic shift). As time passes and we continue our experience of the world, the self-organisation of our adaptive perceptual cycle continues through the processes of exploration, testing, criticality and the resilience or adaptation of schemata.

Schemata are the sources for making plans, intentions and imaginings against which we test our real world experience and the aim of this process is to establish a 'good-fit' between our internal schema and the external world. A schema can create expectations that may direct the way we experience the world; it may either be confirmed or, depending on the usefulness and relevance of the schema, it may need to be modified.

Frederic Bartlett's classic experiment that explored the power of the schema has become a touchstone for investigations into perception and cognition. Bartlett (1932) requested participants: *Draw me a picture of the man's face*. The first participant was shown a drawing of a rather exotic man's face. The participant drew their version of the same face from memory and passed it on to the next person who then drew it from memory for the next person and so on. The sequence of memory drawings showed that the persistence of the schema of a man's face forced a fit from an idiosyncratic man's face towards a generic man's face. It was surmised that when a schema is confronted by a representation of familiar features, but the familiar features have something unfamiliar about them our schema forces a fit of those unfamiliar features (or normalises) into one that is familiar (Figure 2.4).

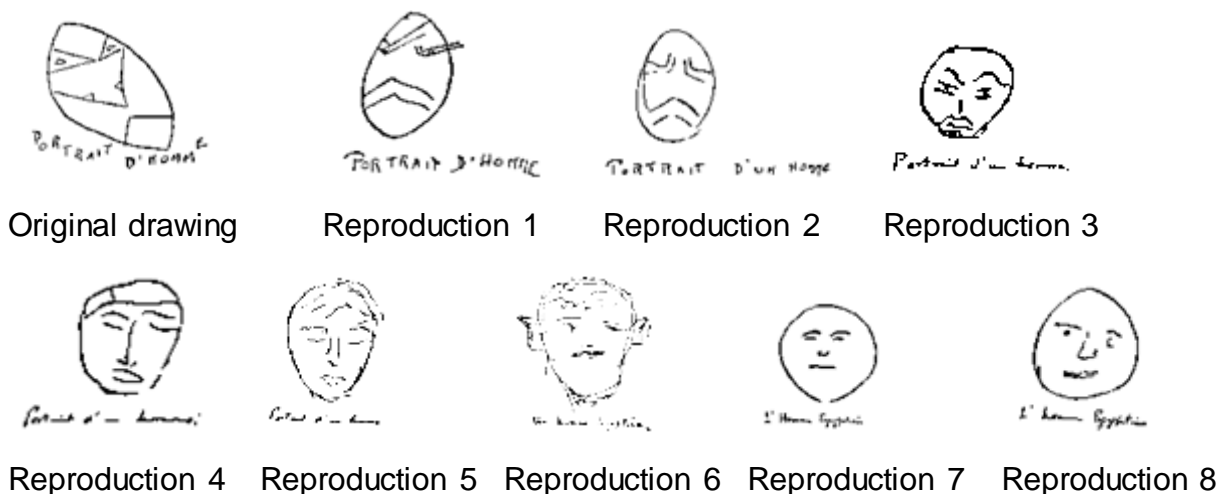


Figure 2.4: *Draw me a picture of the man's face* (Bartlett, 1932, p178-179).

There is an ancient foundation to the Bartlett experiment. In ancient Greek mythology Procrustes was a thug lurking in the mountains. He would lure people who passed by into his lair by offering them a bed for the night. The innocent guest would lie in Procrustes' iron bed while Procrustes furtively examined guests to see if they fitted the bed. If the guests were too tall Procrustes would amputate the excess length. If the beleaguered guests were too short Procrustes would stretch his guest's limbs until they fitted the iron bed. The point of this tale is that the construct of Procrustes' iron bed is fixed and the idiosyncratic physical attributes of the guests were forced to fit the bed.

The urban design and masterplanning of places have great potential for forcing a place to fit a fixed construct. Kevin Lynch (1960) in his influential urban design research project peeked into people's schemata of urban places when he asked: *Draw me a quick map of central Boston... just a rough sketch*. The aim of this task was to ascertain the salient elements of Boston City – we might even say people's schemata of Boston. These mental maps were categorised into schematic urban elements that make a place legible or easily interpreted. A legible language for cities is accessible to many people because of the brain's talent for organising categories and pattern matching; without this ability we could not draw even a simple mud map to give directions to a lost tourist.

This shared language of a city's legibility implies that idiosyncratic features are transformed, distorted or even erased to form schemata that make up categories such as a landmark, node, district, edge and path (Lynch, 1960). If this is so, then the legibility of a mental map is the result of our economising brain that needs to categorise objects and to construct legible schemata so that we are able to interpret and function in the real world.

However, a schema tends to resist change because it is embedded in the 'fixity' of memory as Malpas (2013) and Casey (2000) alluded. It is only through the persistent onslaught of the overwhelming evidence of real world experience that the adjustment of schemata occur; however, the power of schemata is that they offer coherence, consistency and order (for as long as they are relevant) and this can have significant placemaking implications.

2.5 THE POWER OF SCHEMATA IN PLACEMAKING

The new town of Seaside on the Sunshine Coast in Queensland, Australia, was deliberately planned with the New Urbanism of the Duany, Plater-Zyberk development of Seaside in Florida USA, in mind. Not only was the masterplan somewhat similar (central boulevard, pavilion beach access and so on) but also the neo-traditional American building style was echoed in an attempt to recapture a familiar imagery: "This is the first, and most famous, exponent of 'new urbanism', a school of town planning which seeks to return to the small town, community-based ethos of the 1950s and redefine it for life in the 21st century" (Meachum 2001, p5). New Urbanism has staked its claim in town planning coding practice through the exemplar of Seaside: "Seaside sets the Scene...Seaside, Florida, seems to have acquired some of the status of...land-mark set pieces...most prominently, Seaside is famous for being an early agenda setting example of a particular brand of new-traditional urbanism...Seaside is significant for its use of codes; in particular, the reinvention or revival of codes prescribing three-dimensional forms and urban components" (Marshall 2011, p3).

The dilemma is that the urban designer for the town of Seaside in Queensland, Australia has forced a Procrustean fit using the fashionable New Urbanism model from Seaside in Florida, USA. Look at these examples of buildings in and around Seaside in Queensland and from Seaside in Florida (Figure 2.5). Where do you think you are?



(a)

(b)

(c)



(d)



(e)



(f)



(g)



(h)



(i)

Figure 2.5: *Where do you think you are?* Guess which places are in Florida, USA and those that are in Queensland, Australia.

The answers are: (a) Seaside Queensland; (b) Seaside Florida; (c) The Boardwalk Queensland; (d) The Boardwalk Queensland; (e) Seaside Queensland; (f) Seaside Florida; (g) Seaside Queensland; (h) Seaside Florida; (i) The Boardwalk Queensland. You may be able to guess which buildings look as though they belong on the Sunshine Coast in Queensland. Local architects have established a beach-shack model (or schema) over many years and features such as the skillion roof, timber pergolas, decks, corrugated sheeting and so on have become almost generic architectural elements for what is often called the ‘Sunshine Coast’ style.

It may be a little more difficult to guess where the other buildings belong. Which ones are in Seaside, Queensland and which ones are in Seaside, Florida? They all have the traditional picket fence and charming details. However, sifting those that belong in Queensland and those that belong in Florida is not so easy. Both Seaside townships appear to conform to a quasi-baroque, neo-traditional American style of architecture. However, beyond the architectural style it is interesting that all these examples fit a schema: a Sunshine Coast beach-shack schema or a quasi-baroque, neo-traditional American schema. The power of such schemata is emphasised by the fact that the town of Seaside in Queensland is within walking distance of the sophisticated beach-shack development of The Boardwalk and thousands of kilometres – indeed, in another hemisphere - from Seaside in Florida. You may prefer a particular architectural style over another based on familiarity or perhaps novelty, but if we consider the quest for authenticity, the architectural imagery of authentic places that these developments promote is more or less problematic.

The problem of authenticity is exacerbated by, as Elizabeth Rapoport accuses, the “global intelligence corps [GIC] and the internationalisation of urban planning and design” (Rapoport, 2014, p2). She points the finger at those small but elite architectural and planning firms that spread their global influence and style internationally, and “...aspire for prestigious commissions around the world” (Olds, 2001, in Rapoport, 2014, p2). The point is that such internationalisation is not only transmitted by the global intelligence corps of ‘starchitects’, but also by humble home grown architects who conform to influential architectural styles that challenge their capacity for authentic placemaking. And New Urbanism with its network of concepts beginning with Jane Jacobs ‘ (1961) mixed use urban neighbourhoods through to Peter Calthorpe’s (1993, 2014) sustainable communities and transit oriented developments have developed principles that have been translated internationally under the banner of New Urbanism (Biddulph et al, 2002, 2010). However, many an urban theorist has noted that: “...the thinking behind the respective concepts is utopian, nostalgic, and deterministic...Built examples...do not always match the vision, since in addition to giving substance to a ‘cloudy paradigm’...they are also subject to the whims of developers, the proclivities of residents, and the reality of economic and social forces” (Biddulph et al, 2002). The negotiations for all of these ‘whims’, ‘proclivities’ and ‘forces’ often is the reduction of well-intentioned if ‘cloudy’ paradigms to the visual image of an architectural style. Design guides or codes or agendas often are the vehicle to realise ‘landmark set pieces’ such as Seaside (Marshall, 2011; Biddulph et al. 2002). Dealing in representations whether through narrative, discourse, analysis or visual imagery has its Procrustean pitfalls:

Representations of place... are most certainly attempts to express control and therefore forms of power...the process of generating a series of representations of an existing and future state for a place becomes and exercise in imposing a form of rationality and control which may or may not serve certain interests...In relation to places it is evidently the case that images, even mundane images, and the meanings that they convey, become a vehicle for influencing the place and its inhabitants, and that these might conflict or *jostle* with other forms of representation [his emphasis] (Biddulph, 2014, pp292, 293).

The power of these representations and by default architectural style lies in the satisfaction of our expectations or schemata of a place. The human comfort derived from familiarity in the form of nostalgic representations and meanings is the reward of an aura or authenticity. An architectural style may go some way towards creating an aura of authenticity for a place, but this does not necessarily make a place. Sometimes the level of conformity that is found in such developments as Seaside and The Boardwalk tends to tame the idea of place. And once tamed the difference between the two developments of Seaside and The Boardwalk beyond form and colour is questionable. Both developments reduce the role of urban design and architecture to selecting a theme that markets nostalgia. However, creating a nostalgic image is easy, but making a place is not.

Creating a nostalgic image is easy because this type of development tends to be, as Marshall (2011) terms it, a set piece. A set piece is a container for activity. Placemaking is more than the background setting or container of life. As discussed by recent place philosophers, place or *topos* is the result of the interdependency of our schema and the real world. This difference between place conceived as a set piece or background and place as *topos* is important. In traditional philosophy, Aristotle's *topos* was defined as objective space whereas Plato's *chora* was defined as subjective place. More recently, Aristotle's *topos* has been reinterpreted as the *topos* of *somebody* and Plato's *chora* as a situation in which things *come into being* (Malpas, 1999). Aristotle's *topos* of *somebody* supports the argument that if *somebody* belongs to a *topos* this makes it a place. This argument re-connects Aristotle's *somebody* with *topos* in a definition of place but tends to banish the notion of space.

Space may be defined through the idea of *kenon* or void. *Kenon* defines space as the abstraction of a thing from its context (Malpas, 1999). If something is abstracted from its surroundings it becomes a thing without context and enters a pure realm or empty space known as *kenon*. If this is so, the abstraction of an architectural style from its context relegates it to an abstract notion of a stylistic

fashion peddled from one place to another unrelated to anybody or anyplace. It is in the pure space of *kenon*. As such, abstraction disables the process of *becoming* a place at the heart of a *chora*. The implication is that places devoid of a relationship between *topos* and *somebody* or those places that have been conceived in a timeless pure space of *kenon* excludes the intention for spaces to become places. They are set pieces disconnected from either *topos* or *somebody*.

Ironically, it is likely that the subjective *chora* and not the void of *kenon* were uppermost in the minds of the designers for both Seasides and for The Boardwalk. The vehicle for making these places invoke the image of an idealistic seaside *chora* is the deliberate use of a generic architectural style. However, creating places sourced from images of rose-coloured memories may be a trap as insidious as Procrustes' iron bed.

Another way of looking at the definition of space and place considered space as the realm of physical movement and place as a pause in that movement (Tuan, 1977). This idea of a pause-space colours the idea of place with stasis (Cresswell, 2004). The stasis of a pause-space is reminiscent of Aristotle's *topos* and Plato's *chora* because the pause-space is associated with living in a place and forming attachments and a sense of belonging to that particular place. That is to say, once we get to know a place and put down roots we form attachments through the 'fixity' of our memories and begin to nurture *topos-philía* (Tuan, 1974). In the case of the Seasides and The Boardwalk, however authentic the original memory and topophilia might have been, the designers' idealisation trapped them into an abstraction of an architectural style created in a void – a schema unrelated to the real world context in which these developments were planned. Such idealised memories become a Procrustean schema that forces a nostalgic fit and all that it implies.

Forcing a nostalgic fit trivialises authentic places by merely reproducing an architectural set piece. The English Townscape movement (with its roots in the English Picturesque) deliberated upon a similar dilemma decades ago. It was artist Gordon Cullen who realised the Townscape concept through his illustrated concept of serial vision (Cullen, 1961). Serial vision was presented as an exploration of a townscape viewed through a series of Cullen's sequential illustrations. Cullen reflected the sublime of the English Picturesque: "You climb laboriously up the winding road and eventually find yourself in a tiny village street at the summit" (Cullen, 1971, p10) to propel the observer from one place to another, motivated by: "Any winding road...which by partial and uncertain concealment, excites and nourishes curiosity... [T]he effect of the picturesque is curiosity" (Price, 1810, in Aitchison, 2010, p132).

Townscape emphasised the visual (sensory) and emotional (limbic) effect of the relationship of buildings rather than that of individual buildings. Cullen explained the effect of the 'art of relationship' in a way that was accessible in concept and in illustration: "...bring people together and they create a collective surplus of enjoyment; bring buildings together and collectively they can give visual pleasure which none can give separately" (Cullen, 1971 in Larice and Macdonald, 2013, p119). The advantage of this collection of buildings was the aesthetic complexity and experience that availed the viewer by moving through, around and in between buildings. The intent of the Townscape approach was to create a moving drama that tapped into people's emotional responses to their urban experience. A key method to create a viable relationship of buildings was to enable the vitality of architectural diversity that fitted into a framework of visual unity as opposed to the repetition of uniformity. Even Reyner Banham who was an avid Modernist and had an anti-Picturesque stance advanced a similar idea: "...no individual buildings need survive. It is the in-and-out weave of men and communications among the buildings that is essential, not the buildings themselves. No monument is as important to Europe as this texture of its cities...satin smooth like Bath, tweed (with a silken thread) like Glasgow, broadcloth towns like Sheffield, Birmingham's bombazine conurbation. But the texture depends on the kinds of thread and their arrangement, not on the threads themselves" (Banham, 1963, in Whiteley, 2002, p23).

Despite the Townscape protagonists hope for a harmonious yet diverse urban 'texture' in urban design, a decade after Townscape appeared on the scene Cullen lamented: "We have witnessed a superficial civic style of decoration using bollards and cobbles, we have seen traffic-free pedestrian precincts and we have noted the rise of conservation...none of these is germane to townscape. The sadness of the situation is that the superficials have become the currency but the spirit...is locked away..." (Cullen, 1971 in Larice and Macdonald, 2013, p123).

The importance of people's actions and intentions in a place such as going to the shops, meeting friends and so on are ways in which life unlocks the spirit of a place (Relph, 1976; Seamon, 1980; Dovey, 1985). Places become meaningful when they enable people's intentions and experiences to establish interdependency between intentional engagement and its built form context (Malpas, 1999). If we accept this argument of intentional engagement as the basis for authentic places, the attempts to make places through architectural style alone are misguided. The power of nostalgic architectural schemata is that it is based on the sentiments stimulated by childhood memories of a time when most of us in normal families felt nurtured. These emotional memories merge with the

physical forms of our childhood places to create an idealised schema of the past that feels authentic. Even if only few of us have actually experienced harmonious village life this mythical ideal becomes a desirable commodity that feeds a picturesque fantasy of harmony and stability (Dovey, 1985). Indeed, the mythology of living in harmony in a picturesque village or beach shack is likely to be implied in both the architectural brief and in the marketing of such developments as the Seasides and The Boardwalk. The flaw with these developments is that the authenticity of the place has been abstracted into a themed style simply waiting to be enlivened by somebody, rather than being an interdependent creation between the place and its people. Places conceived as commodities are likely to be set pieces devoid of the very qualities that the market seeks.

Themed styles are the product of pattern recognition. Shannon's theory of information says that if information is repeated incessantly it becomes less rich or complex - in other words, entropic. This means that if we visit Seaside or The Boardwalk, the first house we see provides lots of information about its style, origins, socio-cultural references, climate and so on. But then as we see another and then another one, row upon row of similarly styled houses, each additional piece of repetitive detail reduces the richness of the content (Shannon, 1949, in Haken and Portugali, 2003). Our economising brain clusters all the houses in Seaside or The Boardwalk under a few schematic attributes rather than memorising every idiosyncratic detail of each house. A generic category - or theme - emerges that efficiently identifies the Seaside style or The Boardwalk style.

This reduction of information occurs because it seems humans cannot remember more than seven items - plus or minus two (Miller, 1956). If this is the capacity of normal memory, information needs to be limited so that we can continue to simply, function. However, within this economy of reduced information there lurks a dangerous paradox. Reductionism holds a threat of place trivialisation and consequent boredom. The repetition of say, a familiar architectural style or the relentless sameness of typical suburban sprawl pushes our economising brain towards the paucity of reduction. This same process enables a city's legibility. The danger is that our perception of place is on a knife-edge between legibility and sheer boredom. And which way we fall depends upon (it seems) the limitation of the memory to handle firstly, too many details and secondly, a schema that resists change and (as described through the adaptive perceptual cycle previously) if our schema of a place resists change we are under the threat of irrelevance or even dysfunction.

Reductionist themes of safe mythical imagery of harmonious village life hold attraction for those who are overwhelmed by too many diverse details in this global village of ours. Some may feel a

sense of threat to their place identity. Increasing globalisation such as the movement of money, people and products that seem to have no bounds or the insatiable spread of homogenous, generic products throughout the world (Macdonalds, Microsoft, Versace, Apple etc.) as well as the spread of diverse people and products from all parts of the planet contributes to a sense of lost place identity (Cresswell, 2004). Globalisation is characterised by the homogenous multinational products that merely communicate consumerism. Globalisation may also be characterised by the movement of diverse people and their cultural mores from anywhere in the world to anywhere in the world. This scenario of the ubiquitous flow of global people and money from who-knows-where is in tension with the need for permanence and place identity. The sense of loss of place identity is countered by shoring up a sense of permanence as people retreat into the safety of a familiar place (Harvey, 1996). This creates a market for urban developments that promise cosy familiarity. As such, a sense of place becomes a commodity that fits into a familiar package that sells.

Nostalgic imagery sells. The problem is that creating a place based on marketable nostalgia may be self-defeating. Marketable places are necessarily tamed for the consumption of a particular niche and this often means one that is homogeneous and exclusive. Places that *come-into-being* through the relationship between a *topos* and *somebody* tend to insert the unpredictability of somebody's intentions. The irony is that the removal of that unpredictable somebody threatens the very authenticity that the consumer seeks by eliminating any intent beyond that of a mythical image. As such, Seaside and The Boardwalk appear to be simply products plucked from a shelf of architectural styles that have created separate, disconnected abstractions of village or beach life adjacent one another and competing for the attention of a fickle niche market. The result is that both places appear to exist in denial of each other.

This yearning for permanence or for putting down roots in a harmonious village or beach life may be an attempt to deny the reality of the global movement of people and products that seem to threaten people's sense of familiarity with their places: "We mourn places as well as people," writes Casey... The rich mosaic of land, people, community and local history that constitutes a place can be swept aside and replaced by homogenised experience" (Wattchow and Brown, 2011). If this is so, it is not surprising that the yearning for permanence is often achieved by resorting to introverted or reactionary placemaking that attempts to reconstitute familiarity. Doreen Massey (1993) suggests, rather than introversion as a salve for the loss of place the idea of movement, connectivity, diversity and the opportunity to create interesting networks with the outside world offers another way to express connections with a place: "One way of thinking about place is as

particular moments in such intersecting social relations, nets of which have over time been constructed, laid down, interacted with one another, decayed and renewed. Some of these relations will be, as it were, contained within the place; others will stretch beyond it, tying any particular locality into wider relations and processes in which other places are implicated as well” (Massey 1994, p120). This offers a counter argument to inward-looking, exclusive or reactionary places. Massey’s place becomes a boundless concept of social, economic, cultural and other networks that intersect to create local and global connections. Places become outward looking and place is created through an accretion of diversity, connectivity and inclusion. Certainly, this is an attractive idea. But, this fails to address the problem of some people’s reactionary responses to their threatened schema of place. If people feel misaligned to their schema of a place, pontificating that diversity is a wonderful thing and promoting the joys of the multi-cultural milieu is unlikely to diminish people’s feelings of threatened place identity. As Andres Duany candidly stated: “Yes, they are confused by media-induced fear and manipulative marketing. But as a result many of them want to live in monocultures, in enclaves. What are we to do, impose our principles upon their desires?” (Duany in Mehaffy, 2004).

Those who feel threatened – possibly because of the systemic rigidity of their schema resisting the reality of the global village or the complexity of big cities – sometimes resort to reactionary placemaking responses such as gated communities or secured high-rise apartments, homogeneous suburbs or nostalgic neighbourhoods. Such reactionary developments seem to find a ready market indeed, some developments seem to cultivate a Procrustean personality that is inward looking, controlling and possibly, fearful.

The holy grail of place diversity and social, economic, cultural and other networks that intersect to create local and global connections must be New York City; and the *grande dame* of placemaking that embraced a cosmopolitan lifestyle was Jane Jacobs. She may have been a ‘crazy dame’ who had no formal urban planning qualifications, but this did not stop her from being a perceptive observer of people and places (Alexiou, 2006; Flint, 2009). There was a level of synchronicity of events and people that seemed to have contributed to the rise of Jane Jacobs - along with her ability for networking, communication and perhaps, opportunism. One might say that Jacobs in her role as an urban design and planning journalist was on the edge of the design professions – a position that probably enabled her to randomly connect with many design professional groups and lay groups - had by good judgement or luck, networked with leading practitioners and theorists who represented leaders of innovative urban planning thought of the day.

The post-war 1950s and 1960s was a particularly vibrant time in New York City. Jacobs was well positioned to network with people such as Lewis Mumford who had strong connections with the British New Town movement; William H. Whyte who nurtured and encouraged Jacobs' controversial essays through *Fortune* magazine; and in particular, impressed Chadbourn Gilpatric of the Rockefeller Foundation (RF) who employed her at a time when the RF were enthusiastic about urban design – the RF had in 1954 funded Kevin Lynch and Gyorgy Kepes' first study of human perception of the urban environment that led to Lynch's (1960) *Image of the City* (Laurence, 2006). By 1958 Jacobs put forward her own urban design research proposal to the RF: "What I would like to do is to create for the reader another image of the city, not drawn from mine or anyone else's imagination or wishes but, so far as this is possible, from real life" (Jacobs, 1958, in Flint, 2009, p91). One might argue that despite her quest for an objective observation, one's perception of 'real life' was most likely a highly subjective construct and most likely influenced by one's own 'imagination or wishes' despite declared intentions; nevertheless, she was successful in her grant proposal. Her research produced the influential text, *The Death and Life of Great American Cities*, which contributed to the end of the architectural fraternity's *amour fou* with modernism.

Jacobs shifted the focus from the architectural object towards the urban objective: where modernism was concerned with functionality and the purity of geometric form, Jacobs focussed on the complexity, if not chaos, of urban life. Jacobs' real life observations of her Greenwich Village neighbourhood acquired theoretical rigour through reference to the Rockefeller Foundation's Director of Life Sciences, Warren Weaver who, in the Foundation's 1958 *Annual Report*, re-published his 1948 article *Science and Complexity*, an early discussion on complexity theory. Weaver categorised scientific problems between simplicity (or order) and complexity (or randomness) highlighting the middle ground as the dimension of 'organised complexity' and 'disorganised complexity'. Disorganised complexity represented problems that were random in nature such as the movement of gas particles. Organised complexity represented problems of a sociological nature such as union groups or racial minorities and by implication for Jacobs' purposes, neighbourhoods (Weaver, 1948; Laurence, 2006; Marshall, 2009). Weaver was a fortuitous and important contact for Jacobs. He had a career of leadership in the scientific community and his credibility was inviolate. Jacobs absorbed his complexity theory, in particular that of 'organised complexity' and applied it to her observations of urban life as she gazed out of her Hudson Street, Greenwich Village window (Alexiou, 2006). Weaver's ideas about organised

complexity gave Jacobs a framework or schema in which to 'fit' her observations of city neighbourhood life.

Jacobs' approach to the city resonated particularly with the thoughts of Lewis Mumford and his colleagues. Interestingly, Mumford who was a staunch advocate of Patrick Geddes' regional planning approach and Ebenezer Howard's Garden City idea, might have aligned with Jacobs on several fronts, but didn't: Jacobs and Mumford were both socialists; both were contemptuous of the centralisation of bureaucratic and corporate power; both disdained suburban sprawl; and both were advocates of organic urban growth (Hall, 2002). However, Jacobs (1961) found her urban ideal in the density of the big city, the prime example being New York's Greenwich Village, whereas Mumford (1961) looked to the town-village model, the prime example being the medieval village.

The schism between Jacobs and Mumford was illustrated by his abhorrence of big cities represented by Jacobs' beloved New York. His vehement (if not hysterical) writings bemoaned the rise of the megalopolis: "Sprawling Giantism...No human mind can comprehend more than a fragment of the complex and minutely specialized activities of its citizens, the constant frustration and harassment of daily activities, to say nothing of gigantic breakdowns and stoppages – all these become normal attributes of the metropolitan regime" (Mumford, 1961, p544). Mumford's justification that 'no human mind can comprehend more than a fragment' of a giant city model such as New York revealed his town-village schema in systemic rigidity to the test of the reality of the big city. Jacobs' schema of New York neighbourhoods was one based on the notion of organised complexity that she had borrowed and made her own. However, despite her diverse city neighbourhood intentions her schema of local neighbourhood community also came under threat.

Just as Cullen reflected in 1971, that 'the superficials had become the currency' of Townscape, Mumford criticised fellow socialist Jacobs for turning her local neighbourhoods into gentrified enclaves. The old tenements and terraces of Greenwich Village and the surrounding districts were renovated to accommodate the upper middle class who had a penchant for a cosmopolitan Lower Manhattan life-style; indeed as reported in *The Economist*, on 11 May 2006: "She was accused of nimbyism and blamed for gentrification, but no one was more disappointed than she was to discover, in the 1990s, that she could no longer afford to live on Hudson Street [Greenwich Village]" (Obituary, 2006). After all the community activism whipped up by Jacobs to protect the Washington Square Park neighbourhoods for the local community, that community went the way of most finding themselves priced out of the market. Gentrification or the urban design 'currency of

superficials' was not the intended placemaking outcome of either Jacobs or Cullen. Both had intentions based on retaining authenticity of the English Picturesque townscape form or the organised complexity of the city as a sociological entity, but each found themselves the disappointed doyens of style: "She [Jacobs] pithily noted that all new ideas arise in old buildings. In other words, *the template* [schema] *was her own neighbourhood* of Greenwich Village in Manhattan [my emphasis]" (Kidd, 2011).

All of these urban design ideas from New Urbanism, Townscape and what one might call Jane Jacobs' Cosmopolitan Picturesque illustrate the power of schemata in the perception of place. All of these urban design ideas have travelled far (at least to Australia) almost without translation into a local urban design dialect. The power of models, plans or schemata of places - whether promising a harmonious village life or cosmopolitan lifestyle - can set a Procrustean iron bed for placemaking. The adaptive perceptual cycle offers the notion of a self-organising adaptive system that is a first step towards understanding how places are perceived and how placemaking is conceived and how design professionals might move towards adaptive and resilient placemaking.

2.6 CONCLUSION

This chapter introduced some core ideas of placemaking derived from place philosophy and cognitive psychology. A relational approach to place was explained as the interdependency of the concept or schema of place and the experience of place phenomena. Several theoretical concepts from place philosophy, cognitive psychology, human geography and complexity theory were used to develop the idea of the adaptive perceptual cycle. The discussion highlighted the power of the schemata of the adaptive perceptual cycle in placemaking by reflecting upon influential approaches in placemaking.

Small World Network Theory as an adaptive and resilient framework for masterplanning will be introduced in the next chapter. This chapter will explain the foundations of small world network theory and self-organising criticality in outline through its beginnings in sociology and social network analysis; the principles of self-organised criticality; the contrasting evolutionary dynamic of gradualism and punctuated equilibrium; and an exploration of brain network research that has potential to align with city networks. Each of these aspects will contribute to an understanding of small world network theory and its relevance to masterplanning urban places as adaptive and resilient placemaking

CHAPTER THREE

SMALL WORLD NETWORK THEORY

3.1 INTRODUCTION

The previous chapter introduced the idea of place through concepts from the philosophy of place and the perception of place. Place philosophers discussed the idea of place as the interdependency between the concept of place and real world places. Cognitive psychologists supported this approach and proposed that perception was the interdependency of our schemata of the mind and our experience of the real world. These concepts of place philosophy, cognition and perception and self-organised criticality were synthesised by this present author into the original idea of the adaptive perceptual cycle and was applied in a discussion about the power of schemata in placemaking.

This chapter will explain the principles of small world network theory and self-organised criticality. The discussion will outline the beginnings of social network theory that were the foundations of small world network theory and also more recent research into brain networks. The principles of adaptation and resilience will be examined through contrasting approaches to evolution – gradualism and punctuated equilibrium. This will be posed as a background to explain the dynamic of small world network theory. Small world network theory is relevant to masterplanning because it may enable us to envisage the distribution of clusters of activities, the connectivity between those clusters and the likely impact on the organisation and vulnerability of an urban network.

3.2 ORDER FROM CHAOS: THE GENERATION OF PLACE

Our Western philosophical predecessors tackled the question of the generation of place through the means of metaphor. Importantly, metaphors do not travel empty-handed – they have metaphorical baggage because they are installed in our ideas and meanings, which may be culturally or knowledge defined. Nevertheless, a good metaphor has a vividness that makes meaning lively (Game and Metcalfe, 1996; Simonsen, 2004; McLean and Hassard, 2004). If we begin with how the notion of the generation of place first emerged as envisaged by Plato and Aristotle, metaphors abound and create striking explanations; however this is not to underestimate the portent of their arguments. Both philosophers offer us nascent thoughts into the problem of order from chaos that

has puzzled many a philosopher since, not to mention those concerned with masterplanning for urban change.

Plato and Aristotle have some fundamental differences. Plato's proposition about the generation of place depended upon the intervention of a 'Demiurge' (a Creator) that created Order from Chaos *at some point in time* – place was explained as a creation sourced from a Demiurge possibly, from beyond the void. Conversely, Aristotle's 'Vessel' defined the existence of place *from the beginning* - place was explained through *Physics* (natural science in general, esp. the Aristotelian system: Greek *phusika* 'natural things,' from *phusis* 'nature') (New Oxford American Dictionary, 2007) (Figure 3.1).

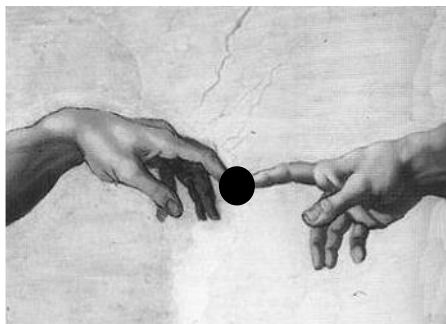


Figure 3.1: 'The Demiurge' and 'The Vessel' (Plato, *Timeaus*, 360BCE; Aristotle, *Physics*, 350BCE in Casey, 1997).

Plato's cosmology proposed the emergence of an ordered universe from the chaos of random stuff swirling in space. This chaos of swirling disparate stuff known as 'The Receptacle' was shaken by the powers of the 'Nurse of Becoming' and, "being thus moved were perpetually being separated and carried in different directions...separated the most unlike kinds farthest apart from one another, and thrust the most alike closest together; whereby the different kinds came to have different regions, even before the ordered whole consisting of them came to be" (Plato, *Timaeus* c360BCE, in Casey 1997, p34). A metaphor that underlies this passage is the winnowing of wheat: The Receptacle is shaken to separate the chaff from the grain into 'different regions' (Casey, 1997). Plato says of The Receptacle, "It never departs at all from its own character; since it is always receiving all things, and never in any way whatsoever takes on any character that is like any of the things that enter it: *by nature it is there as a matrix for everything*, changed and diversified by the things that enter it [his emphasis]" (Plato, *Timaeus*, c360BCE, in Casey, 1997, p32).

The *matrix for everything* is the clue that gave The Receptacle its generative role. In this interpretation *the matrix* is an environment or surrounding medium in which something develops (Latin, ‘breeding female,’ later ‘womb,’ from *mater, matr-* ‘mother’). If Plato’s Receptacle is *a matrix for everything*, The Receptacle itself must be the ‘Nurse of Becoming (Latin *nutricius* ‘(person) that nourishes,’ from *nutrix, nutric-* ‘nurse,’ from *nutrire* ‘nourish’) (New Oxford American Dictionary, 2007). The Receptacle was a space for the *becoming* of places.

Plato’s matrix ‘never departs at all from its own character’. This means that the matrix was a neutral structure that enabled the generation of different regions. Within this interpretation, *the matrix for everything* consisted of the chaos of swirling disparate stuff that winnowed itself into regions of ordered stuff. It is important to note that in this context, Chaos was not necessarily, chaotic. Chaos in this sense was ‘the formless void’; ‘the great deep’; ‘the nether abyss’; ‘infinite darkness’; ‘the yawning gulf’ (denoting a gaping void or chasm, later formless primordial matter: via French and Latin from Greek *khaos* ‘vast chasm, void’) (New Oxford American Dictionary, 2007). Plato postponed the role of place until after Order was summoned and regions were formed (Plato, *Timaeus* c360BCE in Casey, 1997). Plato’s cosmic Order arrived in the guise of geometry and measurement with the primordial regions consisting of geometric shapes described as: tetrahedron (fire); octahedron (air); icosahedron (water); and cube (earth). At this point Plato needed to create The Demiurge that intervened through the instruments of geometry and measurement (or even a masterplan) to create Order from Chaos.

Aristotle thought this deference to the Demiurge was absurd. He proposed that everything already had its proper place. Chaos might have been a swirling mass of formless stuff, but the motion of this stuff meant that even in a formless void there was movement from *one place to another place*. Once the act of locomotion was introduced this argument enabled Aristotle to commit Chaos to a Place at the outset: “...the most general and basic kind [of] change is change in respect of place, which we call locomotion” (Aristotle, *Physics* 350BCE in Casey 1997, p51). Aristotle was not alone as he pondered place. An assortment of philosophers before and after him had also questioned how, when and why Place came into being: Archytas (c400BCE) “all existing things are either in place or not without place” ; Zeno (c450BCE) “everything that exists is somewhere”; Georgias (c300BCE) “the unlimited not somewhere”; Whitehead (c1920ACE) “everything is positively somewhere in actuality”; and, Aristotle (c350BCE) “place is thought to be some surface and like a vessel and surround” (Casey, 1997, pp53, 344, 359). Aristotle’s Vessel as an analogy explained

how we are enveloped by our 'surrounder' consisting of a layer of oxygen, an ozone layer and so on and finally perhaps, the universe. Although the Vessel was the container, place was defined as the *volume* of The Vessel that envelops us rather than The Vessel itself.

In contrast to Plato's Receptacle that received Order from Chaos through the intercessionist Demiurge, Aristotle's Vessel contained the swirling stuff of place, but there is no Creator of Order - it is already in place. What Aristotle gave us was the 'Unmoved Mover'. His argument was that the physics of locomotion exists, but something must have initiated the first movement - this was the Unmoved Mover. This entity was not an intercessionist Demiurge that created Order through geometry and measurement, but rather one that was in a timeless, formless void. The Unmoved Mover merely initiated locomotion and the swirling stuff of chaos began to move from one place to another place. Plato and Aristotle have had a stab at defining the emergence of Order from Chaos as they sought the generation of place. Now, if we span the millennia this emergence of order from chaos is called self-organisation.

3.3 SELF-ORGANISATION

If we continue in a metaphorical vein, self-organisation was lucidly explained by theoretical physicist Per Bak et al (1995, 1997) through a sand pile metaphor. Imagine you are sitting on a flat sandy beach (the metaphor for equilibrium). Take a handful of sand and let the grains of sand trickle through your fingers and watch the sand pile grow. As the grains of sand fall the pile becomes steeper and soon small, local sand slips occur. As the pile gets steeper small sand slips begin to occur throughout the sand pile. Gradually, a local effect has become a global effect or one that engulfs the whole sand pile. At some point, an equal amount of sand is added to the pile as the amount that has slipped. At this point, the sand pile is in a stationary critical state. And at this point, a single grain of sand may result in a catastrophic cascade of sand. Once the sand pile slips into a flat mound it has returned to equilibrium of the flat sandy beach. As the sand grains continue to trickle through your fingers the flattened mound of sand begins to rise again. And again, the sand pile builds and slumps, unceasingly. In other words, small local crises can occur and be supported in increments, but in time and at a point of criticality, one more local crisis collapses the global system. And the process begins again.

It is easy to be a sand forecaster in the flatland of equilibrium or stasis. At these non-critical times, not only can a sand forecaster predict what will happen but also s/he can understand it: "Once the pile has reached the stationary critical state...the sand forecaster can still make short time

predictions by carefully identifying the rules and monitoring his local environment...However, he cannot predict when a large event will occur, since this is contingent on very minor details of the configuration of the entire sand pile” (Bak, 1997, p59). And the ‘minor detail’ of a single grain of sand at the sand pile’s point of criticality can trigger a global cascade.

Self-organisation is elaborated by the idea of synergetics (Greek *sunergos* ‘working together,’ from *sun-* ‘together’ + *ergon* ‘work’) (New Oxford American Dictionary, 2007). Synergetics is a process by which the various factors that make up the world we live in (and in an urban context these might be political change, economic desires, social mores and so on) present order parameters, for example, regulations, policies, traditions, tyrants, power brokers or the rule of law. There may be few or several order parameters that compete to capture control of a context and the order parameter that ‘captures’ and ‘enslaves’ its competitors, wins (Haken, 1996; Portugali 2011; Portugali et al, 2012). Haken (2006) describes the ‘slaving principle of synergetics’:

...quite intricate relationship between order parameters and parts is captured by the slaving principle of synergetics, which can be visualized as follows. The order parameters act like puppeteers that steer the movements of the puppets. Order parameters allow us to describe the newly evolving state ... When one or several control parameters approach a *critical value* the state of the system becomes unstable and is replaced by a new state [his emphasis] (Haken, 2006, p111).

A more benign analogy of Hermann Haken’s (1996) ‘enslaved parts and order parameters’ in ‘circular causality’ might be this: Imagine you are a member of an orchestra. In this orchestra there are the strings, percussion, horns, woodwinds etc. But this orchestra has no conductor and no sheet music – it is going to improvise (self-organise). If the orchestra is going to ‘make music’ the musicians will have to work together. Musicians have an understanding of how to make music using order parameters such as harmony, rhythm, pitch and so on. The orchestra begins to play and members listen carefully to their neighbour to try to recognise the order parameter so as to fit in. Each member and section of the orchestra can either compete to dominate the whole orchestra, which may result in a cacophony or listen and work together. By adjusting to each other in ways that acknowledge the orchestral context the musicians fit in with the most dominant order parameter and enable the emergence of music. This musical metaphor describes how an improvised or self-organised piece of music might emerge by working together in a way that is mutually acceptable.

The synergetics of the orchestra is a complex adaptive system that makes music rather than a discordant noise.

A complex adaptive system (such as improvised music) is a process that has an inherent capacity for negotiation and compromise, capture and enslavement. Physicist Gell-Mann (1994) described complex adaptive systems: "... a complex adaptive system acquires information about its environment and its own interaction with that environment, identifying regularities in that information, condensing these regularities into a kind of 'schema' or model, and acting in the real world on the basic [sic] of that schema. In each case there are various competing schemata, and the results of the actions in the real world feed back to influence the competition among those schemata" (Gell-Mann, 1994, p17). The alignment with the adaptive perceptual cycle discussed in Chapter Two highlights the notion that humans are complex adaptive systems teetering on the edge of chaos in a constant mental negotiation through a process of self-organised criticality.

Self-organised criticality describes the processes of adaptation and resilience. Adaptation, as we have discussed in Chapter Two, describes the change of an entity towards its goodness-of-fit with an environment, whereas resilience describes an entity that resists change. If the changed environment persists and the resisting entity reaches a point of criticality, such as irrelevance or dysfunction, then the changed environment supersedes and the entity must adapt to survive. Consider these self-organising processes in the light of the theory of evolution. Evolution is explained as a gradual, incremental process and is often at the heart of town planning, urban morphology or urban design (Jacobs, 1961; Alexander et al, 1977, 2002; Kostof, 1991, 1992; Batty and Marshall, 2009; Marshall, 2012). Charles Darwin's theory of evolution supported gradualism, which describes a slow, gradual process resulting in small periodic changes to biological species. This may be a valid metaphor for urban change in which changes are incremental and gradual - but some changes are not. The occurrence of self-organised criticality puts into question the relevance of gradualism as a planning paradigm for all urban contexts at all times and under all conditions.

Darwinian evolution claims that adaptation of species to an environment is gradual and slow within a geological, long-term timeframe. Evolutionary adaptation is not necessarily smooth but in increments or small periodic changes. The incremental adaptation of creatures to an environment in the short-term is imperceptible, but in the long-term, adaptive changes of natural selection become apparent as a gradual and constant process. Importantly, Darwin in *The Origin of Species* notes the lack of fossil records to confirm gradualism: "Geology assuredly does not reveal any such finely-

graduated organic chain” and also by biologist Steve Jones who in his update of Darwin’s book says: “The fossil record - in defiance of Darwin's whole idea of gradual change - often makes great leaps from one form to the next. Far from the display of intermediates to be expected from slow advance through natural selection many species appear without warning, persist in fixed form and disappear, leaving no descendants” (Jones, 1999, p252). Despite these doubts, the gap in the fossil records was put down to the lack of well-preserved fossil evidence and so, gradualism was assumed.

Others interpreted the gaps in the fossil record as evidence of an alternative evolutionary process – punctuated equilibrium. Stephen J Gould and Niles Eldredge (1972, 1977) interpreted the gaps in the fossil record as long periods of equilibrium or stasis when creatures remained resilient to change and then suddenly, the stasis was punctuated by a rapid and dramatic adaptation, possibly triggered by a cataclysmic event in the environment or genetic mutation. In this event, the critical threat of extinction of a species stimulated survival through rapid adaptation or as Jones says (1999) to ‘disappear, leaving no descendants’. The point is that evolution can be explained by more than just an incremental or gradualist paradigm. Evolution is consistent with the contrasting processes of gradualism as well as punctuated equilibrium. Both are evolutionary models found in the fossil records – some creatures’ lineages can be explained by periods of gradualism, some by periods of punctuated equilibrium and others by both (Saylo et al, 2011).

Gradualism is considered the dominant paradigm for mainstream populations of creatures that over the millennia remove the less fit through natural selection. Gradualism describes the survival of a population of species through evolution towards average features for a widespread environment: “the entire parent population slowly morphs into the descendant species” (Saylo et al, 2011, p30). Punctuated equilibrium applies to geographically isolated or peripheral populations of creatures that slightly vary genetically because of their slightly varying environmental conditions. Punctuated equilibrium describes survival through the critical evolution of outlier or peripheral species towards idiosyncratic features for an isolated environment: “...only a small segment of the parent population buds off into the descendant population, permitting the original parent population to persist” (Saylo et al, 2011, p30). Different evolutionary models occur because of differences in the timeframe, context and crises. Gradualism is an evolutionary process of incremental transitions observed in widespread, relatively stable contexts and demonstrates a continuous lineage of gradual change of a species over a geologically long timeframe. Alternatively, punctuated equilibrium is an evolutionary process of phase transition observed in isolated, critical contexts and demonstrates a

discontinuous lineage of rare, radical change to a species over a short timeframe (Eldredge and Gould, 1972; Eldredge, 2002; Saylo et al, 2011). If we align gradualism and punctuated equilibrium with Bak's metaphorical self-organising sand pile we might say that gradualism represents the small slips of sand and punctuated equilibrium represents the critical cascade of the sand pile.

Consider the difference between gradualism and punctuated equilibrium in the context of social groups of human creatures. The important difference is that gradualism is characterised by the continuous lineage of a species, but alternatively, punctuated equilibrium is characterised by the discontinuous lineage of a species. In the light of these evolutionary models, imagine these contrasting populations of human creatures and environments: firstly, a caveman world; and secondly, the futuristic world of Solaria (Watts, 1999a, 1999b; Asimov, 1993) (Figure 3.2).

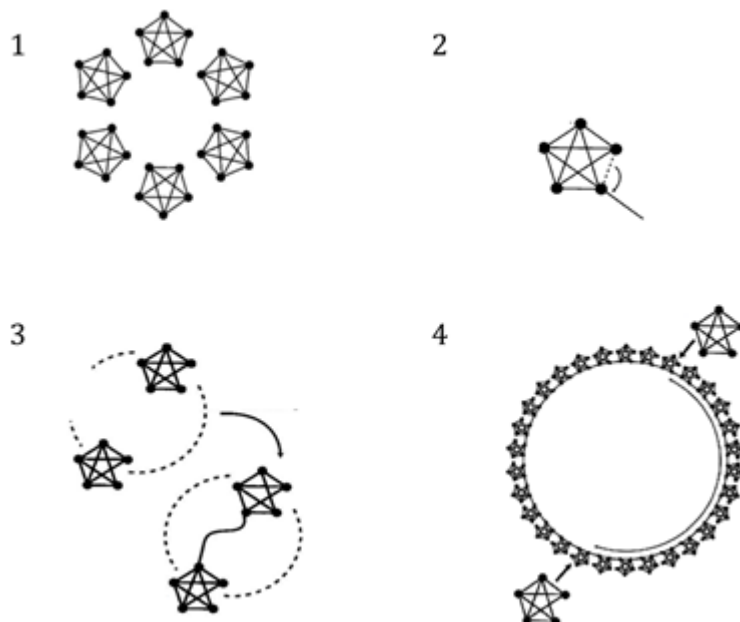


Figure 3.2: Caveman world (Watts, 1999b, p115).

Duncan Watts (1999b) asks us to imagine a world of disconnected caves. Watts proposes that in a disconnected caveman world it is likely that the only cavemen one might meet are those in one's own cave because in each cave lives a group of cavemen who only know each other and no one else. As long as our species of cavemen remain with our cave mates our lineage (including culture, knowledge etc.) will be continuous (Figure 3.2(1)). Some incremental adaptations might occur as our environment changes over the long term but essentially, it is a world in equilibrium or stasis.

Imagine that one curious caveman ventures out and meets another adventurous caveman passing by (Figures 3.2(2) and 3.2(3)). On meeting, each of these cavemen introduces their entire group of cave mates to the other entire group of cave mates. The random meeting of these two cavemen from different caves transforms the disconnected caveman world into a connected caveman world because, "...their propensity to be acquainted immediately becomes very high and stays that way regardless of how many additional mutual friends they may have" (Watts, 1999a, p503) (Figure 3.2(4)). In a caveman world it is likely that the only cavemen one might meet are those with whom one has a mutual acquaintance. This means that our propensity to be acquainted suddenly goes from very low (few friends) to very high (many friends). Not only was this meeting of two cavemen a random occurrence, their meeting punctuated the equilibrium of both disconnected caves by the sudden introduction of many mutual acquaintances. The disconnected caveman world in which groups of cavemen lived a life of stasis has suddenly, become a connected caveman world. Their world has expanded and is more open to new ideas, but our connected cavemen world is still limited to our nearest neighbours. The cavemen are connected to the neighboring caves and friends can become mutual friends of friends and so on. The network begins to loop in on itself – eventually, the cavemen form a homologous group with a continuous lineage, 'having the same structural features and pattern of genes' (from Greek *homologos* 'agreeing, consistent,' from *homos* 'same' + *logos* 'ratio, proportion') (New Oxford American Dictionary, 2007).

The futuristic planet of Solaria describes a sci-fi world inhabited by beings that live in complete isolation only communicating through robots and computers (Watts, 1999b; Asimov, 1993). The Solarians are absolute isolates and their lineage is utterly disconnected. The likelihood of connecting with other Solarians is very low because they only communicate indirectly and contact is random. Solarians meet their cyber-chums randomly one isolated individual at a time. In this scenario the propensity for a Solarian to connect with anyone else is very low as is creating a mutual acquaintance or some friends. The only way a Solarian can create a network of mutual acquaintances is by meeting every Solarian one at a time until all Solarians have met everyone else on the planet to become a large and diverse collection of heterogeneous Solarians (from Greek *heterogenēs*, from *heteros* 'other' + *genos* 'a kind') (New Oxford American Dictionary, 2007).

These two worlds of cavemen and Solarians are extreme scenarios intended to illustrate networks of people in which either everyone knows everyone else (or have strong ties such as families or neighbours) or networks in which isolated beings connect randomly (or have weak ties such as an acquaintance or work colleague). The caveman world is one in which everyone knows everyone

else and continues the caveman lineage, culture or knowledge. The propensity to create a large homologous network is immediate in the connected caveman world. The Solarians are so isolated that their lineage, culture and knowledge is discontinuous. The propensity to create a large heterogeneous network occurs eventually, once everyone meets everyone else on the planet.

Now, imagine that a friendly caveman meets a lonely Solarian at a gathering; during the conversation they are surprised and delighted to discover they have a mutual acquaintance. It is not hard to imagine that either of them might exclaim: *Small world isn't it!* At this point of enlightenment and connection a 'phase transition' has occurred and these contrasting worlds of homologous order and heterogeneous randomness merge to become a 'small world'. The small world network created by merging the connected caveman world and the disconnected Solarian world exposes the Solarians to the consistency of order and the cavemen to the creativity of randomness. All this has been supported empirically through the seminal work of Watts and Strogatz (1998) and subsequently by many others in diverse disciplines that describe a new network typology of small worldliness as a network of some randomness and some order (Figure 3.3).

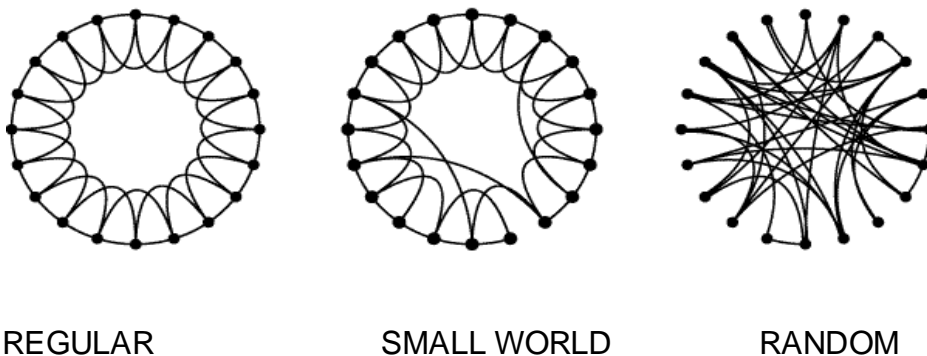


Figure 3.3: Small world typology (Watts and Strogatz, 1998)

3.4 SOCIAL NETWORK ANALYSIS

The notion of small world networks (or social network analysis) has been part of sociology since the turn of the twentieth century. At this time, the rise of densely populated urban conurbations or modern cities exacerbated the problem of creating order from chaos –consider the problem of how cities and nations of millions of individuals could form cohesive social networks that acknowledge the necessity of a collective life. The traditional focus on individuals and community developed an understanding of the relational characteristics of social networks (Wasserman and Faust, 1994; Scott, 2000; Crossley, 2008; Guiffre, 2013).

A brief history sets the scene of social network analysis. Early ideas on social networks address concepts of community and society. Émile Durkheim and Ferdinand Tönnies pioneered a relational approach to social networks in the late 1800s (Calhoun et al, 2007). Tönnies argued that a social group can consist of a network typically made up of personal contacts based on tightly knit family ties or shared values and beliefs. This is ‘community’ and consists of a social network in which everyone knows everyone else much like a connected caveman world. Alternatively, a social group consists of a network typically made up of formal contacts based on loosely knit ties of duty and organisation. This is ‘society’ or a social network that is functional and formal – somewhat like the impersonal Solarian world. Durkheim argued that society represented the transition from an individual, personal social reality towards a collective, impersonal social reality. This transition from individual to collective creates a social reality that is more than the sum of its individual members – it creates a collective social group and social reality usually described as ‘a sense of belonging’ to the collective (Guiffre, 2013).

The relational approach to social network analysis was boosted in the 1900s by Georg Simmel’s work on the relationship between individuals and their social structures particularly at a time when modern urban conurbations were beginning to burgeon. The core of Simmel’s approach emphasised the relational effects between individuals and social structures and how each created the other; simply put, a social network defines individuals and the individuals define the social network (Calhoun et al 2007). It is a short step to consider the interdependency of people and place through a vast network of abstract and concrete relationships. Individuals’ relationships with a place as a social, cultural, political or economic nexus for example, are based on the interaction of ‘exchange’. Simmel argued that exchange, “...lifts the individual thing and its significance for the individual man out of the singularity, not into the sphere of the abstract but into the liveliness of the interaction...Exchange is the purest and most concentrated form of all human interactions in which serious interests are at stake” (Simmel, in Guiffre, 2013, p19). Simmel implies that it is the outcome of these networks of exchange that create society – that is to say, social entities and individuals are in a constant process of creating each other. This interaction or process of exchanges places people in the arena of negotiation in which as Haken (1996) in his theory of synergetics says, those who ‘capture’ and ‘enslave’ their competitors, wins; or in more benign terms we negotiate and compromise through mutual concessions.

Simmel addressed the problem of creating order from chaos associated with rapidly increasing populations in early modern cities (Calhoun, et al, 2007; Crossley, 2008; Guiffre, 2013). His concern was how a city of millions of people could integrate and interweave to form a cohesive society. To resolve this inquiry he directed his attention to the nature of networks and the effect of network size on social interactions (Crossley, 2008). Simmel argued: “Individuality in being and action generally increases to the degree that the social circle [the network] encompassing the individual expands” (Simmel, in Guiffre, 2013, p58). He presented a dichotomy of a ‘wide social circle’ and a ‘narrow social circle’. The wide social circle argument claimed that the increase in the social circle decreased the identity of that large social circle. This means that an increase in population facilitates diverse individuals to contribute to the social network in diverse ways by increasing opportunities for expressions of individuality – somewhat like the random collection of Solarians whose individuality created the diversity of a heterogeneous group. Despite the increased opportunities for diverse self-expression at the individual scale, the compromises required to facilitate individual diversity diluted the identity of the ‘wide social circle’. Conversely, the narrow social circle argument claimed that a decrease in the social circle decreased the individuality of the members, but increased the distinctive identity of the social circle as an entity. A decreased social network has fewer opportunities for diverse individuality; the narrow social circle facilitates like-mindedness in individuals that eventually, dominates the identity of the entire social circle – somewhat like the caveman world that looped in on itself to create the consistency of a homologous network.

If we apply the ‘wide social circle’ and ‘narrow social circle’ argument to city life, Simmel suggested that it was only in the city, which challenged and transcended the continuity of tightly knit social groups that individuality was realised and where an individual could also become part of the wider world. In a town or village, “...the sphere of life...is in the main, enclosed within itself. For the metropolis it is decisive that its inner life is extended in a wave-like motion over a broader national or international area” (Simmel, in Guiffre, 2013, p59). The small town community was one in which the likelihood of a continuous lineage looping in on itself with little opportunity to insert innovation or creativity threatened.

The beginnings of relational approaches to social network theory spread into many disciplines, such as anthropology and psychology during the 1930s, reemerged in the 1950s through empirical studies that explained social structures. These studies were the foundation for theoretical studies that matured in 1960s and 1970s when social network theorists began to focus their attention on

methods of social network analysis (Calhoun et al 2007; Freeman, 2004; Guiffre, 2013). In particular, Harvard sociologist Harrison White developed multidimensional scaling analysis (MDS): “Lorrain and White’s method was able to realize, for the first time, all the power implicit in the social network concept. First, it operated simultaneously on both nodes and relations...; Second, it enabled researchers to deal with a given network at all levels of abstraction” (Berkowitz, 1982, p5). Multidimensional scaling analysis (MDS) is a method for mapping relational distances of variables or people on a spatial map using actual relations between variables in a network, rather than imposing a priori categories or predetermined meanings on the analysis of relations – this is an important attribute of MDS as it enables the input of the researcher’s qualitative interpretation.

White and his Harvard colleagues and students in social network analysis contributed much to social network theory. White was described as seeking: “*how to get at the interweaving of pair relations into the complex tapestry of social structure and process... [his emphasis]*” (More and Lorrain, 1971, in Freeman, 2004, p125). White’s thoughts about the step from a binary network analysis to a multidimensional network analysis enhanced the beginnings in social network analysis; its reemergence is found in small world network theory at the turn of the twenty-first century. Further contribution from sociology came from Mark Granovetter (1973) whose work on the ‘strength of weak ties’ was key to understanding the role of random ties in small world networks and also Stanley Milgram’s classic social network experiments that instigated further research and popularised interest in the idea of ‘six degrees of separation’ (Milgram, 1967; Travers and Milgram, 1969; Korte and Milgram 1970; Crossley, 2008; Schnettler, 2009; Guiffre, 2013).

Milgram’s classic social network experiment was this: participants located on the west coast of the USA were requested to send a letter to someone unknown to them on the east coast of the USA (a Boston stockbroker); the participants were required to pass the letter on to an acquaintance (with whom they were on first name terms) who might know someone who might know someone else who might know the target receiver – the Boston stockbroker. The average number of steps (or degrees) from the origin sender to the target receiver turned out to be six (in fact 5.2 degrees, but no doubt the temptation of a catchy alliteration was too much to resist for playwright John Guare (1990) who conjured, ‘six degrees of separation’). Although Milgram’s experiments had some shortcomings with regard to completion rates of the chain letters (21.6% or 64 successful chains out of 296) the question of how a pair of strangers, geographically far apart and from the huge population of the USA could be connected in so few steps captured popular imagination and

inspired the new breed of social network physicists (Watts, 1999; Barabasi, 2002; Kleinfeld, 2002a, 2002b; Dorogovtsev and Mendes, 2003; Crossley, 2008).

3.5 SMALL WORLD NETWORKS

Small world network theory has progressed beyond the intuitive exclamation: *Small world isn't it!* The idea of small world networks - that germinated with Milgram's 'six degrees of separation' experiment - was revived in the late 1990s by Watts and Strogatz (1998) and Barabasi and Albert (1999). Duncan Watts (1999, 2004) and Albert-László Barabási (2003) spearheaded the investigation into small world network theory and have stimulated similar investigations in many applied disciplines. Firstly, Watts addressed the question of how two people on the planet could be connected by just a few steps by investigating random networks based on the work of Paul Erdős and Albert Rényi (1960) who studied the evolution of random graphs. Erdős and Rényi found that clusters emerged from networks of random nodes through exponential growth even if the nodes had only a small number of ties. For example, assume you are acquainted with 500 people and each of these people is acquainted with 500 people, then you are connected to 250,000 people only after two steps (or two degrees of separation) and after three degrees you have 125,000,000 people in your pool of potential acquaintances (Pool and Kochen, 1978). Continue in this vein and the possibility of being six degrees from any target person on the planet (be they prince or pauper) seems plausible, theoretically. However, real world social networks are not made up of random individuals as described in this mathematical scenario. Real world social networks consist of some random individuals and some who are in families or cliques. The strength of ties between isolates, cliques and neighbourhoods varies in such real world networks; for example, family-ties are strong whereas contact person ties are weak. Strong ties such as friends of friends tend to form cliques of like-minded people who have strong ties to similar cliques of like-minded people. The social network loops in on itself leading to a homologous group because the opportunities to make new contacts who introduce innovations are limited. Conversely, Granovetter's 'strength of weak ties' describes how weak ties such as an acquaintance outside the immediate social group can shrink the distance between social groups and introduce new contacts and innovative ideas (Granovetter, 1973, 1983).

The strength of weak ties describes an important element of small world network theory. Weak ties that bridge cliques or create short cuts between neighbourhoods, shrink long social distances and create small worlds. Watts argued that Granovetter's weak ties were similar to random ties in small world networks. Watts looked to Erdős and Rényi's work on the exponential growth of random

nodes and found that real world complex networks such as the US electricity power grid or the neural system of a nematode worm combined random connectivity with orderly clusters to create a small world network.

Importantly, Erdős and Rényi also found that a small world structure does not emerge gradually. It appears suddenly at a point of criticality – this is the phase transition into a small world that occurs when a critical number of connections have been reached. Small worldliness is a process of change and phase transition is its driver; for example, the sudden collapse of a sand pile at the critical addition of a grain of sand or the punctuated equilibrium of a species in stasis that adapts quickly to survive the crisis of a sudden environmental cataclysm or the critical point when water transforms into steam or ice, illustrate phase transition phenomena.

The complexity of networks is further complicated because networks can be either spatial or relational. Spatial networks are defined by Euclidean distance and demonstrated by transportation networks, street grids, infrastructure and telecommunications networks and so on. Relational networks are non-linear such as professional groups, friends and relatives, gossip, fads and fashions. Those who tackled the algorithms that defined small world networks have illustrated their empirical studies of both spatial and relational networks via graph theory. Watts and Strogatz (1998) argued that small world networks were identified by the clustering coefficient (C) and average shortest path length (L).

C measures the typical local cluster and L measures the typical global distance between local clusters. Watts and Strogatz' (1998) seminal paper explained how to identify a small world network. Firstly, here are a few basic graph theory terms for clarity in the following discussion: a graph (or network) consists of *vertices* and *edges*; a *vertex* is a node or point; an *edge* is a line connecting vertices; a *degree* is the number of connections between nearby vertices; a *neighbourhood* is a cluster of nearby vertices that form a subgraph; a *giant component* is a subgraph in which all nodes in the subgraph can be reached by all other nodes in the subgraph; a *cluster coefficient* is a measure of the degree (or steps) which nodes in a graph take to cluster together. There are many more fascinating terms that give precision to graph theory, but these few will suffice to interpret the core of the Watts and Strogatz (1998) and the Barabasi and Albert (1999) theories that explain the emergence of small worldliness. Watts and Strogatz (1998) explained in their initial exposé:

Starting from a ring lattice with n vertices and k edges per vertex, we rewire each edge at random with probability p . This construction allows us to 'tune' the graph between regularity ($p = 0$) and disorder ($p = 1$), and thereby to probe the intermediate region $0 < p < 1$, about which little is known... We quantify the structural properties of these graphs by their characteristic path length $L(p)$ and clustering coefficient $C(p)$... $L(p)$ measures the typical separation between two vertices in the graph (a global property), whereas $C(p)$ measures the cliquishness of a typical neighbourhood (a local property).

The networks of interest to us have many vertices with sparse connections, but not so sparse that the graph is in danger of becoming disconnected... *These small-world networks result from the immediate drop in $L(p)$ caused by the introduction of a few long-range edges. Such 'short cuts' connect vertices that would otherwise be much farther apart than L_{random} .* [my emphasis]. For small p , each short cut has a highly nonlinear effect on L , contracting the distance not just between the pair of vertices that it connects, but between their immediate neighbourhoods, neighbourhoods of neighbourhoods and so on. By contrast, an edge removed from a clustered neighbourhood to make a short cut has, at most, a linear effect on C ; hence $C(p)$ remains practically unchanged for small p even though $L(p)$ drops rapidly. The important implication here is that at the local level (as reflected by $C(p)$), the transition to a small world is almost undetectable (Watts and Strogatz, 1998, p440).

The Watts-Strogatz (WS) small world network has characteristically a large cluster coefficient and small average shortest path length. Or in other words, for large N , a small fraction (p) of shortcuts will contract (global) *Length*, but will leave (local) *Clustering* unchanged (Watts, 2006). Clusters remain locally ordered ($p=0$) but a few random shortcuts ($p=1$) contract the network globally (a small world): "These small-world networks result from the immediate drop in $L(p)$ caused by the introduction of a few long-range edges. Such 'short cuts' connect vertices that would otherwise be much farther apart than L_{random} ." (Watts and Strogatz, 1998, p440). Notice that there is an 'immediate drop' in the average path length when a few random long-range edges or short-cuts between vertices are introduced. This explains the phase transition from the connected caveman world to a small world by the introduction of a few random Solarians. There is a global effect of an immediate drop in the typical separation between two vertices, as Watts and Strogatz explained previously, 'not just between the pair of vertices that it connects, but between their immediate neighbourhoods, neighbourhoods of neighbourhoods and so on'. Conversely, the transition to a

small world at the local level is an ‘almost undetectable’ effect on the cliquishness of a typical neighbourhood. Their findings show that the average shortest path length for random networks and for small world networks are both small, but the cluster coefficient of a small world network is larger than for a random network. This means that the world can be both small and highly clustered. As such, Watts reveals that a small world consists of local clusters of tightly knit (or strong ties) neighbourhoods in a global field of loosely knit (or weak) ties.

Soon after the Watts and Strogatz (1998) findings were published, a raft of wide ranging experiments and applications from the spread of epidemics, to the study of brain activity, digital networks and so on, found relevance in small world network theory. In particular, a study of the URL connectivity of the internet was fertile ground to test the problem of order from chaos. Barabasi and Albert (1999) found in their study of the internet that many nodes have a small degree (a few steps between adjacent nodes) and a few nodes have a very large degree (many steps between adjacent nodes). This means that the few nodes with a very large degree display connectivity throughout the network. These large degree nodes become central hubs or giant components that connect with most nodes in the network – this translates into influence and power. Barabasi (2003) argues that nodes having a very large degree are widely connected throughout the network and form a large central hub (a giant component) which has a level of centralised connectivity that creates a network that is highly reachable. This leads to many self-similar neighbourhoods or ‘mirrored sites’ (so called in the language of the internet) or ‘fractals’ in geometric language. The Barabasi-Albert (BA) model is a small world that is dominated by a highly centralised hub (a giant component) and is scale-free (or mirrored, self-similar or fractal). The Watts-Strogatz (WS) model is decentralised and is a small world without the intercession of a giant component.

Importantly, all scale free networks are small worlds, but not all small worlds are scale free. The key difference is the distribution of the neighbourhoods. The BA small world is highly centralised (or tree-like) whereas the WS small world is decentralised (or mesh-like) (Figure 3.4). The difference between the degree distribution of either tree-like or mesh-like networks points to the dynamic that drives certain nodes to cluster and connect and others not. Consider the spread of a rumour in the context of the tree-like BA centralised small world and alternatively, in the mesh-like WS distributed small world. The WS small world of tightly knit neighbourhoods connected by loosely knit random links consists of distributed neighbourhoods; contact through your nearest neighbour is the most likely opportunity to spread a rumour. A central hub dominates the BA small

world of self-similar neighbourhoods; contact through the central hub is the most likely opportunity to spread your salacious rumour.

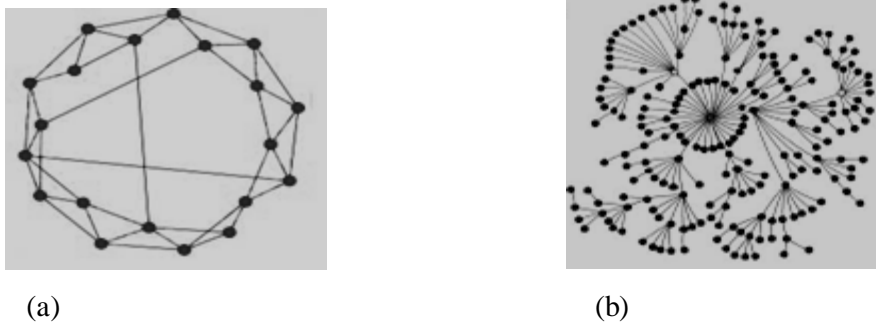


Figure 3.4: (a) WS small world (Watts and Strogatz, 1998); (b) BA scale free (Barabasi and Albert, 1999)

The dynamic that spreads a rumour (or epidemic, information or fashion) in a WS small world is via a ‘nearest neighbour’ whereas in a BA small world a rumour is spread via the ‘power law’. A BA scale free network distribution displays preferential attachment to a few well-connected nodes or ‘rich club’ that is demonstrated by the truism, ‘the rich get richer’. A WS small world network distribution displays nearest neighbour attachment by which a ‘greedy algorithm’ connects one node with its nearest nodal neighbour to get closer to its target (Watts, 1999a; Kleinberg, 2000, 2004).

The network distribution dynamic – either preferential attachment or nearest neighbour - has significant consequences on the fragility and strength of a small world. A BA scale free, centralised small world network is vulnerable to targeted failure but resilient to peripheral failure. A giant component dominates the centralised network and failure spreads rapidly throughout the global network: “...*the absence of an epidemic threshold in such networks* [their emphasis]” is the weak point in the BA scale free network and, for example: “Diseases may easily spread within them” (Pastor-Satorras and Vespignani, 2000, in Dorogovtsev and Mendes, 2003). However, a scale free network has the advantage of self-similarity; the central hub is ‘mirrored’ throughout the network, which reduces the vulnerability of those neighbourhoods at the periphery despite those near the central hub being exposed to the rapid spread of failure. This means that a BA small world central hub is most likely resilient to the peripheral failure of local neighbourhoods, but local neighbourhoods are vulnerable to the failure of the central hub or giant component. As such, the network distribution of a BA scale free network is simultaneously fragile and resilient. Self-

similarity makes the network peripheral neighbourhoods resilient and the giant component makes local neighbourhoods fragile.

A WS distributed small world network that has tightly knit neighbourhoods and a few long range short cuts is resilient to targeted failure, but less so to a peripheral failure. A WS small world network is generated by nearest neighbour nodal connections that form dense local neighbourhoods. These dense local neighbourhoods connect via just a few random long-range short cuts so that failure spreads less rapidly - in contrast to the centralised BA small world - because there is no giant component that will spread failure rapidly throughout the entire network. In a WS small world, failure spreads less rapidly via the nearest neighbour.

WS small world network neighbourhoods characteristically are not self-similar (or mirrored). This makes them vulnerable to the peripheral failure that might eliminate a neighbourhood entirely, but not impact upon the whole network. If the threatened peripheral neighbourhood has a random long-range short cut to another more robust neighbourhood this offers the strength of a weak tie to the failing peripheral neighbourhood. It is the strength of weak ties and the mesh-like network of the WS small world network that makes it less vulnerable to targeted failure than the tree-like BA small world network. Just a few random long-range short cuts or weak ties give local neighbourhoods the opportunity to adapt in the face of critical change. Random or weak ties to local neighbourhoods are an entry into the diversity and innovation of global information that enables adaptation, and yet the distributed network enables resilience to sustain consistency and coherence. The combination of a few random weak ties and the strong ties of tightly knit neighbourhoods of WS small worlds creates a fragile yet resilient small world. The distributed network makes the network peripheral neighbourhoods fragile and the few random long-range short cuts (weak ties) make local neighbourhoods resilient.

The difference between the BA scale free network and the WS small world network is relevant to spatial networks, to relational networks and particularly to masterplanning - a process that is required to address both spatial and relational networks. Spatial networks are based on Euclidean distance and include physical networks such as transportation routes, urban and regional infrastructure services or worldwide communications. Boundaries and borders physically limit spatial networks - these may be political borders or geographical boundaries such as rivers or mountain ranges. Spatial networks in masterplanning refer to the design of clusters of activities and to the connectivity of those clusters of activities. This is nothing new in the masterplanning agenda

– spatial cluster and connectivity are basic functions of a plan whether it is formalised as a statutory planning document or the informal placement of one's cabana on a tropical beach. However, how activities are best clustered and connected for the immediate purposes and for future unpredictable purposes is the dilemma that design professionals face. Small world network theory refocuses the masterplanning of places towards the *relationship* between clusters of activities and the quality of their connectivity (weak ties or strong ties). Masterplanning often begins and ends with the spatial network design; however, the relational networks of a neighbourhood or city often have an unpredictable impact on the implementation of a masterplan because this usually involves people.

Relational networks are certainly influenced by spatial proximity but typically, relational networks are those that are not based on Euclidean distance but facilitated by people's like-mindedness and more abstract content such as the spread of information, knowledge, trends or personal networks of friends and colleagues or limited by barriers such as the digital divide, socio-economic or cultural differences. The human factor of relational networks is difficult to masterplan in the simplistic sense of designing objects in space. Often relational networks involve the continuity of time as people and their perceptions and ideas spread, interact or shift towards adaptation or resilience as outlined in the adaptive perceptual cycle discussed in Chapter Two. A masterplanning approach that is cognisant of how people adapt to or resist urban change offers a way to understand the impacts of urban change on people's perception of place, their place attachment and identity. One example among many is how the adaptive perceptual cycle taps into people's likely responses to urban novelty and in particular, those who are the likely 'early adopters' of innovative ideas who have a fragile threshold to change; the 'early majority'; the 'late majority'; and, those who are the likely 'late adopters' who are resistant to change (Rogers, 1995; Valente, 1996, 2005; Ganis et al, 2011). In masterplanning, combining both spatial and relational networks is challenging and usually limited to spatial networks, however the impact of neglecting relational networks is often revealed once a masterplan is publically exposed to the community at large, particularly for large scale urban redevelopment sites. Small world network theory provides an opportunity to align spatial and relational networks if that alignment can be demonstrated empirically.

Spatial networks are essentially influenced by urban and geographic configurations. Consider the growth of settlements under different geographic spatial conditions: firstly, physical barriers such as mountains, forests, rivers or valleys may limit settlement growth; and secondly, settlement growth may be relatively unlimited in places such as a savanna, desert or tundra. Importantly, limited or unlimited spatial geography is not the only factor that impacts on the network distribution of real

settlements because relational factors are also important - but it serves us here to demonstrate some spatial small world outcomes to such geographic conditions.

Researchers investigating small worlds that might emerge under different spatial conditions have modeled geographic spatial networks by introducing nodes into a limited field and into a virtually unlimited field (a digital construct that has no barriers whatsoever) (Nisbach and Kaiser, 2007; Kaiser and Hilgetag, 2004). The emergence of a network distribution model in a geographic space or field reveals how nodes cluster and connect under the different spatial conditions of a limited field and virtually unlimited field. Firstly, a pioneer node was located in a limited field and one in a virtually unlimited field. Randomly, a new node was located in the limited field and also in the unlimited field. The new node either connected with the pioneer node or not (according to the researchers' algorithmic probability). If the new node failed to connect it was removed from the field. Only those nodes that successfully connected with the pioneer cluster of nodes survived to form a neighbourhood.

To test the periphery of the limited and unlimited fields, other pioneer nodes were located some distance away from the original pioneer cluster (or neighbourhood) and more nodes were located randomly near the original pioneer neighbourhood. A multi-nodal field emerged if the surviving nodes clustered and connected. To achieve small worldliness the results needed to show the characteristic high cluster coefficient (or dense neighbourhoods) and low average shortest path length (or a few long-range short cuts).

Marcus Kaiser and Claus Hilgetag's (2004) research demonstrated that a sparse field of nodes with a few possible connections generated a chain-like configuration of nodes in both limited and virtually unlimited fields. Such networks displayed a low cluster coefficient (low density neighbourhoods) and a high average shortest path length (many long-range short cuts). This means that sparse networks are not small worlds. However, these networks were found to be power-law generated and so, are called 'linear scale free'. An example of something like this type of linear scale free network distribution might be found in Australia which (although girt by sea) essentially is geographically unlimited. Australia is traversed and girdled by long-range highways because the distances are vast (unlimited) and the network distribution of towns and cities is relatively sparse.

Although no difference was evident between a limited or unlimited field in a sparse network, if the algorithmic probability of network growth was tuned to a higher density, different outcomes

emerged: “While it was impossible to generate high network density under virtually unlimited growth conditions, the introduction of spatial limits resulted in high density and clustering, as well as low ASP [average shortest path]” (Kaiser and Hilgetag, 2004, p3). This means that in an unlimited field, nodes on the periphery of the network are isolated and fewer connections are made than those nodes located in the centre of the network. However, in a field limited by a geographic barrier the network soon occupies the entire field and new nodes located in an increasingly dense network create higher density neighbourhoods. The high cluster coefficient (high density neighbourhoods) and low average shortest path length (a few long-range short cuts) in this scenario creates small worldliness. Something like this might be illustrated by the city of Sydney that is geographically limited by Sydney harbor and by the mountains to the west. The dense neighbourhoods are connected by the long distance short cut of Sydney Harbour Bridge that spans between the north shore and the CBD.

3.6 NETWORKS IN MIND

The brain is a limited spatial field. Interestingly, the brain may be a network that is both spatial and relational, the skull being the physical limit for the mass of neurons that spend most of their time in relational tasks. One might say that the skull is the brain’s geographic limit spatially, but that the neural network that facilitates ‘the mind’ is unlimited relationally. The synthesis of the brain’s physical spatial network of neurons and synapses that enables the relational network of the mind is a metaphor for the city with its physical transportation, infrastructure services and communication networks that serve the relational network that make our city lifestyle. Indeed, many urban theorists ascribe an alignment between the city and the mind (Hillier, 2012; Alexander 2002; Salingaros, 1998). Urban theorists who are immersed in the planning and design of cities are likely to structure their perception of the city on schemata that fit in with their knowledge and background. Accordingly, for these urban theorists geometric intuition or spatial law is proposed as the brain’s capacity to geometrically order the complexity (if not chaos) of the city.

Bill Hillier (2012) in particular, claims that geometric intuition is evidence that we might ‘learn about minds’ by analysing the space syntax of cities. Hillier, attempts to learn about minds through its products (in this case, the city) rather than the brain to learn how people perceive and cognise cities. Hillier’s proposition that space syntax may potentially, “throw light on spatial cognition” (Hillier, 2012, p12) is based on a presumption of intuitive geometry.

Space syntax is an intuitive geometry because the normalisation of streets and intersections is a way our economising brain enables us to find our way coherently and consistently. Space syntax for decades was one of the few quantitative attempts to analyse urban space and how people use it (Hillier and Hanson, 1984; Hillier and Penn, 2004). The space syntax representation that has attracted most attention is the axial map which uses graph theory to model how urban spaces are integrated or segregated. The steps towards an axial mapping representation of cities are: (a) normalise the street network; (b) count the changes in direction; and, (c) determine the depth integration value (Figure 3.5).

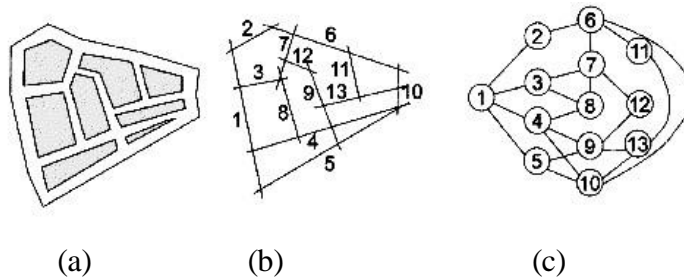


Figure 3.5: Axial mapping process (Porta, Crucitti and Latora, 2006, p714).

The urban street networks are normalized into the fewest and longest lines and patterns of line connectivity. By manually counting the changes in street/ pedestrian/ traffic direction as well as the number of intersections a depth of integration value is revealed. This means that intersections are numbered in levels as each line intersects further into a deeper level, somewhat like the branching of capillaries, trees or other dendritic structure. The level of urban segregation or integration value and pattern implies a city's pattern of physical form and social use. "The most integrated lines are those from which all others are shallowest on average, and the most segregated are those from which they are deepest" (Hillier, Penn, Hanson, Grajewski, and Xu, 1993, p35). This means that integrated places have a connectivity pattern that has few levels of intersections (shallow) and segregated places have a connectivity pattern that has many levels of intersections (deep). The axial map calculates an integration value that represents the pedestrian and traffic movement that travels along a line: "Integration values in line maps are of great importance in understanding how urban systems function because it turns out that how much movement passes down each line is very strongly influenced by its 'integration value'" (Hillier, 1996, p160).

Criticism of space syntax arises because: the quantitative results are often interpreted qualitatively (Ratti, 2004; Bafna, 2003); the process is limited to a binary of linked or non-linked points that ignores other multidimensional forms of connectivity found in real cities (Osman and Suliman,

1994); the popular axial map depends on the existing street network and its buildings and yet the three dimensional measurement of building heights is ignored along with other movement generators such as bus stops, train stations, width of streets, pedestrian pathways, affective, cognitive or sensory experiences (Ratti, 2004; Jiang, 2004, 2006; Porta et al 2006; Montello, 2007); the axial map normalises urban information and sets the condition “that the grid is more or less equally loaded in its different parts with buildings” (Hillier, 1999, p176). These conditions occur rarely in real life and so the results of the axial map may be considered too abstract, limited and biased (Ratti, 2004). And finally, space syntax is an abstraction of street networks that implies the abandonment of metric distance (Crucitti, Latora and Porta, 2006; Ratti, 2004).

The abandonment of metric distance in space syntax raises the question of how the non-metric output of space syntax enables spatial cognition in action. Certainly, distance can be cognitively compressed or stretched in time and space; after all how often do we hear the whining words, “Are we there yet?” emanating from small voices in the back seat of the family vehicle? These few words are spatial cognition in action. This simple phrase represents the building of spatial cognition that is based on expectations of time and distance relative to real experience, which is interestingly distorted by distinctly human feelings of arousal and pleasure, novelty and familiarity, curiosity and boredom and yet, these are what make spatial cognition and placemaking meaningful.

The presumption of intuitive geometry to which Hillier refers is sourced from the role of the brain’s hippocampus that appears to impose a Euclidean framework on non-Euclidean inputs (Hillier, 2012; O’Keefe and Nadel, 1978). This Euclidean framework refers to the distortion that occurs when we recall say, our cognitive map of a place. We commit a map to memory by normalising random angles so that they become regular angles; for example, we tend to distort the oblique angles of a street intersection to 90^0 (Evans and Pezdek, 1980; Tversky, 1981). This is taken as evidence that analysing cities geometrically might teach us about the mind (Hillier, 2012). Rather than using the city (as interpreted by Hillier’s axial maps) as a metaphor for spatial cognition perhaps firstly, we should explore how the brain works.

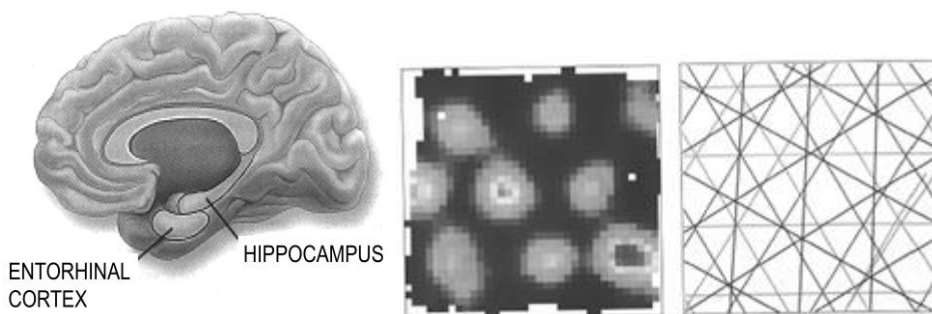
Neuroscience may seem a long way from urban design and planning, but such core urban design and planning topics as complexity, legibility, memorability, imageability, cognitive mapping or the perception of place imply that the way the human brain works might have something to do with placemaking. This brief overview about how the brain works reveals a network of astounding

complexity and rapidity that creates our memories of place, urban legibility and our capacity for cognitive mapping.

The human brain has about one hundred billion neurons. Each of these neurons is connected by about ten thousand synapses. The human brain's microscopic processing connections are estimated at about one thousand trillion (Bullmore, Barnes, Bassett, Fornito, Kitzbichler, Meunier and Suckling, 2009). The use of functional Magnetic Resonance Imaging (fMRI) has discovered place-tracking neurons called 'grid cells' which may explain the brain's process of cognitive mapping (Knierim, 2007)

Firstly, let us get our bearings as we look into the brain. Deep within the brain lays a cluster of organs known as the limbic system. This system enables us to create retrievable memories by associating our memories with our emotions. The hippocampus (horn-shaped extensions of the limbic system) enables memory and the amygdalae (almond-shaped termini of the hippocampus) enable emotional responses.

The hippocampus is the brain's cognitive mapping centre. An early 'map-in-the-head' proposition ushered in the concept of cognitive mapping (Tolman, 1948) and was applied in the 1960s by Kevin Lynch (1960) in his influential work, *Image of the City*. By the 1970s it was discovered that neurons in the hippocampus (called 'place cells') display place specific firing. This means that a place cell fires when we are in a specific location, which enables us to remember where we were and what we did there (O'Keefe and Nadel 1978). Memory of place is acquired in the hippocampus (place cells) via the nearby entorhinal cortex (grid cells). The grid cells inform the place cells in the hippocampus. Grid cells fire when we move and constantly update our location. These grid cells are described as a hexagonal grid arranged in a precisely repeating grid pattern of equilateral triangles that tessellate the floor of the neural environment (Moser and Moser, 2007; Knierim, 2007). The grid cells form a lattice-like structure (called a place field) that acts as a matrix for place specific information (Figure 3.6).



(a) (b) (c)
Figure 3.6: (a) the hippocampus (place cells) and the entorhinal cortex (grid cells); (b) place cells fire (c) grid cell projects a lattice across a place field. (Knierim, 2007; O'Keefe et al, 2014)

With many grid cells there are many overlaid grids mapping our surroundings and increasing the resolution. The place cells respond to external cues and can be re-programmed as those external cues change. This means that whenever we move around a city and observe particular features such as a landmark, place cells fire. Simultaneously, the grid cell system fires so that we can map our location in the place field. The place field is constantly updated as we navigate our way through our surroundings (Knierim, 2007).

Small world network theory has found its way into the research on brain activity. The similarity between brain activity and small world networks is this: firstly, the brain is a complex network that juggles multiple spatial and relational interactions such as psychological, physical, conceptual or emotional scenarios; secondly, the brain segregates, distributes and integrates information; and thirdly, the brain has most likely evolved to maximise efficiency with the least amount of effort (Bassett and Bullmore, 2006; Bullmore and Sporns, 2012).

Brain activity research illustrates small world networks as dense, specialised, local regions of the brain with long range short cuts that distribute and integrate brain activity. Importantly, Danielle Smith Bassett and Ed Bullmore found: "...small world networks of the brain can *operate dynamically in a critical state*, facilitating rapid adaptive reconfiguration of neuronal assemblies in support of changing cognitive states [my emphasis]" (Bassett and Bullmore, 2006, p513).

'Operating dynamically in a critical state' points to the characteristic small world dynamic of self-organised criticality to enable the brain to constantly update and adapt to changing scenarios. This also suggests that a fully operational brain is teetering on a knife-edge of criticality - in a stationary critical state - ready to adapt to any different scenario that might arise. Such research into brain activity explains how small world brain networks consisting of dense, local clusters (or neighbourhoods) of ordered, like-minded functions enable us to think coherently and consistently, while long range short cuts between these local clusters enable us to adapt rapidly and creatively. We may teeter on the edge of criticality, but what keeps us thinking in an orderly yet rapid manner are small world network characteristics that combine the creativity of randomness and the

coherence of order with least effort (Chialvo, 2004; Sporns et al, 2004; Bassett and Bullmore, 2006; Achard and Bullmore, 2007; Rubinov and Sporns, 2010; Bullmore and Bassett, 2011) (Figure 3.7).

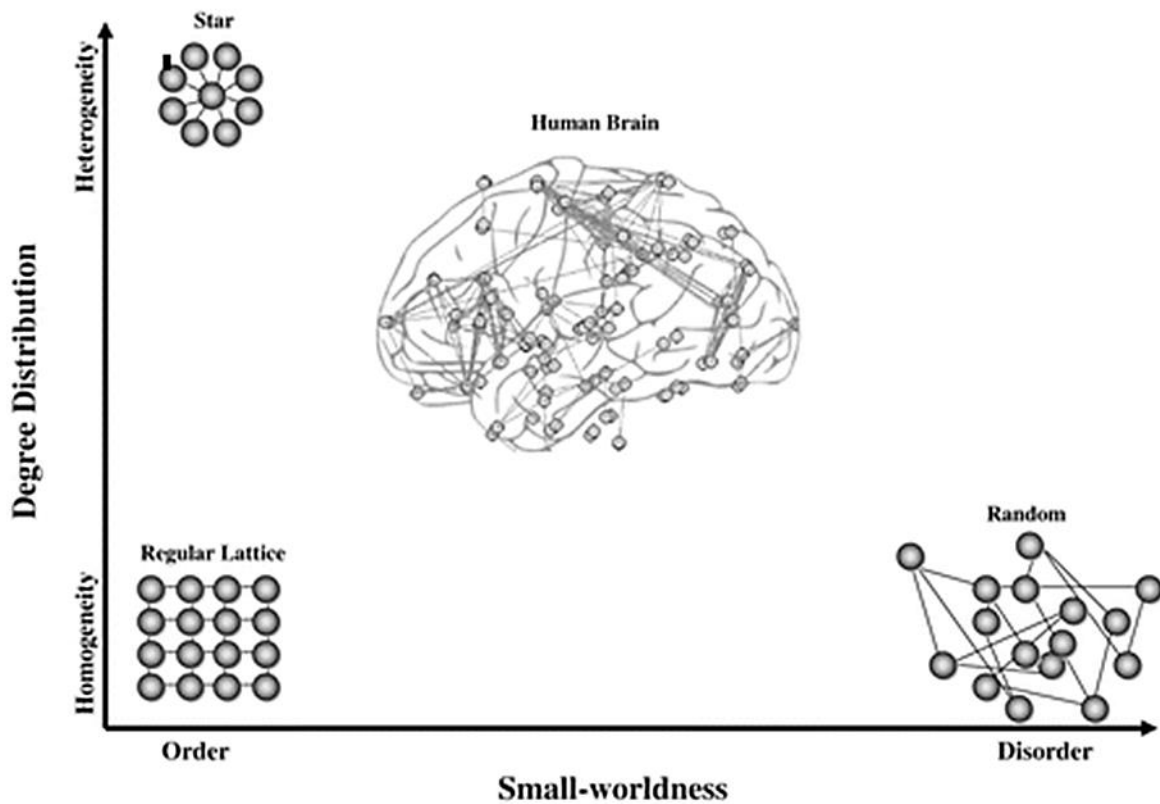


Figure 3.7: “Organization of human brain networks in comparison to extremal architectures on topological dimensions of small-worldness (x -axis) and degree distribution (y -axis)” (Bullmore and Bassett, 2011).

The cognitive mapping structure of the brain that has been found in the hippocampus as well as the small world outcomes of the empirical research into brain activity bear some relevance to our task towards adaptive and resilient masterplanning. Such studies can highlight parallel aspects between the brain and the city. For example, brain activity centres (or neighbourhoods) are connected for rapidity, consistency and coherence and operate through the change dynamic of adaptation and resilience as described in the adaptive perceptual cycle discussed in Chapter Two. The research into brain activity demonstrates the concept of cities ‘operating in a critically dynamic state’, which parallels the adaptive self-organising systems of cities. Criticality is the driver of self-organisation and as described in the adaptive perceptual cycle occurs with the interaction between one’s schema and the real world. Self-organising criticality is a process of negotiation to adapt or resist changing either the schema or the real world. With this in mind, we may surmise that the ‘critically dynamic

state' in which the brain operates as described by Bassett and Bullmore (2006) might also apply to the process of the adaptive perceptual cycle and to cities.

Cognitive mapping has highlighted the role of the hippocampus and the role of place cells and grid cells in memory and recall of places. Furthermore, cognitive mapping illustrates how the street grid of say, Manhattan streets as any tourist will tell you are one of the simplest in the world to understand; a map-in-the-head of this city is established almost intuitively. What follows here is purely conjecture, but it seems that the corners of the brain's place field are particularly sensitive to location (Knierim, 2007). This evokes the important role of urban nodes such as street corners and intersections, landmarks and corner shops in creating legibility (Lynch, 1960; Jacobs, 1961; Alexander, 1965, 2002). The similarity of the lattice or mesh-like place field structure of the brain with urban networks such as street grids may be coincidental or implicit, but there does seem to be an inherent understanding of the street grid layout of a place like Manhattan that people find easy to navigate and easy to remember.

If we consider the alignment between the small world characteristics of the clustered and connected neural nodes and pathways of brain activity and the street network of a city, parallels are revealed. We can find our way through a city via a continuous, orthogonal and orderly street grid system with certainty and coherence so that we arrive at our destination consistently in an unruffled and orderly manner; but there are no short cuts to make our journey quicker. Conversely, a city of disconnected and random streets allows us to take rapid short cuts from one place to another; but we risk getting lost and arrive at our destination in a state of dishevelment or even chaos. If the city has both orderly streets and a few random ones characteristic of the small worldliness of brain activity, we may surmise that our journey will be orderly and coherent and yet enable some random short cuts to reach our destination quickly and with least effort. As such, a small world network model may be as advantageous in an urban scenario as it is for brain function. What both systems (the brain and the city) need is a network that is quick, creative and efficient as well as coherent, consistent and orderly. A network typology that combines those characteristics is resilient (the city/brain network assimilates the changed scenario) and adaptable (the city/brain network adapts to the changed scenario).

If our self-organising brain activity networks align with the complexity of cities as some urban theorists suggest our brain activity researchers show by implication that cities are on a knife-edge of criticality. If self-organising criticality defines the nature of small worlds, the process of phase

transition is inherent in this process for both WS small world networks as well as BA scale free networks. Dorogovtsev and Mendes (2003) ask the questions that are reminiscent of the musings of Aristotle and Plato:

Where does it come from? Is it the imposition of some external will, a lucky product of special design, etc.? [Aristotle's Unmoved Mover?] Does somebody intentionally create such an architecture? [Plato's Demiurge?] The answer turns out to be: 'No, while growing, the networks *organize themselves* into the "fat tailed" [resulting from preferential attachment or the 'rich getting richer'] and scale free structures' (Barabasi and Albert, 1999; Barabasi, Albert and Jeong, 1999). These structures are the direct result of the *self-organization* of networks...One can say, by definition, that scale free networks are in a critical state. So, the problems of the network growth are directly related to *self-organized criticality* [their emphases] (Dorogovtsev and Mendes, 2003, p11).

The emphasis on *self-organized criticality* in small world networks is appropriate because it spotlights the relevance of phase transition. In small world network theory, phase transition is described: "These small-world networks result from the immediate drop in $L(p)$ caused by the introduction of a few long-range edges. Such 'short cuts' connect vertices that would otherwise be much farther apart than L_{random} ." (Watts and Strogatz, 1998, p440). The 'immediate drop' into small worldliness to which Watts and Strogatz refer is the critical point when self-organisation occurs as long-range short cuts shrink the distance between neighbourhoods that otherwise, would remain far apart. Barabasi and Albert confirm the principle of critical phase transition in the growth of BA scale free networks: "...the networks *organize themselves* into the "fat tailed" and scale free structures" (Barabasi and Albert, in Dorogovtsev and Mendes, 2003, p11). As such, both proponents of small world network theory adhere to the principle of self-organised criticality as the trigger to an immediate transition into small worldliness.

Small world network research has its critics (Crossley, 2008). Some social science critics claim that current small world researchers tend to focus on abstract mathematical models which can be simultaneously, useful metaphors in applied disciplines or unrealistic unless tempered by reality. In particular, the role of social relationships and interactions between people tends to be eliminated in a quest for repeatable mathematical models. Although such critics say that researchers ignore the meaning of social relations such as inequality and exclusion, conflict and favour, the 'who you know' truism has been a focus for network theory investigations (Scott, 2004; Urry, 2004; Uzzi and Spiro, 2005).

Social connectivity between people has been impacted by technology and transportation so that geographic proximity is no longer a prerequisite for 'neighbourhood'. Social proximity is often a more influential factor in very large cities; for example, in a big city a geographic neighbour can remain a stranger whereas a professional colleague even in another country can be a close friend. Nick Crossley (2008) and Scott Feld (1981) make the point is that a neighbourhood is formed via a 'focus' that facilitates people with a reason to connect despite the geographic distance between them. Furthermore, a focus can shift according to time of day; for example, a geographical location embodies a physical focus such as a town square or playground, but the timeframe of activities determines whether people cross paths or not.

Social proximity also refers to the status of people and the social barriers between them. Even Stanley Milgram in his chain letter experiments was concerned that the letters might not penetrate racial and status boundaries. Milgram found that although some letters reached a target town quickly, the letters then went 'round and round'. Milgram believed that this implied:

...social communication is less restricted by physical distance than by social distance...Almost anyone ...is but a few removes from the President...but this is only true in terms of a particular mathematical viewpoint and does not, in any practical sense, integrate our lives with [his]...We should think of the two points of being not five persons apart but 'five circles of acquaintances' apart – five 'structures' apart. This helps to set it in its proper perspective (Milgram, 1967, in Carter, 2004, p117).

The intervening years since Milgram (1967) set small world network theory in 'its proper perspective', have witnessed the expansion of the research in disciplines far beyond the social sciences. However, a social science approach has potentially, re-emerged in complexity theory of cities (CTC). Along with many other disciplines, CTC has been dominated by a metric approach to the study of small world networks and as laudable as this is, a discussion about place and its making is necessarily social. Portugali (2012) outlines the potentials not yet realised by CTC and says:

CTC have the potential to bridge between the two cultures of cities: the 'quantitative' science of cities and the 'qualitative' social theory oriented study of cities...In my opinion this [social theory oriented urban studies] is one of the reasons for the almost absence of links between CTC and mainstream planning theory. A better link between CTC and social theory oriented urban studies will provide a good context in which to

realize the potential of a CTC approach to urban planning and design” (Portugali, 2012, p61).

With this potential in mind, this present research takes on the complexity of people and their places in a planning context.

3.7 CONCLUSION

This chapter explained small world network theory within the context of self-organised criticality. Evolutionary theory described adaptation and resilience from the perspective of gradualism and punctuated equilibrium which impacts upon the development of neighbourhood density of small world networks. The origins of small world network theory were outlined through sociology and social network analysis and more recent research in brain networks illustrated the potential for small world network theory in understanding cities.

The next chapter will discuss Placemaking as a process of self-organisation as applied by Christopher Alexander’s new theory of urban design in his San Francisco waterfront redevelopment experiment. The positive and negative outcomes of his experimental urban design project will be discussed in light of the adaptive perceptual cycle and small world network theory. The next generation of urban morphology will be introduced through Michael Batty’s fractal city simulations that have emerged from complexity theory of cities (CTC). Each of these approaches will demonstrate their contribution to understanding urban morphology. Portugali (2012) will issue a final challenge to CTC theorists to shift their gaze from the complex but mechanistic study of cities towards one that is a study of human cognition and perception.

CHAPTER FOUR

SELF-ORGANISED PLACEMAKING

4.1 INTRODUCTION

In the previous chapter we delved into the topology and dynamic of small world networks. Small world networks were described as the outcome of self-organised criticality; a change dynamic that applied also to the adaptive perceptual cycle described in Chapter Two. It was argued that a small world network is driven by self-organised criticality and as such, is subject to phase transition that transforms a random set of nodes into a small world network.

In this chapter, the discussion will relate the notion of self-organised criticality of the adaptive perceptual cycle and small world network theory to placemaking. A relational approach to our perception of place was posed by place philosophers Malpas (1999) and Casey (1997); cognitive psychologist Neisser (1976) and others; theoretical physicist Bak's vivid description of self-organising criticality; and human geographer Portugali who with physicist Haken (1996) consider these theories in the context of complexity theories of cities (CTC). The synthesis of these ideas will lead to the proposition that small world networks offer an adaptable and resilient masterplanning framework that has both a short-term time scale as well as a long-term time scale in mind, particularly relevant for our focus on masterplanning large scale inner city redevelopments. As such, the focus of this chapter will be on placemaking in the context of small world network theory and the adaptive perceptual cycle. Small world network theory will be considered in its application to fractal cities, a concept that explains the morphology of cities. The adaptive perceptual cycle based on the notion of place as the interdependency between schemata and experience will be discussed in relation to Christopher Alexander's experimental 'new theory of urban design' process. This specific examination of an antecedent of urban placemaking theory reveals some problems with the perception of place and placemaking via the San Francisco new urban design theory experiment (Alexander et al, 1987) as well as its descendant fractal cities approach (Portugali, 2012; Batty, 2013). Finally, this chapter ends with Portugali's challenge on several fronts of complexity theory for cities (CTC) research. He highlights the gaps in CTC research as the failure to include human cognition and perception; acknowledge short-term and

long-term timeframes; investigate the semi-lattice in the context of small world network theory; and apply qualitative and quantitative methods in CTC research of the people-place phenomenon.

4.2 BECOMING PLACES

The question that confronts placemaking is this: Should places be planned to *come into being* or should places be always, *becoming*? (de Roo, 2010, Seibt, 2013). *Coming into being* in placemaking emphasises the outcome of a plan such as a building or other place artefact. Placemakers such as architects, town planners and urban designers are often cast in the role of creators of a place artefact *coming into being* usually within a foreseeable timeframe. *Becoming* a place shifts the emphasis towards a process of placemaking that is ongoing and incomplete and may involve urban growth or shrinkage over a long-term time scale. There may be a vision or aspiration of an urban artefact or outcome, but the placemakers' role is less focussed on the completion of placemaking because the timeframe is less defined.

The difference between a place *coming into being* and one that is *becoming*, hinges on people's expectation for the realisation of a vision. As described in the adaptive perceptual cycle, people's schemata guide their experience of a real world context or situation; they are armed with expectations. For example, it is reasonable to expect that your architect will implement your dream home to *come into being* within a few months or so. Your architect will expedite the building process through meticulous design detail and efficient construction. However, it may be unreasonable to expect your town planner to realise your harmonious village or cosmopolitan lifestyle in which you feel a sense of place, belonging and community with such immediacy. However, it is reasonable to expect your town planner to sense the Zeitgeist (from German Zeitgeist, from Zeit 'time' + Geist 'spirit') (New Oxford American Dictionary, 2007) and to enable a place *becoming* what it needs to be. Many design professionals overlap in the roles of architect, town planner and urban designer often juggling the short-term time scale of the *coming into being* of a particular built form expectation within a long-term placemaking agenda that has a less particular built form expectation. Each design professionals' role – architect, town planner or urban designer - has a different purpose, priority and approach based on the timeframe of their placemaking agenda.

The combined effects of people's shifting expectations and contextual change over time are the fundamental drives of placemaking. However, this can vary with scale: short-term time scale or long-term time scale; rapid or slow change; criticality or equilibrium. A placemaking project with a

short-term timeframe often is defined by a budget and a client's expectation of a built form artefact. These placemaking projects need a planning product such as a set of delineated plans to expedite the process with certainty. A design professional undertaking a placemaking project with a long-term timeframe, indeterminate budget and an unknown client body usually many decades into the future needs a planning product that adjusts and adapts to change. This means that the push and pull of certainty and uncertainty is the consequence of attempting to predict a fundamentally unpredictable future. Although a detailed masterplan programs the short-term certainty needed for implementation, it is the long-term uncertainty of changing urban contexts, perceptions and the possibility (indeed likelihood) of crises impacting upon placemaking that is problematic. This is why an adaptive and resilient framework underpinning a masterplan supports places *becoming* what they need to be.

Most building projects are budgeted, planned and built in a relatively short term timeframe with the certainty of completion (usually capped with celebratory drinks) as the building *comes into being*. However, placemaking is a continuum that may include such festivities at these tiny teleological points in time, but the drive towards *becoming* a place is uncertain and ceaseless. After all, when did Paris become Paris or New York New York?

A place or project that is planned to *come into being* implies an end product and a sense of resolve if not urgency, whereas the planning for *becoming* a place is somewhat inconclusive and unresolved. Placemaking with a sense of resolve or urgency is one in which a bright new future has been envisioned, masterplanned and programmed to achieve that future. The parameters for a particular future are set and certain. Conversely, placemaking (in a sense, the *becoming* a place for an unknown future community) tends to be more inconclusive, less resolved and perhaps less urgent. The point is that the circumstances under which placemaking is motivated has import – there is either an urgent need to resolve an urban crisis or alternatively, urban equilibrium with no critical urban issues to resolve.

4.3 PLACEMAKING UNDER CRISIS

Placemaking questions seem to be pushed to prominence during a crisis. Indeed, the role of urban designer or town planner is often one of averting crises or amending the outfall of the crises of placemaking from urban blight to sanitation to environmental catastrophe to social injustice to economic failure - crises can emerge from any number of placemaking parameters and problems. And there is no guarantee that crises have been identified correctly and dealt with appropriately, or

that the solution does not expose or create another crisis. A design professional might have some semblance of understanding, expertise, experience or education to diminish the uncertainty about what to do and how to do it, but even in a context of certainty placemaking is always open to change and chance. Certainty and uncertainty indicate a level of confidence in one's prediction, forecast or prophesy. The prophetic nature of a planner's work can be somewhat covertly cloaked in data and information systems but nevertheless, much time and effort is spent honing the role of urban oracle. Knowing what one knows and does not know, or not knowing what one does not know is only part of the problem of prediction. The problem with prediction is its unpredictability.

Here enters the planners' paradox of prediction. A paradox "is an argument that starts with apparently acceptable assumptions and leads by apparently valid deductions to an apparent contradiction...[a paradox] is useful because it can show that something is wrong even when everything appears to be right" (Aharonov and Rohrlich, 2005, p2). The paradox of prediction is nothing new in disciplines such as philosophy, mathematics, physics and economics but such vicissitude in the domain of urban design and planning might be unwelcome when dealing with urban crises such as community safety, health and hygiene, political and social upheaval, economic volatility, environmental catastrophes and natural disasters, poverty and slums. All these crises and more are grist for the planners' mill.

A raft of planning and urban design theories have been stimulated by the problems and opportunities of the densification of cities from the early Utopian ideas of Garden Cities that sought to resolve the Dystopian urban conurbations of the industrial revolution to a much later New Urbanism that elevated familiar places over modern ones. Paradoxically, modern places that were designed to cure the social ills and restore urban and architectural order to a war-torn 20th century through Radiant cities of crystal towers in open verdant spaces eventually were seen as the perpetrators of 'placelessness'. The suburban epidemic spread by the distortion of likely good ideas at that time such as Garden Cities and Broadacre prairie homes, were eschewed by cosmopolitan city dwellers that aspired to New York street life and bohemian Greenwich Village lifestyle neighbourhoods. Nevertheless, city densification – the blight of the industrial revolution - has emerged in the 21st century as the way to solve the crisis of sustainability in the face of climate change and environmental if not human catastrophe.

All of these urban crises can emerge from any number of parameters whether physical, social, cultural or economic and so on. Furthermore, these urban parameters may be inscrutably entangled.

Nevertheless, the good thing about a crisis is that problems become visible, insistent and apparently obvious. The bad thing about a crisis is that the apparent clarity of these visible problems become so convincing that they dominate all other problems, leaving the entangled nuances of the possible impacts from a well-intended resolution, unknown and unforeseen (Rittel and Webber, 1973; Australian Public Service Commission, 2007). The problem is that urban ills can emerge at various times and situations from a complex relationship of urban influences, parameters and participants, which often impact upon the quality of placemaking. And this multidimensional urban scenario is what masterplanning attempts to wrangle.

If the task of masterplanning is to create a sense of certainty in an inevitable context of “social and political fragmentation...[then] Consensus building processes are not only about producing agreements and plans but also about experimentation, learning, change, and building shared meaning” (Innes and Booher, 1999, p412). Consensus as part of a participatory planning process is a good idea particularly if such processes are open to ‘experimentation, learning’ and ‘change’. If the design professional could be certain that the people, place and planning paradigm of the day would stay the same then one might proceed with confidence. However, as John Friedmann asks: “...what would long-range ‘planning’ look like that does not necessarily terminate in visions, frameworks, and policy guidance for day-to-day decision making?...what sort of ‘guidelines’ can a plan provide that is already incongruent with the realities of the region by the time it is officially adopted?” (Friedmann 2004, p54). Paradoxically, certainty is fragile because it is based on one’s confidence or trust in one’s own judgement – and that trust erodes rapidly with the flux of shifting urban parameters. Under such circumstances, the confidence that comes with certainty needs to be bolstered. The traditional planning response was to seek comprehensive information, reliable and valid data, relevant opinions and renowned expertise to sharpen the certainty of predictions and so, to restore one’s confidence. For example, simulation models of where cities have come from and where they are likely to go are a convincing tool to shore up one’s wavering confidence. Trust in one’s judgement restored, decisions can be made confidently, as long as the urban parameters are stable, the urban context remains unruffled by catastrophe and a long-term view helps to smooth everyday perturbations. Inevitably, change happens. One’s expectations may (or may not) eventuate under the constant threat of unknown variables that lurk in the most established of places.

4.4 SELF ORGANISED PLACEMAKING

Self-organisation in placemaking has a history that precedes formal small world network theory and its urban application in simulation models of cities illustrated by CTC protagonists. The notion of

self-organised placemaking particularly in planning cities was nascent in the ideas of systems theory. This approach described the interaction of entities devised as a mechanism that could be tweaked if negative feedback was detected (Taylor, 1998; Van Assche and Verschraegen, 2008). In a planning context this analogy might have seemed a useful justification for controlling the formation of cities by planners as ‘implementers’. This top down implementer approach is countered by a bottom up ‘facilitator’ approach by which planners facilitate the midwifery of places towards what they need to be. Michael Batty describes the difference between urban planning as top down implementation and bottom up midwifery: “...cities are more like biological than mechanical systems. The rise of the sciences of complexity, which have changed the direction of systems theory from top down to bottom up, is one that treats such systems as open, based more on the product of evolutionary processes than of grand design... the image of a city as a ‘machine’ has been replaced by that of an ‘organism’ ” (Batty, 2013, p14). As such, biological metaphors are the rootstock of fractal cities.

Many urban theorists have demonstrated their predilection for placemaking as a biological process; this analogy almost automatically embeds the notions of natural, organic and ecological attributes and in these times of environmental crises and salvation through sustainability, such associations are seen as all for the good. However, the analogy of cities as an ‘organism’ is pliable rather than precise and can refer to a range of concepts from biological lifecycles or the vitality of the life force; to body parts and internal organs; to processes of metabolism, vascular and respiratory systems and so on; and, biological evolution (Marshall, 2009). It seems that the ‘organic’ metaphor is one that can morph into any number of shape-shifting ideas and often applied implicitly. In the case of fractal cities Batty argues, “...for what is, in effect, a new paradigm – that we think of cities as sets of interactions...and networks, and that the patterns that characterize urban growth form emerge as intrinsic consequences of interactions, flows of energy, and information” (Batty, 2013, p16). The metaphor of ‘flows of energy’ – one might even say the ‘chi’ of the city – shape-shifts the image of the city as ‘organism’ from the physical form, biological systems and processes to the domain of the effects of energy, the intrinsic consequences of which ‘characterize urban growth form’. In small world network theory language this might describe the inherent dynamic that shapes the cluster and connectivity of neighbourhood densities: the fractal city is the intrinsic consequence of the ‘power law’ that creates a model of centralised, hierarchical or tree-like, scale free networks; and, the ‘nearest neighbour’ dynamic that creates a distributed, lattice or mesh-like, small world network.

Christopher Alexander was an early experimenter towards an urban design theory based on an idea of the complex lattice-like qualities of places through his primal declaration: *A city is not a tree*, (Alexander, 1965, 1980, 2002; Alexander et al, 1975, 1977, 1987). In his seminal paper, ‘A city is not a tree’, Alexander touched on several points that foreshadowed CTC and small world network theory. Alexander states: “The semilattice axiom goes like this: *A collection of sets forms a semilattice if and only if, when two overlapping sets belong to the collection, the set of elements common to both also belongs to the collection* [his emphasis]” (Alexander, 1965, p58-61). Alexander explained via Venn diagrams how sets and subsets of urban elements are interrelated almost randomly.

It must be emphasized, lest the orderly mind shrink in horror from anything that is not clearly articulated and categorized in tree form, that the idea of overlap, ambiguity, multiplicity of aspect and the semilattice are not less orderly than the rigid tree, but more so. They represent a thicker, tougher, more subtle and more complex view of structure (Alexander, 1965, p58-61)

Alexander embraced randomness and complexity that later CTC urban theorists developed. But as Portugali (2012) points out, the orderly tree form (that horrified Alexander) superseded the semi-lattice through the law of fractal geometry. Alexander with his mathematical colleague Nikos Salingaros (2013) scoured mathematical laws in an attempt to realise a method that could accommodate the ‘overlap, ambiguity’ and ‘multiplicity’ inherent in ‘natural cities’. And perhaps it was not until the turn of the century that such laws were revealed in small world network theory – that inherently accommodates order and randomness – and may offer the dynamic process that might support ‘natural cities’.

Alexander and his colleagues tested his ‘natural city’ concepts of semi-lattice and incremental ‘organic’ placemaking was through the hypothetical urban redevelopment of a large-scale San Francisco waterfront site. His urban design method was one of achieving synergy between two entities: the context and the built form (Alexander, 1977, 1979). The aim of his improvised urban design method was towards the incremental growth of ‘natural cities’ that evolved organically. The *New Theory of Urban Design* (Alexander et al, 1987) “...challenged the notion of ‘design’ as a progressive expression of schematic intentions and argued for a conception of design as a stepwise, non-linear evolution in response to a series of contextual urban factors” (Mehaffy, 2008, p87).

Organic places are those that grow as a whole, just like any biological organism which Alexander and his colleagues assert is not some elusive notion of eco-psychology or an urban design analogy

(Mehaffy, 2008). Alexander claims that the process of placemaking as the growth of a living thing intended to emerge wholeistically, each urban increment informing the next stage of its growth, somewhat similar to the genetic coding information that steers the outcome of an organic entity. This urban design method tapped into early ideas of complexity theory (Weaver, 1948) promoted as ‘organised complexity’ by Jane Jacobs (1961) and generative methods that Alexander and his colleagues continue to explore (Alexander 2014; Salingaros 2014; Mehaffy 2004) that was formalised into New Urbanism and SmartCode (Duany and Plater-Zyberk, 2014) and led (either directly or indirectly) to complexity theory of cities (CTC) via space syntax debates (Hillier 1996; Jiang, 2004, 2006, 2008; Portugali et al 2011; Portugali, 2012; Batty 2013). This is the theoretical milieu and heritage of complexity theory in urban design that Alexander et al (1987) initially tested their new theory of urban design in the San Francisco waterfront redevelopment experiment.

Although the San Francisco waterfront redevelopment experiment was effectively, designed in a studio context he and his colleagues aspired to create an open, intuitive and spontaneous urban design method that acknowledged people’s collaborative involvement in an adaptive process of placemaking. The aim of the project was to achieve wholeness of urban form generated by a single overriding rule: “*Every increment of construction must be made in such a way as to heal the city* [his emphasis]” (Alexander et al, 1987, p22). Building *to heal the city* means that each new piece of the urban fabric acknowledges the continuity of the urban context and the new developments’ healing contribution to the whole (Alexander et al, 1987). Importantly, it is proposed that the ‘healing’ of the city is achieved without a regulatory plan.

This notion of a non-regulatory approach to urban development within the argument of this hypothetical project was theoretically appropriate, but in a real urban context it might have been too much to expect; Alexander may not have predicted the real life outcome of a non-regulatory planning approach. Non-regulatory or non-prescriptive urban planning was seen in the 1980s in the guise of the neo-liberalism of ‘Thatcherism’ in the UK and ‘Reaganism’ in the USA. Alexander may have dreamt of *healing the city* in small scale increments driven by local community consultation to consolidate the growth of the ‘natural city’, however, non-regulatory planning in the hands of the neo-liberal agenda of small government and the free market cultivated a laissez-faire approach to urban redevelopment (Steele, 2009). And as Peter Hall (2002) pithily comments, the urban planners’ role went from “regulating growth to encouraging it by any and every possible means – the gamekeeper turned poacher” (Hall, 2002, p379). Consider the London Docklands redevelopment which (as reported in *The Guardian*) staggered through a swathe of reports, strategic

plans, public enquiries, conflict and confrontation between powerful government ministers and Greater London Council heads, until: "...the Haussmannesque chutzpah of Michael Heseltine [made] something happen. His undemocratic London Docklands Development Corporation overrode planning controls, amassed land acquisition powers and avoided grand strategic plans. This was to be laissez-faire city-building as enterprise zones and business parks crowded out local housing and Dockland jobs" (Hunt, 2009).

This was not the outcome Alexander envisaged. About two decades after the *New Urban Design Theory* proposed a non-regulatory approach, some qualifications were offered; Alexander proposed that new developments needed legal controls and guidelines and also, that developers should contribute to the growth of a community and the rebuilding of neighbourhoods (Alexander et al, 2005). Despite Alexander's shift towards a more regulatory approach the original ideas were retained: that of incremental urban change and the emergence of centres intuitively, rather than prescriptively; and, informal community discussion and feedback to encourage the spontaneous development of an organic urban form. This process was to be nurtured and protected by the regulatory controls and guidelines imposed upon developers.

Theoretically at least, if cooperation between the community, design professionals, government authorities, developers and civic leaders could be resolved, each urban increment would provide a clue to guide the next. The organic accretion of built form increments eventually would complete a wholeistic urban centre. All this was nicely demonstrated in the San Francisco experiment in which clusters of activity nodes and connectors created a complex network that was woven together and intricately interconnected (Alexander et al, 1987).

However, even the participants in the San Francisco experiment were not fantasists. Alexander admitted that although the experimental urban design approach created a place that was intimate and human scale (and this was an important outcome) it lacked the organic unity and coherence to which they aspired. It seems the San Francisco project participants were so immersed in the intricacies of building detail of each urban increment that they failed to step back and see, as Alexander put it, 'the large structure':

At this stage, a danger presented itself. The path from the freeway to the church, and row houses which help to shape this path, have the same kind of physical and

geometrical character as the earlier development. It is slightly straggling, loose, and easy going.

But what was pleasant in the small area of the first part of the development around the garden and the mall, might not be at all pleasant, if continued in the much larger area which was going to be developed next. The curve of the freeway imposed an irregularity, which would be hard to control. *There was a real danger that there would be a randomness, a feeling of incoherence, that would be impossible to tolerate* [my emphasis]...and also impossible to correct, if it was not corrected early on.

In order to make sure this didn't happen, the members of the committee now made a proposal, of a general nature: namely, that in the general area bounded by the freeway, the waterfront, and the main square, there would be a grid of tiny streets, leading to the water.

At first, this proposal caused some resistance...members of the class felt that it violated the spirit of the project, since it greatly resembled a masterplan.

Slowly, discussion made it clear that this proposal was quite unlike a conventional masterplan, since it merely identified a structure of emerging centres in a very small area...but by making it explicit, helped it to develop coherently (Alexander et al, 1987, pp162-163) (Figure 4.1).

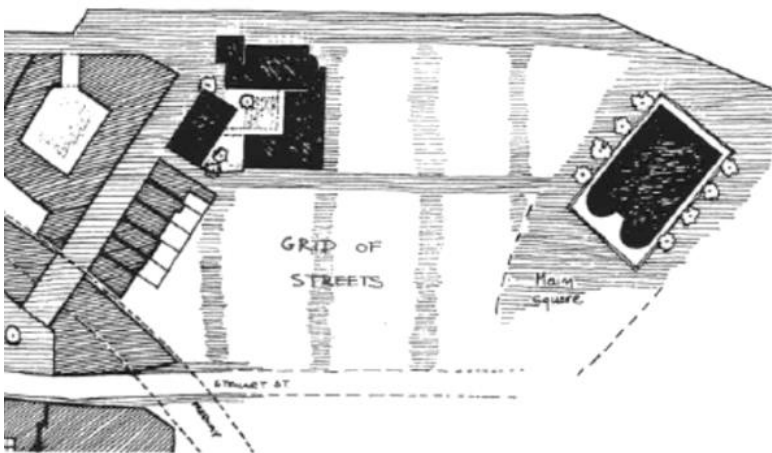


Figure 4.1 San Francisco waterfront project (Alexander et al, 1987, pp162-163)

Alexander admitted candidly: “All in all, then, the unity of the project is not quite as deep as we had hoped. There is partial unity. But the profound simplicity and unity which was often achieved in old

towns, has not yet been achieved... it does not yet have the profound unity of a place like Amsterdam or Venice” (Alexander et al, 1987, p235). Factors that contributed to the failings of the outcome were firstly, because the designers focussed on the building detail that became somewhat idiosyncratic and resulted in a rather muddled architectural character, and secondly (and more importantly) the large-scale urban structure was neglected to the detriment of the whole: “Far more serious...we felt that the project does not yet have a powerful enough *sense of order at the largest scale* [my emphasis]...Thus, unfortunately...the intention of producing large-scale wholeness, we still created something which is too much an aggregate of parts, not a single, well-formed whole” (Alexander et al, 1987, pp236-237). This was the intolerable incoherence that motivated Alexander to intercede and insert an orthogonal street grid into a district that seemed too random to tolerate.

The designers of the San Francisco experiment protested. The insertion of the street grid by a Platonic ‘Demiurge’ or Creator (Alexander in this case) was the antithesis to the spontaneity and spirit professed by the experimental ‘new urban design theory’. In the context of this present discussion, Alexander’s decision to insert some urban design order into the ‘impossible to tolerate’ randomness was significant. Alexander’s intercession caused some consternation with the designers’ intuitive spontaneity and could be called a ‘crisis’. After all, inserting a predetermined orthogonal street grid into an intuitive incremental urban design process is tantamount to failure if not heresy. Nevertheless, Alexander’s insertion of an orthogonal street grid had in effect, generated a potential neighbourhood network (superficially at least) along the lines of a small world neighbourhood in which nodes have strong links with their nearest neighbours to form dense neighbourhood clusters. Although this neighbourhood was not the outcome of nodes connecting through the dynamic of ‘mutual acquaintances’ or the strong ties of a neighbourhood as found in the ‘connected caveman world’ described in Chapter Three, the orthogonal street grid created some order within the intolerable randomness faced by the designers (or more specifically, Alexander) in the context of the San Francisco` experiment.

Another aspect, which is important in the context this present discussion, is the perceptual process that occurred firstly, from Alexander’s perspective and secondly, from the designers’ perspective. This was a demonstration of the adaptive perceptual cycle at work in the mind of Alexander and his colleagues. Consider the words and actions that he and his colleagues revealed. Firstly, he revealed in the words, *There was a real danger that there would be a randomness, a feeling of incoherence, that would be impossible to tolerate*, implies that the intent of good organic urban design had reached his point of perceptual criticality. The reality of the randomness that was emerging in the

project was a bad fit with his schema of good urban design despite the intuitive intent of the theory. Order needed to be inserted into this ‘impossible to tolerate’ randomness. Consequently, an orthogonal street grid was proposed to create a sense of order. Interpreted from the perspective of the adaptive perceptual cycle, the resilience of Alexander’s schema for good urban design meant that the hypothetical world of the San Francisco experiment had to adapt to his schema. Next, Alexander’s proposed insertion of the grid ‘caused some resistance...members of the class felt that it violated the spirit of the project’. Perhaps this indicated that their expectation or schema for this new urban design theory directed that it was a process taking its cues from the ground up rather than from a top down (in this case, Alexander and his committee) intercession of order via a very traditional street grid. After some discussion (compromise, negotiation, debate, or argument) the designers complied and their schemata were adapted towards Alexander’s grid.

In the context of the discussion about the adaptive perceptual cycle this was an important episode- Alexander demonstrated his own schematic tendency towards order in an intuitive random urban design process by inserting an orthogonal street grid into a hypothetical project. In a real world urban context, urban development is exposed to the many vicissitudes of competing stakeholders’ agendas vying for dominance. This contestation may result in places that are fragmented, incoherent or excessively random; however, just as had occurred with Alexander’s hypothetical urban design project, the stakeholder whose order parameter dominates all others (or whoever can negotiate a favourable compromise) sets the agenda. As such, the dominance of an order parameter can occur either coherently through negotiation and compromise or fragmentally through adversarial disputation with placemaking accordingly, emerging from the melee.

Order parameters for the formalization of Alexander’s experimental generative method arrived through New Urbanism and the influential SmartCode (Duany, Plater-Zyberk 2014): ‘Duany’s latest Herculean effort is a new model zoning code called the SmartCode... The SmartCode is based...on an analytical tool called the Transect. The notion, developed by Sir Patrick Geddes in the early 1900’s and refined by the Duany brothers, is that urbanism occurs across a spectrum from urban center to rural wilderness, and that any system of zoning must account for that structure’ (Mehaffy, 2004). Ironically, although the roots of SmartCode are in ‘organised complexity’ and organic evolutionary processes that imply the adaptive and collaborative notions of *A New Theory of Urban Design*, Duany delivers a searing critique:

Do we let the people make mistakes? OF COURSE NOT! Urbanism is too long-lasting. When poorly done its capacity to undermine human happiness is too great! The secret

of all good planners (Chris [Alexander] included) is that they have ‘a black shirt hidden in the closet’ [presumably a reference to the Italian Fascist uniform] (to quote one of our best and most experienced colleagues, told to me in private conversation). Someone really strong must decide the Patterns. We at DPZ [Duany Plater-Zyberk], who have handed over more design to others than anyone else, have learned that the looser the constraints (the codes) the worse the result...

We can no longer count on the vernacular mind. The noble peasants and masons of yore now have televisions and magazines. They are willing subjects of a sick culture, not prisoners within it.

Our only chance is to act like proper modern revolutionaries and capture the most powerful transmitters of the culture: the codes and protocols and marketing mills. There is no other method for implementation on the scale required [his emphasis] (Mehaffy, 2004).

4.5 COMPLEXITY IN PLACEMAKING

Alexander sought to create a wholeistic place, but admitted his urban design project failed. He challenged next generation academia: “So, somehow, we must overcome our ignorance, and learn to understand the city as a product of a huge network of processes, and learn just what features might make the cooperation of these processes produce a whole. We must therefore learn to understand the laws which produce wholeness in the city” (Alexander et al, 1987, in Batty, 2007, p457). This challenge was a stimulant towards unearthing the laws that make fractal cities; however, much of Alexander’s core ideas of the people-place impetus in urban design appear to have succumbed to the fascination with fractal geometry by collaborators of complexity theory of cities’ (CTC) and in particular, with their simulated city modelling.

Firstly, the notion of fractals was “...a term coined by their originator Benoit Mandelbrot (1983) [and] are objects of any kind whose spatial form is nowhere smooth, hence termed ‘irregular’ and whose irregularity repeats itself geometrically across many scales. In short, the irregularity of form is similar from scale to scale, and the object is said to possess the property of self-similarity or scale invariance” (Batty and Longley, 1994, p3). Fractal geometry enables the application of spatial rules that emerge from irregular, organic forms rather than fitting forms to a Euclidean geometry: “...cities are complex organisms, evolving and changing according to local rules and conditions which manifest more global order across many scales and times” (Batty and Longley, 1995, p10). A city itself creates its spatial rules locally and these rules are self-similar or mirrored globally. The

differentiation between Alexander's 'laws which produce wholeness in the city' and Batty's 'cities as complex organisms', evolving and changing local rules and conditions is slight, but significant. Cities are complex organisms that evolve and change according to local rules (Batty and Longley, 1995). This idea is an explicit analogy to the role of genetic codes as the 'local rules' of the organism. Organisms' genetic coding is influenced by the drive of survival, environmental change and sometimes, random mutations and so, the readiness of the genetic coding of organisms (as well as cities) towards adaptation is paramount.

Alexander et al's (1987) 'laws which produce wholeness in the city' perhaps implies a more resilient organism. Specifically, such laws aspired to the wholeness of old world cities almost as an ideal Form in the Platonic sense as expressed by Alexander as he laments that the San Francisco experiment failed to embody "the profound unity of a place like Amsterdam or Venice" (Alexander et al, 1987, p235). Although Alexander and his colleagues claimed that the *process* was paramount this phrase implies (perhaps unintentionally) the *production* of a place exemplar or schema. Nevertheless, Alexander pinpointed a key element that was missing in the outcome of the experimental urban design project – the absence of a 'sense of order at the largest scale', which (as proposed in this discussion) small world network theory might offer.

Michael Batty and his colleagues align fractal cities with evolutionary gradualism; however as explained in Chapter Three through the research by Erdős and Rényi (1960) and later, Watts and Strogatz (1998) and Barabasi and Albert (1999) they all say that small worlds do not adapt and emerge gradually, but suddenly. Considered in the context of an evolutionary metaphor of small world network theory; it depends on the timeframe (long-term time scale or short-term time scale) and the environmental context (widespread and stable or isolated and critical) whether small worldliness is the result of gradualism or of punctuated equilibrium. As previously defined in Chapter Three, evolutionary gradualism is an incremental adaptation of creatures in a widespread and stable environment that in the short-term is imperceptible, but in the long-term, adaptive change becomes apparent as a gradual and constant process. Alternatively, punctuated equilibrium is evolution defined by long periods of equilibrium or stasis when isolated creatures remain relatively resilient to change and then suddenly, the equilibrium is punctuated by a rapid and dramatic adaptation, possibly triggered by a catastrophic event or critical change. If we align these notions of evolutionary adaptation with the phase transition of self-organizing, scale free, fractal cities the application of the principle of gradualism may apply in a very long time scale, but in the more

immediate time scale that masterplanning is required to address – particularly of large scale urban redevelopment sites - it is proposed that punctuated equilibrium is closer to reality.

Evolutionary gradualism or urban incrementalism might be applicable in stable, widespread urban contexts that demonstrate a continuous lineage over a very long time, as found in old world cities such as London, Paris or Rome; however, in parts of the formerly undeveloped world that have been relatively isolated either geographically, politically, economically or culturally, the sudden influx of money or political power or social freedom and equality in these places is more likely to demonstrate the volatile growth spurts of punctuated equilibrium, rather than the gradualism of more established places.

Take a step further into the world of our urban theorists; the approach of Darwinian evolutionary gradualism as implied by Patrick Geddes (Batty and Marshall, 2009) and New Urbanism via Jane Jacobs (1961) is questioned here. If our urban theorists suggest that cities are the products of evolutionary gradualism then this avoids the inconvenient principle of phase transition demonstrated by punctuated equilibrium. If we consider that the notion of the fractal city proposed by some urban theorists, is based on the characteristics of BA scale free networks, then to describe fractal cities in the same breath as urban incrementalism or evolutionary gradualism is ambiguous or at least questionable. Indeed, Michael Batty and Yichun Xie (1999) state: “Our task then ... is very clear. If we can show that the fractal dimension of real cities is *comparatively stable over long periods of time* we will have some confidence in thinking that the theory of *self-organized criticality* has some relevance to the way cities develop [my emphases] ” (Batty and Xie, 1999, p113).

If fractal geometry is sourced in BA scale free networks, it is by definition the product of self-organised criticality and if (as Batty and Xie say) the key to ‘show...the fractal dimension’ of cities is gradualism ‘over long periods of time’, this suggests that the perturbations of crises have been smoothed by observations of a city’s growth over a long-term time frame. As claimed by Darwinian evolution adaptation occurs in widespread species, in relatively stable environments over a very long geological time scale; just as the fractal geometry observed in the evolution of coastlines occurs over a very long time scale (Mandelbrot, 1983; BBM, 1995). Gradualism in the context of placemaking implies that the time scale of the observation of a city is distanced from the everyday life of people whose perception of their place is more or less, immediate.

Consider the development of parts of the city within everyday life in a more immediate time scale, such as the masterplanning of large-scale urban redevelopment sites that are our focus here. As most design professionals will attest, the ‘nimby’ effect (‘not in my back yard!’) is a potent political force that represents people’s resistance to sometimes minor urban change if it affects them personally (for example, a road widening; the demolition of a sentimental old pub or church; the building of a neighbourhood psychiatric facility or waste disposal facility or even social housing) often raises the ire of ratepayers who might see these changes as devaluing their property or changing the character of the place they bought into (Gerrar, 1993). On a larger urban scale in which swathes of inner city areas can be razed to the ground, the disquiet of urban dwellers can become cacophonous as the media whips up an emotive story - an example of this phenomenon will be described in Chapter Seven (Ganis et al, 2014). In the fullness of time, these objections to change are possibly diminished and eventually, perhaps disappear so that urban change crises take on the smoothed appearance of gradualism. People’s expectations viewed over a long time scale may also take on the appearance of benign gradualism; however, in the moment, the misalignment between expectations (or schemata) can be a personal crisis. As described by the adaptive perceptual cycle, if the schemata of people are challenged they will either resist or adapt. Resilience is the cognitive need to retain some familiar order and coherence in the face of unsettling change, but eventually adaptation of the schema or adaptation of the context resolves the crisis. Importantly, this reflects self-organising criticality as a process of cognitive negotiation and compromise within the adaptive perceptual cycle and points to humans as complex adaptive systems, as are cities.

Negotiation and compromise towards a resolution is often part of the masterplanning process. In particular, the redevelopment of large scale inner city sites in which usually, many people have invested emotional, psychological or symbolic value can stir the passions of communities and create unexpected and expensive development crises. The point is that masterplanning is ‘up close and personal’ and must consider the short-term impact of urban change on an immediate population as well as the long-term unknown opportunities of a site for a future population. This requires a masterplanning framework that can offer adaptive qualities in both short-term and long-term time scales; one that can adapt rapidly under crisis and yet retain the coherence of resilience over time. In effect, the design professional must take the immediate view of the foot soldier at the front as well as the strategic view of the general in the war room.

4.6 THE CHALLENGE TO MASTERPLANNING

Complexity theory of cities (CTC) experiments using quantitative simulation models of cities are sometimes described as ‘thought experiments’ (Portugali et al 2012; Pumain, 2012; Portugali, 2011), which as Portugali warns: “...there is a danger that if CTC go in their current direction they will soon become a new version of the old quantitative approach and as such subject to the same criticism leveled at it in the early 1970s...most studies...[in CTC] are silent about the qualitative message” (Portugali, 2011, p99). Conversely, masterplanning by gradualism so that change happens in cities through urban incrementalism is desirable and seems appropriate at first glance.

Incremental masterplanning offers time for people’s perception of place to adjust and adapt to small-scale urban changes. Incremental masterplanning offers a gracious and subtle design process “*to heal the city* [his emphasis]” (Alexander et al, 1987, p22) as well as a growth process that is at an intimate, human scale and a more humane development process. Furthermore it is a more democratic smaller lot development scale and infill opportunities, which facilitate a finer grain city that has visual detail and interest. For these reasons and more, incremental gradualism in urban placemaking is laudable. However, some development projects such as large-scale urban redevelopments are subject to project managed critical paths intended to expedite the building process and to generate quick, big profits. And the generation of quick, big profits runs counter the gradualism required for generative coding methods.

One might propose generative methods of urban design through legislative development controls and codes (Marshall, 2011; Marshall in Portugali et al, 2012). Stephen Marshall (2011) in a discussion of the urban design impact of Seaside, Florida, USA described the value of regulatory planning codes:

Seaside is significant for its use of codes; in particular, the reinvention or revival of codes prescribing three-dimensional forms and urban components... ‘*Codes do not stipulate an entire ‘designed’ project*’ [Dutton, 2000, p78; his emphasis]...a code is not a design, but a specification of generic elements and their relationships...codes are typically intended as a guide to ongoing or long-term management of a development, not just a single act of conception followed through to construction...the Seaside code can be seen as part of a ‘proactive vision’ for shaping public space. The code aimed to achieve harmony in architectural form, while leaving the design of the individual buildings to others so as to encourage variety. (Marshall, 2011, pp3-5).

Coding is often well intentioned, aiming for much more subtlety than is usually delivered. Consider the challenges of coding in the light of the discussion in Chapter Two in which the outcome of

Seaside, Queensland mirrored the famous ‘landmark set-piece’ of Seaside, Florida at the opposite end of the planet. The ‘specification of generic elements’ to ‘achieve harmony in architectural form’ teetered and tumbled into set piece architecture in this antipodean development. For economic reasons such developments are often delivered in a relatively rapid timeframe rather than the long-term timeframe that might realise Marshall’s ‘proactive vision’ of harmony and variety. Generic codes are fundamentally schemata that need to be exposed and tested in a specific context and time, keeping in mind that this specific context will inevitably change. New Urbanist codes or schemata passed through the relational network of many stakeholders: design professionals who were swayed for a time by the New Urbanist aesthetic that travelled worldwide; developers who most likely set the agenda; local government authorities that implemented the agenda; and communities that bought the agenda. All these stakeholders often have, as demonstrated by the Towns of Seaside described in Chapter Two, preconceptions and expectations that are resilient when adaptation is more appropriate.

Coding of elements is a placemaking genome that informs a space on how to become a place and like all genomes, relevance or dysfunction is qualified by a capacity to evolve either gradually during times of equilibrium or rapidly in times of crisis. In the case of Seaside in Queensland, Australia, it seems the New Urbanist code colonised a far-away beach irrespective of the particular socio-cultural genome. Somehow, the subtlety of Marshall’s coding intent was lost along the way to Seaside in Australia:

[C]odes are not just about detailed design, but reach out to address the compass of town planning...*Codes do not stipulate an entire ‘designed’ project, with each building designed in detail. Rather, the code fixes certain infrastructure aspects of the design...urban infrastructure...allows for a projects realization by many participants over a long duration of time. A level of conformity to the original vision is thereby ensured through the interpretation and expression of individually design elements [Marshall’s emphasis]*” (Dutton 2000, in Marshall 2011, p4).

Andres Duany agrees with this principle when he says: “...it is essential to a resilient, authentic community that it come into being sequentially, influenced by many hands and minds. That is my definition of urbanism, as opposed to that of the large architectural project designed in detail at one time and that passes for urbanism because of its scale” (Duany in Mehaffy, 2004). And yet in the same conversation with Mike Mehaffy, Duany states: “It’s always back to the problem of large numbers...And there is another, more insidious problem: The assumption that by handing decision

[sic] over to others, that what will ensue will be variegated and that it will manifest the intelligence of collective self-interest. There is little evidence of that. The default setting...is monocultures of KITSCH! [his emphasis]" (Duany in Mehaffy, 2004). Duany may have based his SmartCode on Patrick Geddes' idea of the Valley Section as a zoning mechanism but it did not capture its spirit or intent. The valley section illustrated Geddes' trilogy of 'folk/work/place' as a model for the survey and analysis of a region from the 'hills to the sea': "From an understanding of our regions and our cities, we cannot but come to vitalising and evolving them in place, work and people; and with in every case their own people [such as miner, hunter, shepherd or fisher] creating the best from their own place [the human settlements that arise from them]" (Geddes 1923). As such, the social groups of people adapt and create 'the best from their own place' and indeed, this might include Duany's derogatory 'KITSCH!' which others might call the 'vitality of the vulgar'. Duany dons his architectural 'black shirt' and demonstrates why codes and masterplanning gain authority in an unpredictable world of large scale, rapid and critical change in which everyone dares to have a say.

Rem Koolhaas and his Office of Metropolitan Architecture (OMA) embrace this unpredictable world or large scale, rapid and critical change. Koolhaas claims:

If there is to be a 'new urbanism' it will not be based on the twin fantasies of order and omnipotence; it will be the staging of uncertainty... Since it is out of control, the urban is about to become a major vector of the imagination. Redefined, urbanism will not only, or mostly, be a profession, but a way of thinking, an ideology: to accept what exists...To survive, urbanism will have to imagine a new newness...urbanism redefined as a way of operating on the inevitable...undermine its certainties, explode its limits, ridicule its preoccupations with matter and substance, destroy its traditions... We have to imagine 1,001 other concepts of city; we have to take insane risks; we have to dare to be utterly uncritical; we have to swallow deeply and bestow forgiveness left and right... In a landscape of increasing expediency and impermanence, urbanism no longer is or has to be the most solemn of our decisions (Koolhaas 1995, pp959, 971).

Two decades later in 2014, Koolhaas as curator of the Venice Biennale, succumbs to a more retrospective notion as reported in *The Guardian*: "Provocative Dutch practitioner finally accepts offer to curate biannual exhibition, declaring it will 'sever all connections with contemporary architecture' Under the title of Fundamentals, Koolhaas promises a radical departure from the usual survey of the current architectural scene, focusing instead on [a] historical approach" (Wainwright, 2014). Koolhaas remarks: "A few years ago, I would never have thought of proposing such a bland

idea for an exhibition...But when we started researching the histories of these elements, it was like looking for the first time through a microscope and discovering completely unknown species” (Koolhaas in Wainwright, 2014). Perhaps this epiphany was an Alexandrian *Pattern Language* moment, which similarly analysed the elements of architecture and are the genome of the generative codes for New Urbanism and which Koolhaas fundamentally, opposed (Mehaffy, 2008). However, the Rem Koolhaas OMA masterplan for Sydney’s Darling Harbour redevelopment described in Chapter One shows no capitulation to Alexander’s collaborative approach in this large scale, rapid and critical urban change until the public outcry of disapproval to the initial scheme stimulated a rapid revision.

Generative codes are promising for the masterplanning of large-scale urban developments that are allowed to develop over time. However, it cannot be assumed that all masterplanned projects will be gradual and incremental with codes to ‘guide ongoing or long-term management of a development’. Sometimes, development is ‘a single act of conception followed through to construction’ (Marshall, 2011). The power of schemata in placemaking is resilient, particularly if a visionary theme is alluded to as displayed by New Urbanism or even the Sunshine Coast style illustrated in Chapter Two. It may be that by merely alluding to an ‘original vision’ or a genome conjures a Procrustean schematic construct to which many participants must fit.

The challenge of masterplanning is to have an inherent capacity for adaptation and resilience in times of long term equilibrium as well as times of short, sharp crises in both the immediate and distant time scale, Such a framework offers an adaptive spatial and relational web upon which urban placemaking tenets can cling. Time and change drive complex adaptive systems such as small world networks as well as the adaptive perceptual cycle. This alignment between a small world masterplanning paradigm and people’s perception of place is a step towards masterplanning adaptable and resilient places for a relatively immediate time scale with a simultaneous view to the future.

Many small world researchers and some urban theorists are entrenched in their abstract mathematical modelling, but such models are a small step towards unravelling the complex neighbourhood networks that make cities. ‘Organised complexity’ as Jane Jacobs (1961) describes cities involves interactions, interdependencies, mutual influences and relations shifting between millions of humans and non-humans dealing with the problem of creating order from chaos. To tackle this constantly shifting complex conurbation of human and non-human interactions, the

mathematical models and metaphors with which physicists tinker are a beginning towards understanding and building complex ideas such as the organised complexity of cities. After all, the notion of organised complexity of which Jacobs speaks was borrowed from Warren Weaver's (1948) scientific model of early complexity theory, *Science and Complexity*. Juval Portugali (2011) critiques the somewhat dazzling digital conurbations representing urban simulation models that illustrate *Cities and Complexity* (Batty, 2007) and proclaim a *New Science of Cities* (Batty, 2013):

And yet, cities are not natural entities such as liquids, light beams, snow flakes, sand-piles or trees and their parts are not atoms or molecules, or sand grains. Cities are artifacts, that is, artificial systems – facts of art and human culture – and their parts are human beings that unlike sand grains can think, learn, plan, forget, change their mind, ... and their actions and behavior are products of intentions, plans, social and cultural norms, political pressure and the like. These properties enable humans to adapt to their environment and these properties make each human being a complex, self-organizing adaptive system (Portugali, 2011, p104)

Although Portugali discards just about every metaphor in self-organisation literature he does make a point. The point is that people play a significant role as agents of urbanity as expressed by human geographers and philosophers who engage with relational approaches of placemaking (Peet 1998; Thrift, 1999; Thrift and Dewsbury, 2000; Thrift, 2004; Murdoch 2006). These theorists take the view that cities are an entanglement of relationships between human and non-human entities and it is the *effect between* these entities that embodies the power of the relationship. In a placemaking sense, this means that the *effect* (for example, between a person and a place whether emotional, physical or intellectual) is what makes a place. Portugali points to the powerful influence of simulation modelling particularly those that pursue computational algorithms describing the morphology of cities and along with some extraordinary computer graphics tend to smother the human intent of the exercise. As Portugali says:

There is nothing wrong of course in sophisticated simulation models crunching huge quantities of data by means of fast computers. What's wrong is, firstly, that simulation models originally designed as media by which to study phenomena of complexity and self-organization become the message itself... and as a consequence most studies,,are silent about the qualitative message of complexity theories to cities...The medium has too often become the message; too often complexity theories of cities and cities themselves are seen...as theories of cognitively simple interacting agents that in a bottom-up process give rise to cities and systems of cities that are stable and robust. The

problem is ...urban agents are cognitively complex and cities are not robust... A case in point is the phenomenon of chaos...is not on the agenda ...The reason to my mind is that chaos is hard to identify in cities by means of published statistical data and as a consequence there are no applications of chaos theory to cities (Portugali, 2012, p99)

Simulations as models have value in explaining complex concepts for the purpose of communication, but the trap is that our pattern seeking brain tends to cling to the complicated visual patterns of graphic media instead of seeing the complexity of urbanity. This is the classic trap of 'the medium is the message' (McLuhan, 1964). Furthermore, Portugali (2012) specifically states that 'the phenomenon of chaos...is not on the agenda' and by implication avoids the inconvenient principle of 'phase transition' that is inherent in these scale free simulations. If, as Barabasi et al (1991) have stated, '...the networks *organize themselves* into...scale free structures [his emphasis]' (Barabasi et al, in Dorogovtsev and Mendes, 2003) then self-organised criticality and by definition phase transition is part of the process of fractal constructs.

Portugali's challenge is to progress beyond these mechanistic simulations of cities and he proposes that complexity theories of cities (CTC) investigate: "...the nature and meaning of urban agents... how human agents perceive and cognize space, how they navigate and behave in space, or take location decisions ... Apart from a few exceptions, CTC ignore this body of knowledge... The potential that has yet to be realized is to develop a better balance between the qualitative and quantitative messages of complexity theories and their application to the study of cities... A better link between CTC and social theory oriented urban studies will provide a good context to realize the potential of a CTC approach to urban planning and design." (Portugali, 2012, pp60-61). This better link between complexity theory and social theory oriented urban studies is the task of this research.

4.7 CONCLUSION

This chapter focussed on self-organisation as the dynamic of placemaking. Christopher Alexander's new theory of urban design as it was applied in his San Francisco waterfront redevelopment experiment illustrated some key concepts of the adaptive perceptual cycle and small world network theory, in action. Although there were some flaws in the outcome of Alexander's experiment, it emerged that the problem lay in the absence of large structure in this improvised urban design process. Michael Batty's fractal cities approach was discussed as the next generation of understanding city morphology that embraced complexity theory of cities (CTC). Portugali

presented the challenge to CTC theorists who tinker with algorithmic concepts of cities to steer the CTC future research agenda towards human cognition and perception of cities.

The next chapter will introduce the empirical research and will tackle Portugali's challenge by exploring a tripartite placemaking construct: conceived space; perceived space; and adaptive space. The rationale for the research framework will be explained as a development of Lefebvre's triad of urbanity which has been adapted for the context of the adaptive perceptual cycle and small world network theory central to this present research. The empirical research framework will describe the details of each of the tripartite investigations as well as the key statistical methods.

CHAPTER FIVE

RESEARCH METHODS

5.1 INTRODUCTION

Chapter Four focussed on placemaking in the context of small world network theory and the adaptive perceptual cycle. Small world network theory was considered in its application to fractal cities, a concept that explained the morphology of cities. The adaptive perceptual cycle based on the notion of place as the interdependency between schemata and experience as presented by place philosophy and cognitive psychology (Neisser, 1976; Malpas, 1999) was discussed in relation to Christopher Alexander's experimental 'new theory of urban design' process. This specific examination of an antecedent of urban placemaking theory revealed some problems with the perception of place and placemaking via the San Francisco new urban design theory experiment (Alexander et al, 1987) as well as its descendant fractal cities approach (Portugali, 2012; Batty, 2013).

This chapter will explain the key research methods to be used in the empirical studies. A mixed methods approach will be taken so as to incorporate the advantages of qualitative and quantitative methods. Along with descriptive statistics, the key research method will be multidimensional scaling analysis (MDS) that was developed from sociology as was described in Chapter Two. Although this technique has statistical rigour, the interpretations of the MDS plots are open to researcher interpretation. This enables the richness of a qualitative approach which will be supported by content analyses of the urban design literature and the participants' written data responses. Interview data will be an adjunct to a metric Network Analysis technique (Sarkar, 2013) that has been further developed by this present author.

5.2 AIM OF THE EMPIRICAL STUDY

The empirical study will grapple with Portugali's challenge to examine: "...the nature and meaning of urban agents... how human agents perceive and cognize space, how they navigate and behave in space, or take location decisions ... The potential that has yet to be realized is to develop a better balance between the qualitative and quantitative messages of complexity theories and their application to the study of cities" (Portugali 2012, pp60-61). Furthermore, Portugali points out that

in contrast to Alexander's (1965) seminal paper, *A city is not a tree* current complexity theory of cities (CTC) is limited: "So far CTC have demonstrated that *a city is a tree* [my emphasis]...A tree is a typical example of a complex system and of a fractal structure that can and has been generated by a variety of algorithms...The fact that a given model can successfully generate a tree and a city doesn't mean that a city is a tree – it is not" (Portugali 2012, pp58, 59). He goes on to challenge CTC theorists: "The potential that has yet to be realized here is thus to further elaborate on the long-term CTC and to create a better balance between the short-term and long-term aspects of cities as complex self-organizing systems" (Portugali 2012, p60). These ideas are the challenge of this research and contribute to the research framework of the overall thesis and to the research framework of the empirical study (Figure 5.1 and 5.2).

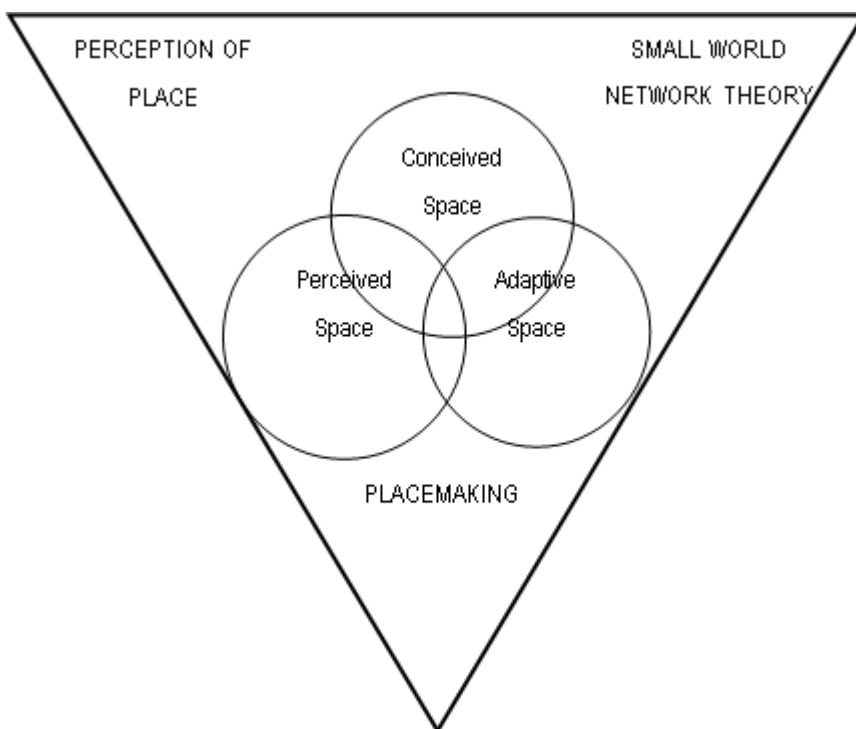


Figure 5.1: Research framework

This framework illustrates how the concepts discussed in Chapter Two (The Perception of Place) including that of the adaptive perceptual cycle, Chapter Three (Small World Network Theory) and Chapter Four (Placemaking) are linked in helping to answer the research question.

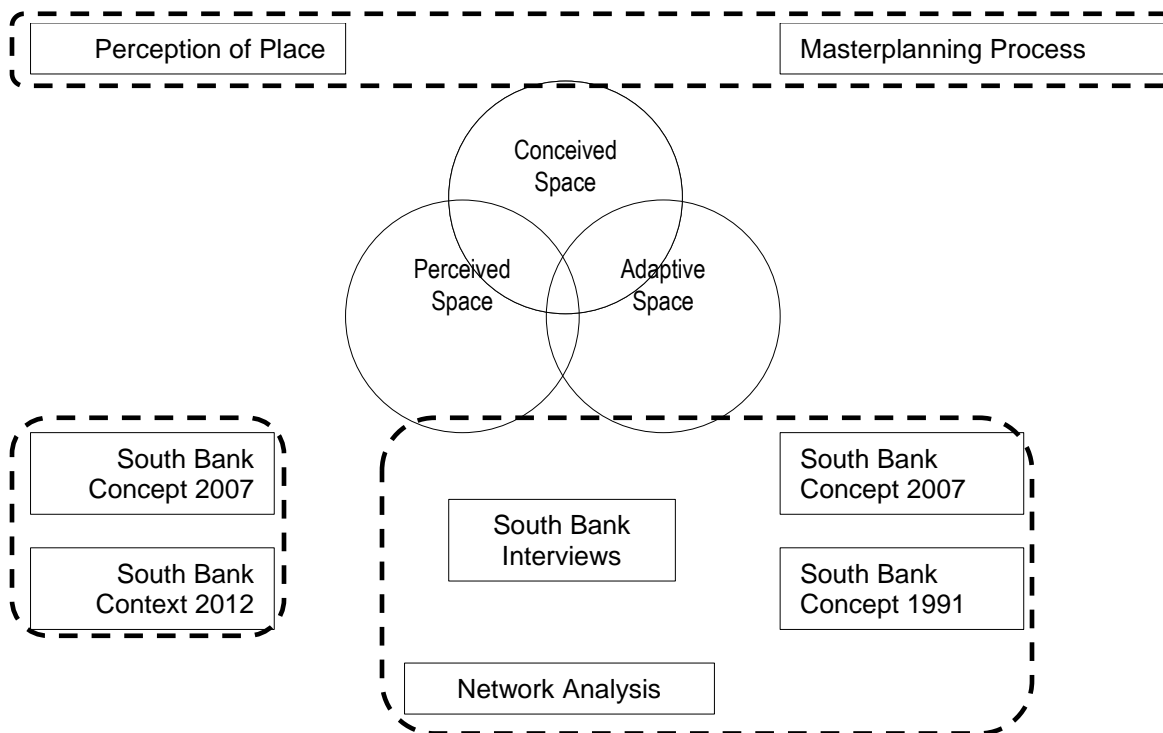


Figure 5.2: Empirical research framework – groups of tasks to investigate tripartite research framework

The empirical research framework clarifies how the ideas in these earlier chapters provide the framework for the case study analysis which is at the core of Chapters Six, Seven and Eight.

5.3 SELECTION CRITERIA FOR THE CASE STUDY SITE

In Chapter One, a review of three urban developments in crisis described the problems of masterplanning with specific reference to inner city urban redevelopment sites: firstly, the Melbourne Docklands, a redevelopment site consisting of over two hundred hectares; secondly, Sydney's Darling Harbour which is a sixty hectare site of prime Sydney Harbour frontage; and thirdly, Brisbane's South Bank encompassing forty-two hectares, located south of the CBD across the wide Brisbane River. The three urban redevelopment examples described in Chapter One illustrated the intense impact on the people-place phenomenon that such redevelopments can have on cities: the scale is large; implementation timeframes are generally rapid; budgets are massive; investment is high risk; developer-authority negotiation can be adversarial; and the impact on

people and places is deep and widespread. Furthermore, crises whether incremental or rapid can occur at any time. It is for these reasons that the masterplanning of such inner city redevelopment sites needs a process and product that incorporates urban change.

The selection of a particular case study site considered these urban change criteria: the pace of the redevelopment as rapid or slow; the time scale as short-term or long-term; change as crisis driven or gradual; and, change as perceptual and/or contextual. Most importantly, the case study selection required a level of completion of the redevelopment and evidence of various types of masterplans used during the redevelopment over time, particularly in response to crises.

The Melbourne Docklands as a redevelopment is still relatively incomplete with some vast areas still underdeveloped. The Sydney Darling Harbour project is in the 'blueprint' masterplan stage and in the throes of uncertainty as the public at large is exposed to the realisation of what is planned for the already demolished site. Finally, Brisbane's South Bank has completed its redevelopment process and was reinstated to the authority of the Brisbane City Council in late 2012, marking the end of the role of the South Bank Corporation.

A brief comparison of these sites in the context of the urban change criteria suggests that Brisbane's South Bank was subjected to early rapid change in the short-term and was driven by crises with a high impact both on people's perception of the South Bank site as well as its conception and physical context of the site. A high level of perceptual, conceptual and contextual change could apply to all the sites, but rapid change is seen more so in Sydney's Darling Harbour and Brisbane's South Bank because of the demolition of large parts of the site whereas Melbourne's Docklands has changed more slowly. Furthermore, Sydney's Darling Harbour and Brisbane's South Bank have been initially masterplanned as a detailed 'blueprint' with the intent of short-term implementation whereas Melbourne's Docklands has been masterplanned initially as a pliable vision over the long-term. Finally, Brisbane's South Bank has been impacted by several political, social and environmental crises during its redevelopment. In sum, Brisbane's South Bank as a completed project with evidence of masterplan change and various significant crises over time (but limited to the period 1991 to 2012 after which time, the authority of the South Bank Corporation was revoked) offers an appropriate case study for this empirical research.

5.4 SAMPLING AND PARTICIPANTS

Understanding and making places is the discipline of many groups each of which is diversely invested in place making. This study taps into the key groups who participate in placemaking concepts, design, and implementation and also people's lived experience of place. Revealing how places change is taken from the perspective of those who conceive of places through masterplan representations (design professionals) and those who experience those places (visitors to South Bank).

The factors that influence sampling methods are cost and precision. In this research the time to collect data from participants is a high cost. To counter this disadvantage, precision is enabled by the selection of sub-groups (strata) that have distinct professional or community roles. A stratified selection represents distinctive, homogeneous strata of the population (Tashakkori and Teddie, 1998). The advantage of using homogeneous sub-groups or strata is that a smaller sample size may have the same precision as a heterogeneous sub-group of larger sample size (Daniels, 2012). The disadvantage is that relevant stratification criteria must be selected so as the sub-groups are in fact, homogeneous within each stratum and distinctive between each stratum.

Stratified sampling may be proportionate or disproportionate. A proportionate stratified sample requires the sample to be a proportion of the whole sub-group community; for example, a proportion of all registered architects in Brisbane or all local government councillors or of the entire community of South East Queensland. The variability in the population of each of these sub-groups makes it impractical for proportionate sampling; there are very few councillors compared with the sub-group of architects or planners who are in turn, very few compared with the population of the communities of Brisbane or South East Queensland. This means that there may be a bias towards the larger population based on the proportion of their sub-group compared with other less populated sub-groups.

To counter the difficulty of bias due to proportionate sampling, a disproportionate stratified sample using equal allocation is proposed. This means that an equal number of participants are allocated for each sub-group; the Exploratory Study in this research uses approximately 10 participants per sub-group. Although an allocation of 10 participants per sub-group is a relatively small statistical sample the homogeneous nature of each sub-group offers more precision. This is because the differences between the participants *within* each sub-group are minimised and the differences *between* each sub-group is maximised. The homogeneity of each sub-group enables less error and the distinctiveness between each sub-group enables variance. However, each sub-group needs to be

strongly correlated to the dependent variables, in this case the urban design qualities of what makes a good place and the priorities for a good masterplanning process. And the strength of the correlation depends on two variables; the selection of sub-group types and the variability of interest (Daniels, 2012).

Many groups participate in a masterplanning process such as environmental planners, hydrologists, diverse local community groups and businesses, community development bodies and even public artists. However, the selected groups in this present research are considered to have the most influential professional role in the masterplanning process either through infrastructure planning, urban design outcomes, political clout, statutory documentation and the development industry that implement masterplans.

The participants for the conceived space study consisted of a disproportionate stratified selection of design/development professionals, community representatives and others living in Brisbane, South East Queensland. The groups were made up of Architects (10); Councillors (local government elected representatives) (8); Developers (7); Landscape Architects (7); Planners (24); Transport Engineers/Planners (11); and, Others (9). There were a total of 76 participants.

The professional/community role of the participants was important to the framing of the participants' responses; they were asked to assume their usual professional role and to respond from that perspective. This is important because it is their contribution as a design professional or community member to the masterplanning process that is of interest here. Although each of these sub-groups represented key actors in the outcomes of a place their relative interest was also a variable. Their level of interest or disinterest might have resulted in disproportionate numbers of respondents between groups but importantly, each individual in each sub-group was offered an equal opportunity to respond. Interest variability may be used as an indication of relative participation in the process of placemaking. Indeed, this is a form of disproportionate sampling known as 'optimal allocation', which results in an even more accurate outcome than that of 'proportionate stratified' sampling (Daniels, 2012). Optimal allocation is also likely to be more accurate than 'equal allocation', which can under-represent a large group and over-represent a small group in the attempt to avoid bias.

The participant groups for the perceived space and adaptive space case study of South Bank consisted firstly, of a random selection of on site visitors to South Bank and secondly, convenience

samples of Brisbane design professionals. The design professionals were selected from Brisbane's prominent architecture/planning/urban design firms who have not been commissioned by South Bank Corporation at any time. A convenience sample of these design professionals was proposed because of the relatively few large, multi-disciplinary design firms located in the Brisbane CBD. Large, multi-disciplinary design firms were approached because masterplanning, urban design or placemaking commissions are usually offered to firms that support an experienced range of design disciplines.

The visitors to South Bank were selected on site between the hours of approximately noon and 3.00pm, week days and weekends during the Queensland mid-winter (June 2012) when the weather is typically, fine and sunny and the likelihood of rain in this sub-tropical climate is very low during the winter months. South Bank as a primarily tourist, entertainment and educational area currently – although the residential market is escalating - can be crowded or not. The timeframe for the survey questionnaire was set by the factors of time cost and availability of potential participants. The aim for the perceived space and adaptive space study of South Bank was to gather groups (visitors and design professionals) of approximately 40 participants per group,

5.5 RATIONALE OF THE RESEARCH FRAMEWORK

The integrated nature of the research framework is adapted from Lefebvre's urban triad of three notional spaces; conceived space, perceived space and lived space (Lefebvre, 1991, Shields, 1999; Elden, 2004; Merrifield, 2006) with the outcome of the 'trialectic' between these three 'spaces' being 'urbanity'. According to Lefebvre firstly, conceived space is the representations of space usually produced by urban professionals such as architects, planners, engineers and so on, usually commissioned by developers or government authorities. These representations of space come in the form of masterplans or planning schemes in any combination of text, maps, models, graphics and digital images. These representations illustrate a conceptual notion for a place usually based on any number of planning theories or architectural or urban design ideas or simply a development protocol that has been profitable in the past. Although many urban professionals are likely to dispute the point that their representational products are abstract or theoretical or intellectual exercises, a conceptual planning product is fundamentally an idealised vision or schema that has not been tested by the vicissitudes of reality. Secondly, perceived space (in the context of Lefebvre's interpretation) is the 'as built' urban form of a place as we sense it. As such, Lefebvre uses a traditional meaning of perception rather than the meaning adopted in our discussion of the adaptive perceptual cycle; that is, perception of place as the outcome of the testing and adjustment between

one's conceptual schema and one's real world experience. Lefebvre distinguishes between our conception (or schema) of a place and our perception (as sensation) of a place, whereas most cognitive psychologists place philosophers in this present research – in particular, Ulric Neisser (1976) and Jeff Malpas (1999) - emphasise perception as the interdependency between conception and experience. Thirdly, 'lived space' according to Lefebvre is "...alive: it speaks. It has an affective kernel or centre..." These are places (such as a house, street or neighbourhood) where we form attachments and build place identity and a sense of belonging. "It embraces the loci of passion, of action and of lived situations...it is essentially qualitative, fluid and dynamic" (Lefebvre 1991, p42). Lived space is the grounding of everyday life as experienced physically and emotionally. It is the place where ordinary folk put down roots and experience a space through their senses, memories, pleasure or discomfort, amenity, acceptance or alienation. In effect, Lefebvre's interpretation of 'lived space' as the 'loci of passion, of action and of lived situations' is that which we call here, 'place'.

An adaptation of Lefebvre's urban triad was constructed in this research framework that adjusted to the theories applied in this present research based on place philosophy and cognitive psychology and also the intent of the research question. An important piece of evidence that this research sought was that of how places adapted to or resisted change. To this end, the integrated research framework used here adapted Lefebvre's urban triad to explore 'conceived space', 'perceived space' and 'adaptive space' in the context of masterplanning adaptable and resilient urban places that are relevant to people's perception of place. Importantly, it is the areas of overlap of the notional 'spaces' that is of more interest here, rather than the differentiation between these 'spaces' (Figure 5.1).

The integrated research framework is underpinned by two ideas, both of which focus on urban change over time, rather than the qualification of urbanity such as described by the urban triad. The two ideas engaged to reveal how places can be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place are the adaptive perceptual cycle and small world network theory. Firstly, the adaptive perceptual cycle represents the vehicle for human perception and cognition of which Portugali (2012) speaks and as discussed in Chapter Two. Secondly, small world network theory is proposed as a masterplanning framework for adaptable and resilient placemaking as discussed in Chapter Three and Chapter Four.

5.6 EMPIRICAL RESEARCH FRAMEWORK

The three parts of the empirical study examined conceived space, perceived space and adaptive space. The conceived space study was exploratory and intended to understand the schemata of those involved in the conception of masterplans. The adaptive space study examined the shift in the masterplanned South Bank activity clusters and the pathway connectivity of the conceptual South Bank masterplans prepared in 1991 and as amended in 2007. The perceived space study examined the shift in the visitor's perception of the context of South Bank in 2012 compared with the 2007 concept for South Bank. In addition, interviews recorded verbatim of the leaders of the design and development of South Bank revealed the crises that they faced and their responses to those crises. Finally, a metric Network Analysis (Sarkar, 2013) that compared the 'as built' South Bank site in 1997 and also in 2012 applied small world network approach to the urban form outcome (Figure 5.2).

5.6.1 SURVEY QUESTIONNAIRE The conceived space study investigated the topics of firstly, the perception of place and secondly, placemaking through the process of masterplanning. The outcome of the conceived space study was the integration of these two parts of the survey questionnaire. The conceived space research instrument was a devised to examine people's perception of place, their ideas about the masterplanning process and their thoughts about the role of time, adaptability and certainty in that process. The questions investigating the perception of place was framed by the query of what urban design qualities make a good place in the context of South East Queensland.

An initial review and content analysis of the urban design literature sourced the urban design concepts, guidelines and principles that serve the industry. At the outset, a literature map established the categories of texts and topics that were linked closely as well as those that broadly addressed the research question. These data were the source for the content analysis of urban design qualities that were eventually transformed into a semantic differential task for the investigation into the perception of place question.

The semantic differential task consisted of bipolar categories located at opposite ends of a ranked scale. The rank indicated the respondent's strength of agreement with a particular urban design quality that makes a good place. Importantly, the bipolar categories did not have any negative or positive connotation nor were they presented in a way that might reveal researcher preference or a pattern of types in the categorical list of urban design qualities.

The responses from the semantic differential task were used to elicit two outcomes: firstly, the concept mapping multidimensional scaling analysis (MDS) plots, the results of which showed the relationship of urban design qualities that were considered to make good places; and secondly, correlation coefficient results revealed those participant sub-groups that had similar and dissimilar notions of good urban places. Understanding what urban qualities make good places and also, which groups were likely to be similar or dissimilar in their perception of place is useful for a masterplanning process because it offers a starting point for negotiating people's expectations for good places and an understanding of the point-of-view of the different groups involved in that negotiation.

The next part of the questionnaire revealed how the participants prioritised the importance of each stage of the masterplanning process from conceptual, contextual and pragmatic perspectives. The aim was to review the shifts in the participants' priorities in a masterplanning process depending on their conceptual, contextual or pragmatic intent and to see if there were differences between their cognition and their practice. The conceptual masterplanning priorities task revealed what was considered the most important stages of a masterplanning process. The stages were devised from the *Urban Design Compendium* (English Partnerships, 2008) because this text incorporates much of the current approach that has dominated urban design education and leading practice in Queensland if not Australia, for decades. The conceptual masterplanning stages were presented: Technical Preparation; Design Preparation; Designing; and Monitoring. However, this task did not frame the participants' responses in a specific urban context or timeframe in which to consider the masterplanning stages; rather the task sought the participants' conceptual notions of a masterplanning process.

The contextual masterplanning priorities task introduced the contextual scenario of a town centre located in South East Queensland and a masterplan timeframe of a short-term time scale and a long-term time scale. The aim was to see if there was a difference between the participants' priorities for the same masterplanning stages of the previous task - the conceptual masterplanning priorities task - now set in an urban context and in two different timeframes.

Certainty and adaptability in masterplan implementation are often processes of pragmatic tension; a masterplan that offers certainty is usually one that is detailed and predictable whereas one that offers adaptability is usually strategic and open to unpredictability. So as to expose this tension, the participants were presented with simple statements with which they could agree or not. Some of the

statements were structured to be indirect (Crano and Brewer, 2002). This means that the researcher's intention in the question is not revealed. The purpose is to elicit participant ambiguity or contradiction; for example, in this present research it was expected that most design professionals would agree that masterplans needed to be 'detailed' or 'to fulfil the technical predictions' however, this might counter the aim of adaptability that they might also profess. If this is so, this reveals the contradiction between the certainty of detailed and complete masterplans and the uncertainty of flexible and adaptive masterplans. Finally, an opportunity was provided for an open comment about the research question. The aim was to expose other problems that the participants thought were more important or to raise more questions. Open comment opportunities were also available for most of the survey questions so as the participants had an opportunity to explain the nuances of their ranked responses. In sum, these survey questions were aimed at eliciting results from each masterplanning perspective (conceptual, contextual and pragmatic) that might pull into focus the tension between certainty and uncertainty and the role of the context and time frame in masterplanning.

5.6.2 CASE STUDY The case study of South Bank was an opportunity to examine the adaptive perceptual cycle construct as well as the relevance of small world networks as an adaptive and resilient masterplanning framework was applied in these studies by testing the design professionals' network schemata of South Bank against the visitors' experience of the cluster and connectivity networks of South Bank.

The adaptive space study of South Bank ranked the similarity or dissimilarity of small world network models to the South Bank masterplan 1991 and the South Bank 2007 masterplan. Two independent groups of design professionals participated and were asked to rank the similarity or dissimilarity of each network model to each of the South Bank masterplans. The aim was to reveal the adaptation and resilience of the South Bank masterplan from 1991 to 2007.

The perceived space study of South Bank ranked the similarity or dissimilarity of small world network models to visitors' experience of South Bank 2012. The participants consisted of two independent groups of visitors to South Bank. One visitor group ranked the similarity or dissimilarity of the network models to their South Bank activities experience (Cluster) and another visitor group ranked the similarity or dissimilarity of the network models to their South Bank pathway experience (Connectivity).

The design professionals' results for the South Bank 2007 masterplan adaptive space results and for the visitors' experience of South Bank 2012 were integrated. The integration of these data through the analysis of multidimensional scaling analysis (MDS) revealed the difference in the perceived space of South Bank as experienced by visitors in 2012 against the conceptual expectations of the South Bank masterplan 2007. In this way, the adaptive perceptual cycle construct as well as the relevance of small world networks was applied in these studies by testing the design professionals' network schemata of South Bank against the visitors' experience of the cluster and connectivity networks of South Bank.

Interviews with the leaders of the design and development of South Bank enriched the results of the adaptive space and perceived space results. This was a semi-structured telephone interview in which they were questioned about the crises that they faced during the development of South Bank as well as their responses to those crises. These data were transcribed verbatim and contributed a qualitative background to the quantitative Network Analysis of the as built South Bank site 1997 and 2012. The Network Analysis was applied in an analysis of 'neighbourhoods' and 'connections' using graph theory intended to reveal the propensity of the network towards a grid/mesh-like network (WS small world) or a tree-like network (BA small world).

The outcome of the case study of South Bank that investigated specifically, perceived space, adaptive space and network analyses of the masterplans as an application of a small world network paradigm from the perspective of human perception and the shifts of adaptation and resilience of the South Bank masterplans. If the results of the multidimensional scaling analyses (MDS) and the network analyses align, it may indicate a step towards the quest posed by Portugali (2012) towards the analysis of cities as human and urban complex adaptive systems.

5.7 KEY RESEARCH METHODS

Mixed research methods were used so that the strengths of both qualitative and quantitative approaches illuminated aspects of the research question from different perspectives. The use of qualitative and quantitative methods was intended to extract the best attributes from both approaches and to infill the gaps of each approach: the generic, statistical and theoretical reliability of a quantitative approach can benefit from the validity of specific data that is generated by a qualitative approach. A mixed methods approach is the middle ground between the context-free generalisations of a quantitative approach and the relativism and humanism of a qualitative approach (Johnson and Onwuegbuzie, 2004). A mixed method enables not only various ways to

collect data, but also to analyse data. In this research the data was collected using a textual survey questionnaire and visual research methods. The intent of the mixed methodology was to scrutinise the research question from different perspectives (also known as triangulation) and, as Portugali (2012) challenges, saying: ‘The potential that has yet to be realized is to develop a better balance between the qualitative and quantitative messages of complexity theories and their application to the study of cities’.

5.7.1 MULTIDIMENSIONAL SCALING One of the most important research methods used in this study of conceived space, perceived space and adaptive space was multidimensional scaling analysis (MDS) with the results illustrated as concept map plots. MDS is usually applied in studies of social network theory. As discussed in Chapter Three, Harvard sociologist Harrison White developed multidimensional scaling analysis (MDS) which ‘was able to realize, for the first time, all the power implicit in the social network concept’ (Berkowitz, 1982). The outcome of MDS has been called a perceptual map, a concept map, points-of-view analysis or a psychological map (Gordon and Bass, 2014; Borg and Groenen, 1997; Trochim 1989, Gollege and Rushton, 1972; Tucker and Messick, 1963). The relevance of MDS in this study is that people’s perceptions are sought to reveal how ‘human agents perceive and cognize space, how they navigate and behave in space, or take location decisions’ Portugali in an integrated construct of place as conceived space, perceived space and adaptive space.

Multidimensional scaling analysis (MDS) was considered relevant for this study because participants’ judgments of attributes and similarities were qualitative and non-metric: for example, if a participant is asked to measure the distance between say, South Bank, the Brisbane CBD and Surfers Paradise on the Gold Coast, Queensland these linear data analysed by classical metric MDS will map the geographical points of South Bank and the Brisbane CBD in close proximity and distance Surfers Paradise. But, if a participant is asked to rank the *similarity attributes* of the same places these non-linear data analysed by non-metric MDS are likely to cluster South Bank and Surfers Paradise in close proximity and to distance the Brisbane CBD; qualitatively, the former are tourist playgrounds and the latter is a Central Business District. Both of these methods plot the relationship of places via Euclidean distance however, classical MDS is a metric relationship and non-linear MDS is a perceptual relationship (Jaworska and Chupetlovska-Anastasova, 2009; Bartholomew et al, 2008).

Cluster Analysis (CA) supports the interpretation of the MDS plots as the CA results offered a guide to how the variables clustered by examining the CA hierarchical dendrogram in which presumably, variables that cluster are conceptually related. However, the algorithms for MDS and CA are different; variables that seem to be related in a CA dendrogram may not necessarily, appear in close proximity in the MDS plot. If the results are ambiguous the MDS takes precedence because the mathematical basis of MDS plots is considered to have greater strength. As such CA results were only suggestive (Holland, 2008; Trochim, 1989).

Although Principal Component Factor Analysis (PCFA) is often used for dimension reduction and to reveal hierarchical clusters, it has been demonstrated that these results tend not to correspond to the visual plots of MDS (Trochim, 1989). The difference is that PCFA finds linear combinations of the variables and MDS retains the proximities/distances using shortest path lengths located in a graphic space. The distances between the MDS points represent the similarities and dissimilarities as perfectly as possible (Chen and Buja, 2008; Kruskal, 1964). Importantly, the difference between MDS and PCFA is that MDS does not require preconceived notions of which factors (or dimensions) “might underlie, determine or correspond to which dimensions” (Carroll and Wish, 2002, p396).

MDS dimensions emerge from the measures of proximity or similarity judgements of the participants. MDS measures of proximity such as ranks are transformed to measures of similarity or dissimilarity and are graphically represented as “Euclidean distances in some space of unknown dimensions...given for each object its distances to all other objects, we attempt to see how well the distances can be fitted” (Carroll and Wish, 2002, p396). The number of dimensions is increased iteratively from one, adding dimensions until an additional dimension makes little difference to the solution; this is a stationary configuration. At this point, the optimum similarity or dissimilarity distances between the variables are attained “with the final solution chosen to achieve the best balance between parsimony, goodness-of-fit and, especially substantive interpretability” (Shepard, 1980, p392).

Interpretability and robustness are the advantages of MDS. The visual plots or maps are seen as a useful and easily assimilated graphic representation of complex data and robust even if there is missing data or noise/error (Coxon, 2012). Interpretability of MDS plots is a somewhat intuitive process facilitated by the visual plots of clusters and dimensions that represent the participants’ underlying conceptual structure of their subjective judgements. In MDS, *Stress* is the indication of

significance or the probability that the result is not 'by chance' but a real effect. The significance level ($p < 0.05$ or < 0.01 or < 0.001 depending on rigour) tells us if the null hypothesis is rejected (the effect is not due to chance but a probable effect). *Stress* in MDS indicates the significance of the iteration until the final solution (Sturrock and Rocha, 2000; Kruskal, 1964). "... [T]he imperfection or badness-of-fit is measured by Stress. Low stress is desirable; No stress is perfection!" (Coxon, 2012, p2).

Ranked or ordinal data are non-linear and so require non-parametric methods of analyses. Ordinal data does not presume that the data are normally distributed when there may be reasons for the distribution to be skewed or unknown. Skew may occur because of low participant numbers or disproportionate sampling. This present research attempts to elicit participants' perceptions of place as well as concepts of masterplanning and so the parameters of the investigation depend on the participants' knowledge and experience. These are areas of indeterminate opinion and difficult to presume a statistically normal distribution. Despite these unknowns, non-parametric methods are considered robust because they can be used in such distribution-free situations in which the parameters of a question are unpredictable.

In sum, MDS was considered an appropriate method in the study of conceived space, perceived space and adaptive space because the intent was to reveal the underlying conceptual structure of the participants' subjective responses and also to reveal the goodness-of-fit of the similarity attributes between variables. This accords with the adaptive perceptual cycle, which also sought to find the goodness-of-fit between the similarity attributes of a concept (or schema) and context (experience).

5.7.2 VISUAL RESEARCH METHOD A visual research instrument was used for the case study of the South Bank adaptive space and perceived space tasks. The visual research method was intended to tap into the participants' schemata of South Bank masterplans that had been adapted over time (adaptive space) and also visitors' experience of South Bank as a perceived space in 2012. The visual research instrument consisted of schematics of the connectivity of South Bank and the clustered activities of South Bank based on the similarity and dissimilarity with network typologies (Appendix 2).

Visual research is considered an integral part of traditional textual research methods; it is a useful adjunct to the research because it puts people in a precise relationship with the shape and meaning of a context (Olson et al, 2008). In this present research, the visual masterplan concept as well as

the context of South Bank was the participants' focus of the 'precise relation' to the context of South Bank's 'shape and meaning'. The visual schematic network models represented those network models described in Chapter Three and aligned with the notion of the schemata of the adaptive perceptual cycle discussed in Chapter Two. Visual research engaged another way of perceiving and understanding the world not only sequentially but also as multidimensional, nonlinear and dynamic space (Ott and Dickinson, 2009; Foss, 2005). And, as explained previously, multidimensional scaling analysis (MDS) enabled the quantitative measurement and qualitative interpretation of the spatial, multidimensional and dynamic characteristics of placemaking.

5.7.3 WILCOXON MATCHED PAIRS Other methods and analyses used in this research were Likert scales, a Wilcoxon matched pairs test and graph theory. The Likert scales were analysed using descriptive frequency analyses. The Wilcoxon matched pairs test analysed the masterplanning context prioritisation task. This task examined the participants' masterplanning responses when a timeframe context was set for the process. The participants were presented with a matched-pair scenario: a short-term timeframe (5 to 10 years) and a long-term timeframe (20 to 25 years). A Wilcoxon matched-pairs analysis was used because this is a repeated measures test in which each participant responds to a pair of scenarios one of which has an intervention; in this task the intervention is time. A Wilcoxon matched-pairs test shows if there is a significant difference between the medians of the paired results.

5.7.4 NETWORK ANALYSIS Graph theory was used in Network Analyses of the 'as built' outcome of South Bank in 1997 and in 2012. The information was gathered from aerial maps and from on-site visits by the researcher. Graph theory was a useful application because it enabled a comparison between the as built South Bank 1997 site and the 2012 site that could reveal the adaptation of the site over time in the context of small world network theory. Somwrita Sarkar (2013) in her research that was adapted for this present research explained the use of network analysis in understanding network typology in cities: "The street networks we consider here are essentially planar networks. Since we are interested essentially about the fine scale structure of local areas within the city, we do not consider non-planar features such as multi-level intersections. In formal terms, a street network is represented as a graph $G = (V, E)$, where the graph G is an abstract mathematical structure defined by the two sets V and E . The set V is a set of n nodes or vertices, and the set E is a set of m unordered pairs drawn from V , each pair representing a link or an edge." (Sarkar, 2013, p2). Sarkar (2013) investigated the network typology of city and suburban streets of Sydney and Melbourne by generating primal graph representations of fine scale street networks

using network metrics. A grid or ‘mesh-like’ street layout consisted of a regular orthogonal typology, whereas streets such as cul-de-sacs were ‘tree-like’ and consisted of a hierarchical typology. Sarkar (2013) also identified a combination of tree-like networks within the overall grid or mesh-like street network typologies of Sydney and Melbourne.

Sarkar’s algorithms are explained here and the preliminary development by this present author of the algorithms for the purposes of this research will be explained in Chapter Eight.

The first network metric is a measure of the topological characteristics of the network. This is the *beta index*.

$$\beta = m / n$$

The *beta index* is the ratio of nodes (n) to edges (m). The higher the *beta index* the more grid or mesh-like is the network. The lower the *beta index*, the more tree-like is the network.

The second network metric is a measure of the number of cycles in the network. This is the *cyclomatic number*.

$$C = m - n + 1$$

The higher the *cyclomatic number* the more grid or mesh-like is the network. The lower the *cyclomatic number* the more tree-like is the network.

The third network metric is the *alpha index*, which is a measure of the cycle density. This is the number of cycles that actually exist in a network compared with the maximum number that can exist. Planar networks such as streets, the maximum number of cycles that can exist is known to be $2n - 5$.

$$\alpha = C / 2n - 5$$

The higher the *alpha index* the more grid or mesh-like is the network. The lower the *alpha index* the more tree-like is the network.

Finally, the *gamma index* is a measure of the link density of the network. This is a measure of the number of links that actually exist compared with the maximum number of links that can exist. The maximum number of links for planar networks is known to be $3n - 6$.

$$\gamma = m / 3n - 6$$

The higher the *gamma index* number the higher is the link density of the network and the more grid or mesh-like is the network. The lower the *gamma index* number the lower is the link density and

the more tree-like is the street network. Link density correlates positively with the number of cycles.

This present research required some modification of the parameters of the network analysis based on the network data derived from South Bank 1997 and 2012 and the intent of the study. The focus is on the clusters of activities or neighbourhoods and the connections or intersections. The connectivity of South Bank is variable consisting of pedestrian pathways, shared zones, local streets, long-range connections, bus routes and train lines. Furthermore, the connections within South Bank are configured mostly for the qualitative touristic experience rather than for efficiency and direct accessibility. As defined in Chapter Three: a path or edge connects two vertices or nodes; two adjacent nodes represent a 'clique'; and a cluster of adjacent nodes represents a 'neighbourhood' or sub-graph. In South Bank the difference between a 'clique' and a 'neighbourhood' has been equalised because a clique may consist of two adjacent nodes, but these could be large institutions or popular cafes or tourist destinations or other places where people gather. Similarly, the underground carpark qualified as a 'neighbourhood' because of its large scale and multiple access and egress points throughout the site. The intent of the network analyses of the 'as built' configuration of South Bank 1997 and 2012 is that the outcome might indicate the small worldliness of South Bank if only at a planar level, but along with the results from the adaptive space and perceived space tasks could support the small world paradigm for masterplanning.

5.7.5 CONTENT ANALYSIS The qualitative method of analysis for written, verbal or textual data used categorisation through content analyses. The literature that was reviewed to distil the urban design categories for the semantic differential task that sought the participants' perception of place was content analysed to reduce the data to a workable number of categories as was the participants' written survey data.

There are different types of content analyses, which vary in abstraction from analysing the frequency of particular words to analysing the more abstract content of ideas. Some qualitative analyses are somewhat impressionistic with the researcher sifting the data intuitively. However, even in an intuitive approach the content tends to succumb to the brain's schemata and this tendency is acknowledged and alerted the researcher.

The content analysis for this discussion categorised the data from the literature review in an explicit way. An explicit data organising system clarified the categorisation process for the researcher and

the reader (Tesch, 1990). The content analysis method required: firstly, defining a question; secondly, the intended use of the results; thirdly, consideration of categories and concepts used in urban design theory and practice; and fourthly, the actual data.

The key topics of the perception of place and the process of place making were sought by framing the literature reviews within the question: *What makes a place?* This question focused the distillation of the literary data and was also informed by the content analysis of those data. Importantly, researcher bias towards dominant urban design theories and texts needed to be recognised and countered. With this possible researcher bias in mind, the organising system for the content analysis consisted of several iterations (Tesch, 1990). Specifically, the steps of the content analysis were:

1. Immersion in the literature and coding of topics, phrases and key words describing urban qualities
2. Review the data and code those topics that were related and form clusters.
3. Similar topics were clustered into new lists and a preliminary category name was noted.
4. Topics were listed in three columns: major, minor and residual.
5. Reflection upon the precise meaning of the categories.
6. Counter-point texts were reviewed and devised an opposite category through an iterative process. From this process the bipolar semantic differentials emerged

5.8 CONCLUSION

The research addressed Portugali's challenge to examine complexity theory of cities (CTC) from the perspective of: human cognition and perception; a short-term and long-term timeframe; Alexander's semi-lattice concept in the context of small world network theory; and the implication of using qualitative and quantitative methods. To this end, the research framework of the empirical studies was based on Lefebvre's urban triad concept of urbanity, which in this discussion was modified towards the concept of the adaptive perceptual cycle as illustrated in the research framework: the conceived space; the perceived space; and the adaptive space. This was implemented through surveys of masterplanning stakeholders in South East Queensland and a detailed case study of Brisbane's South Bank development.

The next chapter will present the results of the conceived space study and will discuss the significance of the results of each stage of this exploratory part of the empirical research. A key task of the research instrument will be to elicit a concept map of the participant's perception of place and

to examine the masterplanning process. An important method for the research will be multidimensional scaling analysis (MDS) which is a method sourced from cognitive psychology and social science and combines statistical rigour with qualitative interpretation of human cognition and perception. In accordance with a mixed methods approach, other quantitative methods will be applied as well as qualitative content analyses.

CHAPTER SIX

CONCEIVED SPACE RESULTS

6.1 INTRODUCTION

Chapter Five was a discussion of the methods used to investigate the research question: *How can places be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place?* The three key elements of the integrated research framework were described as developed from Lefebvre's notion of the urban triad as the source of 'urbanity'. This urban triad concept was developed for this present empirical study as: conceived space; perceived space; and, adaptive space.

This chapter will discuss the results of the empirical study of conceived space (Figure 6.1). The conceived space study will present firstly, the results of the study of the perception of place elicited through the sub-question, *How do design professionals and others perceive urban places?* Secondly, the results of the study of the masterplanning process will be discussed which were elicited through the sub-question, *How are urban places masterplanned in a context of change, certainty and uncertainty?* The combined results of the conceived space study are intended to be exploratory and to refine the focus of the research question for testing in a case study. The case study of Brisbane's South Bank will be the focus of the perceived space and adaptive space study discussed in Chapter Seven and Chapter Eight.

The methods used for the concept mapping task which will investigate the perception of place is multidimensional scaling analysis (MDS). As discussed in Chapter Five, this is the key analytical method because it enables statistical rigour as well as more qualitative researcher interpretation of the results. The use of qualitative and quantitative methods as well as the focus on data gathered from 'human agents' embedded in this research is important in addressing the challenge posed by Portugali: "... how human agents perceive and cognize space, how they navigate and behave in space, or take location decisions ... CTC [complexity theory of cities] ignore this body of

knowledge... The potential that has yet to be realized is to develop a better balance between the qualitative and quantitative messages of complexity theories and their application to the study of cities... A better link between CTC and social theory oriented urban studies will provide a good context to realize the potential of a CTC approach to urban planning and design.” (Portugali 2012, pp60-61). This chapter will focus on an exploration of conceived space with an examination of the perception of place and the masterplanning process. The results of the conceived space study have been published in a peer reviewed journal and presented at a conference (Ganis, Minnery and Mateo-Babiano, 2011).

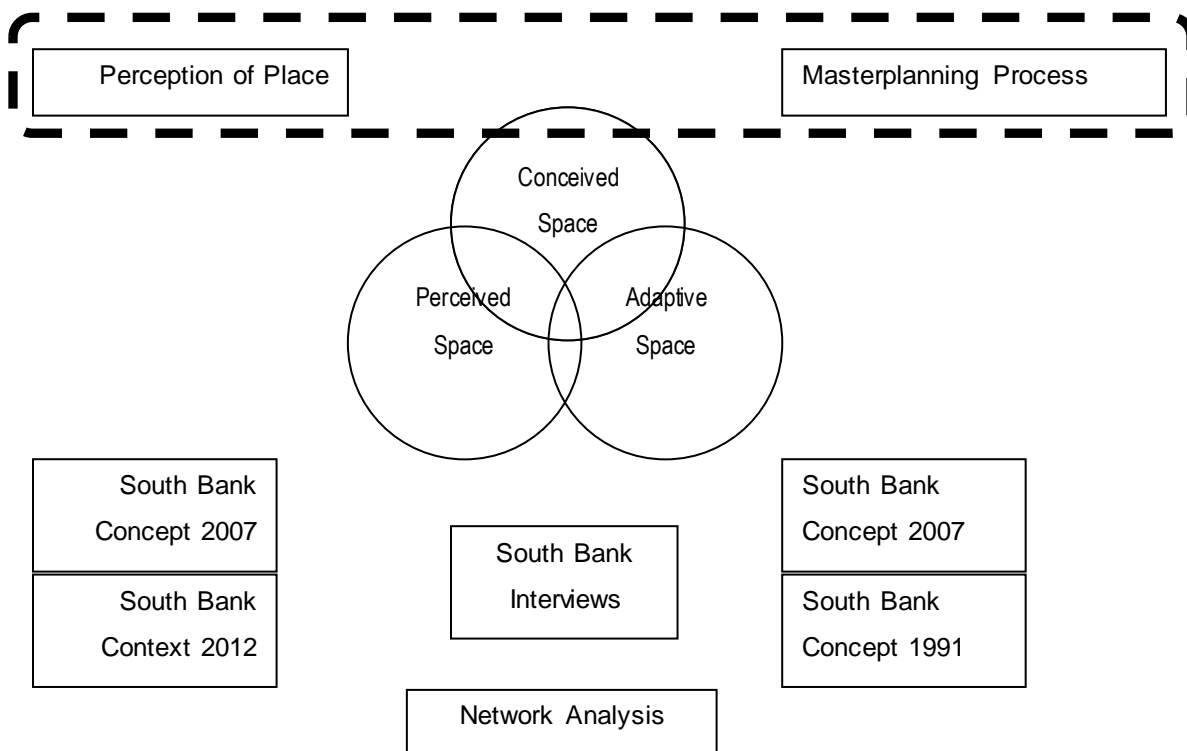


Figure 6.1: Empirical research framework – Conceived Space

6.2 PARTICIPANTS

As discussed in Chapter Five, the participants for the conceived space study consisted of a disproportionate stratified selection of design/development professionals, community representatives and others living in Brisbane and South East Queensland. The participant groups were selected because they represented the key negotiators in masterplanning processes in Brisbane and South East Queensland. The influence of the disproportionate sample using an optimum allocation approach was evident and indicated the conceptual influence that the participation of Planners may have in the place making process. The groups were made up of Architects (10);

Councillors (local government elected representatives) (8); Developers (7); Landscape Architects (7); Planners (24); Transport Engineers/Planners (11); and, Others (9). Each group was surveyed separately. There were a total of 76 participants.

6.3 CONCEIVED SPACE RESULTS

The study of the conceived space was addressed through a questionnaire survey, which queried: *How do design professionals and others perceive urban places? And, How are urban places masterplanned in a context of change, certainty and uncertainty?* This two-pronged approach attempted to reveal: Part One, the urban design qualities of placemaking through the participants' perception of the places with which they were familiar in Brisbane and South East Queensland (concept mapping task); Part Two, the masterplanning process under different contextual circumstances (masterplanning prioritisation tasks) (Appendix 1).

The aim of the concept mapping task was to elicit the participants' underlying conceptual structure of their perception of good urban places in South East Queensland. The aim of the masterplanning prioritisation tasks was to reveal the participants' conceptual notions of the masterplanning process, which were then tested in a contextual scenario within a Short Term (ST) and a Long Term (LT) timeframe and finally, the participants were tested under more pragmatic development scenarios, which introduced the contradictory tensions of masterplanning for certainty and uncertainty.

6.4 PART ONE: PERCEPTION OF PLACE

6.4.1 CONCEPT MAPPING TASK RESULTS The professional/community role of each group was important and so, Question 1 of the questionnaire survey requested the participants to state their professional or community role and to respond to the questions from the perspective of that role.

Question 2 investigated the perception of place. A semantic differential task presented bipolar categories of urban design qualities derived from a content analysis of the urban design literature. The participants were asked to rank good urban design qualities in the context of South East Queensland. The participants were given a context in which to consider their responses so that they might frame their deliberations in a familiar and relevant scenario.

Multidimensional Scaling analysis (MDS) was used because it is a relational method traditionally used in psychology and social network analysis (Scott, 2000; Wasserman and Faust, 1994). Cluster

Analysis (CA) supported the interpretation of the MDS plots. If there was ambiguity between the MDS and the CA the MDS result took precedence (Trochim, 1989; 2009). MDS analysis configured plots consisting of clusters of variables (shown as groups of dots) and dimensions (shown as a line or curve of dots). The clusters/dimensions of dots that were close together in the space were strongly related and those that were less related were distanced. The results were two-dimensional for clear interpretation.

The *Stress* value of an MDS analysis is an evaluation the results' goodness-of-fit: a stress value of <0.15 is a good fit and one that is >0.25 is a bad fit (Trochim, 1989). The lower stress value indicates greater reliability and the higher the stress value indicates that the results may be too complex to interpret.

The results indicated a range of *Stress* values for each group between >0.01 and <0.16 (<0.15 is a good fit and one that is >0.25 is a bad fit). This range indicated a good fit not only because these MDS plots were two-dimensional (a better fit is attained with more dimensions) but also, the variables were relatively complex concepts open to broad interpretation. As such, the goodness-of-fit supported the interpretation of these results.

The interpretations of the MDS Concept Maps showed that each group's plot was different. Nevertheless, a visual inspection of the MDS plots showed that Variable 3 Clear Wayfinding and Variable 9 Movement Network Connectivity were somewhat related in all the plots - except for the Landscape Architects. In particular, the combined All Groups plot (76 participants, which was well over the acceptable minimum of participants required for the veracity of MDS results) showed a compelling relationship of variables consisting of Variable 1 Compact, Distinct Urban Centres; Variable 3 Clear Way-finding; and, Variable 9 Movement Network Connectivity (Figure 6.2 and Figure 6.3). A Content Analysis of the open comments that were requested for each quantitative ranking response for the semantic differential task enhanced the researcher's interpretation of the MDS plots of each group's concept map.

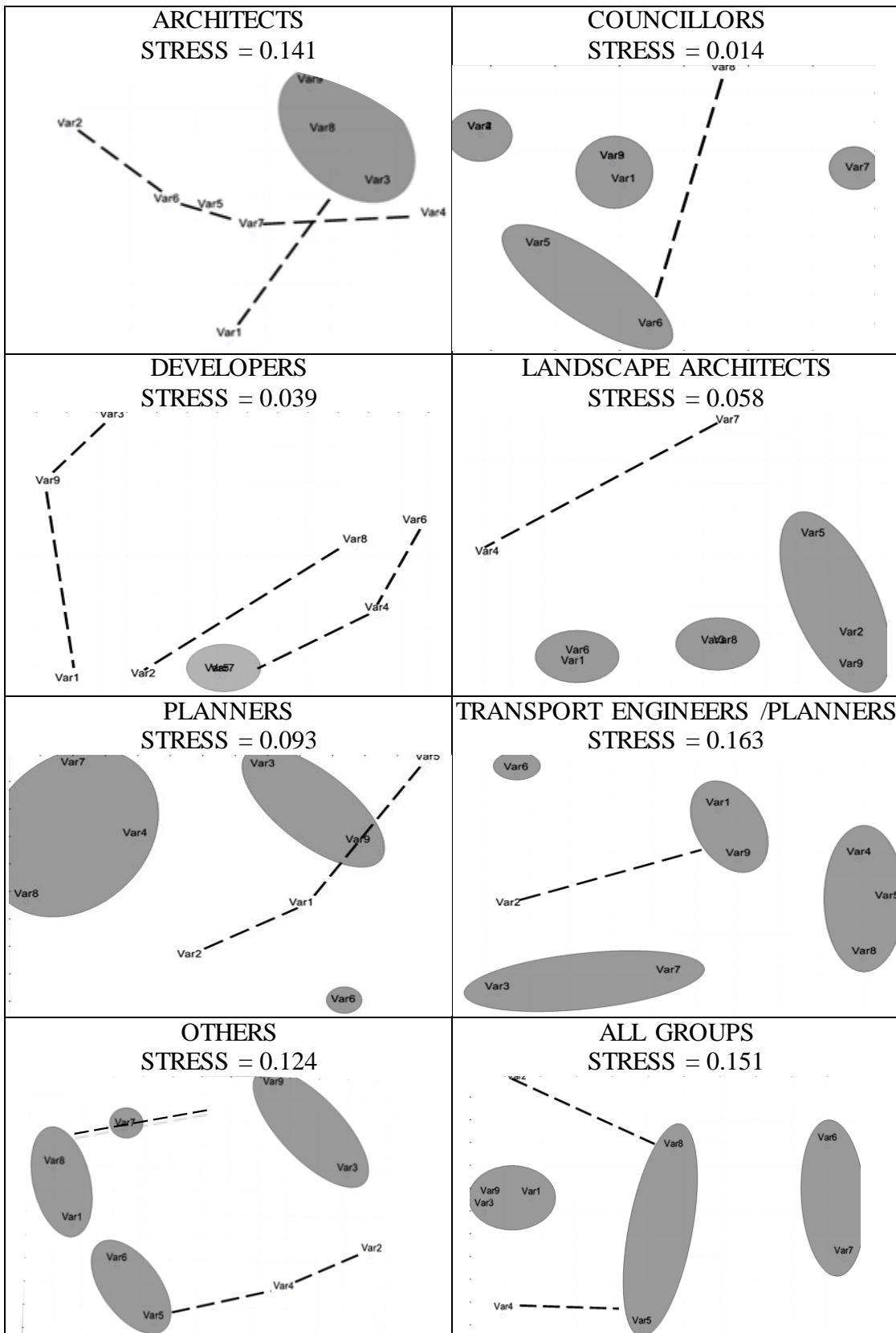


Figure 6.2: Conceived space. Concept maps plotted via multidimensional scaling analysis (MDS).
Stress Value: 0= excellent fit; <0.15= good fit; >0.25= bad fit (Trochim, 1989; Kruskal, 1964).

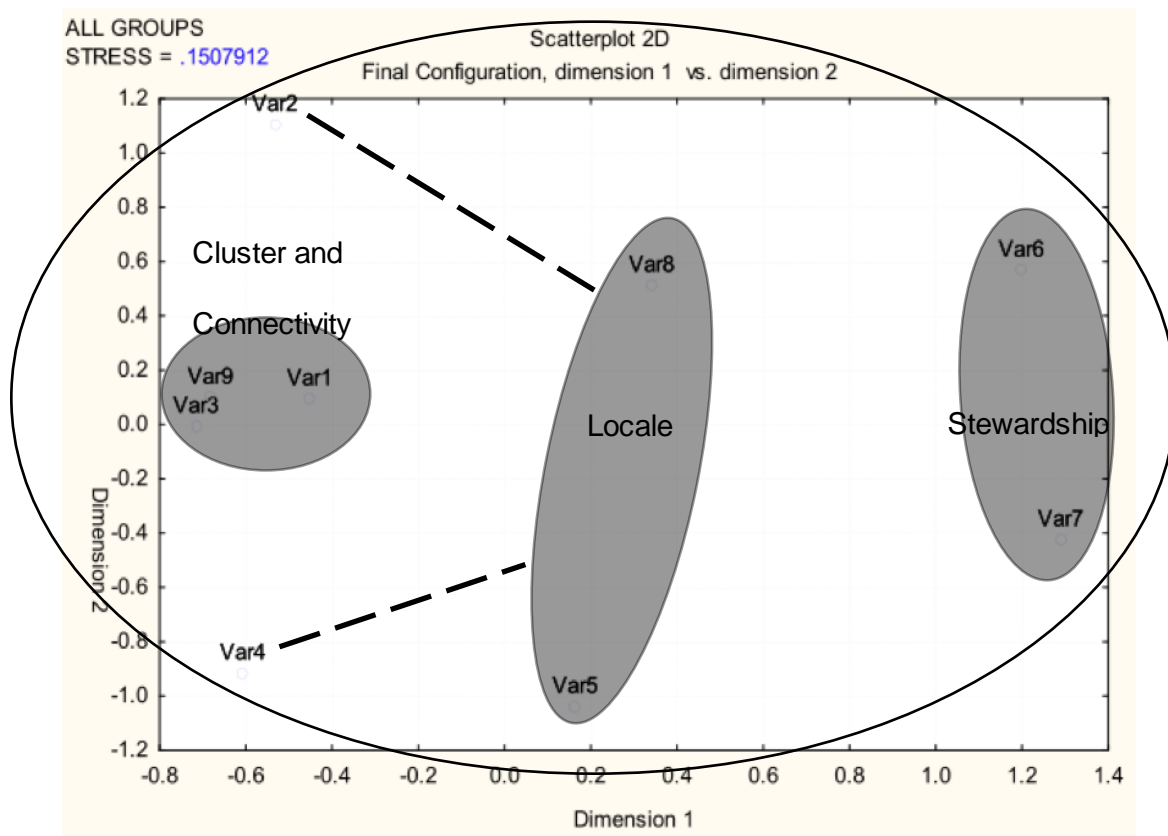


Figure 6.3: Conceived Space. All Groups MDS Plot. Normalised Raw Stress Value = 0.1507912
0= excellent fit; <0.15= good fit; >0.25= bad fit (Trochim, 1989; Kruskal, 1964).

The result of the All Groups plot illustrated a hub, which was interpreted as ‘Cluster and Connectivity’. This categorisation was based on the relationship of the three variables. The consistency of the relationship of these three variables in the MDS plots and the Cluster analysis (CA) supported the notion that Cluster and Connectivity represented a core concept of the participants’ perception of good urban places. This was a significant finding because the urban dynamic of Cluster and Connectivity represented by the close relationship of these three variables (Compact, Distinct Urban Centres; Clear Way-finding; and, Movement Network Connectivity) as the dominant placemaking aspect of good urban design quality aligned with the dynamic of small world network theory discussed in Chapter Three and Chapter Four. This key finding supported the refinement of the research question towards a small world network paradigm.

The adjacent cluster of variables consisted of Variable 5 Small-scale local infrastructure; Variable 8 Evolving places; and with links to Variable 2 Local character building style; and to Variable 4 Sensory experience. This cluster is interpreted as ‘Locale’ because the variables describe aspects of urbanity interpreted as human scale built form and people’s experience of a place over time (Small-scale local infrastructure; Evolving places with links to Local character building style; and Sensory experience). Locale was the nearest neighbour to the Cluster and Connectivity hub, which suggested a strong relationship between the urban dynamic of Cluster and Connectivity in the form of urban density and interconnected transport routes and the built form and experience of a Locale. An important aspect of this Locale cluster was Variable 8 Evolving places, because it indicated the participants’ recognition of a self-organising process of urban change over time rather than a finite notion of completed places. This was a significant finding in the context of not only understanding people’s perception of place, but also of the masterplanning process. If people perceived places as ‘evolving’ this implied that the masterplanning process needed to enable that evolutionary process. As such masterplanning needs to encompass the processes of adaptation and resilience, which are inherent in the concept of self organised criticality of small world network theory. This implication adds further refinement and support to the research question in the direction of complex adaptive systems for urban placemaking.

Finally, the All Groups MDS plot illustrated a cluster that consisted of Variable 6 Safe places and Variable 7 Ecological conservation. This cluster was interpreted as ‘Stewardship’ because it described a sense of responsibility for people and the natural environment. This cluster was the least contiguous with the hub Cluster and Connectivity; the nearest neighbour to Stewardship was Locale. This implied that the concept of good urban places not only referred to the human scale built form and experience of a Locale, but also was closely related to people’s sense of responsibility towards a place (Safe places and Ecological conservation).

6.4.1.1 SIGNIFICANCE OF THE CONCEPT MAPPING RESULTS The concept mapping task results revealed that Cluster and Connectivity, Locale and Stewardship described a network of urban design qualities that represented these participants’ conceived space of what makes a good place. It was proposed that this concept map represented these participants’ schemata with which they are armed as they experience their real world urban context.

Interestingly, the hub of Cluster and Connectivity describes the shaping of urban places through conurbations of buildings and streets as a fundamental concept of urban centres since people first established relatively permanent settlements. This may seem a simplistic or banal finding; however, if we consider that the lineage of this schema of *what makes a good place* is revealed in nascent Neolithic notions of ‘settlement’ (for example, as evidenced by the agrarian settlement of Çatalhoyuk in Anatolia described in Chapter Two) the apparent endurance of this schema is compelling. The result of the concept mapping task, which elicited the hub of Cluster and Connectivity was significant because this hub revealed a concept that has endured despite the modernist era that promoted a settlement pattern of large buildings dispersed in open spaces and the separation of various forms of transportation connectivity. The result described as Cluster and Connectivity indicated the goodness-of-fit that this fundamental schema of settlement seems to represent.

Importantly, this result was derived from MDS analysis that is a non-parametric method and as explained in Chapter Five, is a relational method that does not consist of predetermined categories; rather the categories are derived from researcher interpretation of the results that emerge from the participants’ MDS plots. This means that there is an element of qualitative analysis in MDS derived results, missing from more mechanistic analyses that Portugali (2012) critiqued. In the context of this research into people’s perception of place, the results of the concept mapping task represented the schemata of “... how human agents perceive and cognize space” (Portugali et al, 2012, pp60-61) and supported the key dynamic of Cluster and Connectivity that emerged from the human perception of place.

The hub of Cluster and Connectivity was a significant finding also because this schema aligned with the underlying dynamic of small world network theory. As introduced in Chapter Three, small worldliness is created when nodes and neighbourhoods cluster and connect via the dynamic of either ‘nearest neighbour’ (WS small worlds) or by the ‘power law’ (BA scale free small worlds). The key finding of Cluster and Connectivity as the hub of the participants’ schema of good urban places supported the proposition that small world networks might offer a placemaking paradigm that will retain relevance for people particularly in a context of critical change. Relevant placemaking in a context of critical urban change is an important element of the research question. As discussed in Chapter Three and Chapter Four, cities represent self-organising conurbations and the process of Cluster and Connectivity is the dynamic that propels small world networks as s

theoretical model for cities as complex adaptive systems. The Cluster and Connectivity result flags the relevance of self-organisation as a step towards illuminating the research question.

6.4.2 KENDALL TAU CORRELATION COEFFICIENT ANALYSIS RESULTS This method examined the differences between the stratified sub-groups. The intent of this examination was to gain a greater understanding of the stance taken by various stakeholders in the negotiations of a design and development placemaking process. The MDS plots for each group illustrated the differences between each group’s concept map (or schema) of a good urban place. These differences suggested that although there was a collective conception of a ‘good place’, which was revealed by the goodness-of-fit of the All Groups result, the differences and similarities between the sub-groups leads to an understanding of alternative points-of-view. These similarities and differences between the stratified sub-groups were examined through a Kendall tau correlation coefficient analysis (Table 6.1).

Table 6.1: Kendall tau correlation coefficient analysis of stratified sub-groups

KENDALL TAU CORRELATION COEFFICIENT								
MD pairwise deleted. Marked correlations (shown in bold) are significant at $p < .05000$								
	ALL	A	C	D	LA	P	TE/P	O
ALL	1.000	0.944	0.309	0.743	0.704	1.000	0.816	0.857
A	0.944	1.000	0.253	0.800	0.647	0.944	0.760	0.800
C	0.309	0.253	1.000	0.289	0.514	0.309	0.342	0.434
D	0.743	0.800	0.289	1.000	0.666	0.743	0.579	0.705
LA	0.704	0.647	0.514	0.666	1.000	0.704	0.514	0.782
P	1.000	0.944	0.309	0.743	0.704	1.000	0.816	0.857
TE/P	0.816	0.760	0.342	0.579	0.514	0.816	1.000	0.724
O	0.857	0.800	0.434	0.705	0.782	0.857	0.724	1.000

The significant correlation coefficients are shown in bold and indicate those sub-groups who were similar or dissimilar. This means that the Kendall tau correlation analysis reveals correlation coefficients indicating those groups that have similar schemata or conceptions of a good place and those groups who have a different schemata and by how much - as indicated by the coefficient (in

bold). Briefly, a co-efficient that is nearest 1 indicates the groups that are most closely related (a perfect correlation being 1) in their conceptual structure of good urban places and those furthest from 1, less related.

The following is a brief explanation of the results of each sub-group column illustrated in Table 6.1 (above). The results in the All groups column showed that most groups were more or less correlated except for one interesting difference; the Councillors (C) with a coefficient of 0.309 did not correlate with the ALL groups result. The Councillors (C) appeared to be isolated from all other participant sub-groups' schema for what makes a good urban place. The Architects (A) correlated mostly with the Planners (P) with a coefficient of 0.944, and least with the Councillors (C) with an insignificant coefficient of 0.253. The Councillors (C) interestingly, correlated only with the Landscape Architects (LA) with a significant coefficient of 0.514 and least with the Architects (A). The Developers (D) correlated mostly with the Architects (A) with a coefficient of 0.8 and least with the Councillors (C) with an insignificant coefficient of 0.289. The Landscape Architects (LA) was the only sub-group that correlated with all other sub-groups with the most significant coefficient of 0.782 being with the Others (O), although most sub-groups were also closely correlated with them. The Planners (P) correlated mostly with the Architects (A) as well as the Others (O) with a coefficient of 0.857 and least with the Councillors (C). The Transport Engineers/Planners (TE/P) correlated mostly with the Planners with a coefficient of 0.816 and least with the Councillors (C) with a coefficient of 0.342. Finally, the Others (O) correlated mostly with the Planners (P) with a coefficient of 0.857 and least with the Councillors with a coefficient of 0.434. Interestingly, the Others (O) were non-design professionals and were expected to be more aligned with the community focus of the Councillors (C) but the results showed a reversed tendency of least correlation.

6.4.2.1 SIGNIFICANCE OF THE KENDALL TAU CORRELATION ANALYSIS RESULTS

Although some correlations fulfilled researcher expectations there were some that were counter-intuitive and some even disturbing. In particular as shown in Table 6.1, the significant correlation coefficient between the Landscape Architects and the Councillors was a counter intuitive, but interesting outcome whereas the Councillors insignificant correlation with the All groups, Architects, Developers and Planners in particular was disturbing. Councillors play an important design and development role with these sub-groups and with whom there should be a level of understanding, engagement and cooperation. The role of Architects and Planners is to offer the conceptual input into a planning process and the role of Councillors as elected community

representatives, is to be instrumental in the implementation of these plans. Dissimilarity between the Councillors' schema of good urban places and All others including design professionals (except for the Landscape Architects) and particularly the Councillors dissimilarity with Architects, Planners and Developers seems to indicate a serious point of contention in a planning process.

The results for the Landscape Architects indicated some similarity with the Councillors, although this was not as significant a correlation as the Landscape Architects had with the remaining sub-groups. Counter intuitively, among the design professionals the Landscape Architects had least correlation with the Architects ($A = 0.647$); the Developers ($D = 0.666$) and the Transport Engineers/Planners ($TE/P = 0.514$) but the most significant correlation with the non-design sub-group of Others ($O = 0.782$) and slightly less so with the Planners ($P = 0.704$). One might assume that Landscape Architects would have a strong alignment with design professionals based on their convergent education and experience, rather than with the Others (or even the Planners). Perhaps design professionals, such as Architects, Transport Engineers/Planners, Developers and Landscape Architects are focused more on their specialty in building design, transportation, urban development or landscaping, rather than the wider social issues that preoccupy the Others or the Planners. However, this does not explain the schism between the Councillors and the Others.

It was expected that the community focus of the Councillors and the non-design professional Others would be a source of similarity. In fact, the results showed that the Others had least correlation with the Councillors ($O = 0.434$). Rather, the Others had most correlation with the Planners ($P = 0.857$) Architects ($A = 0.8$) and Landscape Architects ($LA = 0.782$). As such, the Others appeared to align with the wider aesthetic and social concerns of urban design, rather than the perhaps more technical and economic foci of Traffic Engineers/Planners ($TE/P = 0.724$) and Developers ($D = 0.705$) respectively, and least with the Councillors ($O = 0.434$).

The isolated significant correlation coefficient between the Councillors and the Landscape Architects ($LA = 0.514$) and the Councillors' least correlation with Architects ($A = 0.253$) and Planners ($P = 0.309$) might indicate Councillors' predilection towards more politically expedient urban planning projects. It may be that politically minded Councillors prefer concrete more innocuous outcomes such as landscaping, open space, sports fields, parks, gardens and verges, rather than more complex and controversial social or aesthetic building projects that are more vulnerable to public opinion. Alternatively, it might be that the restorative power and political acceptability of parks, recreation and open spaces is a strong conceptual tie between the Landscape

Architects and the Councillors, whereas the other design and development professionals have a predominantly urban focus, the political agenda of which is likely to be more contentious.

A Content Analysis of open comments that support the concept mapping task describes the variation between the groups along with interpretations of the MDS concept mapping plots of each group and the All groups

In sum, the Kendall tau correlation analysis revealed some significant anomalies in what might be expected from the study of the perception of place by the stratified sub-groups of participants. In particular, the significant difference between the Councillors and the design professionals (except for the Landscape Architects) and also unexpectedly, the difference between the Councillors and the Others was an important finding because it highlights a serious misalignment in the implementation of relevant placemaking. The misalignment between the Others and the Councillors is of concern because both of these groups represent the wider community as opposed to the design and development professionals, who are perhaps, framed by their professional roles, education and experience. Despite this professional frame, the Others appeared to align with the designer sub-groups more so than with any other sub-group. As such, the results revealed the sources of an adversarial planning scenario and emphasised that an assumption that community representatives aligned (the Councillors and Others in this study) was not necessarily so. Indeed, the Others as representatives of the wider community who were not politically motivated or compromised seemed to support the perception of place or schema of what makes a good place elucidated by design professionals, particularly by Planners and Architects. These results highlight that those sub-groups with generally similar design focus have a similar perception of place, but that the Councillors who are the key implementers of placemaking projects, need to be embedded into placemaking projects, rather than receivers of such projects if the schism between Councillors and the other sub-groups that appears in these results is to be mended.

6.5 PART TWO: MASTERPLANNING

The masterplanning prioritisation tasks took the conceived space study to the next level – from the perception of place to the realisation of place. The masterplanning prioritisation tasks examined three aspects of the masterplanning process: firstly, conceptual masterplanning; secondly, contextual masterplanning; and thirdly, pragmatic masterplanning.

6.5.1 CONCEPTUAL MASTERPLANNING RESULTS The aim of the Conceptual Masterplanning task (Question 3 of the questionnaire) was to elicit the participants' notions of their priorities in a masterplanning process. The masterplanning stages and priorities are conceptual because the question was not related to a particular context of time or place. Rather, the task tapped into more abstract notions of the masterplanning process as a way to establish the participants' conception of the masterplanning process. This is important because the subsequent task (masterplanning context prioritisation task) was intended to reveal the shifts in the participants' conception or schema of the masterplanning process within a particular urban context and timeframe. The participants were advised: *For the purposes of this study, I have assumed the following four-stage masterplanning process, as outlined in the Urban Design Compendium, English Partnerships, 2000.* The participants were requested: *Please rank each of these masterplanning stages using the following scores.* The participants' scores were ranked on a Likert scale, from 1 (unimportant) to 5 (extremely important). The stratified sub-groups were combined into the group of 76 participants because the data were to be quantitatively analysed, and larger data are more reliable for a frequency analysis (Table 6.2).

Table 6.2: Results of the Conceptual Masterplanning Priorities task (most important priorities are shown in bold).

TECHNICAL PREPARATION
Technical Reports (mean 4.18; std. dev. 0.79) Community Consultation (mean 4.00; std. dev. 0.97)
DESIGN PREPARATION
Site and Context Analysis (mean 4.51; std. dev. 0.69) Urban Design Principles (mean 4.20; std. dev. 0.76) Vision and Creative Ideas (mean 4.49; std. dev. 0.60)
DESIGNING
Uses and Activities (mean 4.33; std. dev. 0.73) Traffic and Pedestrian Network (mean 4.61; std. dev. 0.52) Streetscape Design and Landscaping (mean 4.28; std. dev. 0.75) Building Form, Height and Mass (mean 4.04; std. dev. 0.82) Architectural Character (mean 3.78; std. dev. 0.87)
MONITORING
Urban Design Quality Appraisal (mean 3.82; std. dev. 0.89) Design Review and Masterplan Updating (mean 4.03; std. dev. 0.80)

The results showed that *Traffic and Pedestrian Network* (mean 4.61; std. dev. 0.52) was the most important priority closely followed by the *Site and Context Analysis* (mean 4.51; std. dev. 0.69) and the *Vision and Creative Ideas*. Moderately important conceptual masterplanning priorities were: *Uses and Activities* (mean 4.33; std. dev. 0.73); *Streetscape Design and Landscaping* (mean 4.28; std. dev. 0.75); *Urban Design Principles* (mean 4.20; std. dev. 0.76); and the *Technical Reports* (mean 4.18; std. dev. 0.79) that guide the structure of the masterplan. Next, the *Building Form*,

Height and Mass (mean 4.04; std. dev. 0.82); and *Architectural Character* (mean 3.78; std. dev. 0.87) indicated lesser priorities of a masterplanning process. Finally, the least important masterplanning stages were the monitoring stages of *Design Review and Masterplan Updating*; *Urban Design Quality Appraisal*; and interestingly, *Community Consultation*.

6.5.1.1 SIGNIFICANCE OF THE CONCEPTUAL MASTERPLANNING PRIORITIES

RESULTS These results were grouped into conceptual masterplanning categories of importance. Firstly, the most important stages were concerned with connectivity, time and change. Secondly, moderate importance was given to overarching design principles and functional requirements of the structure of the masterplan. Thirdly, the design detail and built form were addressed and finally, least importance was given to the post-occupancy appraisal and monitoring of the masterplanning process. A significant anomaly in these categorised results was the relative unimportance given to *Community Consultation*.

The results revealed the primary importance of the *Traffic and Pedestrian Network* stage and confirmed the conceptual relevance of Connectivity. This was important because the results of the previous Concept Mapping task elicited the hub of Cluster and Connectivity as a key to the schema of the participants' perception of place. This part of the investigation into the conceptual masterplanning prioritisation process advanced the empirical research by eliciting the participants' conception of placemaking. The apparent alignment between the hub of Cluster and Connectivity in the participants' perception of place and the *Traffic and Pedestrian Network* stage (or Connectivity) of the masterplanning process reaffirmed the participants' key conceived space schema of Cluster and Connectivity in their conception of placemaking.

Interestingly, the next most important stages of conceptual masterplanning priorities of the *Site and Context Analysis* and the *Vision and Creative Ideas* offered an insight into the participants' awareness of time and change in the masterplanning process: a *Site Analysis* is an examination of a past and present site context whereas *Visioning* proposes a future context. This means that conceptually at least, the participants have at the outset identified Connectivity, Time and Change as the most important stages of a masterplanning process. These insights were important because urban connectivity, time and change are central to the dynamic of small world network theory. As such, the importance of the masterplanning stages categorised as Connectivity, Time and Change to the conceptual masterplanning process adds support to the proposition that small world networks,

which are driven by connectivity, time and change offer an appropriate paradigm with which to underpin a masterplanning framework.

The moderately important stages showed a shift in the participants' conception of placemaking towards the overarching principles and the three-dimensional urban built form, which fleshed-out the skeleton of the *Traffic and Pedestrian Network* (Connectivity) stage of the masterplan process. Finally, the least important conceptual masterplanning priority stages were the appraisal and monitoring of the masterplan, which might be because it is an unknown and perhaps considered outside the immediate concern of practicing design professionals who are largely focussed on the implementation of masterplans.

Within this group of least important priorities appeared the anomaly of *Community Consultation*. Usually, community consultation is completed in the very early stages of a masterplanning process and often claimed to be a very important contribution to the design professionals' cache of relevant information. Nevertheless, in the context of these results, *Community Consultation* ranked relatively unimportantly. Perhaps the lack of a context of time and place diminished the priority of the community in this abstract conceptual masterplanning process. This result questioned the importance usually claimed for *Community Consultation* compared with the *Site and Context Analysis*, or the *Vision and Creative Ideas*, or the *Uses and Activities*, which are usually informed by community consultation at an early stage of the masterplanning process.

The next task tested the same masterplanning stages in a particular context of time and place and as such, established a more realistic contextual focus for the participants to envision the community of a place.

6.5.2 CONTEXTUAL MASTERPLANNING RESULTS The contextual masterplanning priorities task inserted the context of time and place into the stages of the masterplanning process (Question 4 of the questionnaire). The aim was to elicit any differences between masterplanning for a short-term (ST) timeframe and for a long-term (LT) timeframe in a particular urban centre context. The context was the South East Queensland region and the timeframes were considered in light of those used for the South East Queensland Regional Plan/s (Queensland Government, 2005, 2009).

The combined participant groups were asked to complete a prioritisation matrix that was devised using the same masterplanning stages as the previous conceptual masterplanning priorities task: Technical Preparation; Design Preparation; Designing; and, Monitoring. The masterplanning context was described: *Imagine you are a participant in the masterplanning of a new urban centre in South East Queensland (say, a town centre of approximately 2Km²). However, the masterplan needs to show the outcome in the short-term and in the long-term. ST = short-term timeframe (5 to 10 years); LT = long term timeframe (20 to 25 years). A rank between 1 (low) and 10 (high) indicated the level of the participants' agreement with each statement in each timeframe (Table 6.3).*

Table 6.3: Contextual masterplanning statements for masterplanning process task.

STATEMENT: <i>“Within the timeframe, this stage of the masterplanning process should demonstrate...”</i>
<ol style="list-style-type: none"> 1. <i>Relevance to the community</i> 2. <i>Certainty for the development industry</i> 3. <i>Delivery of the outcome on time and within budget</i> 4. <i>Flexibility and adaptability</i> 5. <i>Certainty for the community</i> 6. <i>A detailed urban design/ architectural vision</i> 7. <i>Fulfillment of technical growth predictions</i> 8. <i>Environmental and social justice</i>

The conceptual masterplanning stages were retained in this task but the participants were now asked to consider these statements in the context of masterplanning; firstly, in a short term timeframe (ST) and secondly, in a long term timeframe (LT). This means that there were repeated data for two scenarios, which enabled a comparison of matched pairs of data.

6.5.2.1 WILCOXON MATCHED PAIRS TEST RESULTS A Wilcoxon matched pairs test revealed the significant differences between the medians of the pairs of responses given in the context of a short-term timeframe (ST) and those in the context of a long-term timeframe (LT)

within each masterplanning stage: Technical Preparation (TP); Design Preparation (DP); Designing (D); Monitoring (M).

Technical Preparation (Table 6.4) showed no significant difference between either timeframe except for the Short Term (ST) importance of item:

Q4.3 *Delivery of the outcome on time and within budget* (p=0.000015) (ST mean 8.09 std. dev. 1.51; LT mean 6.93 std. dev. 1.838).

Table 6.4 Technical Preparation (TP) stage – Wilcoxon matched pairs results

TECHNICAL PREPARATION STAGE (TP)		
SHORT TERM (ST)	LONG TERM (LT)	
Wilcoxon Matched Pairs Test. Marked tests are significant at p < .05000 (shown bold)		
	Valid - N	p-level
Q4.TP1/ST & Q4.TP1/LT	66	0.059325
Q4.TP2/ST & Q4.TP2/LT	62	0.385343
Q4.TP3/ST & Q4.TP3/LT	63	0.000015
Q4.TP4/ST & Q4.TP4/LT	61	0.069710
Q4.TP5/ST & Q4.TP5/LT	64	0.269414
Q4.TP6/ST & Q4.TP6/LT	58	0.274784
Q4.TP7/ST & Q4.TP7/LT	58	0.134669
Q4.TP8/ST & Q4.TP8/LT	60	0.085925

The mean shows that the delivery of the technical outcome *on time and within budget* is more important in the Short Term (ST) than in the Long Term (LT). As an issue of Preparation it is plausible that delivery time and cost are much more critical in the Short Term than in the Long Term. Although this is the only significant result, another result that is not significant but in the light of the *Community Consultation* anomaly of the Conceptual Masterplanning task previously discussed, this tendency is interesting. The result that suggests a slight tendency towards concern for community relevance in a Short Term timeframe than in a Long Term timeframe is:

Q4.1 *Relevance to the community* (p=0.059) (ST mean 7.54 std. dev. 2.155; LT mean 7.151 std. dev. 2.178)

If we consider the importance of the role of community consultation and the possible objection or controversy towards a masterplan by that community, this only slight difference between the Short Term and Long Term response indicates how community relevance to a masterplanning process is underestimated.

Other items that are not significant but indicate possible Long Term concerns are:

Q4.4 *Flexibility and adaptability* (p=0.069710) (ST mean 7.38 std. dev. 1.97; LT mean 7.72 std. dev. 2.075) and,

Q4.8 *Environmental and social justice* (p= 0.086) (ST mean 7.806 std. dev. 1.726; LT mean 8.067 std. dev. 1.676).

The relevance of *flexibility and adaptability* is that this indicates concern with a project over time during which there are likely to be shifts and changes in an urban context. This is an issue of stakeholder expectations and suggests that flexibility is necessary over time as those expectations change or perhaps become irrelevant. As such, it is reasonable to suggest that *flexibility and adaptability* of the Technical Reports may be needed as part of a monitoring and review process if expectations in the Long Term are to be satisfied. However, topics of *environmental and social justice* are probably timeless, but an awareness of Short Term responsibility for Long Term *environmental and social justice* is a concern that stakeholders possibly expect.

The Design Preparation results (Table 6.5) considered more important in the Short Term than in the Long Term were:

Q4.1 *Relevance to the community* (p=0.039044) (ST mean 7.392 std. dev. 2.096; LT mean 6.945 std. dev. 2.123).

Q4.2 *Certainty for the development industry* (p=0.011766) (ST mean 7.354 std. dev. 1.899; LT mean 6.825 std. dev. 2.012).

Q4.3 *Delivery of the outcome on time and within budget* (p=0.000545) (ST mean 7.877 std. dev. 1.431; LT mean 7.063 std. dev. 2.05).

Q4.6 *A detailed urban design/ architectural vision* (p=0.023051) (ST mean 7.629 std. dev. 1.969; LT mean 7.246 std. dev. 1.972).

Table 6.5: Design Preparation (DP) stage – Wilcoxon matched pairs results.

DESIGN PREPARATION STAGE (DP)		
SHORT TERM (ST) LONG TERM (LT)		
Wilcoxon Matched Pairs Test. Marked tests are significant at $p < .05000$ (shown bold)		
	Valid - N	p-level
Q4.DP1/ST & Q4.DP1/LT	64	0.039044
Q4.DP2/ST & Q4.DP2/LT	63	0.011766
Q4.DP3/ST & Q4.DP3/LT	63	0.000545
Q4.DP4/ST & Q4.DP4/LT	61	0.750884
Q4.DP5/ST & Q4.DP5/LT	63	0.259080
Q4.DP6/ST & Q4.DP6/LT	61	0.023051
Q4.DP7/ST & Q4.DP7/LT	56	0.537336
Q4.DP8/ST & Q4.DP8/LT	59	0.534926

These items address stakeholder expectations and the preparation and implementation of a masterplan, so it is plausible that concerns about relevance, certainty, time and cost and the architectural documentation that will deliver an expected outcome are priorities of the Design Preparation stage in a Short Term timeframe.

The Designing stage (Table 6.6) showed those concerns that impacted upon certainty and delivery in the Short Term:

Q4.2 *Certainty for the development industry* ($p=0.0443$) (ST mean 7.594 std. dev. 1.797; LT mean 7.197 std. dev. 1.99).

Q4.3 *Delivery of the outcome on time and within budget* ($p=0.001$) (ST mean 8.169 std. dev. 1.464; LT mean 7.258 std. dev. 2.064).

Q4.5 *Certainty for the community* ($p=0.042096$) (ST mean 7.671875 std. dev. 1.543596; LT mean 7.147541 std. dev. 1.869368).

Table 6.6: Designing (D) stage – Wilcoxon matched pairs results

DESIGNING STAGE (D)		
SHORT TERM (ST) LONG TERM (LT)		
Wilcoxon Matched Pairs Test. Marked tests are significant at $p < .05000$ (shown bold)		
	Valid - N	p-level
Q4.D1/ ST & Q4.D1/ LT	64	0.201401
Q4.D2/ ST & Q4.D2/ LT	61	0.044331
Q4.D3/ ST & Q4.D3/ LT	62	0.000796
Q4.D4/ ST & Q4.D4/ LT	60	0.448965
Q4.D5/ ST & Q4.D5/ LT	61	0.042096
Q4.D6/ ST & Q4.D6/ LT	61	0.061413
Q4.D7/ ST & Q4.D7/ LT	56	0.283978
Q4.D8/ ST & Q4.D8/ LT	60	0.287092

If we compare these Designing results with the previous Design Preparation results there is a shift between items concerned with stakeholder expectations (Design Preparation) and those concerned with the satisfaction of stakeholder expectations (Designing). It seems plausible that immediate issues of certainty and delivery dominate the Designing stage as an important Short Term outcome.

An item that is not significant but shows a possible tendency is:

Q4.6 *A detailed urban design/architectural vision* ($p = 0.061$) (ST mean 8.065 std. dev. 1.447; LT mean 7.738 std. dev. 1.662).

Strictly speaking this item addresses the detailed vision and is a better fit with Design Preparation; however there may be some overlap with the Short Term Designing stage.

Monitoring (Table 6.7) indicated no significant difference between either timeframes except for one item that was considered more important in the Short Term than in the Long Term:

Q4.3 *Delivery of the outcome on time and within budget* (p=0.044810) (ST mean 7.556 std. dev. 1.838; LT mean 6.984 std. dev. 2.109).

Table 6.7: Monitoring (M) stage – Wilcoxon matched pairs results

MONITORING STAGE (M)		
SHORT TERM (ST) LONG TERM (LT)		
Wilcoxon Matched Pairs Test. Marked tests are significant at p <.05000 (shown bold)		
	Valid - N	p-level
Q4.M1/ ST & Q4.M1/ LT	64	0.060212
Q4.M2/ ST & Q4.M2/ LT	60	0.855199
Q4.M3/ ST & Q4.M3/ LT	61	0.044810
Q4.M4/ ST & Q4.M4/ LT	58	0.239652
Q4.M5/ ST & Q4.M5/ LT	63	0.495379
Q4.M6/ ST & Q4.M6/ LT	57	0.492460
Q4.M7/ ST & Q4.M7/ LT	56	0.975736
Q4.M8/ ST & Q4.M8/ LT	59	0.404178

This appears to be a plausible result considering the more critical impetus of delivery time and cost in the Short Term than in the Long Term probably because masterplan delivery and budgetary outcome is more difficult to commit in the Longer Term.

6.5.2.2 SIGNIFICANCE OF THE CONTEXTUAL MASTERPLANNING RESULTS The intent of this task was to insert a context of time and place into the participants’ conceptual notions of the masterplanning process. The participants retained their role and perspective as a design or development professional, community or other, responded to masterplanning scenarios in a Short-Term timeframe (ST) and in a long-term timeframe (LT) for a place described as a 2Km² town centre located in South East Queensland.

The results showed that at all masterplanning stages the short-term (ST) priorities were the most important between the matched pairs of timeframes (ST and LT). The importance placed on short-term priorities revealed the aspects of masterplanning that required certainty. The most important short-term scenarios focussed on the masterplanning implementation actions: *Delivery of the outcome on time and within budget; Relevance to the community; Certainty for the development industry; A detailed urban design/ architectural vision; Certainty for the community.*

The *Delivery of the outcome on time and within budget* was the most persistent action and was important during all masterplanning stages from the Technical Preparation stage through to the Monitoring stage. This revealed that masterplanning in the short-term was a process in which the certainty of timing and budget was paramount, particularly to these predominantly design and development professionals. The sense of short-term certainty was supported by the subsequent focus on the masterplanning items: *Relevance to the community; Certainty for the development industry; A detailed urban design/ architectural vision; and, Certainty for the community.*

Interestingly, the short-term importance of the items, *Relevance to the community* and, *Certainty for the community* revealed in this Contextual masterplanning task, was in contrast to the previous Conceptual masterplanning task (Question 3 of the questionnaire) the result of which showed *Community Consultation* as somewhat of an afterthought. The contrast between the result of Question 3 and Question 4 was significant in that a clearly contradictory opinion was elicited. Perhaps this indicated how the participants' approach to masterplanning changed when considering the masterplanning process conceptually (with no time and place defined) and contextually (within a defined time and place). A context of time and place alerted the participants to a client body (*Certainty for the development industry* and, *Delivery of the outcome on time and within budget*); the successful implementation of an urban development project (*A detailed urban design/ architectural vision*); and the end users of the urban development project (*Relevance to the community* and, *Certainty for the community*). As such, these results showed that the most important priorities of each stage of a masterplanning process were short-term considerations. However, the significance of this revelation was the implication that conversely, in the context of a long-term timeframe certainty is unimportant – that is to say, masterplanning in a long-term timeframe is fundamentally, uncertain. This revelation was explored in the next task, Question 5, Pragmatic masterplanning that addressed certainty and uncertainty in masterplanning.

6.5.3 PRAGMATIC MASTERPLANNING RESULTS Sometimes, the simple practicalities of a process are overlooked or considered too banal for consideration. After the conceptual masterplanning and the contextual masterplanning investigation the final task sought a more pragmatic perspective with an examination of masterplanning for certainty and adaptability. This task consisted of direct, simple questions that rephrased the masterplanning priorities expressed in the previous questions (Question 3 and Question 4), but taking on a more pragmatic urban development slant (Question 5 of the questionnaire).

The statements for this task were presented in such a way as to elicit any contradictions in the participants' responses by covertly phrasing questions. The participants ranked their agreement or disagreement with the statements on a Likert Scale from 1 = agree; to 5 = disagree. The discussion of the results that follow begins with the items of strongest agreement with the statements and end with the strongest disagreement (1 = strongest agreement; and 5 = strongest disagreement). A contradictory result is shown in bold (Table 6.8). The question began with the words: *When preparing a masterplan for an urban centre in South-East Queensland...*

Table 6.8: Mean results for all participants

	Valid N	Mean	Std.Dev.
Q5 (a)	72	2.0	0.9
Q5 (b)	72	1.7	0.6
Q5 (c)	72	1.8	0.8
Q5 (d)	72	2.2	0.9
Q5 (e)	72	3.8	0.7

The statements with which the participants indicated strongest agreement were:

Q5 (b)...*it must provide for the urban growth predictions of the technical analyses* (mean 1.7; std dev 0.6)

Q5 (c)...*an adaptable masterplan will lead to a more relevant built environment* (mean 1.8; std dev 0.8).

The statements with which the participants showed moderate agreement were:

Q5 (a)...*the physical outcome of the built environment must be clearly described* (mean 2; std dev 0.9); and,

Q5 (d)...*a detailed masterplan helps create urban design and architectural character* (mean 2.2; std dev 0.9)

Finally, the statement with which the participants disagreed was:

Q5 (e)...*an adaptable masterplan will be too uncertain for the development industry* (mean 3.8; std dev 0.7)

Importantly, the results that described Q5 (b) ...*it must provide for the urban growth predictions of the technical analyses*; and Q5 (e)...*an adaptable masterplan will be too uncertain for the development industry*, revealed a contradictory opinion.

6.5.3.1 SIGNIFICANCE OF PRAGMATIC MASTERPLANNING RESULTS The aim of this task was to elicit through simple, direct questions the tension between certainty and uncertainty or predictability and adaptability in masterplanning. Specifically, ‘certainty’ in masterplanning implies a predictable implementation process, requiring prescribed technical and building details. However, masterplanning that will be relevant for a future, unknown community requires a level of uncertainty, adaptability and flexibility. The tension between these contradictory masterplanning outcomes was revealed thusly: The question, Q 5(e) stated that *adaptable masterplans are too uncertain for the development industry*. This statement was posed to see if the participants might contradict their earlier responses: for example, if the participants believed that it is important that the masterplan 5(b)...*must provide for the urban growth predictions of the technical analyses*, this indicated that the development industry needed certainty. Similarly, if it was important that, 5(a)... *the physical outcome of the built environment must be clearly described*, and 5(d)... *a detailed masterplan helps create urban design and architectural character*, this supported certainty in masterplanning.

If the results showed that the participants believed 5(a), 5(b) and 5(d) that masterplans should give certainty through clearly described and detailed architectural character, but they also believed 5(c) that adaptable masterplans are more relevant and 5(e) adaptable masterplans are *not* too uncertain for the development industry, this was a contradiction between the role of certainty and the uncertainty of adaptability. Indeed, there was virtually no difference between the strength of

agreement with 5(c) that adaptable masterplans lead to more relevant urban places (mean 1.8 std dev.0.8) and, 5(b) that predictive technical analyses must be satisfied (mean 1.7 std dev. 0.6). This result revealed a tension between certainty and uncertainty that may be at the heart of the problem with masterplanning processes that do not address time and change in urban placemaking.

Importantly, the results of the pragmatic masterplanning priorities task confirmed the tension and contradiction between certainty and uncertainty that is acknowledged by the design professions and yet, the way forward to a resolution of this tension has been elusive. Some practitioners support a masterplanning approach that consists of large scale framework plans (also known as structure plans) that indicate a flexible urban arrangement that 'frames' future smaller scale masterplanned development. This approach acknowledges time and the uncertainty of change by establishing a framework within which a more certain detailed future might emerge in time. However, the uncertainty of a framework plan is challenging within the reality of some demanding contexts such as large-scale urban redevelopment sites that are the focus of this research.

Significant inner city places have many intense and profound implications from political to economic imperatives; social justice and cultural rights; community needs and individual wants. All these and more are sources of pressure towards practitioners' planning places for a certain future. Consequently, as illustrated by the three Australian urban redevelopments in crisis discussed in Chapter One, an alternative masterplanning response in such intense urban contexts is to provide short-term certainty through detailed masterplans at the outset that illustrate a desired future of perhaps many decades hence, despite practitioners' acknowledgement of long-term uncertainty.

This was the approach taken by the Queensland state government at a time when its integrity was in question - as will be described through the case study of South Bank in Chapter Seven. Under the political cloud of the day, there was a need to offer up a transparent future for the South Bank site to counter the cries of 'cronyism' from a cynical community. Once the political scars had healed and a Royal Commission and its dark revelations had sated community ire, the masterplan for South Bank was significantly amended towards a more uncertain, but adaptive masterplan that acknowledged the unpredictable nature of long-term urban development. However, as will be described in Chapter Seven and Chapter Eight, massive changes to masterplans, which are instruments for the implementation of often huge infrastructure is inefficient and expensive running into many millions of dollars along with time costs and economic and social instability at many levels. As will be related in Chapter Seven and Eight in the case study of South Bank, a more

benign placemaking approach is proposed through a masterplan that is underpinned by a framework that is adaptive and resilient, rather than one that requires large scale demolition renewal.

6.6 SIGNIFICANCE OF THE CONCEIVED SPACE RESULTS The conceived space study was one part of a tripartite research framework the other parts being the perceived space and adaptive space in relation to the South Bank case study site (these results will be discussed in subsequent chapters). The conceived space study focussed on the conception of placemaking through an examination of firstly, the perception of place and secondly, the masterplanning process. The study of conceived space was addressed through a questionnaire survey, which queried: *How do design professionals and others perceive urban places? And, How are urban places masterplanned in a context of change, certainty and uncertainty?* The data were analysed and interpreted using multidimensional scaling analysis (MDS) supported by Cluster Analysis (CA) and a Content Analysis of each group's open comments.

The Concept Mapping task revealed the differences and similarities between a stratified random selection of design and development professionals, community representatives and others who indicated their perception of what makes a good place from the perspective of urban design qualities. The MDS concept map results of the stratified sub-groups showed that the urban design qualities that were consistently similar for most sub-groups (except the Landscape Architects) were Clear Way-finding and Movement Network Connectivity, but overall the sub-groups results were dissimilar. The degree to which the sub-groups were similar and dissimilar was revealed in the Kendall tau correlation analysis. The most significant result of this analysis was that the Councillors differed from all the other sub-groups except for the Landscape Architects. Furthermore, the sub-groups that differed most from the Councillors were the Architects, Developers and Planners all of whom play key roles in the design and development of urban places. If this is so, this implies a point of opposition between the schemata of the Councillors' perception of place as implementers of urban change and the design and development professionals as the conceivers of urban change.

Despite the differences between the sub-groups, the combined All groups concept map showed a compelling result of three clusters: the hub of Cluster and Connectivity; Locale; and Stewardship. The MDS concept map illustrated the interrelationship between variables by proximity. Those variables that were located close together formed a cluster or neighbourhood of variables with those distanced forming other clusters or neighbourhoods. Cluster and Connectivity variables formed a

hub with Locale - its near neighbourhood. Stewardship cluster was also a near neighbourhood with Locale but was distanced from the Cluster and Connectivity neighbourhood.

It was surmised that the urban form qualities of Cluster and Connectivity had a strong relationship with Locale and that Stewardship has a strong relationship with Locale, but less so with Cluster and Connectivity. Importantly, Locale was the most contiguous neighbourhood between the other two neighbourhoods. This implies that Locale (from late Latin *localis*, from Latin *locus* 'place') (New Oxford American Dictionary, 2007) is the keystone of the relationship of neighbourhoods or clusters illustrated in the concept map. From the perception of place perspective, this schema of *a good place* appears to be plausible along with the urban form concept of Cluster and Connectivity and the more abstract idea of Stewardship contributing to the Locale (defined as: 'a place where something happens or is set, or has particular events associated with it') (New Oxford American Dictionary, 2007).

In the context of the research question, *How can places be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place?* the neighbourhood of Cluster and Connectivity that emerged from the concept mapping task was important. Cluster and Connectivity denotes an urban dynamic of growth, time and change that aligns with small world network theory introduced in Chapter Three. The variables that make up the neighbourhood of Cluster and Connectivity are: Variable 1 Compact, Distinct Urban Centres; Variable 3 Clear Way-finding; and, Variable 9 Movement Network Connectivity. These three variables represented the framework of urban places from the urban built form typology (compact and distinct) to the movement typology (clear and connected). Interpreted in the context of this research question the Cluster and Connectivity result offers a launching point towards a network based masterplanning framework that is supported by the participants' schema of what makes a good place.

The second part of the conceived space study examined masterplanning process priorities from a conceptual, contextual and pragmatic point-of-view. The result of the conceptual masterplanning priorities task indicated that the most important priority was the *Traffic and Pedestrian Network* stage. This result was significant because it supported the conceptual relevance of Connectivity, which was elicited in the previous Concept Mapping task (the hub, Cluster and Connectivity). The contextual masterplanning priorities task introduced a context of time (a short-term timeframe and a long-term timeframe) and place (a 2km² urban centre in South East Queensland). The Wilcoxon

matched pairs test revealed the importance of short-term certainty in masterplanning and by implication, long-term uncertainty. Short-term masterplanning considerations were important at all stages of the masterplan process (Technical Preparation; Design Preparation; Designing; and Monitoring) and indicated the high priority given to certainty, particularly expressed as the *Delivery of the outcome on time and within budget*. There were no long-term timeframe priorities, which flagged a tension between masterplanning for short-term certainty and for long-term uncertainty.

The pragmatic masterplanning priorities task confirmed this tension between certainty and uncertainty. As discussed in Chapter One in which three large-scale Australian urban redevelopment projects in crisis were described, masterplanning can take various approaches from highly detailed and deterministic to broad-brush and flexible. However, at the core of the problem with each of these large-scale urban redevelopment projects were the tensions between certainty and uncertainty. The pragmatic masterplanning task queried the participants about the importance of certainty and adaptability in masterplanning from a development stance. The contradiction was revealed between the desire for certainty in a masterplan and also for adaptability in a masterplan. The significance of this contradiction was that it points towards the need for a masterplanning process that enables both certainty and adaptability or, as the research question challenges, *to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place*.

6.7 CONCLUSION

This chapter presented the results of the exploratory conceived space study. The research instrument was a survey questionnaire which investigated the perception of place and the masterplanning process. The participants were a stratified random selection of design and development professionals and community. The key results indicated that people's concept map for good urban design qualities was dominated by the Cluster and Connectivity which was generally supported by the investigation into the masterplanning process along with the additional outcome that affirmed the tension between planning for short term certainty and for long term uncertainty. The results of the conceived space study confirmed the theoretical trajectory of the study towards the adaptive perceptual cycle and the application of small world network theory in masterplanning.

The next chapter will introduce the case study of Brisbane's South Bank in a study of perceived space. A brief outline of the masterplanning history of South Bank will describe the crises that the masterplanning process endured and its effects on the masterplan outcome. A multidimensional

scaling analysis (MDS) will analyse the design professionals' conception of the South Bank Concept 2007 masterplan and the visitors' experience of the South Bank Context in 2012 in a similarity ranking of network schemata. The perceived space study is based upon the difference between the schematic concept and real world context proposed by the adaptive perceptual cycle.

CHAPTER SEVEN

PERCEIVED SPACE RESULTS

7.1 INTRODUCTION

The previous chapter presented the results of the conceived space of placemaking through a survey questionnaire that examined the perception of place and the masterplanning process. The conceived space result identified Cluster and Connectivity as an urban dynamic that aligned with small world networks, which characteristically (as explained in Chapter Three) are adaptable and resilient. Furthermore, the masterplanning process results of the conceived space study revealed that Connectivity was the most important masterplanning priority supporting the previous place schema of Cluster and Connectivity. The masterplanning process part of the questionnaire survey contributed further to the conceived space study through the results revealing the tension between short-term certainty and long term adaptability. These results highlight the need for a masterplanning framework that supports levels certainty as well as uncertainty.

This chapter will build upon the exploratory conceived space results to investigate the perception of place through the perceived space study of the case study area of Brisbane's South Bank. The perception of place was discussed in Chapter Two and importantly, introduced the adaptive perceptual cycle - an original concept developed by this present author from the ideas of Neisser (1976), Gibson, (1979), Portugali (1996), Bak (1997) and Malpas (2013). The adaptive perceptual cycle asserts that 'place' is the outcome of the interdependency between one's schema of a place and one's experience of that place.

The perceived space study will be based on the outcome of the conceived space results of the perception of place revealed in Chapter Six in which the concept mapping task illustrated the importance of Cluster and Connectivity, Locale and Stewardship in the participants' perception of place. It was surmised through the conceived space study of the perception of place that Locale (*locus* or place) was a pivotal concept that was contiguous with the urban form aspects of Cluster and Connectivity as well as with the more abstract notions of Stewardship.

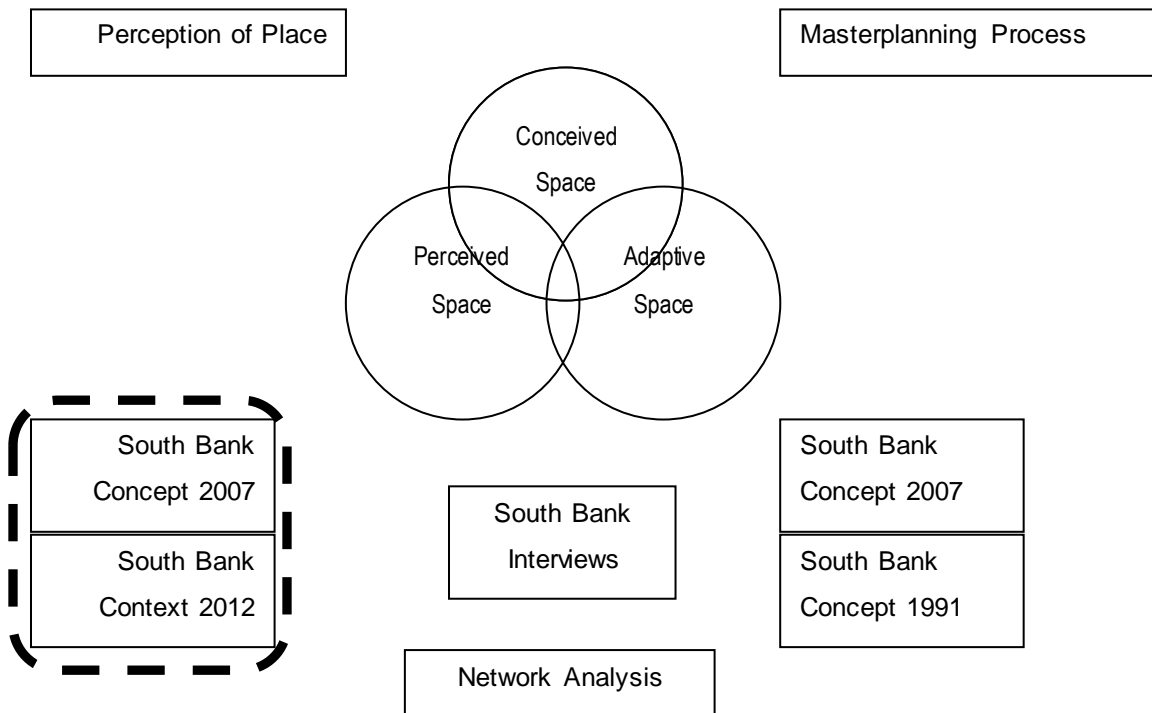


Figure 7.1: Empirical research framework – Perceived Space

The perceived space study adheres to the notion of the adaptive perceptual cycle by using data from the design professionals’ conception or schema of the South Bank masterplan 2007 and data from visitors’ experience to South Bank in 2012. The outcome is expected to reveal the shift between the Concept of the South Bank masterplan 2007 and the visitors’ experience of the South Bank Context 2012 in accordance with the idea of the adaptive perceptual cycle. The results will illustrate the possible perceptual shifts based on the notion of the adaptive perceptual cycle. The importance of the outcome of the perceived space MDS plot is that it will test the effect of the masterplanning model as a Concept 2007 against the Context 2012 of a real world experience.

Firstly, by way of introduction to the South Bank case study site, a brief masterplanning history of crises will describe the complex urban background that influenced the masterplanning process for the redevelopment of Brisbane’s South Bank. A full discussion of the evolution of the masterplanning of South Bank is included in part of this chapter and was first published in *Urban Policy and Research* (Ganis, Minnery and Mateo-Babiano, 2014)

7.2 SOUTH BANK: BACKGROUND

South Bank is now a well-established part of Brisbane's lifestyle and entertainment scene. From the preparation of Expo 88 as part of Australia's bicentennial celebrations to the redevelopment of the site post-Expo, South Bank has been intensely masterplanned. Archival masterplans chronologically illustrate the responses to various crises. The South Bank site was extracted from the authority of the Brisbane City Council (BCC) by the South Bank Corporation (SBC) at the time of the South Bank Development Plan 1991 until December 2012. The SBC was both a planning and development agency set up to realise the South Bank Development Plan. The termination of the role of the SBC in 2012 implies that the site will be subject to the normal BCC development assessment and neighbourhood planning processes. This discussion looks at how South Bank survived and evolved over the years of its masterplanning.

South Bank is a familiar urban redevelopment model in Australia post-2000 with developments such as the Melbourne Docklands (VicUrban), Port Adelaide waterfront (Land Management Corporation) and Darwin's waterfront (Darwin Waterfront Corporation) (Oakley, 2011; Oakley and Johnson, 2011). These developments have been initiated within a similar corporate construct and ambitious vision fuelled by a fear of becoming "a backwater...of declining significance" (Dovey, 2005, p208). Despite the intense masterplanning that these large scale urban redevelopments typically undertake their long term viability may be questioned. As was reported in the *Sydney Morning Herald* on 12 December 2012, "Almost 25 years after its reopening for the bicentennial, Darling Harbour [Sydney] will be dug up again to make way for Australia's largest convention and exhibition space as part of a billion-dollar facelift" (McKenny and Hasham, 2012). And also proclaimed in *The Australian* on 11 December that "it is hoped will rival glossy complexes such as those in Singapore" (Allen, 2012). Such aspirations raise public expectations not to mention the stakes because they are high profile, high risk projects open to political and economic vicissitude. This discussion traces the development of South Bank from the perspective of its leadership team and the content of the masterplanning process and products that were in a sense, crisis driven – the question is will similar post-2000 urban redevelopment projects follow a path of certainty or the potentiality of uncertainty?

In the case of South Bank, the initial quest for certainty seemed to drive the masterplan. However, the dynamic mood of the citizenry of Brisbane was underestimated: "Citizens can be charmed or blinded, by a certain approach that is then institutionalized without thoroughly discussing the drawbacks or without putting in place the structures and incentives to generate debate and

adaptation - rules to change the rules (Garde, 2004). Such is a recipe for rigidity and in time, for disaster” (Van Assche et al, 2013, p191). As the South Bank story unfolds, the way citizens were ‘charmed or blinded’ by the South Bank masterplan 1991 which was ‘institutionalised’ in the South Bank Development Corporation Approved Development Plan (1990) and how the South Bank masterplan 2007 enabled the ‘rules to change the rules’ may be apparent in this description of how socio-cultural, political and economic crises impacted upon the design and development of South Bank, Brisbane from 1988 – 2012.

7.3 PRE-EXPO 88

Originally, the Turrbal and Yuggera people camped at South Brisbane and although the area was swampy it was a place for large convivial gatherings. Once Brisbane was established as one of Britain’s far-flung penal colonies a more belligerent population settled (Snow, 2012; Noble, 2001). “Between the wharves and the interstate railway station built in the 1880s, were streets of sly grog and loose women, dance halls and theatres, a place where local mixed with foreign” (Noble, 2001, p1). By the 1950s and 1960s South Brisbane was in such decrepitude that the major flood of 1973 – 1974 earmarked the southern riverbank for redevelopment. The Queensland state government led by ultra-conservative Premier Joh Bjelke-Peterson grasped the opportunity for a significant inner city redevelopment and so began the cascade of South Brisbane into an era of change.

The 1970s saw the emergence of the new Cultural Centre precinct with the building of the modern Queensland Art Gallery, Queensland Museum and the Queensland Performing Arts Centre (QPAC) along the South Brisbane edge of the Brisbane River. But it was the success of the Commonwealth Games held in Brisbane in 1982 that cultivated the capacity and confidence to go for such world stage events as Expo 88 and even an Olympic Games bid that were intended to ‘Show the World!’

7.4 EXPO 88

The long and difficult political tussle that led to the successful bid of Expo 88 was set in the mire of the Bjelke-Petersen government of the day, which was eventually exposed - in all its local colour - during the Fitzgerald Enquiry. The Fitzgerald Enquiry was the Royal Commission into Police Corruption in Queensland 1988-1989 that exposed a culture of illegal brothels, prostitution and the bribery and corruption of some senior level officers of the Queensland police service. The intrigue and innuendo tarnished the somewhat puritan image of the conservative Queensland government. This is another story that does not pertain here directly, except in its cast of characters and the negative impact upon community perceptions of the integrity of the Bjelke-Petersen government

and its development agenda, particularly the compulsory acquisition of land for Expo 88: “The policy this Government has adopted is bordering on organised crime” a former independent state parliamentary member stated on October 22, 1984 (Foundation Expo 88, 2009, p1).

Expo 88 authorities resumed some private land and along with some Council and State land acquired a total of 42 hectares stretching along one kilometre of riverbank from the Victoria Bridge to Vulture Street, South Brisbane. The basis for funding the resumptions and the Expo 88 site development and festivities was the post-Expo sale of the site to private developers. This strategy was based on the preparation of a masterplan that would offer viable commercial space to attract investment. This was the key sticking point between the Queensland government’s development agenda and the BCC’s aim of protecting the interests of CBD property owners. The allocation of a generous gross floor area for commercial development on the post-Expo site was seen as a serious threat to CBD property owners (Carroll, 1993). “At the centre of the problem was...the financial situation of Expo 88. The Council wanted, in summary, a maximum of 100,000 sq. metres of commercial space on the site, with greater open, public space, especially on the riverfront...the Council’s position radically altered the [Expo] Authority’s financial prospects” (Carroll, 1993, p453). The Expo Authority (dominated by Deputy Premier Sir Lew Edwards) was obliged by the Expo 88 1984 Act to pursue the recovery of the significant costs “...and to achieve a net financial result that will not impose a burden of cost on the Government of Queensland” (Brisbane City Council, 1993, p3).

Despite this background of fiscal realities and political jockeying, Expo 88 was a spectacular success: “It was a social and cultural epiphany that put the city on the world map and brought the place to life like never before. It changed the way the country thought about its third-largest city until that point regarded as a big country town. And it changed the way Brisbane people thought about themselves, their home and their river” (Snow, 2012, p1).

Prior to Expo 88 the ‘overgrown country town’ slur was common, but Expo 88 was set to change all that: “We are no longer the deep north and we want to prove this to the world at large” declared Premier Sir Joh Bjelke-Petersen on October 19, 1981. And, “Brisbane will never be the same again” proclaimed Expo chairman Deputy Premier Sir Lew Edwards, soon after his appointment on April 5, 1984 (Foundation Expo 88, 2009, p1). “Our basic aim has been to make World Expo 88 the catalyst for a significant change in our lifestyle” (Sanderson, 2003, p66) stated Sir Lew Edwards at the opening of Expo 88 on the 24 April, 1988. And as blazoned by the headlines of the then

influential local newspaper, the *Courier Mail* on the 24 April, 1988: “Our coming of age party: Bridging the yawning gap from a hayseed State to an urbane, international future” (Sanderson, 2003, p66). And not long after Expo 88, the not quite urbane colloquialism of ‘BrisVegas’ entered the local language.

Not everyone was a gung-ho visionary: “Brisbane has the friendliness and identity of a large country town and it has, at the same time, world class aspects...But let’s hang on to the uniqueness of our own architectural environment...let’s keep the human aspect of Brisbane” offered Angus Innes, former leader of the Queensland Liberal Party on the 29 April, 1988 (Sanderson, 2003, p66). Nevertheless, properties were demolished to make way for the Expo development and rents in the area skyrocketed. The concerned citizens of the surrounding communities of South Brisbane envisioned their less affordable future housing and protested that, “The rich get Expo, the poor get homeless” (Foundation Expo, 2009, p1). But the cascade of change had begun and the promise of a bright, new lifestyle of extended opening hours for hotels and restaurants, the joie de vivre of sidewalk cafes, outdoor dining and street entertainment gathered momentum. Such was the enthusiasm and confidence that even before Expo 88 had taken to the world stage the Expo Authority began to envision a post-Expo South Bank redevelopment.

7.5 SOUTH BANK

People’s experiences of Expo 88 seem to be seared in their memory because apart from the spectacle of nightly fireworks, international pavilions, entertainment for all it was a place to gather socially with friends and family. People recalled in 2003, “Expo...it was very much a social thing. We’d all get together on Friday nights at a friend’s house and get on the train to go the Expo...We’d get there and all start off at the German Beer Hall and order the big Steins of beer” remembering his experience as a young man and, “Well, we enjoyed it! We took our two children... We watched a lot of buskers because the kids enjoyed that!” remembering her experience as a young mother and also, “...I remember climbing and standing on the big U of the Australian Pavilion sign and getting our pictures taken! I could see across everything...I remember being happy! It’s funny, ‘cause I think that was my most memorable experience of Expo” remembering her experience as a child visiting Expo (Anderson, 2003, pp408, 410, 411). So, despite the hoopla of ‘We’ll Show the World!’ people’s long-term memory of Expo 88 was not of the exhibitions, entertainment or pavilions, but rather the recollection of their social context of shared experiences (Anderson, 2003). It was underestimated by government authorities that the

emotive experiences attached to this place would fuel people's protestations of the masterplanning process and proposals that ignored these experiences.

Expressions of interest for the development of South Bank were called for in November 1986 and the Expo Authority, the state government and BCC assessed thirteen proposals. Consider the scenario of political intrigue in 1986: the BCC needed to protect the interests of CBD property owners; the BCC also needed the backing of State Government for their proposed Olympic Games bid; the Expo Authority needed to recover costs in accordance with the Expo 88 Act 1984; the development industry wanted a viable gross floor area of commercial space at South Bank (Carroll, 1993). And importantly, the expectations of the people of Brisbane were about to shift towards a new lifestyle and place attachment to the site.

1987 saw the River City 2000 Consortium selected as the preferred developer of South Bank (BCC Archives, 1987). The Consortium was a joint venture between the local developers Kern Corporation, F. A. Pidgeon and Son as well as a Superannuation Fund Investment Trust, Conrad International Hotel and Jupiters Casino with plans prepared by local architects Robin Gibson and Partners who had designed the adjacent Cultural Centre and Stenders and Partners who had participated in the designing of Expo 88.

The River City 2000 Consortium revealed in November 1988 (just after the festivities of Expo 88 were over) the South Bank A\$1billion development to be completed over six years (Figure 7.2 and Figure 7.3). The South Bank redevelopment included an international hotel and a second hotel; a 50 storey World Trade centre; commercial offices, retail and residential accommodation; an exhibition and convention centre; an Orbisphere science centre; the Endeavour island; a casino; and public open space (Gibson, 2003).

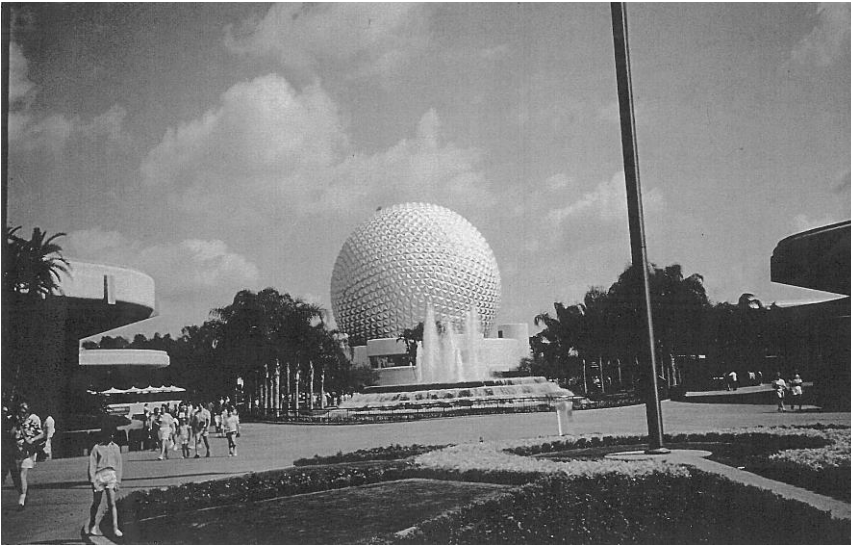


Figure 7.2: The Orbisphere; River City 2000 Consortium

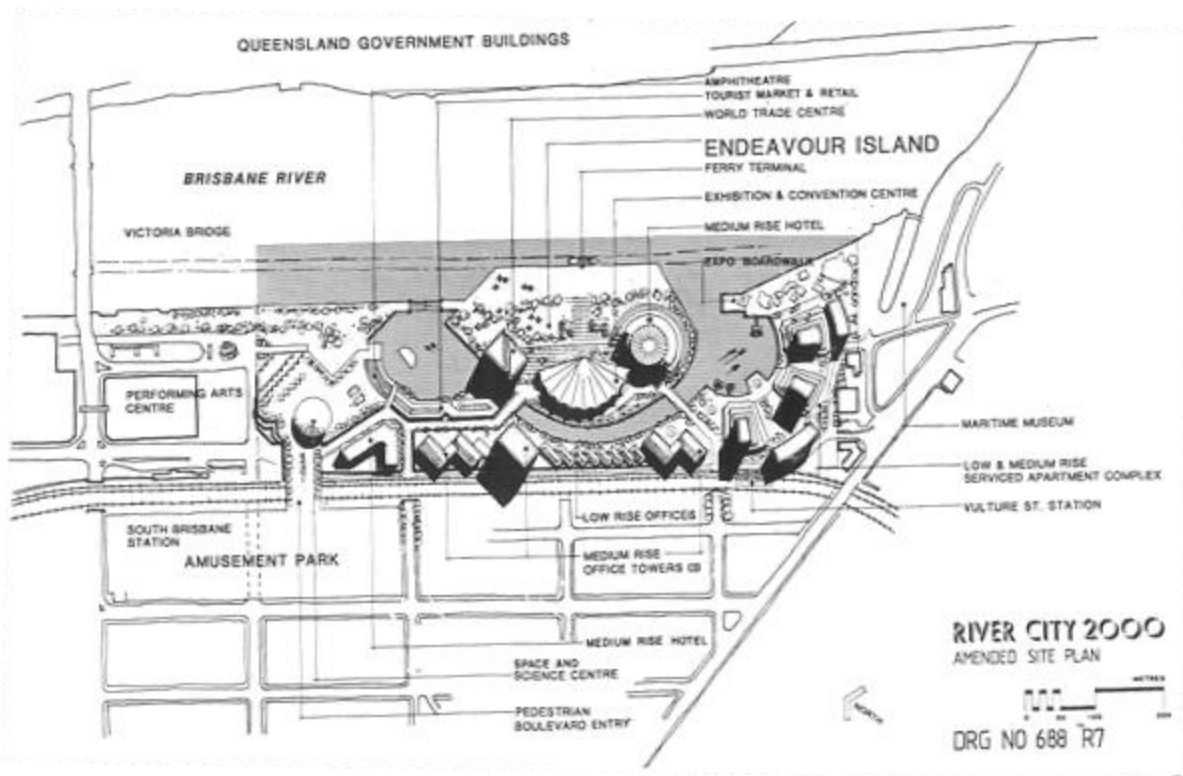


Figure 7.3: River City 2000 Consortium

Controversy raged. The *Courier Mail* reported on 15 November 1988: “Within weeks of the announcement the wheels were coming off the redevelopment wagon. People objected to the lack of consultation, the lack of open space, the casino and the way the decision was reached. Allegations of cronyism surfaced and, as people became attached to the site through Expo, it became apparent that something would have to be done...the Premier, Mr Ahern [Sir Joh Bjelke-Petersen had

shuffled off the political stage after a bizarre ‘Joh for Prime Minister’ bid] announced that the River City plan would be scrapped” (Rodgers, 1988, p9). The developers and government authorities had failed to see that the people’s expectations had shifted and there was a misalignment between the River City 2000 Consortium proposal and people’s expectations.

A new South Bank Development Corporation was established with some fundamental leadership changes: “The South Bank Corporation Act 1989 provided a far more significant role for the Brisbane City Council. It provided for five Corporation members, two to be nominated by the Council as opposed to no members...The Corporation’s Development Plan was to be subject to public comment” (Carroll, 1989, p457). The Corporation commenced a masterplanning and community consultation process. People’s expectations had shifted over the few months of Expo 88 and free access to the river and parklands and places to meet and be entertained was now a lifestyle priority for Brisbane people.

The Expo 88 local architect (Graham Bligh along with Lawrence Nield, Noel Robinson and Andy Stenders) was called in to prepare a second attempt at designing a South Bank concept for community consultation. This time, the commercial agenda was minimised and as the *Sunday Mail* reported on 20 November 1988: “The good news for anyone concerned about the redevelopment of the Expo site is that the man in charge of act two of Brisbane’s greatest show on earth says he is ‘a true romantic at heart’. ‘The romance in me is coming out in my Expo thoughts,’ said Graham Bligh, artist and dreamer, a lover of the great outdoors and all things beautiful” (da Costa-Roque, 1988, p25).

No one wanted to be tarnished with a River City 2000 Consortium grubby profit agenda: “There is a certain amount of poetry to be found in the descriptions of some of the features of the redevelopment of the area, which is reassuring to those who might have worried that redevelopment plans were in the hands of soulless lovers of bricks and mortar” (da Costa-Roque, 1988, p28). And so the pendulum of publicity and architectural style swung in the opposite direction.

This time, a visionary concept plan was prepared for community consultation that reflected the Expo South Pacific lagoon concept but most importantly, this was to be a ‘people’s place’ that would recapture the ‘spirit of Expo’ (Figure 7.4). The *Courier Mail* crowed on 15 November 1988: “No doubt the Government and Expo Authority were taken aback by the strength of public protest...The Government and the Brisbane City Council for that matter, would have ignored such

clear results [of a survey conducted by the *Courier Mail*] at their electoral peril...the ideas outlined yesterday are attractive. If carried through, they would seem to preserve that spirit of Expo” (Editorial, 1988, p8).

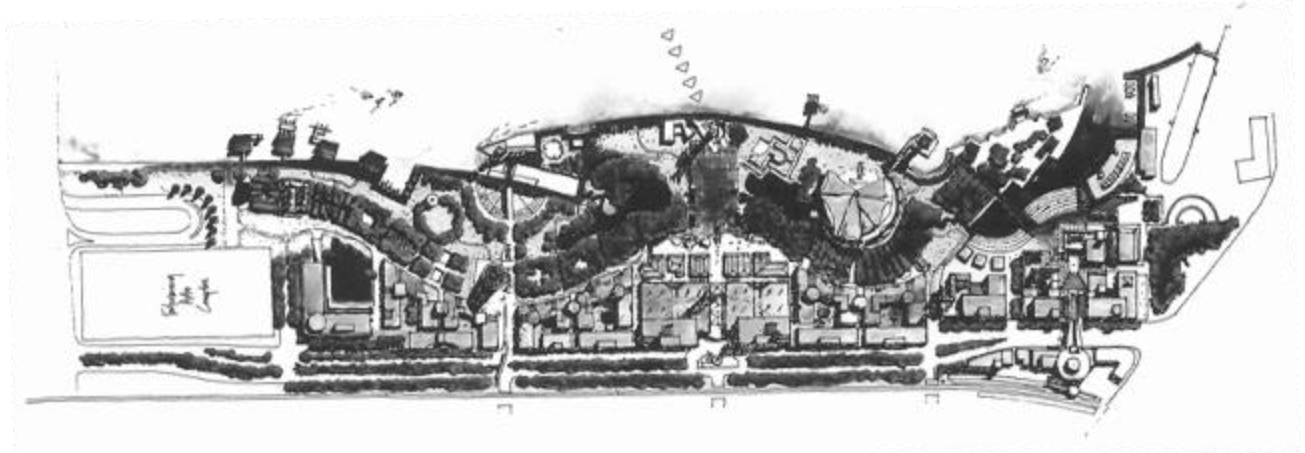


Figure 7.4 Bligh, Nield, Robinson and Stenders proposed South Bank concept plan 1988.

This time, the South Bank Development Corporation trumpeted, “Together we’ll make it great!” and declared that its aim would be to “create a landmark development, and a continuing legacy of the very successful World Expo 88, for the benefit of Brisbane, Queensland and Australia” (BCC Archives, 1988a, p1). Community consultation was completed for the visionary concept plan of South Bank and the outcome showed that there was strong support for open space; entertainment; cafes and restaurants; and opposition to building height (BCC Archives, 1988b). Expo 88 had set up an expectation for the South Bank masterplan that attempted to sustain a spectacle that was by its nature, ephemeral. But Expo had happened and it was part of Brisbane’s psyche. In terms of place making expectations a schema for South Bank was in place even before the architect’s pencil had scratched the paper.

“The South Bank Corporation is seeking submissions from the following architectural firms: Bligh Robinson Pty Ltd; Robin Gibson and Partners; Daryl Jackson Architects; McKerrell Lynch Architects; Media 5 Architects to allow it to make an appointment for the Master Architect of the site” (BCC Archives, 1989, p2). The South Bank Corporation Act 1989 empowered the SBC to “promote, facilitate, carry out and control the development of land within the Corporation area” (BCC Archives, 1989, p3).

The SBC outlined their architectural objectives: firstly, “sympathetic guidelines for private sector building should enhance the adjacent people’s place and act as a catalyst for further quality development in South Brisbane; secondly, the people’s place should be of outstanding character and

make an emphatic landmark statement and continue the international spirit of Expo; thirdly, special features in the people's place should enhance its financial viability; and fourthly, it should be within the realities of budgets, town planning principles and commercial viability" (BCC Archives, 1989, p3).

With this brief in mind, the selected architectural firms garnered their imaginations and prepared masterplans that borrowed from a cache of landmark clichés to capture the client: Bligh Robinson proposed a 'Place of the Sun' with "active water lagoons, falls, dolphin pools, crystal clear water, clearer than Mykonos, white buildings contrasting to the azure water" (Bligh Robinson, 1989, p14; Figure 7.5). Daryl Jackson promised "exaggerated Venetian poles; the idea draws upon the Grand Canal as analogy" (Jackson, 1989, p14; Figure 7.6).



Figure 7.5: Bligh Robinson South Bank 'Place in the Sun' masterplan 1989.

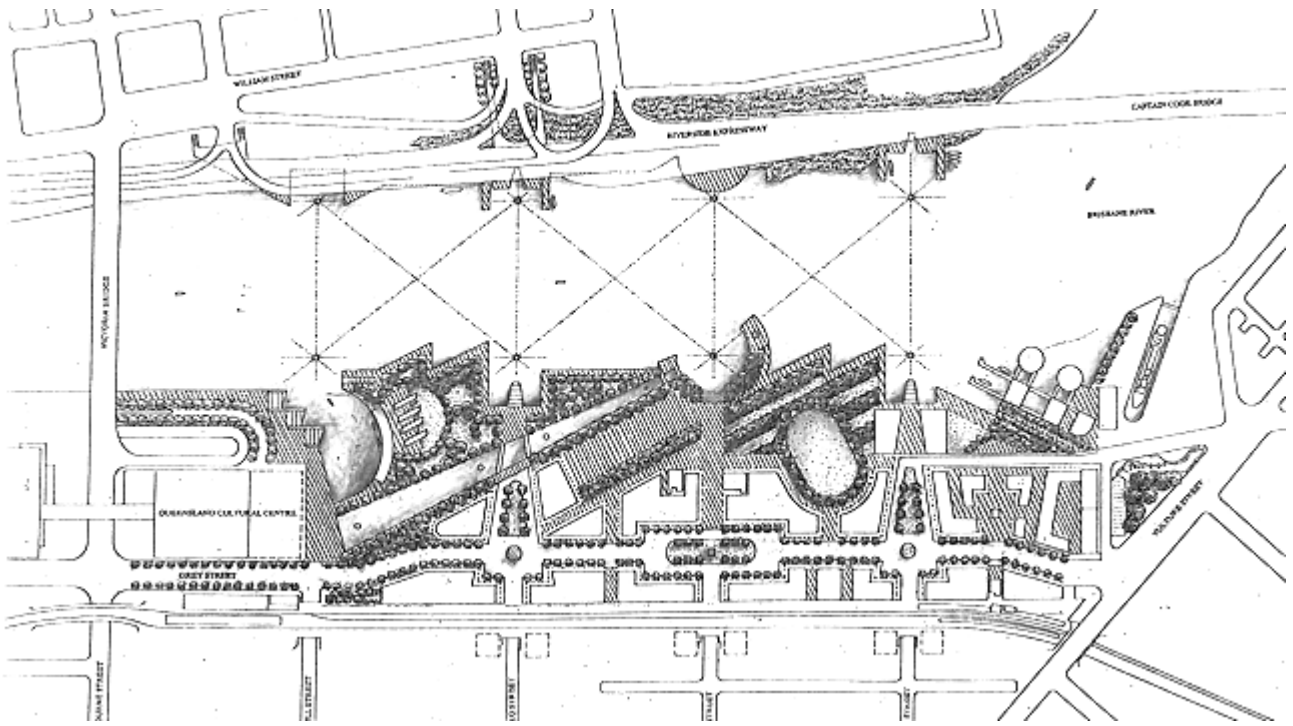


Figure 7.6: Daryl Jackson 'Grand Canal' South Bank masterplan 1989.

McKerrel Lynch offered "The Avenue of Flags: The Avenue will be monumental in scale and will culminate in two (2) obelisks at the river's edge" (McKerrel Lynch, 1989, p29; Figure 7.7).

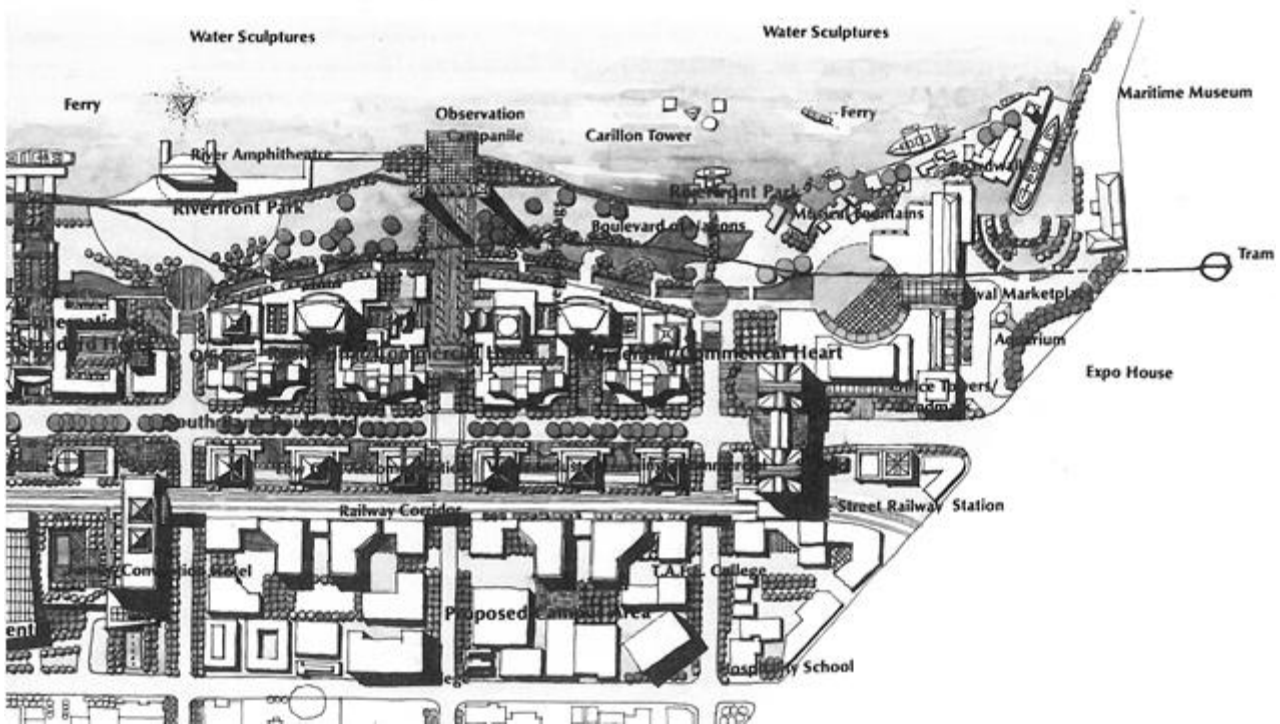


Figure 7.7 McKerrel Lynch 'Avenue of the Flags' South Bank masterplan 1989.

But finally, Media 5 trumped them all with their theme of “the park within the buildings within the park” and emphasised that “The pre-eminence of the landscape is the principal avenue through which the entire project image is established and interrelationship of events and activities maintained” (Media 5, 1989, pp12, 18). Media 5 was a U.S. firm that specialised in Hawaii/Gold Coast theme park, high-rise and resort projects and so were well versed in reflecting a holiday ‘Spirit of Expo’ and a ‘Place for People’ with their emphasis on landscaping, lagoons, canals and the landmark that captured the client - the South Bank beach (Figure 7.8).



Figure 7.8 Media 5 ‘Park within the Buildings within the Park’ South Bank masterplan 1989.

It must have seemed that the long and tortuous journey towards a South Bank masterplan was coming to an end. Only the formalities remained and in November 1989 the South Bank Corporation Area Draft Development Plan went on public display for 30 days during which time the public could inspect the plan, lodge written submissions and complete questionnaires. At the end of the public display period, the SBC assessed the public’s responses and recommended revisions to the masterplan to prepare the Draft Development Plan (Queensland Government Gazette, 1990). The South Bank Corporation Area Development Plan was gazetted on 28 April 1990. And when the post-expo South Bank parklands opened in 1992, people initially flocked to the free parklands and beach, but the development industry that was the means to recover the cost of Expo 88 and underwrite the free ‘Place for People’ remained aloof.

This was the next crisis to beset the South Bank redevelopment project and one that had serious consequences to its masterplanning. The immutability of the Media 5 masterplan was its greatest

weakness; once this monolith was in place there was no reasonable way to adapt the site. By 1997, SBC commissioned a new masterplan. The Denton Corker Marshall (DCM) masterplan approach shifted from a construct of certainty that was rigid over time to a more uncertain approach that enabled the randomness of real life to infiltrate and adapt the site (Figure 7.9 and Figure 7.10).

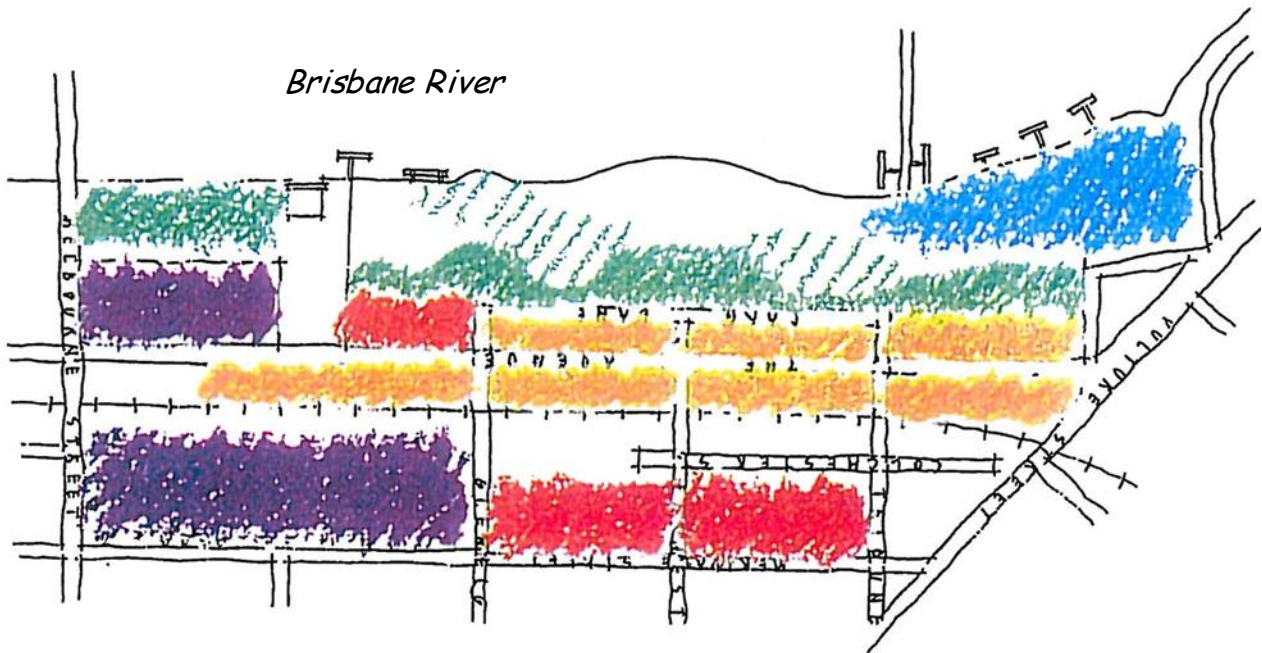


Figure 7.9: Denton Corker Marshall (DCM) South Bank masterplan 1997-2007

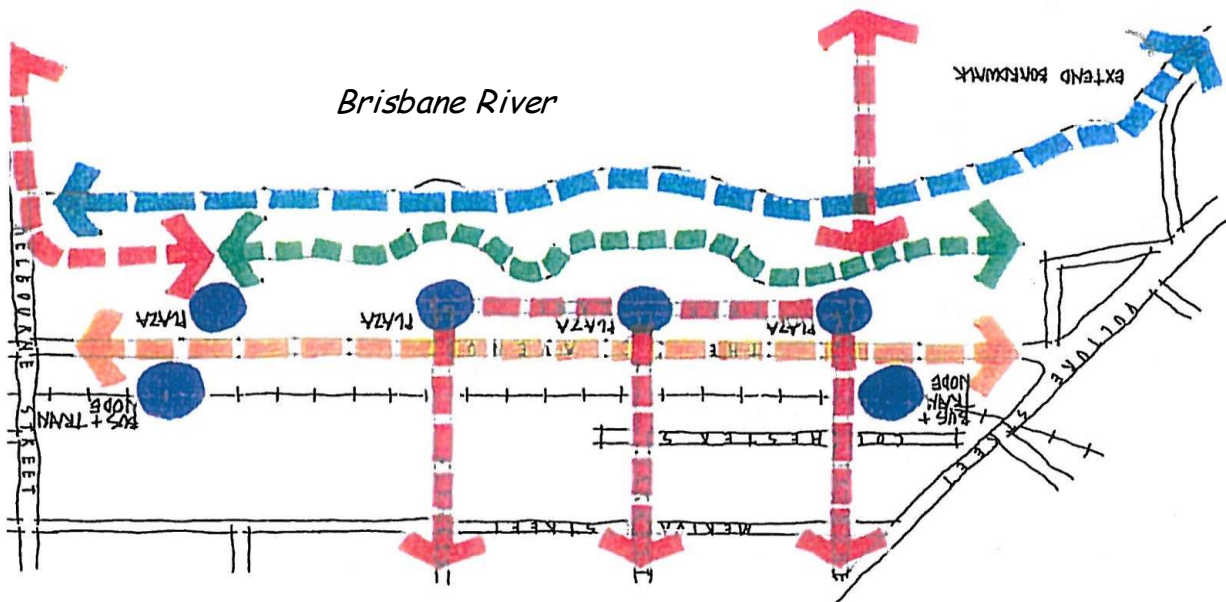


Figure 7.10: Denton Corker Marshall (DCM) South Bank masterplan 1997-2007

This masterplan proposed the uncertainty of ‘fuzzy’ clusters of activities with a predominately mixed-use spine along The Avenue (now renamed Grey Street) the parklands along the Arbour, the Beach and river’s edge. This masterplan also proposed the certainty of coherent long distance

connectivity to activities via The Avenue (Grey Street) the meandering Arbour and the riverbank pathway as well as re-establishing the street grid with South Brisbane.

In sum, three major pathways were established; firstly, Grey Street Boulevard was re-established as a real street; secondly, the canal that had been a significant barrier to river access was turned into a contemporary sculptural Arbour; and thirdly, the pathway along the riverbank leading to the beach and connecting to the Goodwill Bridge and the Kurilpa Bridge beyond the Art Galleries guides pedestrians, cyclists and joggers from outside to inside South Bank Parklands. The DCM South Bank Stage One 1997 masterplan was followed by Stage Two 2007 masterplan, and it is the outcome of the 2007 South Bank masterplan that is the object of this perceived space study and the adaptive space study in Chapter Eight.

7.6 PARTICIPANTS

The participants for the perceived space study were design professionals who responded to the South Bank masterplan Concept 2007 and groups of visitors' to the South Bank Context 2012. There was a Cluster network similarity task as well as a Connectivity network similarity task presented to independent visitor groups. At least forty participants per group was the aim and this was equalled or exceeded. The participants were 41 design professionals and 109 visitors to South Bank with an equal distribution of male and female visitors. The research method of multidimensional scaling analysis (MDS) retains its statistical rigour for fewer than 10 participants, which in this study was exceeded.

7.7 PERCEIVED SPACE RESULTS

The design professionals responded to the task by ranking the similarity of the visual cue of each plan type network model with the South Bank Concept 2007 and the visitors' ranked the same plan type network models of the South Bank Context 2012. The network models represented schemata of plan types and aligned with the concept of schemata of the adaptive perceptual cycle (Appendix 2).

The visitor groups responded to Cluster network models and Connectivity network models representing schemata of the plan types for the South Bank Context 2012. The network models were presented as schemata of the small world networks (WS small world network and BA small world network) and also as Ordered and Random networks. The Ordered and Random network models offered an opportunity to elicit a nuanced response that could contribute to the interpretation

of the MDS plots. The visitors also responded to a verbal task that textually described the same network models that were illustrated (Figure 7.11, Figure 7.12 and Table 7.1).

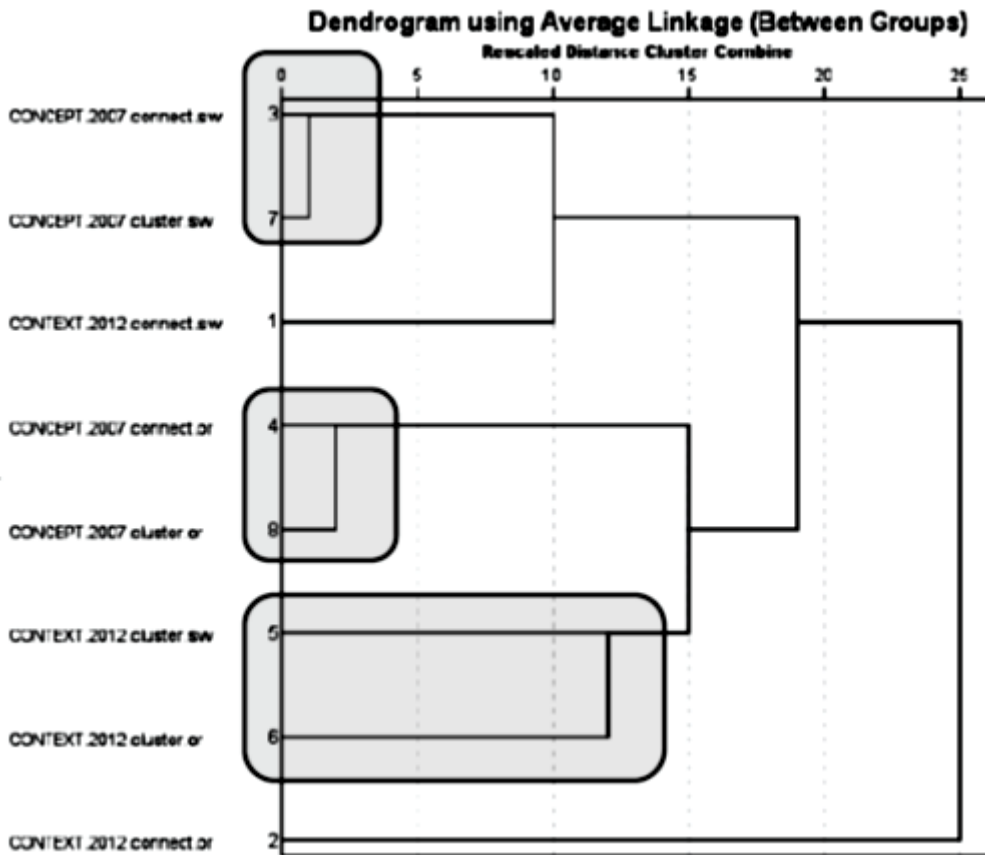


Figure 7.11: Perceived space Cluster Analysis results

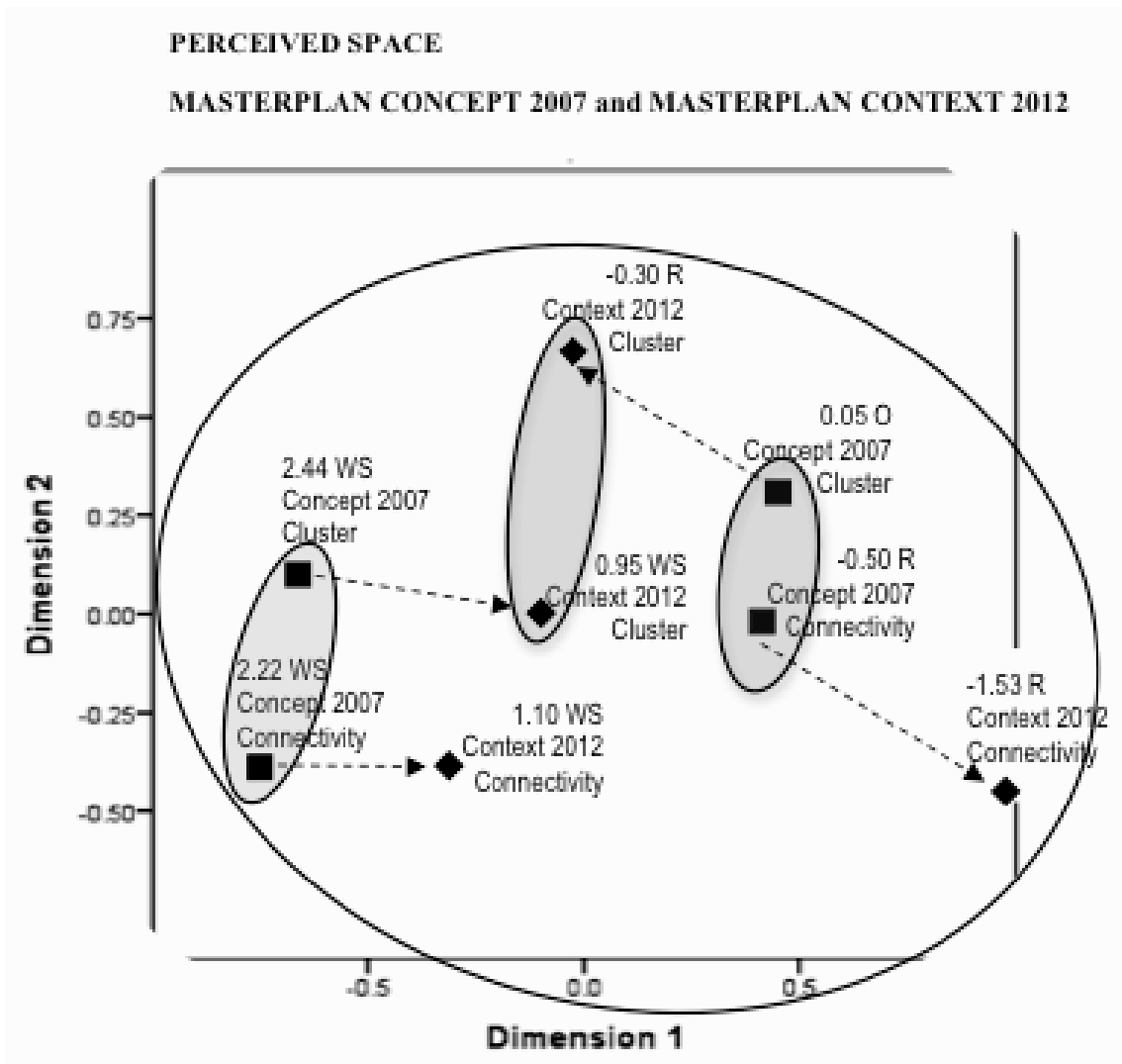


Figure 7.12: Perceived space of South Bank masterplan Concept 2007 and South Bank masterplan Context 2012

■ Concept 2007 ◆ Context 2012 - - - → Direction of perceptual shift.

Multidimensional Scaling analysis (MDS) Normalised Raw Stress Value = 0.01408

0= excellent fit; <0.15= good fit; >0.25= bad fit (Trochim, 1989; Kruskal, 1964).

Table 7.1: Perceived space Mean results South Bank Concept 2007 and South Bank Context 2012.

SMALL WORLD NETWORK			ORDER/RANDOM NETWORK		
	Concept 2007	Context 2012		Concept 2007	Context 2012
Cluster	2.44WS	0.95WS	Cluster	0.50O	-0.30R
Connectivity	2.22WS	1.10WS	Connectivity	-0.50R	-1.50R

A Cluster Analysis (CA) supports the interpretation of the multidimensional scaling analysis (MDS) as explained in Chapter Five. The Mean results are a measure of the participants' perceptual shift between the network types of the South Bank masterplan Concept 2007 and the South Bank Context 2012. The perceived space MDS plot shows the adaptation and resilience of the South Bank Concept 2007 masterplan in comparison with the South Bank Context 2012. The interpretation of the perceived space MDS plot is supported by the results of the Cluster Analysis (CA) and the Mean results.

The perceived space MDS plot represents the integration of the design professionals' Concept of South Bank 2007 masterplan and the visitors' on site experience of the Context of South Bank 2012. The MDS plot shows the relative proximity of the Concept 2007 object points and Context 2012 object points. The CA dendrogram illustrates the Concept 2007 object points and the Context 2012 object points clustered in separate hubs. However, the MDS plot illustrates the perceptual shift that occurred with every South Bank Concept 2007 object point compared with the South Bank Context 2012 object points (note the direction of perceptual shift arrow indicated on the perceived space MDS plot). This means that the visitors' experience of the South Bank Context 2012 did not align with the South Bank Concept 2007. Ideally, a successful realisation of the South Bank 2007 masterplan should show the Concept object points and the Context object points in close proximity or in the same hub. Had this occurred it would imply that the perceived space represented the realisation of the design professionals' expectations of the South Bank Concept 2007 masterplan. However, this was not the case.

The results of the perceived space MDS plot (supported by the Mean results) illustrate the South Bank Concept 2007 masterplan as a hub consisting of WS small world network characteristics for both Cluster (2.44WS) and Connectivity (2.22WS). Similarly, the perceived space MDS plot illustrates the South Bank Concept 2007 hub consisting of Order/Random network characteristics for both Cluster (0.05O) and Connectivity (-0.50R).

The perceptual shift of all the South Bank Concept 2007 object points by the visitors' South Bank Context 2012 experiential responses is revealed in the perceived space MDS plot simply by a visual examination of the direction of the arrows. The perceptual shift illustrated by the perceived space MDS plot of South Bank Context 2012 relocates Cluster and Connectivity for both the WS small world object points as well as the Order/Random network object points.

Firstly, the predominantly WS small world network characteristics of the South Bank Concept 2007 Cluster (2.44WS) and Connectivity (2.22WS) have for the South Bank Context 2012 results shifted slightly towards BA scale free network characteristics for Cluster (0.95WS) and Connectivity (1.10WS) but not enough to fully regroup into a BA scale free network. This means that the visitors' perceived the WS small worldliness of the South Bank Context 2012 generally as the design professionals' conceived of the South Bank Concept 2007 - as a WS small world network.

Secondly, the South Bank Concept 2007 Order/Random network results showed the visitors' South Bank Context 2012 results for Cluster (-0.30R) and Connectivity (-1.53R) as an overall perceptual shift towards Randomness. This means that despite the tendency towards Order in the South Bank Concept 2007, the visitors' experience of both Cluster and Connectivity of the South Bank Context 2012 was Random.

7.8 VISITOR SURVEY RESULTS

The visitor survey was intended to present the networks of the South Bank context 2012 as a textual description so that those lay participants who may have difficulty with visualisation of the network schemata would have a second chance to express their opinion of their visitor experiences of South Bank Context 2012. The survey presented qualitative scenarios in the context of network theory. Each scenario described a WS small world network, a BA small world network, an Order network and a Random network. Each of these scenario options was presented twice so as to capture the breadth of visitor interpretation. The number of participants enabled quantitative methods of frequencies and a cross tab analyses (Table 7.2, Table 7.3, Table 7.4 and Table 7.5).

Table 7.2: Cluster scenario (researcher's reference sheet)

CLUSTER Scenario <i>When you visit South Bank Parklands what do you do mostly?</i>	Network Type	Characteristics
Organised Group Activities (e.g. yoga, gym)	Ordered	Fixed and predictable
General Eating and Drinking (e.g. cafe, pub)	Random	Flexible and unpredictable
Learning (e.g. university, TAFE, workshops)	WS small world	Distributed
Theatre/Concerts (e.g. QPAC, Plaza, movies)	BA small world	Centralised
I live/work in South Bank	WS small world	Distributed
Picnics (e.g. parklands, beach)	BA small world	Centralised
Walking/cycling (e.g. riverside, streets, park)	Random	Flexible and unpredictable
Special Events (e.g. River Festival, Fireworks)	Ordered	Fixed and predictable

Table 7.3: Connectivity scenario (researcher's reference sheet)

CONNECTIVITY Scenario <i>When you walk through South Bank Parklands how do you find your way mostly?</i>	Network Type	Characteristics
I always follow the main pathways through South Bank and do not take short-cuts.	Ordered	Fixed and predictable
I need to look at the signs to find my way in South Bank otherwise I feel lost.	Random	Flexible and unpredictable
I take short-cuts off the main pathways to get to various places in South Bank easily and quickly.	WS small world	Distributed
I follow a few main pathways through South Bank because they lead to the main activity area.	BA small world	Centralised
There are short-cuts through the South Bank parklands that lead to many interesting places.	WS small world	Distributed
All the main pathways seem to lead to the South Bank beach.	BA small world	Centralised
The short-cuts through the South Bank parklands do not lead anywhere in particular.	Random	Flexible and unpredictable
South Bank pathways are very orderly and predictable.	Ordered	Fixed and predictable

Table 7.4: Frequencies of combined Cluster and Connectivity scenarios.

CLUSTER/CONNECTIVITY					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Order	20	18.3	20.8	20.8
	Random	28	25.7	29.2	50.0
	WS	22	20.2	22.9	72.9
	BA	26	23.9	27.1	100.0
	Total	96	88.1	100.0	
Missing	System	13	11.9		
Total		109	100.0		

CLUSTER/CONNECTIVITY		
N	Valid	96
	Missing	13
Mean		2.5625
Std. Deviation		1.10322

Table 7.5: Cross tab of gender x cluster/connectivity.

CROSSTAB						
Count						
		CLUSTER/CONNECT				Total
		O	R	WS	BA	
gender	Males	12	15	6	15	48
	Females	8	13	16	11	48
Total		20	28	22	26	96

The Cluster visitor group was asked what they did mostly when they visited South Bank. Similarly, the Connectivity visitor group was asked how they found their way through South Bank mostly. The frequencies of the Cluster and Connectivity groups were combined to elicit a statistically significant result from the 96 valid responses and a cross tab between the males and females indicated how each group differed in their experience of the South Bank Context 2012.

The participants responded to the descriptions for the WS small world network, BA scale free network as well as the Order/Random network descriptions. The frequency results show that the combined group of visitors' responses for Cluster and Connectivity scenarios of the South Bank Context 2012 for small worldliness was a BA scale free network (27.1%) and for the

Order/Random network was Random (29.2%). This means that visitors experienced the South Bank Context 2012 as a hierarchical BA scale free network, but also as Random. This result is not far from the result of the perceived space MDS plot. The perceived space showed a slight shift of small worldliness from a WS small world towards a BA scale free network; however the Mean result retained the WS small world characteristics. The nuances of Order/Random networks illustrated in the perceived space MDS plot is confirmed by the frequency result. It can be surmised that generally, the frequencies result supports the perceived space MDS plot result.

The results of a demographic survey describe the typical visitor to South Bank on weekdays and weekends between approximately noon and 3.00pm on fine and sunny winter days typical of the sub-tropical Brisbane climate during the month of June. The results show that the typical visitor to South Bank as either male (50.5%) or female (49.5%); under 30 (49.5%); a local Brisbane resident (62.9%); visiting South Bank with friends/family (75.5%).

A cross tab analysis shows a difference between the visitor experience of male and female visitors. Males experienced South Bank mostly as a BA scale free network (15) but an equal number of males experienced South Bank as Random (15) with slightly fewer numbers of males who experienced it as Orderly (12). Very few males experienced South Bank as a WS small world (6).

Interestingly, females experienced South Bank as a WS small world (16) in contrast to males (only 6) who ranked South Bank as a WS small world. Fewer numbers of females experienced South Bank as a BA scale free network (11) and as Random (13). However, compared to males fewer females (8) than males (12) experienced the South Bank context 2012 as Orderly.

These results show that the males (15 of them) were the drivers towards a hierarchical BA scale free network along with some females (11 of them). However, most females (16 of them) ranked the site as a distributed WS small world network. The dominant experience of the site was as a Random network (28 people) and a BA scale free network (26 people).

7.9 SIGNIFICANCE OF THE PERCEIVED SPACE RESULTS

The most significant result of the perceived space MDS plot is that it highlights the difference between the South Bank Concept masterplan 2007 as conceived by design professionals and the visitors' real experience of South Bank Context 2012. Considered in the light of the adaptive perceptual cycle discussed in Chapter Two this difference simulates the interface between the

schema (concept plan) and the real world context. Furthermore, from a place philosophy perspective proposed in particular by Jeff Malpas (1996; 2014) this interface space accords with the area of interdependency between schema and context that is the idea of place. The perceived space MDS plot is a 'map' of this 'place'.

Small world networks were offered as the schemata for perceived space study so as to investigate its potential as a masterplanning framework to underpin adaptable and resilient placemaking. The participants' similarity ranking of the schematic small world networks were further informed by the similarity ranking of schematic, traditional Order/Random networks. The significance of the perceived space MDS plot results is that they show firstly, the relative resilience of the WS small world network and secondly, the Random experience of the visitors to South Bank 2012. Although there was a slight shift towards a BA scale free network overall, South Bank retained its WS small worldliness. Conversely, the Order/Random network of the South Bank 2012 Context for Cluster and Connectivity both shifted from relative Order towards Random. This means that despite the attempt to introduce some clarity and Order through the South Bank Concept masterplan 2007 the visitors' experience failed to realise this orderliness; chose a Random experience; or were subjected to a Random experience.

The results of the perceived space MDS plot are generally supported by the visitors survey that presented textual descriptions of the schematic networks. The Random network of South Bank dominated, as did the BA scale free network however the male visitors largely drove this. While most female visitors tended towards WS small worldliness many female visitors supported the dominant results.

The slight tendency towards the BA scale free network model is interesting because it implies a way that visitors' cognitively cope with places they might experience as Random, novel or confusing. If the Randomness is confusing for visitors (mostly male ones) perhaps by reorganising the schema of South Bank into a slightly more Ordered or hierarchical cognitive map of the South Bank Context to assist with the visitors' site navigation. Consider that a WS small world network typically consists of distributed neighbourhoods whereas a BA scale free network typically consists of a dominant neighbourhood hub that is mirrored throughout; the cognitive efficiency of remembering one giant hub in a hierarchically organised network is easier than mentally juggling several distributed neighbourhoods. Perhaps the slight tendency toward a hierarchical BA scale free network reveals a way-finding strategy that shows how a cognitive map of visitor intent tends to be

constructed. Conversely, the Randomness might be interpreted as a desire for novelty, mystery or adventure. If this is so, then perhaps a less hierarchical cognitive map of South Bank such as a distributed WS small world might be conceived to cultivate a desire for novel visitor experiences.

In sum, the results of the perceived space MDS plots and the visitors' survey indicate that visitors to South Bank perceived it to be Random despite the ordering efforts of the masterplanners of South Bank 2007. This reveals a key difference between the schemata of those who are involved in the Concept planning of places and those who experience the Context of those places. This is an important outcome because it highlights to design professionals who plan such places that perhaps users experience places based on very few clues and cues. These results suggest that a place might be experienced by some people as confusing and disorienting or alternatively, others may experience such places as mysterious and adventurous. If this is so, this implies a masterplanning framework that can inherently support coherence and serendipity.

7.10 CONCLUSION

This chapter presented a study of the perceived space of Brisbane's South Bank. A historical background of the development of South Bank was described to illustrate the crises that occurred throughout the masterplanning and implementation of South Bank and the masterplanning responses that evolved between 1988 and 2007. Design professionals' conceptions of the South Bank Concept 2007 masterplan were compared with visitors' experience of the South Bank Context 2012 presented as visual cues of network schemata. The intent was to ascertain the shift between the schema of South Bank and the real world context as illustrated by the adaptive perceptual cycle.

The next chapter will study the adaptive space of the South Bank masterplans 1991 and 2007. Design professionals will respond to the similarity ranking of network schemata of the South Bank masterplan 1991 and a separate group of design professionals will respond similarly to the South Bank 2007 masterplan. Multidimensional scaling analysis (MDS) will illustrate the shifts of adaptation or resilience of the masterplans.

CHAPTER EIGHT

ADAPTIVE SPACE RESULTS

8.1 INTRODUCTION

The previous chapters – Chapter Six and Chapter Seven – explored the conceived space and perceived space of the case study area of Brisbane’s South Bank. The final part of the tripartite empirical study will be the adaptive space study. Firstly, the exploratory conceived space study provided the theoretical trajectory for the empirical case study by eliciting the schema of Cluster and Connectivity as a significant placemaking concept; and the significance of short term certainty and long term uncertainty, both of which aligned with the potential for adaptation and resilience offered by small world network theory. Secondly, the perceived space study built upon the concept of Cluster and Connectivity in relation to network theory and furthermore, examined the construct of the adaptive perceptual cycle through a comparison between the conception of South Bank and the experience of South Bank using visual cues of schematic networks. The results of the perceived space MDS plot showed a shift in the visitors’ experience of South bank context in 2012 from the design professionals’ conception of the South Bank concept masterplan 2007. As such, this indicated a possible misalignment between the schematic concept of South Bank and people’s experience of the place of South bank.

This chapter will discuss the adaptive space study and investigate longitudinally, the shifts of adaptation and resilience in the masterplan concepts of Brisbane’s South Bank 1991 and 2007. Furthermore, a preliminary Network Analysis will illustrate the adaptive shift of the ‘as built’ urban network of the South Bank site between the years 1997 – 2012. The Network Analysis will be supported by interviews with the leaders of the re-design and redevelopment of South Bank 1997 - 2012 (Figure 8.1).

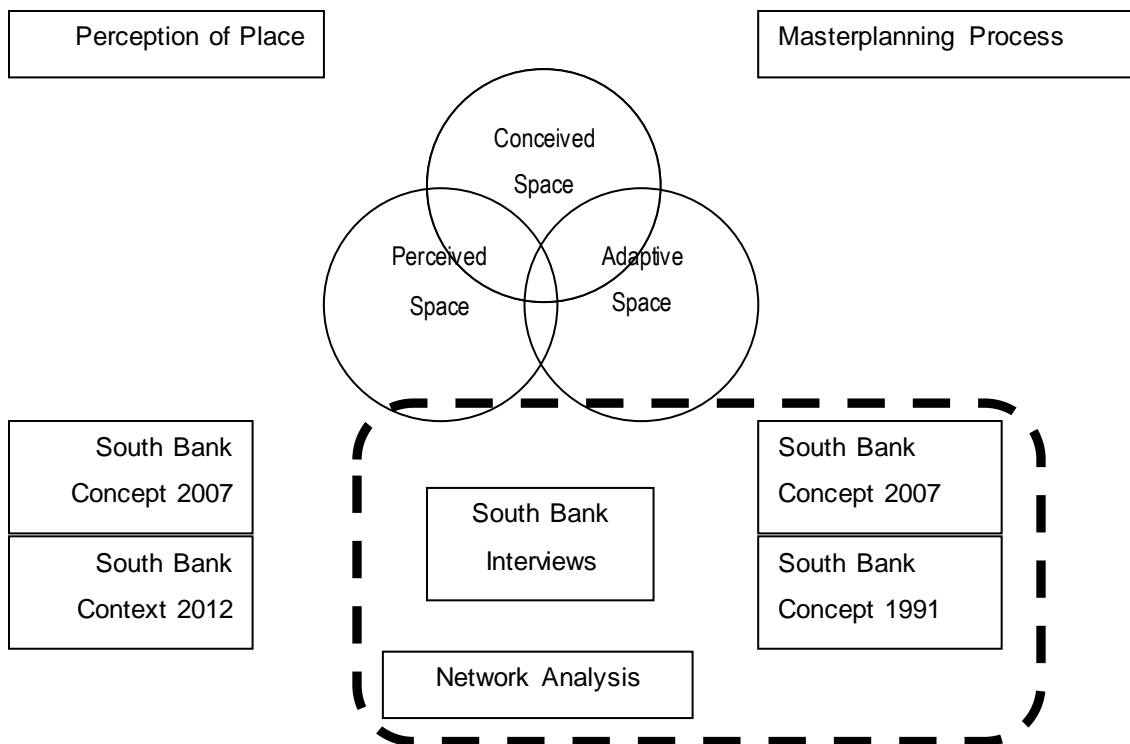


Figure 8.1: Empirical Research framework – Adaptive Space

8.2 PARTICIPANTS

The participants for the adaptive space study consisted of two groups of design professionals; one group of 35 participants who examined the South Bank masterplan 1991 and a separate group of 41 participants who examined the South Bank masterplan 2007. The key research method of multidimensional scaling analysis (MDS) was considered appropriate for this number of participants because MDS retains its statistical rigour even for fewer than 10 participants, which in this study was exceeded.

8.3 ADAPTIVE SPACE RESULTS

It is proposed here that Multidimensional Scaling (MDS) plots illustrate the adaptive space by representing the adaptive shift from the South Bank 1991 masterplan and the South Bank 2007 masterplan. The data for the adaptive space MDS plots were acquired through similarity rankings between Cluster and Connectivity network models compared with the South Bank Concept 1991 masterplan and the South Bank Concept 2007 masterplan. Network models were presented to design professional groups as visual cues for a similarity rating of each masterplan. Specifically, visual cues of Cluster plan type network models and Connectivity plan type network models were

presented as schemata of the small world networks (WS small world network and BA scale free network) and also as Order and Random networks. The Order/Random network models offered an opportunity to elicit a nuanced response that could contribute to the interpretation of the MDS plots. The schemata of plan types were also described in a brief sentence for participant clarification (Appendix 2).

A Cluster Analysis (CA) was completed to support the interpretation of the subsequent MDS plots as explained in Chapter Five. The Mean results indicated the degree of adaptive shift between the network types of masterplan 1991 and masterplan 2007.

The adaptive space MDS plot shows the adaptation and resilience of the South Bank Concept 1991 masterplan against the revised South Bank Concept 2007 masterplan. The interpretation of the adaptive space MDS plot is supported by the results of the Cluster Analysis and the Mean results (Figure 8.2, Figure 8.3 and Table 8.1).

Firstly, the Cluster Analysis (Figure 8.2) shows a clear grouping of the variables that represent the South Bank Concept masterplans 1991 and 2007 for Cluster and Connectivity of small world (sw) characteristics. This grouping was confirmed by the MDS plot (Figure 8.3) that also shows these same variables in very close proximity. Next, the Order-Random characteristics (or) for the South Bank concept masterplans 1991 and 2007 are more distinctive. That is to say, the Cluster and Connectivity characteristics for each Concept masterplan are grouped separately indicating a difference (or adaptation) between the masterplans from 1991 to 2007. This differentiation is also clearly plotted in the MDS analysis, which shows a shift towards orderliness for both Cluster and Connectivity in the 2007 South Bank Concept masterplan.

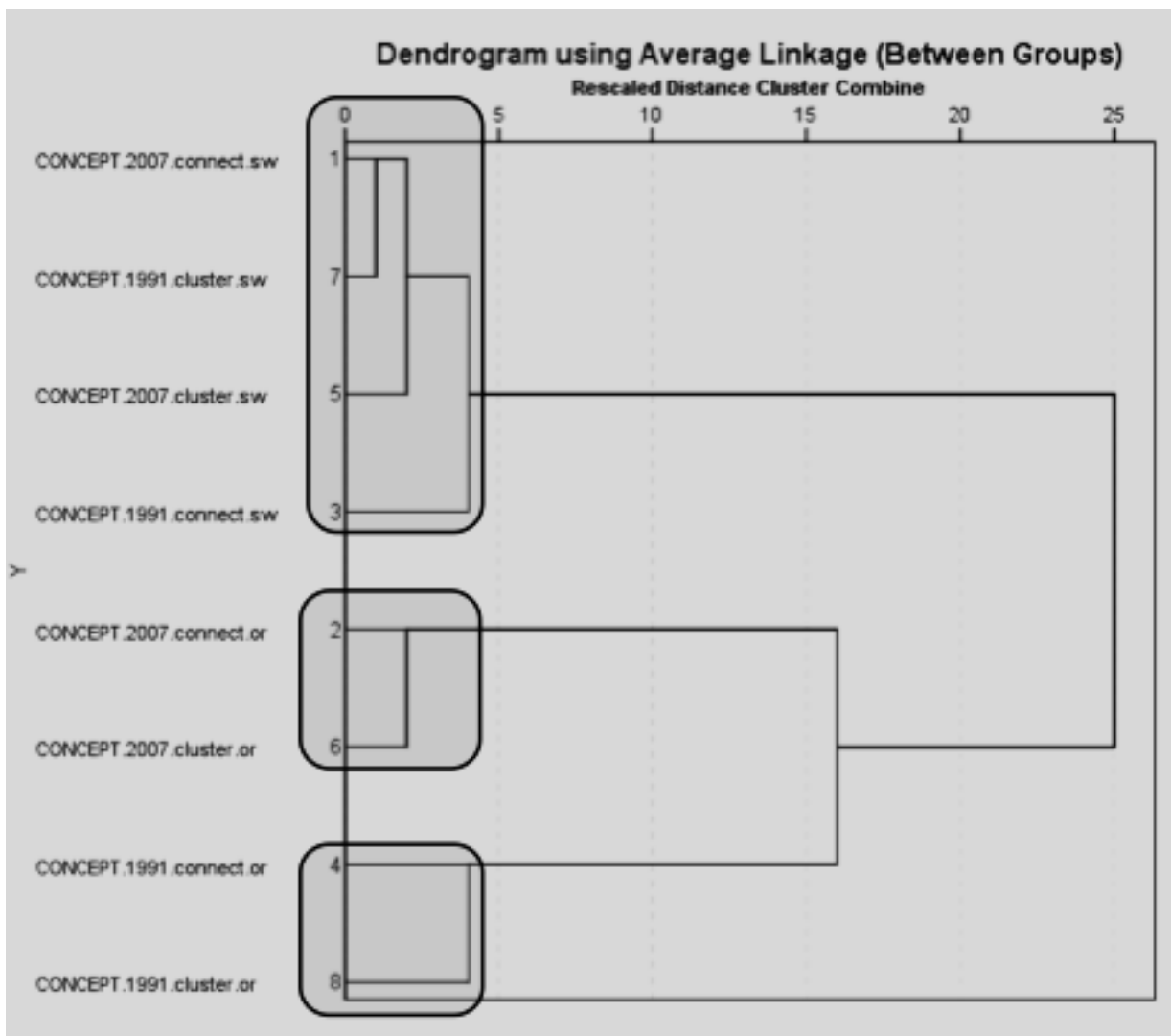


Figure 8.2: Adaptive space Cluster Analysis results.

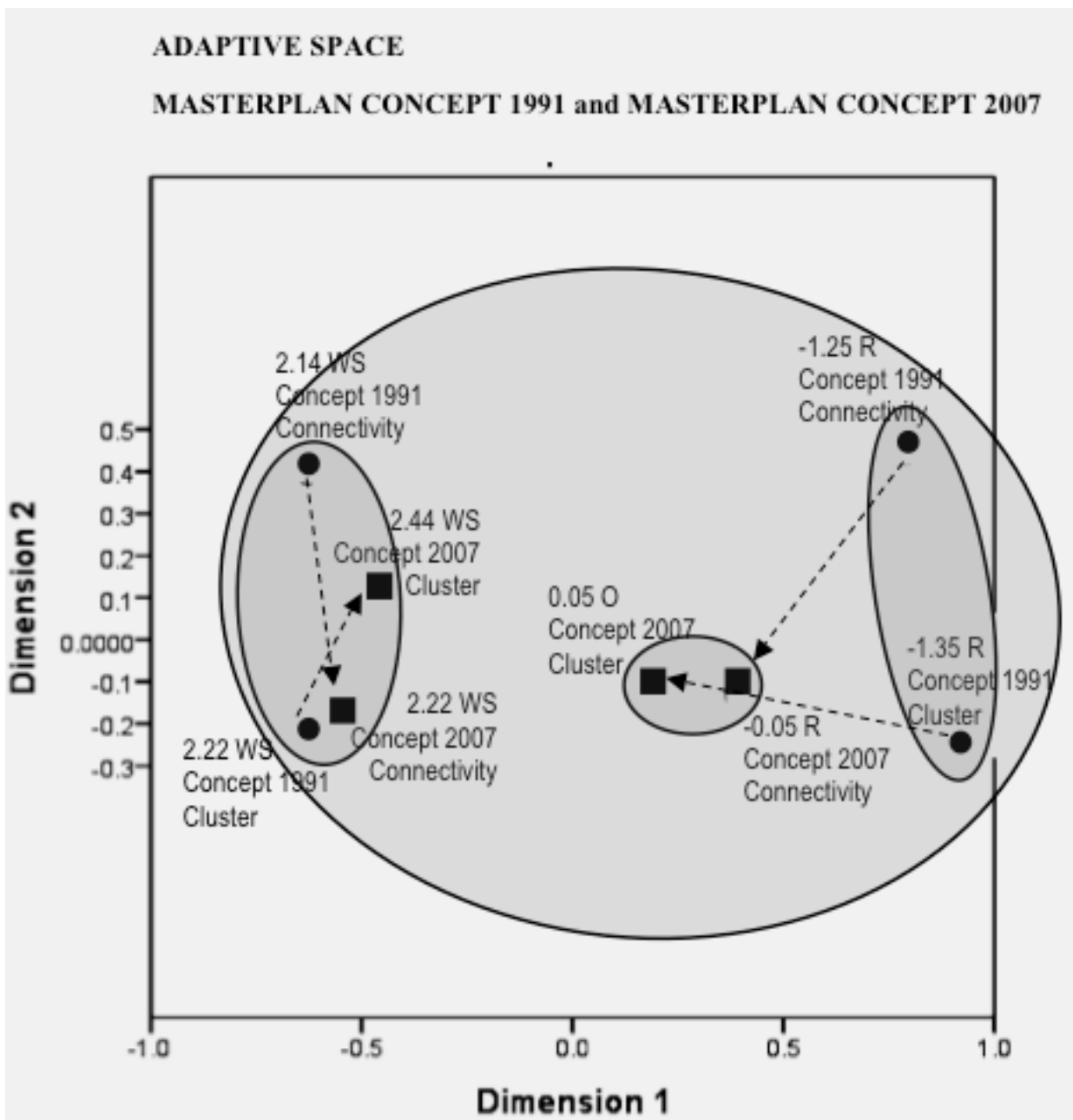


Figure 8.3: Adaptive space of South Bank masterplan 1991 and South Bank masterplan 2007

■ Concept 2007 ● Concept 1991 - - - → Direction of adaptive shift

Multidimensional Scaling analysis (MDS) Normalised Raw Stress Value = 0.00475

0 = excellent fit; <0.15 = good fit; >0.25 = bad fit (Trochim, 1989; Kruskal, 1964)

Table 8.1: Adaptive space Mean results South Bank masterplan 1991 and South Bank masterplan 2007.

SMALL WORLD NETWORK			ORDER/RANDOM NETWORK		
	Concept 1991	Concept 2007		Concept 1991	Concept 2007
Cluster	2.22WS	2.44WS	Cluster	-1.35R	0.05O
Connectivity	2.14WS	2.22WS	Connectivity	-1.25R	-0.05R

The Adaptive space MDS plot and the Mean results show the resilience of the WS small world network Cluster and Connectivity characteristics of the South Bank Concept 1991 masterplan. The MDS plot shows Cluster and Connectivity characteristics of South Bank Concept 1991 and 2007 masterplans located in close proximity forming a large hub (located on the far left of the adaptive space MDS plot). This means that the WS small world network of the South Bank Concept 1991 masterplan has been resilient in the face of the South Bank Concept 2007 masterplan. This demonstrates the resilience of the WS small world network at a masterplanning level.

The resilience of the WS small world network Cluster and Connectivity characteristics are confirmed by the insignificant differences in the Mean results between the South Bank Concept 1991 WS small world network Cluster characteristic (2.22WS) and the South Bank Concept 2007 WS small world network Cluster characteristic (2.44WS). Similarly, there is little difference between the Mean result for South Bank Concept 1991 WS small world Connectivity characteristic (2.14WS) and the South Bank Concept 2007 WS small world Connectivity characteristic (2.22WS).

Despite the resilience of the WS small world network, a further examination of the similarity ranking of Order/Random networks delves into the nuances of small world networks. The adaptive shift of the South Bank Concept 1991 masterplan towards the South Bank Concept 2007 masterplan is revealed in the difference between the Order/Random Mean results as well as the location of the object points plotted in the adaptive space MDS plot.

The MDS plot illustrates a hub or neighbourhood of South Bank Concept 1991 object points for the Order/Random networks for both Cluster and Connectivity (located on the far right of the adaptive space MDS plot). If we compare the results of this neighbourhood with the adjacent neighbourhood (located in the centre of the adaptive space MDS plot) there is an adaptive shift in the South Bank Concept 2007 masterplan towards Order for both Cluster and Connectivity. The adaptive shift towards Order illustrated in the adaptive space MDS plot is also clearly illustrated in the Cluster Analysis dendrogram and supported by the Mean results; the South Bank Concept 1991 Cluster characteristic (-1.35 R) has shifted towards the Order of the South Bank Concept 2007 Cluster characteristic (0.05 O); and the South Bank Concept 1991 Connectivity characteristic (-1.25R) shows a very slight adaptive shift towards Order in the South Bank Concept 2007 Connectivity characteristic (-0.05R) although, Connectivity remains Random.

In sum, these adaptive space MDS plot results indicate that over time, the WS small world network characteristic in the conceptual masterplanning of South Bank has been resilient, but that the underlying Order/Random characteristic shifted towards Order. However, although the results appear to show an adaptive shift towards Order for Cluster characteristics the Connectivity characteristics remain Random.

8.3.1 SIGNIFICANCE OF THE ADAPTIVE SPACE RESULTS

The adaptive space results illustrated the adaptive shift in the masterplanning process from the South Bank masterplan 1991 towards that of the South Bank masterplan 2007. Firstly, the adaptive space MDS plot showed the resilience of the WS small world network characteristics because there was an insignificant adaptive shift of Cluster and Connectivity between the 1991 masterplan and the 2007 masterplan. This was an important outcome because it highlighted the possible sustainability of a WS small world network as a masterplanning framework for urban redevelopment sites. Secondly, the Order/Random characteristics highlighted the nuances between the 1991 WS small world network and the 2007 WS small world network. The results illustrated on the adaptive space MDS plot showed that there was a shift from Random characteristics for both Cluster and Connectivity in the South Bank masterplan 1991 towards Order characteristics for both Cluster and Connectivity in the South Bank masterplan 2007. As discussed in Chapter Three, small world networks are a combination of Order and Random networks. Perhaps the tendency for the participants to rank an adaptive shift towards Order in the revised South Bank Concept 2007 masterplan possibly illustrated the lack of Order in the South Bank Concept 1991 masterplan. This means that at a masterplanning concept level at least, Order was seen to be a missing ingredient that needed to be infused into the South Bank Concept 2007 masterplan. Indeed, as illustrated in Chapter Seven, the Denton Corker Marshall (DCM) Concept masterplan 1997 – 2007 was based on the principles of Order for the certainty of coherent Connectivity throughout the site as well as a more Random approach to address the Clusters of uncertain future activities. As such the adaptive space MDS plot confirms this adaptive shift towards Order in the conception of Connectivity in the DCM South Bank Concept 2007 masterplan while illustrating the resilience of the distributed WS small world network characteristics of both masterplans.

8.4 NETWORK ANALYSIS AND INTERVIEWS

Network Analysis (NA) enables a metric examination of the morphological changes that have occurred in an ‘as built’ urban network structure. This metric network analysis is supported by the

qualitative interviews of leaders of South Bank's design and development. The collaboration of metric results with the interview data highlights the significance of both approaches. The metric results indicate the degree of adaptive shift from the network construct of the 'as built' South Bank 1997 towards South Bank 2012, but the interview data illuminates the possible reasons for that adaptive shift.

The interview data elaborated the metric network analysis and provided the human agency of the decision-making context to the morphology of urban change. Decisions that promote placemaking change find their source in the adaptive perceptual cycle discussed in Chapter Two. A stimulant for decision-making is a crisis. As described in Chapter Seven, the redevelopment of South Bank had several points of criticality that finally instigated a rethink of the South Bank 1991 masterplan. The interviews relate the process of this rethink and the metric network analysis reveals the network typological outcome.

8.5 INTERVIEW PARTICIPANTS

A group of 6 selected leaders involved in the South Bank design and development participated in semi-structured telephone interviews. The aim was to elicit in-depth descriptive data for an: "idiographic analysis...but the eventual aim is to explicate—eidetically—the phenomenon as a whole" (Finlay, 2009, p9) "in order to come up with a typical essence" (Giorgi, 2008, p37). So as to retain the nuances of the participants' language, the verbal context of their responses was largely retained.

The participants were asked to consider the South Bank masterplan 1991 and the South Bank masterplan 2007. To establish the framework of the interview the questions and an illustration of both South Bank masterplans (as well as the required ethical clearance) was emailed to the participants in readiness for a one-on-one telephone interview a week or so later (Appendix 3). The participants framed their interview in their professional role and were asked these semi-structured questions: firstly, what they thought the aim was of each South Bank masterplan concept; secondly, what compromises or negotiation were made to the masterplan outcome; thirdly, what crises were faced and how these impacted on the masterplan outcome; and finally, who or what were the drivers of the negotiations during these crises. The telephone interview took 20 to 30 minutes. The interviews were recorded and transcribed verbatim by this author.






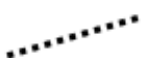



8.6 NETWORK ANALYSIS RESULTS AND INTERVIEWS

Network Analysis (NA) was applied to the network of connectivity and neighbourhoods of the ‘as built’ South Bank 1997 and the ‘as built’ South Bank 2012. South Bank 1997 was the partial realisation of the South Bank Concept 1991 masterplan and South Bank 2012 was the relatively complete realisation of the South Bank Concept 2007 masterplan. These timeframes were selected because firstly, 1997 was the year in which the South Bank Corporation (SBC) commissioned Stage One of the new South Bank masterplan by Denton Corker Marshall (DCM) and secondly, 2012 was the year in which the SBC relinquished its authority over the site and returned it to the authority of the Brisbane City Council (BCC). This means that these timeframes represented a relatively comprehensive version of the ‘as built’ network of connections and neighbourhoods for South Bank in 1997 and for South Bank in 2012.

Cluster and Connectivity were the network elements that generated the metric analysis. This network analysis applied these terms: a *node* represents a place where something happens, such as shop, cafe, university, gallery, beach, recreation and so on; Clusters of activity nodes form *neighbourhoods*; Connectivity is represented by the *intersections* of the network. This analysis emphasised the relationship between neighbourhoods (*n*) and intersections (*m*). Importantly, the intersections were ‘weighted’ according to the strength or weakness of the connector. In accordance with small world network theory, the ‘strength of weak ties’ of long distance connections were given more metric ‘weight’ to an intersection and those intersections that were interrupted by either a physical or psychological disconnection were given less metric ‘weight’ to the intersection.

Aerial maps were accessed from Google Maps upon which network symbols were located and checked on site (Table 8.2, Figure 8.4, Figure 8.5, Figure 8.6 and Figure 8.7). The calculations for the NA were an adaptation of the network metrics used to analyse the typology of the fine scale structure of street networks of Sydney and Melbourne (Sarkar, 2013). The scale of this present research applies network metrics to an examination of the relationship between neighbourhoods (*n*) and intersections (*m*) rather than the finer scale network of streets and intersections applied by Somwrita Sarkar’s investigation (Table 8.3, Table 8.4 and Table 8.5). As such, this present NA is a preliminary development of Sarkar’s algorithm and the intent of its investigation by this present author was to assess its integrity.

Table 8.2 Network symbols

	Long distance connectivity		Carpark access / egress
	Connectivity		Beach and aquactivity
	Interrupted connectivity		Canal
	Intersection connectivity		Neighbourhood
			Node

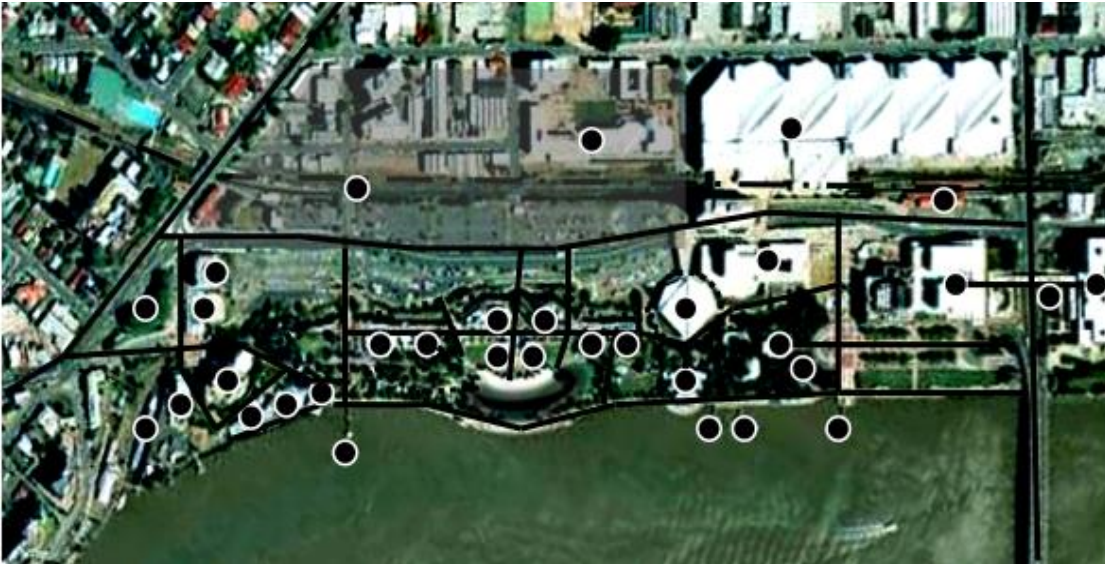


Figure 8.4: South Bank aerial 1997 (Google maps)

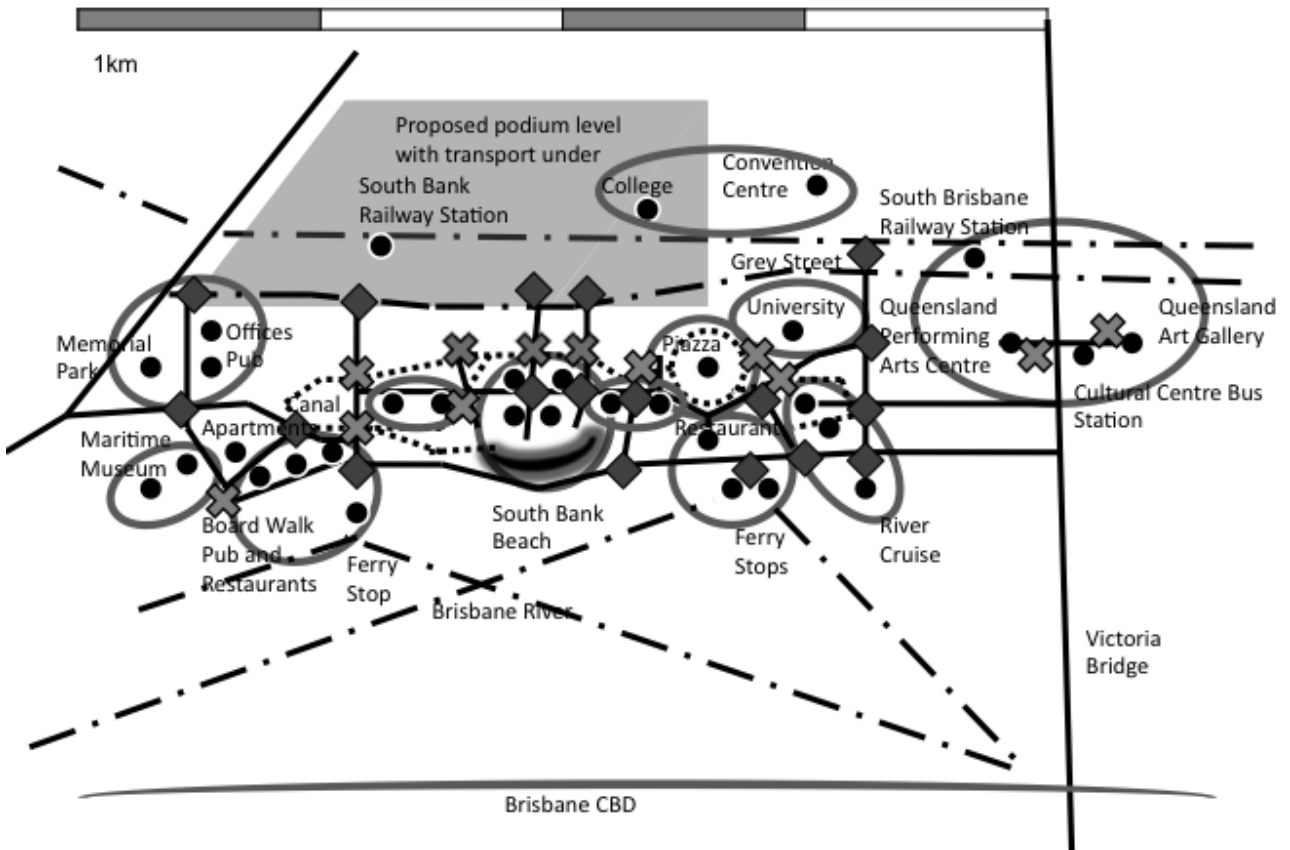


Figure 8.5: South Bank network 1997



Figure 8.6: South Bank aerial 2012 (Google maps)

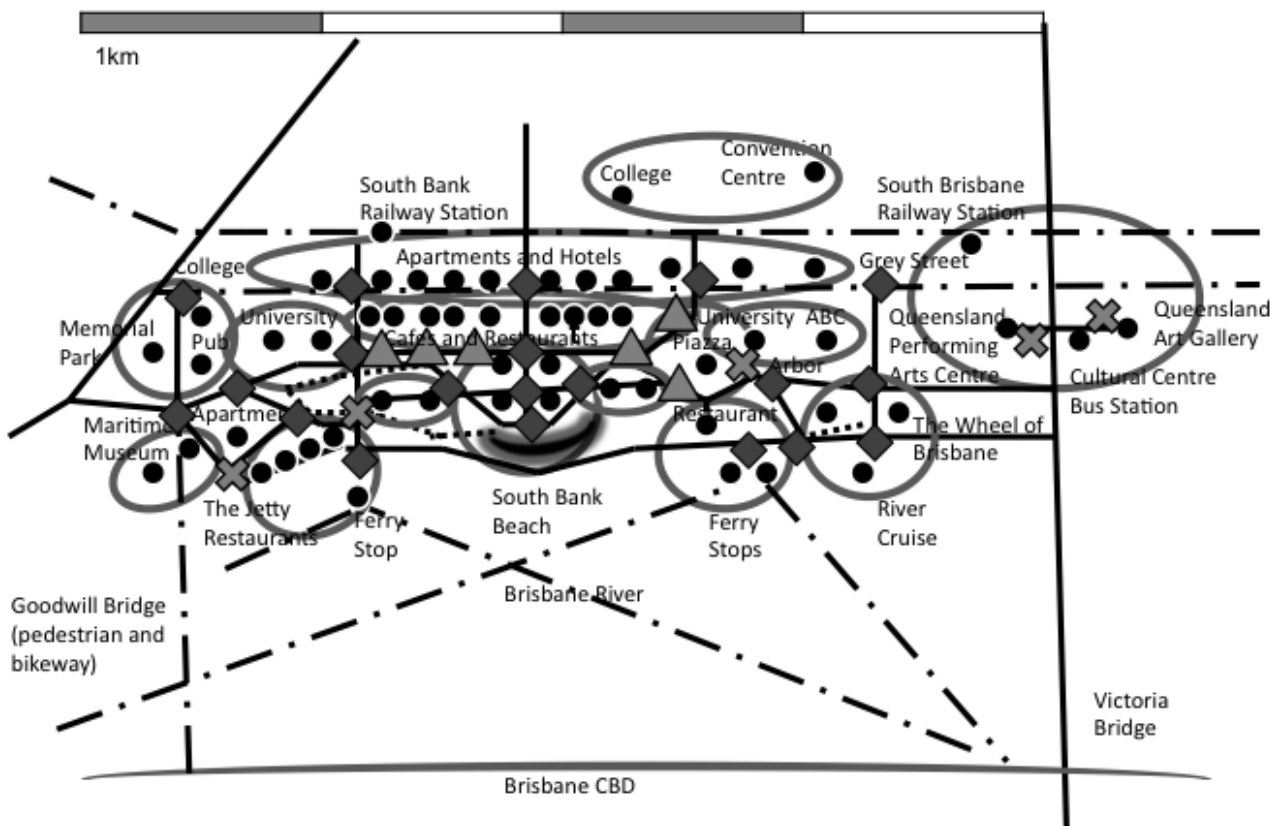


Figure 8.7: South Bank network 2012

Table 8.3: Network Analysis weightings for calculations.

Network element	Metrics
Intersection connectivity is an intersection point where two or more pathways meet; includes pedestrian connections from the underground carpark.	$m = \text{intersection} \times 1$
Intersection connectivity on a long distance connection (LDC); includes carpark vehicle access/egress.	$m = \text{intersections (LDC)} \times 2$
Interrupted connectivity includes overpasses, footbridges, service roads etc.	$m = \text{total intersection connectivity} - \text{interrupted connectivity} / 2.$
Neighbourhood includes the underground carpark as a neighbourhood.	$n = \text{neighbourhood} \times 1$

Table 8.4: Total neighbourhoods (n) and weighted intersections (m).

SOUTH BANK 1997	SOUTH BANK 2012
Intersections (LDC): 7 x 2 Intersections: 10 Interruptions: 12/2 Neighbourhoods: 12 $m = 14 + 10 - 6$	Intersection (LDC): 10 x 2 Intersections: 16 Interruptions: 5/2 Neighbourhoods: 16 $m = 20 + 16 - 2.5$
$m = 18$ $n = 12$	$m = 33.5$ $n = 16$

Table 8.5: Network metrics for South Bank 1997 and South Bank 2012 adapted from Sarkar (2013)

Network metrics	1997	2012	Rationale
Beta index $\beta = m/n$	$\beta = 1.5$	$\beta = 2.093$	Beta index is the ratio of neighbourhoods (n) to intersections (m)
Cyclomatic number $C = m - n + 1$	$C = 7$	$C = 18.5$	Cyclomatic number is the number of cycles in the network.
Alpha index $\alpha = C/2n - 5$	$\alpha = 0.368$	$\alpha = 0.685$	Alpha index is the cycle density; the number of cycles that actually exist in a network compared with the maximum number that can exist.
Gamma index $\gamma = m/3n - 6$	$\gamma = 0.6$	$\gamma = 0.797$	Gamma index is a measure of link density; the number of links that actually exist compared with the maximum number that can exist.

The results of the Network Analysis (NA) of the 'as built' South Bank 1997 and the 'as built' South Bank 2012 indicate the typology of the network of neighbourhoods and connections for each timeframe of the South Bank site. The intent of this analysis was to reveal the difference between the site network of neighbourhoods and connectivity of South Bank based on the changes that have occurred from 1997 to 2012. The NA revealed the small world network typology described as either grid/mesh-like (or a distributed WS small world network) or a tree-like (or a hierarchical BS scale free network).

Firstly, the beta index calculated the ratio of neighbourhoods (n) to intersections (m): The higher the beta index, the more grid/mesh-like is the network; the lower the beta index the more tree-like is the network. The beta index is a measurement of graph connectivity or 'cycles'; a fully connected graph with no cycles (i.e. acyclic) is a tree-graph and is metrically expressed as $\beta < 1$. A graph with cycles is a mesh-like graph and is expressed as $m > n$, and $\beta > 1$. As such, beta index values less than 1 indicate tree-like networks (BA scale free networks) and beta index values greater than 1 indicate grid/mesh-like networks (WS small world networks).

The results of the beta index indicate that South Bank 2012 ($\beta = 2.093$) has a higher beta index number than South Bank 1997 ($\beta = 1.5$) and so, South Bank 2012 is more likely to represent a grid/mesh-like network (WS small world). This result clearly concurs with the adaptive space MDS plot result, which also illustrated that the South Bank Concept 2007 masterplan had WS small world characteristics. However, the adaptive space MDS plot illustrated that the South Bank Concept 1991 was also a WS small world network. The perceived space MDS plot discussed in Chapter Seven illustrated WS small world network characteristics for the South Bank Concept 1991 masterplan, but slightly less so for the visitor experience of the South Bank Context 2012. This may be a subtlety revealed by the iterative calculations of the MDS analysis, bearing in mind that the beta index is considered the simplest means to measure the gross topology of network characteristics (Sarkar, 2013) and also the data sources for the MDS analyses are more complex being based on people's conception and perception of place.

Secondly, the cyclomatic number is a measure of the number of cycles in the network: The higher the cyclomatic number the more grid/mesh-like is the network; the lower the cyclomatic number the more tree-like is the network. An acyclic tree-like street network is typically one consisting of cul-de-sacs with very few cycles, whereas a grid/mesh-like street network typically consists of many

cycles. The cyclomatic number in this investigation is possibly the most telling difference between South Bank 1997 and South Bank 2012.

The results show that the cyclomatic number for South Bank 2012 ($C = 18.5$) is much higher than that for South Bank 1997 ($C = 7$). This indicates that WS small worldliness is more so in South Bank 2012 and is less so in South Bank 1997. The less cyclical characteristics of the South Bank 1997 network is supported by the verbatim interviews with the South Bank leaders of design and development. They point to the separation of transport and pedestrians (possibly a creating an acyclic cul-de-sac effect) as the fundamental problem with the South Bank 1991 masterplan. Bill Corker, a principal architect of Denton Corker Marshall (DCM) recalled:

The original plan [the 1991 Media 5 plan] was a 1960s concept where all transportation and cars were going to be at grade and the walking level was a pedestrian dominated deck above ground level. It was massive (Corker, 2012).

Other design professional leaders who were interviewed reiterated that the principle of transport and pedestrian separation was a major planning flaw. Malcolm Snow, the CEO for the South Bank Corporation (SBC) pointed out:

The planning thinking of the day was that you separate cars and pedestrians ...It was basically ensuring that the podium on which the buildings were built was largely public access and gardens and circulation beneath the podium at grade...When people started to try to imagine what that might look like across the entire 40 hectares, I think they were horrified...And seeing this thing emerging and the type of environment that would result was a kind of epiphany...there was a realisation they should stop and rethink (Snow, 2012).

And with the clarity of hindsight the emphatic failure of the original South Bank 1991 masterplan seemed so obvious. Malcolm Middleton, a master architect for the SBC Design Advisory Panel explained:

It had a fundamental flaw; it had a built in failure that people didn't pick up or completely ignored. It sought to grade separate pedestrians and cars. They tried to build the first stage of it. It just demonstrated the fact that it didn't work, couldn't work, wouldn't work...the ultimate disaster was the bus way through the middle of the site" (Middleton, 2012).

The cyclomatic number for South Bank 2012 ($C = 18.5$) although significantly different from that of South Bank 1997 ($C = 7$) does not tell the whole story. Making South Bank 'work' required

courageous decision-making. But firstly, let us recall the background to the rise of the South Bank 1991 masterplan related in Chapter Seven. The Media 5 South Bank 1991 masterplan had charmed the citizenry with its meandering resort style landscaping, canals and lagoons and the Gold Coast inspired beach. However, the novelty of the spectacle of Expo 88 inevitably faded over time and the South Bank masterplan that attempted to recreate that experience was left behind. Lack of developer interest to invest was critical and this demanded a rethinking of the masterplan. Steve Wilson the chairman of the SBC Board recalled:

The core building and planning context of it was uneconomic because it didn't have access for movement legibility...way finding was extremely difficult. It didn't have a street address for the commercial buildings. As a consequence, the land value, which was meant to finance a lot of the public realm cost, was next to nothing...the public was tiring of it and attendance numbers were falling. (Wilson, 2012).

Although there was a general lack of developer interest significant parts of the original 1991 masterplan were built. And as the buildings emerged from the ground other planning flaws also emerged.

That plan did not attract development. The only development was the Rydges Hotel and the Conservatorium of Music that had been built to the original masterplan, one level above transportation level...The parklands were reasonably successful and the beach was popular because it was free... but you had major hurdles to get through. One was transportation, which was literally fenced with a couple of pedestrian bridges over the bus way. Then you had the canal that became a moat which had humped-back bridges, cutting off the parklands. The site was actually split in two (Corker, 2012).

The site's difficult pedestrian infrastructure was confirmed by a comment by a SBC planner who recalled:

We were told to help people over the bridges if they were struggling, like mothers with prams and the elderly' (Anonymous SBC Planner, 2009)

The 'hurdles' of the impassable transportation corridor and moat-like canal alerted design professionals that a key aspect of pedestrian comfort and ease had been lost in the notion of 'the park within the buildings with the park' that was the catch cry of the South Bank 1991 masterplan.

Its biggest problem was its lack of connectivity to the surrounding suburbs (Snow, 2012).

However, the problem of connectivity was not obvious initially. The SBC knew they had a problem because the development industry shunned South Bank. The Expo 88 spectacle was based on the premise that the redevelopment of South Bank post-Expo 88 would reimburse the state government

coffers. The rethinking of South Bank sought the best design professionals and after a selection process Denton Corker Marshall (DCM) Melbourne was commissioned. Bill Corker recalled:

The Board initially, as we understood it, were looking for some sort of a spectacle. We initially came up with an idea to bring the people to the river and make it like a real canal development. We put that up at the first meeting and that idea basically died a death on the spot. So we were still looking for a gesture...they felt a grand gesture might do the trick...We said, hang on - we have a major urban planning problem. It's not a gesture to get the park going. We've got to go back to fundamentals. The next step was quite important. Steve Wilson [Chairman of SBC Board] and I were wandering around the site and he said to me - he just sort of muttered out loud - 'what happens if we get rid of the boulevard?' The boulevard was part of the deck that the Rydges Hotel and the Conservatorium was built on. Now, a lot of money had been spent on this deck. And then I said, 'well, we've got to get rid of the bus way', which was a major part of Brisbane Transport. And he said that might be possible. I didn't think it was an option. If we get rid of the boulevard and the bus way the answer is simple. All you do now is to treat it like a proper masterplanning project" (Corker, 2012).

This decision was a radical amendment to not only the 1991 masterplan concept but to significant parts of the development already built. Consider the decision that the design professionals and the SBC faced after the long road to resolve the redevelopment of the Expo site and the political controversy that it had detonated for a decade previously.

Steve Wilson recalled:

It was a very difficult decision to make because it was a fundamental change. It meant that we had to unwind the sum of money that had been spent in the last three years on some structure built over Grey Street and the whole programme, the whole plan was about continuation. We were up against an argument that this was substantial renovation of an idea for which you would be destroying something that was already built - which cost some significant money - in pursuit of a whole new agenda. Financially oriented people would say that to change so quickly is a 'rope-able' thing to do" Wilson, 2012).

This was a crisis point. Despite the travails of developing the South Bank 1991 masterplan the real world of South Bank had shifted; its popularity was waning and developers stayed away. A choice was made between the rigidity of a deterministic South Bank 1991 masterplan and the potentiality of a less certain South Bank 1997 masterplan. Rigidity would mean that a deterministic masterplan would continue according to the program with the threat that the result might have become an

immutable monolith. If the development industry was not attracted to invest and people tired of the novelty of the parklands (and this was a certainty) it would become an empty, unfinished and an irrelevant part of the city.

As revealed by the results of particularly, the cyclomatic number the DCM approach to make South Bank 'work' was to give the certainty of coherent connectivity and to allow uncertainty to foster serendipitous neighbourhoods. To this end, the DCM South Bank 1997 masterplan simplified, clarified and gave certainty to some aspects of the urban form, but enabled the adaptation of other aspects. A basic urban frame was established around which the more serendipitous effects of economic, demographic or socio-cultural changes might impact.

The 1997 [DCM] masterplan was never seen as a hard and fast blue-print. The combination of simple but powerful principles meant DCM provided almost in an indicative way how we would respond to each of the 'soft precincts' within the park... DCM did sketch out and identify how new development might occur but we were never constrained by their detailed drawings." (Snow, 2012)

There was a fundamental shift in the concept of South Bank through the DCM South Bank 1997 masterplan. The emphasis was on developing a mixed-use agenda rather than the parkland open space that was reminiscent of the theme park approach of the South Bank 1991 masterplan.

Thirdly, the shift towards mixed-use development impacted upon the density of the cycles and the density of links. Both the alpha index, which measures cycle density and the gamma index, which measures link density support the effect of mixed-use development. The alpha index measures the number of cycles that actually exist in a network compared with the maximum number that can exist in a network. The higher the alpha index number the greater is the cycle density and so, the more grid/mesh-like is the network. The lower the alpha index number the lesser is the cycle density and the more tree-like is the network. The results show that the higher alpha index was measured in South Bank 2012 ($\alpha = 0.685$) and the lower alpha index was measured in South Bank 1997 ($\alpha = 0.368$). This suggests that South Bank 2012 has a cycle density approximately twice as dense as South Bank 1997; nevertheless, both of these alpha indices are relatively high and support the grid/mesh-like network typical of a WS small world network.

Finally, along with cycle density a correlated measurement of link density or the gamma index, describes the difference between South Bank 1997 ($\gamma = 0.6$) and South Bank 2012 ($\gamma = 0.797$). The

gamma index is a measure of link density in which the numbers of links that actually exist in a network are compared with the maximum number that can exist. The higher the gamma index number the greater the link density and the more grid/mesh-like is the network. The lower the number the lesser the link density the more tree-like is the network. Link density in both cases is relatively high with the greater link density found in South Bank 2012.

Although, the difference between the gamma indices of South Bank 1997 and South Bank 2012 is not as great as say, the cyclomatic number or the alpha index these link density measures indicate a grid/mesh-like typology rather than a tree-like typology.

Dense cycles and dense links are generally found in city centres and the change from a parkland concept towards a more urban setting was critical to the urban development of South Bank. This was a radical change to the development agenda, which was largely driven by SBC leadership - Steve Wilson the Chairman of the Board of SBC recalled the challenges of leadership during this critical period of gaining acceptance for the DCM plan:

When we changed from a tourist focus to a locals' focus we had a lot of the existing retail operators (the restaurants) complain... We had a lot of people who thought they were losers out of our plan, run off to the government and threatened to expose it to the media... We had a lot of transport people within government who opposed the new plan because Grey Street would no longer be a bus way; the solution for that was to build a bus underpass. It cost extra money so that was argued against and Transport people said it was a wasteful plan too concerned about the aesthetic not about the practical... There was a crisis within the Board because the DCM plan still envisaged meaningful land development for commercial and residential buildings... we were pioneering the idea of mixed-use development... There were some people on the Board who thought that the whole thing should be changed into a much bigger park. There was tension there - between the brief we had been given by government, which was to make it more exciting, but also to achieve some financial returns verses a giant park. There was a split on the Board about that." (Wilson, 2012).

The 'giant park' gave way to 'mixed-use development'. DCM simplified the masterplan and clarified the connectivity and circulation by reinstating as far as possible the original South Brisbane street grid so that the neighbourhoods surrounding the park were "woven into the existing fabric of the city" (Snow, 2012, p2). This weaving of connectivity was important because it illustrates a key characteristic of small worldliness - long distance short-cuts. Firstly (as illustrated

in Chapter Six) three major connectors were established: Grey Street Boulevard (called The Avenue on the masterplan) which was re-established as a real street, landscaped and with the mix of pedestrians, traffic and commercial and retail activity; secondly, the canal that had been a significant barrier to river access by pedestrians was turned into a contemporary sculptural Arbour that became the long sought for landmark gesture of South Bank parklands and major pedestrian access throughout the site serving as a long distance short-cut; and thirdly, the pathway along the riverbank leading to the beach and connecting to the Goodwill Bridge and the Kurilpa Bridge beyond the Art Galleries guides pedestrians, cyclists and joggers from outside to inside South Bank, a long distance short-cut that connects with the surrounding suburbs and the CBD.

The results of the NA embellished by the impressions gained through the verbatim interviews indicated that South Bank in both timeframes was a typological grid/mesh-like network as characterised by a WS small world network. However, it is clear from the NA that the adaptive shift from the ‘as built’ South Bank 1997 towards the ‘as built’ South Bank 2012 outcome represents a measure of the urban emphasis that was conceived in the South Bank masterplan 1997-2007.

8.7 SIGNIFICANCE OF THE NETWORK ANALYSIS RESULTS AND INTERVIEWS

The Network Analysis (NA) enabled a way to measure the morphology of South Bank 1997 and South Bank 2012. The network metrics were supported and enhanced by the interviews with the leadership of the design and development of South Bank through an understanding of the crises that triggered change. In this study the network metrics were adapted to address clusters of nodes as *neighbourhoods* and connectivity as *intersections* which was not in strict accordance with Sarkar’s (2013) method for seeking the fine-scale typology of street networks represented by nodes as intersections and connectivity as streets; nevertheless, this present study flagged a promising direction for future research.

Generally, the NA results confirmed that South Bank in both timeframes of 1997 (the ‘as built’ version of the South Bank masterplan 1991) and in 2012 (the ‘as built’ version of the South Bank masterplan Stage One 1997 and Stage Two 2007) were grid/mesh-like network typical of a WS small world network typology. This outcome was generally, supported by the results of the adaptive space MDS plots although the metrics of the MDS analysis, which is a multidimensional non-parametric method, elicited some subtle differences possibly outside that of the network metrics.

The NA provided results that proved interesting particularly in the context of the interview data. Specifically, the cyclomatic number, which is a measure of the number of cycles in the network, indicated that South Bank 2012 ($C = 18.5$) had many more cycles than South Bank 1997 ($C = 7$). A low cyclomatic number indicates the more restrictive connectivity of say, cul-de-sacs typical of a tree-like hierarchical network even though the network may be connected. A high cyclomatic number indicates the unrestricted cyclical characteristics of a connected grid/mesh-like network that offers users choices for way-finding.

The WS small world network characteristics are apparent in the somewhat intuitive approach of the design for South Bank 1997 – 2007 masterplan illustrated in Chapter Seven, in which firstly, the certainty and order of long distance short-cuts was established via Grey Street Boulevard, the Arbour and the riverside pathway within the South Bank precinct. Furthermore, the Ferry stops and the Goodwill Bridge pedestrian and bikeway were additional long distance short cuts to and from the CBD directly to South Bank. Long distance short-cuts are key elements in a small world network because they are the elements that promote the ‘strength of weak ties’ that enhance the viability of a network via opportunities for diversity and innovative connections. The second key element of small worldliness is the distributed clusters of nodes or neighbourhoods. This was the WS small world element that the design for South Bank 1997 – 2007 masterplan instigated. Distributed neighbourhoods were proposed as possible activity foci that were open to change so that South Bank might adapt over time. This is the key element of uncertainty and randomness that enables serendipity and innovation in small world networks.

The significance of the NA metric results and the qualitative interviews is that separately and collectively, they support one another towards demonstrating that for this large-scale urban redevelopment scenario WS small worldliness is a viable approach towards masterplanning for adaptation and resilience. This is evidenced by the compelling result of the high cyclomatic number for South Bank 2012 ($C = 18.5$) supported by the additional indices, which all point to WS small world urban network typology. The qualitative data of the South Bank masterplan Stage One 1997 and Stage Two 2007 (illustrated in Chapter Seven) represent the intuitive shift towards small world principles of combined Order/Random characteristics via certain, long distance short-cuts and uncertain, distributed neighbourhoods as expressed by Malcolm Snow:

The 1997 [DCM] masterplan was never seen as a hard and fast blue-print. The combination of simple but powerful principles meant DCM provided almost in an

indicative way how we would respond to each of the ‘soft precincts’ within the park... Its biggest problem was its lack of connectivity to the surrounding suburbs (Snow, 2012).

The DCM masterplan was designed to establish coherence and certainty, but also the ‘fuzziness’ of uncertainty. The fuzzy activity areas opened up the site for its potentiality within the consistency of its designated pathways and connections. As such, “...it describes an entity that has both consistency and fuzzy borders... [It] has some coherence ...but continually dissolves and morphs into something new” (Tampio, 2009, p394). This approach allowed for the adaptive evolution of South Bank and avoided the revolutionary demolition of significant infrastructure as needs and desires changed over time.

In late 2012, the governance of South Bank was returned to the BCC; perhaps this signals the return of the masterplan process to the involvement of the local community who have the potential “to disrupt patterns, generate new encounters with people and objects, and invent new connections and ways of inhabiting everyday urban life” (McFarlane, 2011, p209).

Democratising the masterplanning process to all-comers may still result in the authoritarian certainty of a masterplan design product such as the South Bank 1991 masterplan. However the DCM masterplan design product has perhaps, initiated the democratic uncertainty of everyday life to be absorbed through the South Bank 2007 masterplan. The dilemma is how to address the shifting balance between the potentiality of randomness that enables innovation and adaptation and the coherence of order that offers a sense of certainty in masterplanning; the NA results and interviews appear to support a masterplanning framework such as WS small worldliness that inherently, ‘has both consistency and fuzzy borders... [It] has some coherence ...but continually dissolves and morphs into something new” (Tampio, 2009).

8.8 CONCLUSION

This chapter presented the results of the adaptive space study and the Network Analysis (NA) which included selected verbatim interview data with the leadership of Brisbane’s South Bank redevelopment as a qualitative adjunct to the quantitative NA. The adaptive space MDS plots illustrated the adaptive shifts of the network schemata of the South Bank masterplan 1991 and the revised South Bank masterplan 2007. The results showed the resilience of the WS small world network and also the slight shift towards Order from the 1991 masterplan to the 2007 masterplan. The Network Analysis was a preliminary study to test an original algorithm (Sarkar, 2013) that was further developed by this present author to see if it retained its integrity.

The algorithm was intended to elicit the small world network typology of the site network through a metric analysis of the clusters (neighbourhoods) and connectivity (intersections) of the 'as built' South Bank in 1997 and in 2012. The Network Analysis showed that the 'as built' South Bank of 2012 was more grid or mesh-like (i.e. a distributed WS small world network) than the 'as built' South Bank of 1997.

The next chapter will present the Conclusions of the empirical research in the context of the overall research framework. The Conclusions will be a synthesis of the conceived space, perceived space and adaptive space results from the stance of the interdependency of the idea of place as introduced by place philosophy and cognitive psychology in Chapter Two.

The originality of the core concepts that were developed by this present author will be discussed in the context of the advancement of knowledge. Finally, there will be a brief discussion about the potential for future research in this topic, considering the limitations of this present research.

CHAPTER NINE

CONCLUSIONS

9.1 INTRODUCTION

This chapter will discuss the conclusions derived from the results of the empirical research study revealed in Chapter Six, Chapter Seven and Chapter Eight in light of the inquiry into the research question: *How can places be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place?*

These conclusions will be based on the core concepts that underpinned the empirical research and which reinforced the originality of the contribution to knowledge. The rationale for the study will explain the research challenge and the key theoretical motivation that steered the design of the research framework. The implications of the results of the empirical research will be discussed in the context of the research question and sub-questions: firstly as the exploratory conceived space; secondly, the perceived space; and thirdly, the adaptive space. Finally, the potential for future research will be outlined.

The research was about planning people-places in a context of urban change. This was considered important because urban change impacts upon people's relationship with their place not only physically as a built form but also upon their psychological, symbolic, cognitive associations as well as the demands of economic needs and aspirations, environmental and climatic crises and many other known and unknown factors. Any number of urban factors can trigger a crisis that spreads throughout this complex network s that forms the people-place phenomenon we call cities. Although much research has been focussed on cities and the complexity of their networks, they have tended to concentrate on various types of infrastructure networks. This present research started with human perception and cognition in placemaking, which was identified as a gap in complexity theory of cities research. The masterplanning of large-scale inner city redevelopment sites was the vehicle for the research because such places consist of higher concentrations of people and are where change is more rapid and intense. This research sought to enable the planning of people's places in a way that is relevant to the changing network of factors that contribute to urban placemaking.

9.2 ORIGINALITY OF THE RESEARCH

The original concepts developed through this research were: the adaptive perceptual cycle, a synthesis of the independent theories of others by this author (Chapter Two, Six and Seven); the innovative application of small world network theory for masterplanning large scale urban redevelopment sites (Chapter Three, Four, Seven and Eight); and, the preliminary development of a small world Network Analysis method applied to the ‘as built’ case study site (Chapter Five and Eight). These core concepts underpinned the research trajectory of the empirical study.

9.2.1 CORE CONCEPT 1: THE PERCEPTION OF PLACE The adaptive perceptual cycle was developed as the cognitive mechanism of the change inducement of criticality. Criticality was described as the outcome of the perceptual misfit between cognition or schemata and real world experience or context. The adaptive perceptual cycle as a driver of placemaking was conceived by this author and was a synthesis of the work by key theorists in complexity and chaos theory, cognitive psychology and place philosophy (Neisser, 1976; Gibson, 1979; Portugali, 1996; Bak, 1997; Malpas, 2013).

9.2.2 CORE CONCEPT 2: SMALL WORLD NETWORK THEORY Small world network theory was proposed as an innovative application in masterplanning because it expresses the shifts of adaptation and resilience (Watts and Strogatz, 1998; Barabasi and Albert, 1999). This research applied small world network theory to self-organising adaptive systems such as cities and in this study specifically, as a planning instrument for large-scale urban redevelopment projects. The examination of small world network theory as it applies to masterplanning of such sites was supported by multidimensional scaling analysis (MDS) that introduced human agency through people’s conception of place, perception of place and their adaption of place. This was an innovative application of MDS analysis in the context of placemaking and had value because of its specific use in the analysis of human cognition and perception.

9.2.3 CORE CONCEPT 3: PLACEMAKING . Although limited to the built form adaptation of the case study area of Brisbane’s South Bank a Network Analysis method was applied and tested as part of the research. The author modified a small world Network Analysis metric algorithm by Sarkar (2013) to enhance the investigation of this research. The modified algorithm sought evidence of small worldliness by using Cluster and Connectivity (referred to as ‘neighbourhoods’ and ‘intersection connectivity’, respectively). The modified algorithm was applied in a preliminary study to test if the algorithm would retain its integrity and elicit evidence of small worldliness in the ‘as built’ case study site.

9.3 RESEARCH RATIONALE

The initial inspiration for this research was Kevin Lynch's thought that placemaking needed a prototype model of 'form-in-process'. Lynch's idea of 'form-in-process' was eventually seen as limiting the research to the morphology of the built urban form. The role of human perception in placemaking and the shifts in the conception, perception and adaptive placemaking through a masterplanning instrument was seen as a more comprehensive and relevant placemaking research question which refined the trajectory of this thesis. Complexity theory of cities (CTC) aligned with the application of small world networks; however, Juval Portugali (2012) pointed to several gaps in the research of CTC. Portugali's criticism was that urban complexity simulation models were mechanistic and lacked research into real cities and the implications of human cognition and perception. He challenged: "The potential that has yet to be realized is to develop a better balance between the qualitative and quantitative messages of complexity theories and their application to the study of cities... A better link between CTC and social theory oriented urban studies will provide a good context to realize the potential of a CTC approach to urban planning and design." (Portugali 2012, pp60-61). Furthermore, Portugali pointed out that in contrast to Alexander's (1965) seminal paper, *A city is not a tree*, CTC was significantly limited: "So far CTC have demonstrated that *a city is a tree*. A tree is a typical example of a complex system and of a fractal structure that can and has been generated by a variety of algorithms...*The fact that a given model can successfully generate a tree and a city doesn't mean that a city is a tree – it is not...*[my emphases]" (Portugali 2012, p58, 59). He went on to challenge CTC theorists: "The potential that has yet to be realized here is thus to further elaborate on the long-term CTC and to create a better balance between the short-term and long-term aspects of cities as complex self-organizing systems" (Portugali 2012, p60). These ideas were the challenge of this research and contributed to the construct of the research framework (Figure 9.1).

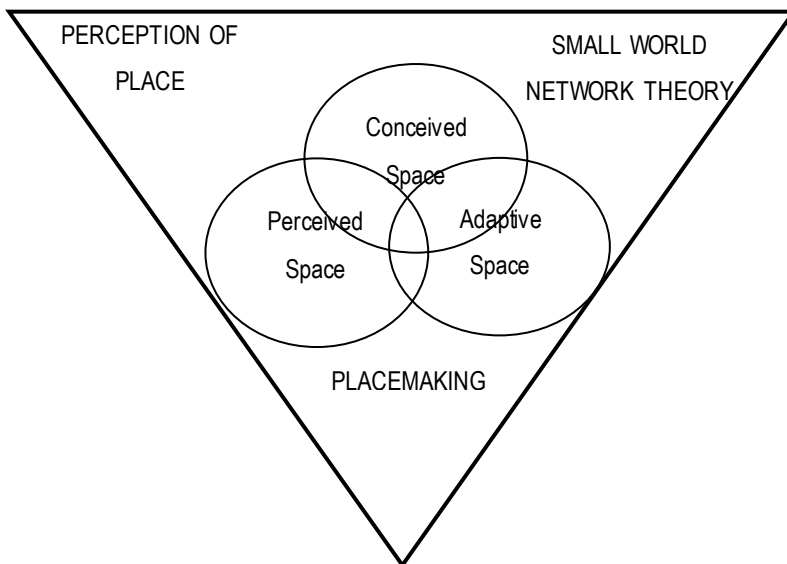


Figure 9.1: Research framework.

The research framework addressed conceived space (placemaking and masterplanning concepts) perceived space (human perception) and adaptive space (the adaptation or resilience of masterplanning). The research framework was an adaptation of Lefebvre's urban triad (conceived space, perceived space and 'as lived' space) that was adapted according to the original concepts applied in this present research and the intent of the research question. An important piece of evidence that this research sought was that of how places adapted to or resisted change from the perspective of human conception and perception. To this end, the integrated research framework used here explored 'conceived space', 'perceived space' and 'adaptive space' in the context of masterplanning adaptable and resilient urban places relevant to people's perception of place.

9.4 SIGNIFICANCE OF THE EMPIRICAL RESEARCH RESULTS

This part of the discussion will put the empirical results into the context the research question and sub-questions. Firstly, the exploration was guided by the tripartite empirical research framework which consisted of an exploratory conceived space study; secondly, a perceived space study of Brisbane's South Bank; and thirdly, an adaptive space study of Brisbane's South Bank. Each of these studies was informed by the idea of the adaptive perceptual cycle, facilitated by small world network theory and illustrated by multidimensional scaling analysis (MDS). The preliminary Network Analysis (NA) study examined the 'as built' neighbourhoods and intersection connectivity of South Bank 1997 and of South Bank 2012. The research addressed Portugali's (2012) challenge to examine complexity theory of cities (CTC) from the perspective of: human cognition and perception; short-term and long-term timeframes; the semi-lattice in the context of small world network theory; and the use of qualitative and quantitative methods as linked with social theory of

urban studies. In this way, the empirical research was focussed towards the integrated factors of the people-place phenomenon.

9.4.1 CONCEIVED SPACE STUDY The exploratory study of conceived space addressed the sub-questions: *How do design professionals and others perceive urban places?* And, *How are urban places masterplanned in a context of change, certainty and uncertainty?* The first sub-question established the schemata of people's idea of what makes a good place the second sub-question examined the context of the implementation of placemaking through a study of conceptual, contextual and pragmatic masterplanning.

The results in answer to the first sub-question, *How do design professionals and others perceive urban places?* showed that despite the differences between the sub-groups of participants the combined All groups concept map (the conceived space) showed a compelling result of three groupings of nodes which were categorised as Cluster and Connectivity; Locale; and Stewardship. In the context of the research question, *How can places be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place?* The connection of Cluster and Connectivity was an important result because it revealed the participants' schema of what makes a good place. This result emerged from the concept map MDS analysis without the presentation of an a priori category. More importantly, this schema aligned with the change dynamic of small world network theory discussed in Chapter Three. Interpreted in the context of the research question the Cluster and Connectivity result confirmed the research direction towards a small world network masterplanning framework. This link between people's perception of place and small world network theory as revealed in the exploratory conceived space result was a key finding of research towards complexity theory of cities (CTC) that embodied Portugali's quest for human cognition and relevance within CTC and people's perception of place.

The second part of the conceived space study examined masterplanning priorities from a conceptual, contextual and pragmatic point-of-view and addressed the second sub-question *How are urban places masterplanned in a context of change, certainty and uncertainty?* The result of the conceptual masterplanning priorities task confirmed the conceptual importance of Connectivity which was elicited in the previous concept mapping task within the schema of Cluster and Connectivity.

The contextual masterplanning priorities task introduced a context of time (a short-term timeframe and a long-term timeframe) and place (a 2km² urban centre in South East Queensland). The results revealed the importance of short-term certainty in masterplanning and by implication, long-term uncertainty. This result flagged a potential tension between masterplanning for short-term certainty and for long-term uncertainty. In the context of this research it spotlighted a significant gap in masterplanning theory and practice as alluded to by Portugali (2012).

The pragmatic masterplanning priorities task confirmed this tension between certainty and uncertainty. As discussed in Chapter One in which three large-scale Australian urban redevelopment projects in crisis were described, masterplanning can take various approaches from the certainty of highly detailed and deterministic masterplans to the uncertainty of broad-brush and flexible masterplans. However, at the core of the problem with each of these large-scale urban redevelopment projects was the tension between short-term certainty and long-term uncertainty.

The significance of the tasks for testing the participants' responses to the masterplanning concept, masterplanning context and pragmatic masterplanning had two significant outcomes for this empirical study: firstly, as a masterplanning concept the schema of Connectivity in particular was confirmed; and secondly, masterplanning contextually and pragmatically confirmed the gap in the knowledge of masterplanning for large-scale urban redevelopment sites of short-term certainty or resilience as well as long-term adaptability. These results sharpened the placemaking challenge, *to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place.*

The conceived space exploratory study supported the theoretical trajectory for the remainder of the empirical research. The conceived space results were important to confirm that the theoretical direction of the core concepts of the adaptive perceptual cycle, small world network theory and the preliminary Network Analysis (NA) could contribute to the resolution of the research question: *How can places be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place?*

The perceived space study and the adaptive space study built upon the results of the exploratory conceived space study and were applied to the large-scale urban redevelopment site of Brisbane's South Bank 1991 to 2012. This site was selected as a case study because it had been subjected to

contrasting masterplanning strategies over approximately twenty years, it had endured several and varied urban crises and it was a relatively complete redevelopment site.

The schemata of South Bank presented to the participants were visual cues as well as verbal descriptions drawn from network theory: WS small world; BA scale free; Order and Random networks. These network schemata framed the participants' responses to the South Bank concept masterplans and the South Bank context the intent being to elicit the shifts of adaptation and resilience via the results of the perceived space and adaptive space MDS plots. This was an application of small world network theory not only to test the implications of network theory for masterplanning, but also the application of MDS analysis for 'mapping' the idea of 'place' as the interface between concept (schema) and real world experience (context). As such, the empirical research straddles theoretical ideas from cognitive psychology, place philosophy, small world network theory and complexity theory in an innovative application of small world networks to the masterplanning of large-scale urban redevelopment sites.

9.4.2 PERCEIVED SPACE STUDY One of the most significant results of the perceived space MDS plot was that it highlighted the difference between the conceptual South Bank masterplan 2007 as conceived by design professionals and the visitors' contextual experience of South Bank 2012. The core concept of the adaptive perceptual cycle discussed in Chapter Two indicated that this difference simulated the interface between the schema (or the conceptual South Bank 2007 masterplan) and the real world context (the visitors' South Bank 2012 experience). Furthermore, from a place philosophy perspective this interface of the perception of place accorded with the interdependency between schema and context that was a core idea of place philosophy and cognitive psychology, in particular the theories of Neisser (1976) and Malpas (1996, 2013, 2014). As such, the significance of the perceived space MDS plot was that it represented a 'map' of the idea of 'place'.

The perceived space MDS plot results showed firstly, the resilience of the WS small world network schema and secondly, the Random experience of the visitors to South Bank 2012 – an outcome supported by the visitors' verbal survey result. This meant that despite the attempt to introduce some Order through the revised South Bank concept masterplan 2007 the visitors' in 2012 either failed to experience this conceptual Order and had a Random experience or chose to ignore this conceptual Order and had an exploratory experience.

Interpreted within the adaptive perceptual cycle, the participants' failure to experience Order when the design professionals had conceived Order in the masterplan indicated that there was a 'bad-fit' between the design professionals' conceptual schema of South Bank 2007 and the visitors' contextual experience of South Bank 2012. If this was so, then this suggested that the visitors were subjected to a random experience, which might have been mysterious or confusing. This urban quality was one of the dimensions in the semantic differential task (Question 2) in the questionnaire survey: participants were asked to rank the urban quality dimension of 'Clear Way-finding' and its opposite, 'Mysterious Exploration'. The box plot result of this dimension showed that the mostly design professional participants considered 'Clear Way-finding' to be an urban design quality of good places. This conceptual intent was reflected in the revised South Bank 2007 masterplan and yet the visitors to South Bank had a Random experience either by choice or not.

If the visitors chose to have a Random experience (or Mysterious Exploration) as opposed to the Order (or Clear Way-finding) that was conceived by the design professionals this highlighted a misalignment between the Order that was designed into the South Bank masterplan 2007 and the visitors experience of South Bank 2012. If the visitors chose to explore South Bank 2012 randomly as part of their touristic experience despite the Order that was injected into the South Bank masterplan 2007 this also highlighted the significance of the resilience of the WS small world network result. The result implied that the WS small world network *enabled* those exploratory choices. This explanation was further supported and clarified in the following adaptive space results and in the Network Analysis results specifically.

9.4.3 ADAPTIVE SPACE STUDY The adaptive space results illustrated the conceptual adaptation of the masterplans from the South Bank 1991 masterplan towards that of the South Bank 2007 masterplan. Firstly, the adaptive space MDS plot showed the resilience of the WS small world network characteristics of the South Bank 1991 masterplan. This was an important outcome because it highlighted the long term resilience of a WS small world network as a masterplanning framework for large scale urban redevelopment sites. Secondly, the Order/Random network characteristics exposed the nuances between the 1991 masterplan and the 2007 masterplan the results of which revealed a shift from Random in the South Bank concept masterplan 1991 towards Order in the South Bank concept masterplan 2007.

Nevertheless, as was pointed out in the results of the perceived space MDS plot previously, the visitors' contextual experience of South Bank 2012 did not align with the 2007 masterplanned

Order; rather, their 2012 experience remained Random. Despite the nuances of the Order/Random network results that shifted towards Order in the adaptive space, but was experienced as Random in the perceived space, both adaptive and perceived space MDS plots illustrated the resilience of the WS small world network as a masterplanning schema and as experienced in the real world. As such, the results so far supported the potential of a WS small world network as a masterplanning framework both conceptually and contextually.

9.4.4 NETWORK ANALYSIS STUDY AND INTERVIEWS The Network Analysis (NA) enabled the measurement of the morphology of South Bank 1997 and South Bank 2012. The NA metrics were supported and enhanced by the qualitative interviews with the leadership of the design and development of South Bank through the exposé of the crises that triggered change. This study tested a NA algorithm applied to elicit the small worldliness of urban places (Sarkar, 2013). This present author modified the original algorithm and its integrity was tested in this study of the ‘as built’ morphology of South Bank 1997 and 2012. Although this was a study only of the urban forms of the Cluster and Connectivity of South Bank the interpretation of the NA metric results were informed and supported by the qualitative interviews of the leadership of South Bank as well as the results of the conceived space, perceived space and adaptive space plots. The NA provided results that proved compelling particularly in the context of the interview data, the perceived space results and the adaptive space results.

The evidence of the quantitative NA results and the qualitative interviews showed the compelling result that South Bank in both timeframes of 1997 (the ‘as built’ version of the South Bank masterplan 1991) and in 2012 (the ‘as built’ version of the South Bank masterplan Stage One 1997; Stage Two 2001; and Stage Three 2007) were grid/mesh-like networks typical of a WS small world network typology. Importantly, the ‘as built’ South Bank 2007 NA result indicated greater opportunities for permeability and visitor exploration. Specifically, the cyclomatic number, which was a measure of the number of cycles in the network, indicated that South Bank 2012 had many more cycles than South Bank 1997. This meant that South Bank 2012 had unrestricted cyclical characteristics of a connected grid/mesh-like network (or WS small world network) that offered visitors choices for way finding and exploration.

The importance of Connectivity was raised by an interviewee when questioned about the critical flaws of the emerging ‘as built’ South Bank 1997 development: “The planning thinking of the day was that you separate cars and pedestrians ...It was basically ensuring that the podium on which the

buildings were built was largely public access and gardens and circulation beneath the podium at grade...there was a realisation they should stop and rethink” (Snow, 2012). This rethinking resulted in the ‘as built’ South Bank 2012 redevelopment in which circulation was vastly enhanced to create the grid/mesh-like network characteristic of a WS small world.

9.5 SYNTHESIS OF THE RESEARCH RESULTS

The exploratory conceived space results confirmed the theoretical direction for the empirical case study towards a specific investigation of a small world network paradigm for resilient and adaptive masterplanning. Small worldliness was investigated through the perceived space study, the adaptive space study and the Network Analysis of Brisbane’s South Bank in a longitudinal study that spanned from 1991 to 2012. All results collectively supported the proposition that for this large-scale urban redevelopment scenario, WS small worldliness demonstrated resilience as a masterplanning framework influenced by the adaptive shifts of the balance between Order/Random characteristics inherent in small world networks.

Overall, there was consistent support for a WS small world network in all the empirical studies. The perceived space result exposed the difference between the schemata of those who conceive places and those who experience places. The perceived space outcome showed that there was a consistent alignment with the WS small world network result, but the nuances for Order/Random networks shifted towards Random. The adaptive space result showed the resilience of WS small worldliness, but there was an adaptive shift towards Order. Finally, the Network Analysis confirmed the evidence of WS small worldliness in the ‘as built’ South Bank 2012 site.

The key points of the research were firstly, that the grid/mesh-like network of the WS small world network was resilient over time. Secondly, despite the desire of design professionals to create order through masterplanning the distributed qualities of a WS small world still offered people the opportunity for a more exploratory experience of this place. Finally, the empirical study demonstrated that for large-scale urban redevelopment sites that are often envisioned at a particular point in time, but are often developed over time and need to respond to crises and change, a WS small world has a capacity for resilience and adaptation as a masterplanning framework.

9.6 IMPLICATIONS OF THE RESEARCH RESULTS

The findings of the research pertain particularly to an analysis of Brisbane’s South Bank and any extrapolation as to the implications to other somewhat similar large scale urban redevelopment sites

should be considered carefully. The practice of urban design and planning of urban places has many unpredictable and complex aspects that influence outcomes and as Nigel Taylor wisely pointed out, “The truth is that there are different types or kinds of theories, answering different kinds of questions, and not only one type of theory is relevant ...” (Taylor, 1998, p16). Nevertheless, within the natural limitations of this research there were elements useful for urban design practice.

The findings of the research illustrated the adaptation and resilience of the distributed characteristics of WS small world networks from the tripartite perspective of conceived space, perceived space and adaptive space over the period the case study timeframe of approximately twenty years. Although in urban design and planning practice these three aspects are most likely intuitively addressed, the masterplanner’s deliberate focus on each aspect offers a framework to consider the interaction between this ‘trialectic’ during the masterplanning process at the outset, rather than as post-occupancy analysis or as a reaction to crises. As such, the research framework that was based on Lefebvre’s (1991) urban triad offers points-of-view for design professionals in urban design and planning practice that is beyond the delineation of built forms and urban network infrastructure.

The three core concepts introduced in this discussion underpinned the tripartite research framework: core concept one discussed the perception of place; core concept two introduced small world network theory as a dynamic masterplanning paradigm; and core concept three considered a placemaking analysis method that was a development of Sarkar’s (2013) network analysis approach.

Firstly, the implication for urban design and planning practice of the results of the investigation into the perception of place was based on concepts of urban design qualities. The findings showed a hub of interrelated concepts called Cluster and Connectivity with links to concepts categorised as Locale and concepts that described Stewardship. The implication of this finding to urban design and planning practice was that it revealed a mental construct, knowledge structure or schema of the perception of place. This schema offered a conception upon which to structure urban placemaking. Secondly, the implications of small world networks as a dynamic method for adaptive and resilient masterplanning offered a potential paradigm upon which to base an urban design and planning approach. If adaptation and resilience were seen as beneficial to the masterplanning process, it was proposed that the construct that underpins such endeavours should be an inherently dynamic paradigm as illustrated by the findings of the adaptive space analysis. Thirdly, part of the analysis

of placemaking introduced a network analysis of South Bank from 1997 to 2012. The network analysis confirmed the relevance of small world network theory and in particular illustrated the adaptive and resilient network characteristics of distributed WS small worldliness. As such, the network analysis of core concept three appeared to support the tripartite research framework results of the conceived space, perceived space and adaptive space investigation. Importantly, the metric network analysis was elaborated by qualitative interviews by the leaders of the design and development of South Bank that added significant social background, human rationale and political and economic reality to the metric results. The outcome described how the network analysis was supported by the narrative of South Bank's design and development and the qualitative interviews aided the interpretation of the network analysis results. This means that these findings combined the focus of metric detail with the contextual 'big picture' of the interview data - a dual approach that design professionals need in practice if placemaking is to be for people.

9.7 FUTURE RESEARCH

The present research unearthed three original core concepts that have potential for future research. Core concept 1, the adaptive perceptual cycle has potential in understanding how people perceive places and how changing those places can impact upon their place identity and place attachment. In the present research a longitudinal study was limited by the requirement of the completion of this particular research study. Testing people's perception of their place over a longer timeframe of place change would enable a direct comparison between how people's perception of a particular place changes as the place itself changes over time and whether that change is perceived as better or worse; people's place identity or place attachment is, or is not altered; or whether in time, people become accustomed or not, to urban changes of their place.

Research into people's perception of place is important in placemaking because how a place is changed has significant impacts not only upon the directly affected communities, but also upon the activities of design professionals as well as the other disciplines concerned with the physical, psychological, social, economic and cultural synthesis of the people-place phenomenon. Although there has been significant research into topics of urban form and into topics of human perception and cognition of place, the melding of these topic areas remains a gap in the knowledge of urban design and planning that this initial research attempted to wrestle.

Core concept 2, small world network theory has potential for a much wider application in both spatial and relational networks. Spatial networks are those that are related to physical or geographic

networks; for example, the infrastructure of cities such as water, electricity and telecommunications, transportation and so on. Relational networks are those that pertain to more abstract ways of connecting to form personal and social groups; knowledge or experience based groups that historically, was central to the investigation of urban sociology.

The bigger challenge is the interrelationship between spatial networks and relational networks that often interconnect urban infrastructure with community and society. This is a less explored area and yet, it is the complex interrelationship of spatial and relational networks that make our urban and regional places. Although the Barabasi-Albert (BA) scale free network has been investigated in relation to urban morphology these studies (via simulation models) have been limited mostly to spatial networks. This present research attempted to combine spatial networks and relational networks through the investigation into people's placemaking conception, perception and adaption over time, framed within the ideas of the adaptive perceptual cycle and small world network theory.

Core concept 3, a placemaking analysis utilising the preliminary Network Analysis (NA) was a metric approach to elicit small worldliness of places. This preliminary study modified the original algorithm (Sarkar, 2013) to fit with the intent of the present research. The modified algorithm appeared to retain its integrity because the NA results aligned with the results of the MDS analyses. Further testing however, is needed to confirm the reliability of the algorithm. If the reliability of the algorithm is confirmed, such a network analysis technique can be of great use to design professionals as it enables the identification of spatial small world networks and can track the growth and shifts in those networks over time.

9.8 CONCLUSION

This chapter summed up the contribution to knowledge; rationale of the research framework; challenge to researchers; the results of the empirical research; presented an overall synthesis of the results; and, offered some future directions for research. The research applied some original concepts that were developed by this present author from concepts derived from cognitive psychology, small world network theory and complexity theory as well as a preliminary study of a Network Analysis. The synthesis of these concepts underpinned the empirical research which addressed the research question, *How can places be masterplanned to be adaptable and resilient in the face of critical change and also be relevant to people's perception of place?* Based on the results of the empirical research, it was proposed that a WS small world network offered a masterplanning framework of adaptive and resilient qualities for large-scale urban redevelopment

sites that ensured urban coherence and consistency as well as enhanced potentiality and serendipity in planning urban places.

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APPENDIX 1
CONCEIVED SPACE STUDY
QUESTIONNAIRE SURVEY

Urban Design Survey

Mary Ganis
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Fax (07) 3365 6899
University of Queensland
School of Geography, Planning and Architecture

The research question is,

How can a masterplanning process and product demonstrate adaptability in a dynamic urban growth context?

CODENO.....

Thank you for taking the time to consider this survey.

South East Queensland is experiencing a period of rapid growth, which will impact on the urban design qualities of its small and large town centres.

During this period, Councils in South East Queensland will need to prepare masterplans for urban centres.

This survey is the first stage of an on-going research project, which will explore urban design qualities and the masterplanning process in the context of South East Queensland.

With your help, I am hopeful that this survey will provide me with rich data about how towns develop and change and how you envisage your role in this process.

All data provided will be amalgamated so as to ensure anonymity and is in accordance with the University of Queensland, Code of Ethics.

Kind regards,
Mary

Throughout the survey, please assume your usual role as a design/development/community professional.

Please keep in mind that the subject area for this survey is South-East Queensland.

Question 1

I am asking this question because I need to record the professional role of each participant.

INSTRUCTION FOR THE TASK:

Please mark with an X, which ONE of these industry roles you usually perform.

I am a...

INDUSTRY ROLE	MARK
Councillor	
Civil Engineer	
Landscape Architect/Urban Designer	
Architect/Urban Designer	
Planner/Urban Designer	
Development Industry	
Other (please name)	

Question 2

I am asking this question because I want to know what you consider to be good 'Urban Design Qualities' in the **existing** urban centres of South East Queensland.

The predicted growth in South East Queensland over the next 20 – 25 years will trigger changes for existing urban centres. These changes will have an impact upon the urban design qualities of urban centres.

INSTRUCTION FOR THE TASK: *Please mark with an X, the ranking number that best fits your idea of good urban design qualities for South East Queensland. Please explain your answer in the box below the quality.*

<i>Good Places in South East Queensland demonstrate...</i>								
QUALITY	R	A	N	K	I	N	G	QUALITY
Compact, Distinct Centres	1	2	3	4	5	6	7	Dispersed Sub-centres
Comment:								
'Local' Character Building Style	1	2	3	4	5	6	7	Unusual, Landmark Architecture
Comment:								
Clear Way-finding	1	2	3	4	5	6	7	Mysterious Exploration
Comment:								
Technical Efficiency	1	2	3	4	5	6	7	Sensory Experience
Comment:								

<i>Good Places in South East Queensland demonstrate...</i>								
QUALITY	R	A	N	K	I	N	G	QUALITY
Small-scale Local Infrastructure	1	2	3	4	5	6	7	Large-scale RegionInfrastructure
Comment:								
Adventurous Places	1	2	3	4	5	6	7	Safe Places
Comment:								
Urban-Rural Fusion	1	2	3	4	5	6	7	Ecological Conservation
Comment:								
Evolving Places	1	2	3	4	5	6	7	Completed Places
Comment:								
Movement Network Connectivity	1	2	3	4	5	6	7	Movement Network Separation
Comment:								

Question 3

I am asking this question because I would like to know how you **prioritise** the various stages of the masterplanning process.

There are many parts to the masterplanning process and relevant criteria need to be addressed.

For the purposes of this study, I have assumed the following four-stage masterplanning process, as outlined in the *Urban Design Compendium*, English Partnerships, 2000.

INSTRUCTION FOR THE TASK:

Please rank each of these masterplanning criteria using the following scores.

5 = extremely important	4 = very important	3 = fairly important	2 = not so important	1 = unimportant
MASTERPLANNING CRITERIA				SCORE
TECHNICAL PREPARATION				
Technical Reports; e.g. traffic, economic, housing, environment etc.				
Community Consultation				
DESIGN PREPARATION				
Site and Context Analysis				
Urban Design Principles				
Vision and Creative Ideas				
DESIGNING				
Uses and Activities				
Traffic and Pedestrian Network				
Streetscape Design and Landscaping				
Building Form, Height and Mass				
Architectural Character				
MONITORING				
Urban Design Quality Appraisal				
Design Review and Masterplan Updating				

Question 4

I am asking this question because I want to see if the timeframe of a development project influences the masterplanning process for **new** urban centres.

Imagine you are a participant in the masterplanning of a new urban centre in South East Queensland (say, a town centre of approximately 2Km²)

However, the masterplan needs to show the outcome in the short term *and* in the long term.

ST = short term timeframe (5 to 10 years)

LT = long term timeframe (20 to 25 years)

INSTRUCTION FOR THE TASK:

Give a score out of 10 (1-10) indicating your level of agreement with the statement-

Within the timeframe, this stage of the masterplanning process should demonstrate...(complete the rest of the statement from the ITEM column).

Please explain your answer in the box below each item.

EXAMPLE ONLY

STAGE	TECHNICAL PREPARATION		DESIGN PREPARATION		DESIGNING		MONITORING	
	ST	LT	ST	LT	ST	LT	ST	LT
ITEM								
'Leading practice'	8	6	9	8	9	7	6	9
Comment								

ST = short term timeframe (5 to 10 years)
LT = long term timeframe (20 to 25 years)

Now, please complete all the cells, by giving a score out of 10 indicating your *level of agreement* with the following statements.

Within the timeframe, this stage of the masterplanning process should demonstrate...

STAGE	TECHNICAL PREPARATION		DESIGN PREPARATION		DESIGNING		MONITORING	
	ST	LT	ST	LT	ST	LT	ST	LT
ITEM								
Relevance to the community.								
Comment								
Certainty for the development industry.								
Comment								
Delivery of the outcome, 'on time' and 'within budget'.								
Comment								
Flexibility and adaptability.								
Comment								

ST = short term timeframe (5 to 10 years)

LT = long term timeframe (20 to 25 years)

<i>Within the timeframe, this stage of the masterplanning process should demonstrate...</i>								
STAGE	TECHNICAL PREPARATION		DESIGN PREPARATION		DESIGNING		MONITORING	
	ST	LT	ST	LT	ST	LT	ST	LT
ITEM	ST	LT	ST	LT	ST	LT	ST	LT
Certainty for the community.								
Comment								
A detailed urban design /architectural vision.								
Comment								
Fulfilment of technical /growth predictions.								
Comment								
Environmental and social justice.								
Comment								

Question 5

I am asking this question because I want to elicit your opinion about the importance of adaptability and certainty in the masterplanning process.

In your role as a design/development/community professional, you will participate in the preparation of many masterplans for urban centres in South East Queensland.

INSTRUCTION FOR THE TASK:

Do you *AGREE*, or *DISAGREE* with the following statements?

Please mark an X in the box under your selected answer.

Each question begins with,

“When preparing a masterplan for an urban centre in South-East Queensland...”

When preparing a masterplan for an urban centre in South East Queensland...

**(a)...the physical outcome of the built environment must be clearly described.
(e.g. building mass and height, open spaces, architectural details and character.)**

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

Do you have any other comments to add?

**(b)...it must provide for the urban growth predictions of the technical analyses
(e.g. economic, transport, population, environmental, housing etc.)**

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

Do you have any other comments to add?

When preparing a masterplan for an urban centre in South East Queensland...

(c)... an adaptable masterplan will lead to a more relevant built environment for the community.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

Do you have any other comments to add?

(d)... a detailed masterplan helps create urban design and architectural character.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

Do you have any other comments to add?

When preparing a masterplan for an urban centre in South East Queensland...

(e)... an adaptable masterplan will be too uncertain for the development industry

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

Do you have any other comments to add?

FINALLY,

May I ask you to respond to the research question in an open comment, so that you may record any thoughts that have not been captured by the previous tasks.

The research question is (in the context of South East Queensland)-

How can a masterplanning process and product demonstrate adaptability in a dynamic urban growth context?

Comment:

Thank you for participating

Mary Ganis

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University of Queensland

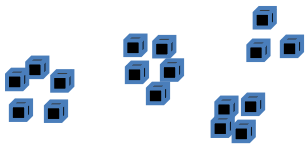
School of Geography, Planning and Architecture

APPENDIX 2
CASE STUDY SOUTH BANK
RESEARCH INSTRUMENTS

CLUSTER AND CONNECTIVITY NETWORK MODELS
VISITOR SURVEY 2012: CLUSTER MODELS
VISITOR SURVEY 2012: CONNECTIVITY MODELS
DESIGN PROFESSIONAL SURVEY SOUTH BANK 1991 CONCEPT
DESIGN PROFESSIONAL SURVEY SOUTH BANK 2007 CONCEPT

CLUSTER AND CONNECTIVITY NETWORK MODELS

CLUSTER MODELS (buildings and activities)



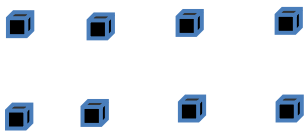
WS small world network

(Watts-Strogatz, 1998)

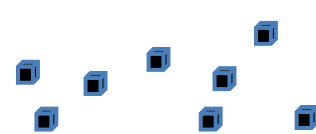


BA small world network

(Barabasi-Albert, 1999)

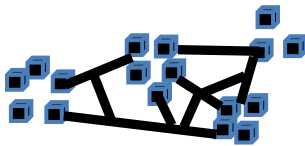


Ordered network



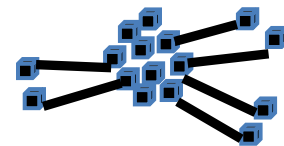
Random network

CONNECTIVITY MODELS (pathways and pedestrian links)



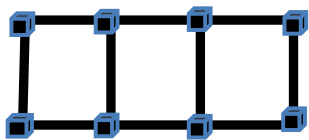
WS small world network

(Watts-Strogatz, 1998)

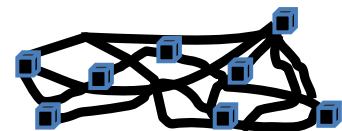


BA small world network

(Barabasi-Albert, 1999)



Ordered network







Random network

VISITOR SURVEY 2012: CLUSTER MODELS

How is the activity area in South Bank clustered? Please rank how similar South Bank is to each Cluster Type scale.

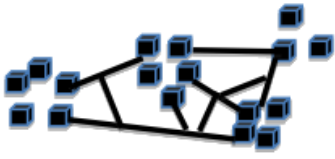

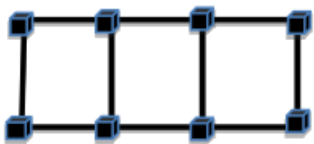
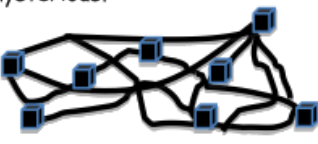
0 = neutral (or don't know) 1 = low similarity 4 = high similarity

CLUSTER TYPE	RANK	CLUSTER TYPE
<p>Clusters of buildings and activities are distributed throughout the site.</p> 	4 3 2 1 0 1 2 3 4	<p>Buildings and activities are clustered in a central area of the site.</p> 
<p>Buildings and activities are evenly distributed throughout the site.</p> 	4 3 2 1 0 1 2 3 4	<p>Buildings and activities are randomly distributed throughout the site.</p> 

<p><i>Please mark ONE answer to the questions with an X.</i></p> <p><i>When you visit South Bank Parklands...</i></p>	
<i>What do you do mostly?</i>	<i>Who do you meet or talk to mostly?</i>
Organised Group Activities (e.g. yoga, gym)	My Girl/Boy Friend
General Eating and Drinking (e.g. cafe, pub)	My immediate and extended family
Learning (e.g. university, TAFE, workshops)	Groups of friends
Theatre/Concerts (e.g. QPAC, Plaza, movies)	Local people who live nearby
I live/work in South Bank	Tourists
Picnics (e.g. parklands, beach)	Work or Business colleagues
Walking/cycling (e.g. riverside, streets, park)	I prefer to be alone
Special Events (e.g. River Festival, Fireworks)	Other (please note)
Other (please note)	DEMOGRAPHICS (please circle) Visitor type [Local] [National] [International] My age is [under 30] [30-40] [40-50] [50-60] [60-70] [over 70] [male] [female]

VISITOR SURVEY 2012: CONNECTIVITY MODELS

How are the activity areas in South Bank connected? Please rank how similar South Bank pathways are to each Pathway Type scale.
 0 = neutral (or don't know) 1 = low similarity 4 = high similarity

PATHWAY TYPE	RANK										PATHWAY TYPE
There are clear pathways and easy 'short-cuts' throughout the site. 	4	3	2	1	0	1	2	3	4	Pathways lead to the central activity area of the site 	
Pathways are ordered and clear. 	4	3	2	1	0	1	2	3	4	Pathways are random and mysterious. 	

Please mark ONE answer to the questions with an X . When you walk through South Bank Parklands...	
<i>How do you find your way mostly?</i>	<i>Who do you walk with mostly?</i>
I always follow the main pathways through South Bank and do not take short-cuts.	My Girl/Boy Friend
I need to look at the signs to find my way in South Bank otherwise I feel lost.	My immediate and extended family
I take short-cuts off the main pathways to get to various places in South Bank easily and quickly.	Groups of friends
I follow a few main pathways through South Bank because they lead to the main activity area	Local people who live nearby
There are short-cuts through the South Bank parklands that lead to many interesting places.	Tourists
All the main pathways seem to lead to the South Bank beach.	Work or Business colleagues
The short-cuts through the South Bank parklands do not lead anywhere in particular.	I prefer to be alone
South Bank pathways are very orderly and predictable.	Other (please note)
Other (please note)	DEMOGRAPHICS (please circle) Visitor Type [Local] [National] [International] My age is [under 30] [30-40] [40-50] [50-60] [60-70] [over 70] [male] [female]







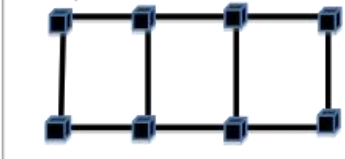
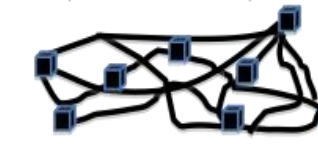
DESIGN PROFESSIONAL SURVEY SOUTH BANK 1991 CONCEPT

Compare this South Bank masterplan with each Plan Type Model. Examine this South Bank masterplan carefully as it may not be what you expect.



Rank how closely the Plan Type Model (below) resembles this South Bank masterplan (above). Place an X in the column of your selected rank number.
 0 = Neutral (or don't know) 1 = weak resemblance 4 = strong resemblance.
 Please select ONE rank number for each Plan Type scale

Either this model OR this model

PLAN TYPE	RANK										PLAN TYPE
Clusters of buildings and activities are distributed throughout the site. 	4	3	2	1	0	1	2	3	4	Buildings and activities are clustered in a central area of the site. 	
Buildings and activities are evenly distributed throughout the site. 	4	3	2	1	0	1	2	3	4	Buildings and activities are randomly distributed throughout the site. 	
There are clear pathways and easy 'short-cuts' throughout the site. 	4	3	2	1	0	1	2	3	4	Pathways lead to a central area that dominates the site. 	
Pathways are ordered and clear. 	4	3	2	1	0	1	2	3	4	Pathways are random and mysterious. 	







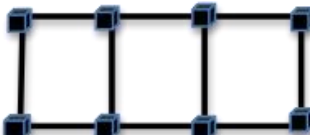
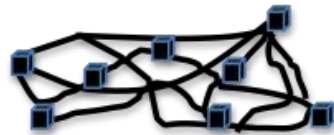
DESIGN PROFESSIONAL SURVEY SOUTH BANK 2007 CONCEPT

Compare this South Bank masterplan with each Plan Type Model. Examine this South Bank masterplan carefully as it may not be what you expect



Rank how closely the Plan Type Model (below) resembles this South Bank masterplan (above). Place an X in the column of your selected rank number. 0 = Neutral (or don't know) 1 = weak resemblance 4 = strong resemblance. Please select ONE rank number for each Plan Type scale

Either this side OR this side (not both sides please)

PLAN TYPE	RANK										PLAN TYPE
Clusters of buildings and activities are distributed throughout the site.	4	3	2	1	0	1	2	3	4	Buildings and activities are clustered in a central area of the site.	
											
Buildings and activities are evenly distributed throughout the site.	4	3	2	1	0	1	2	3	4	Buildings and activities are randomly distributed throughout the site.	
											
There are clear pathways and easy 'short-cuts' throughout the site.	4	3	2	1	0	1	2	3	4	Pathways lead to a central area that dominates the site	
											
Pathways are ordered and clear.	4	3	2	1	0	1	2	3	4	Pathways are random and mysterious.	
											

APPENDIX 3

TELEPHONE INTERVIEW

SEMI-STRUCTURED QUESTIONS

Acknowledgements

These leaders of the South Bank masterplanning process generously contributed their time for interviews:

Bill Corker, Principal Architect, Denton Corker Marshall (DCM) Melbourne

Guy Gibson, General Manager Queensland, Communities Development, Lend Lease

Malcolm Middleton, Master Architect, Design Review Panel, South Bank Corporation

Stephen Pate, Master Landscape Architect, Design Review Panel, South Bank Corporation

Malcolm Snow, CEO South Bank Corporation

Steve Wilson, Chairman of the Board, South Bank Corporation

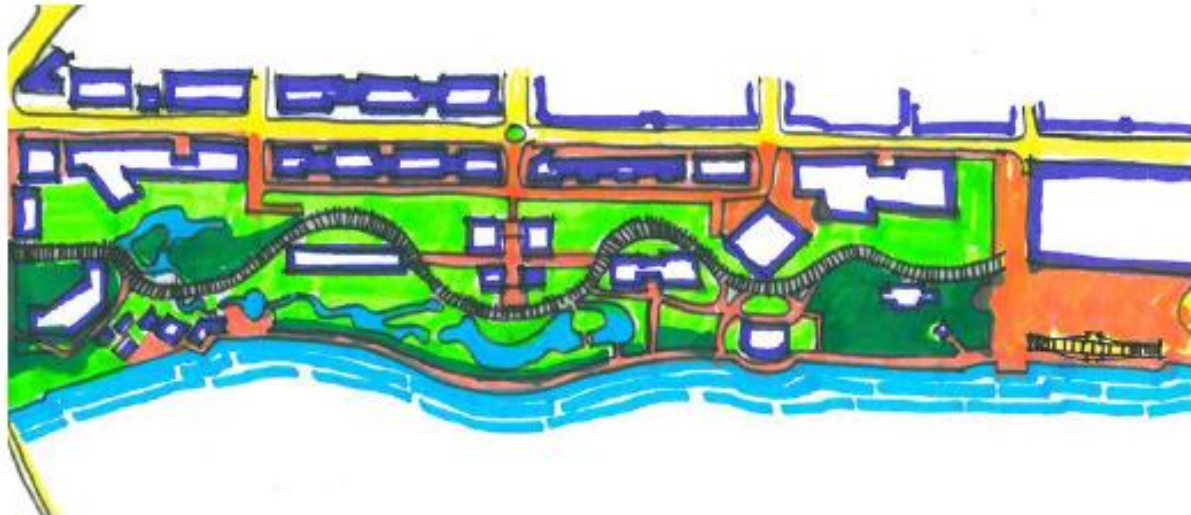
South Bank Past



OPEN COMMENT

1. From your professional point of view what do you think was the aim of this South Bank Concept?
2. What compromises and negotiations were made to the outcome?
3. Who or what were the drivers of the compromises and negotiations of the outcome?
4. What crises (political, social, environmental, economic or other) were faced and what was the response to those crises?

South Bank Present



OPEN COMMENT

1. From your professional point of view what do you think was the aim of this South Bank Concept?
2. What compromises and negotiations were made to the outcome?
3. Who or what were the drivers of the compromises and negotiations of the outcome?
4. What crises (political, social, environmental, economic or other) were faced and what was the response to those crises?

If you have any questions please do not hesitate to contact me.

Thank you for your help,

Kind regards,

Mary Ganis

University of Queensland, School of Geography, Planning and Environmental Management. St Lucia