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Digital Media Façades for Lively Public Spaces: Promoting Dialogue, Participation and Social Innovation in Urban Environments.

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Digital Media Façades for Lively Public Spaces: Promoting Dialogue, Participation and Social Innovation in Urban Environments.

ABSTRACT: Digital façades represent a new medium making its way into urban environments. This medium can affect public life in ways that have yet to be fully understood. Most of these media façades broadcast adverts, but an increasing number of large-scale projects are now also used to screen a broad variety of non-commercial content. On many occasions, these alternative screenings include interactive applications and user-generated contributions (McQuire 2011). The emergence of such “community screens” and “urban social media” may be seen as a promising sign for contemporary city life, as they can address a wide audience and as they tend to be more accessible and less obtrusive than their commercial counterparts. They offer many possibilities for interaction and additional uses of public space, potentially fostering participation, dialog, social innovation, and community building. In this way, they can also enhance the well-being of all communities involved (Osberg, 2003), making urban space more lively, ludic, and experimental and cities more liveable. In this paper, the author explores the relationship among digital media facades, their content, urban space, and public life by looking at different projects and four media façade locations in Berlin, Madrid, São Paulo, and Melbourne. It is argued that non-commercially used digital media façades can have a positive impact on urban space and public life, but that they do not work well in all types of locations. Certain conditions also have to be met to tap into their full potential and to avoid negative side effects such as light pollution.

Keywords: Digital media façades; urban public space; interactive and collaborative public media; digital media supported interaction; community building; placemaking; media architecture.

Introduction

In many parts of the world, public space has undergone a number of substantial changes in recent decades, and there has been a major shift in how it is used. Even in the 1960s, public space in most of the industrialized countries was still predominantly characterized by uses that accounted for necessary activities such as trade and transport. Today, the majority of these activities is optional and recreational. They include, for example, practices such as strolling, doing sports, sunbathing, or just watching people. An increased number of people

are nowadays present in public space not because they have to, but because they choose to. Many of them have more leisure time than members of earlier generations, and most of them have more freedom to use it as they see fit (Gehl 2012, Lewitzky 2005). Due to these developments, the quality of public space becomes even more important than before, as the number and the extent of optional activities are very likely to depend on what streets or squares have to offer. Appealing public spaces tend to attract more and more extensive optional activities, and even make necessary activities last longer. For this reason, this kind of public sites are of great social importance because diverse interactions can occur and different groups of people can interact freely regardless of their class and ethnicity (Gehl 2012).

Because there is an increased number of people who can spend their time in public space, who can linger and observe, and who do not necessarily have to hurry to get to work or focus on their businesses, urban media landscapes have changed considerably in recent decades. Flâneurs or other people who have the means to linger in public space represent an attractive target for the advertising industry, which has intensified its efforts to reach this potential audience by installing an increasing number of digital billboards and other large-scale commercial out of home media in different locations in public space (Zielinska–Dabkowska 2014, Gehl 2012, Lewitzky 2005). This group of people is also likely to engage with new media spaces, which feature non-commercially used large-scale digital urban media such as media façades, which, in turn, can transform public streets and squares into experimental grounds and façades into communication platforms promoting new uses of space, diverse forms of interaction, as well as social innovations (McQuire 2011, Fatah gen. Schieck 2008).

Recent advances in display and LED technologies have made it cheaper and easier to construct and operate digital façades, and these developments have led to an increased presence of this kind of media in urban public space (Zielinska–Dabkowska 2014, McQuire, Martin & Niederer 2009). They are now not only found in high-traffic locations of metropolises such as Times Square in New York, Piccadilly Circus in London, or Shibuya Crossing in Tokyo, but also at less popular sites (Haeusler, Tomitsch, & Tscherteu 2012, Vande Moere & Wouters 2012) in cities such as Linz, Austria, Zaragoza, Spain, or Liverpool, UK. State-of-the-art LEDs allow different kinds of professionals such as architects, engineers, or lighting designers to create ground-breaking structures and new digital façades, which can affect their surroundings not only through their shapes, but also through light, colour or multimedia content. In this context, digital façades can also be understood as important

influences on the interplay of action and structures and thereby as elements that greatly contribute to the constitution of public spaces (Löw 2001).

Most of these urban media are primarily used for commercial purposes and merely display advertising and news. Some of them have, however, recently also been used to screen non-commercial and artistic content. This is a promising sign for urban space, as invasive advertising panels are, at least temporarily, returned to the public and, for example, turned into screens for visual art. One of the most prominent events of this kind regularly takes place at Times Square. Every night just before midnight, more than ten of the electronic commercial billboards at Broadway and 7th Avenue are used to screen “Midnight Moments.” For a few minutes, the media space is opened up for cultural and artistic moving image contributions that attract many people and turn Times Square, as the organizers claim, into one of the world’s most impressive open air art galleries (The Times Square Alliance, Inc.).

In addition to commercial screens that are intermittently used for other purposes, there are also media façades and big screens that exclusively offer varied alternative and even interactive non-commercial content (McQuire 2011). These non-commercial media are sometimes referred to as “community screens” or “urban social media” (Urban Media 2014). Their content can vary considerably: It can include linear art videos, scripts, or even broadcasts of sports events, news, or concerts and other cultural performances. In addition, it may involve different user-generated content and interactive games. With new interfaces and applications, these façades offer diverse possibilities for interaction and additional uses of public space, and as a result, they can be used for urban development and community building. At first sight, large-scale digital media projects appear to be beneficial and flexible tools, which can be easily used to revive public space and to make it more appealing. This process is, however, not as simple as it seems, and this kind of media is unlikely to lead to satisfying results at all locations where they could be installed. Context plays an important role, and the long-term needs of a broad variety of communities have to be considered before this kind of media can be installed (Vande Moere & Wouters 2012). This is particularly true if public money is used to install, for example, sophisticated and very expensive media screens. In this respect, issues such as energy consumption and light pollution also need to be taken into account, and entities that operate media façades have to address these concerns. For example, lighting control systems could be used that can time and regulate the light intensity of media façades or screens over the course of the day and thus reduce the level of light pollution in public space and especially in urban nighttime environments (Zielinska–

Dabkowska 2014). These kinds of systems are also likely to reduce energy consumption and to make media façades more sustainable.

Digital media façades in urban public space: Backgrounds

Media spaces like Las Vegas or Times Square have already been discussed in numerous publications in the second half of the twentieth century (Venturi, Brown & Izenour, 1972), and there has also been substantial research on the functions of screens and television in different places and settings, including public locations before 2000 (McCarthy 2001). The new forms of digital media façades and similar public large-scale digital media have, however, only appeared to a considerable extent around the turn of the millennium, which is why most of the scholarship on this topic has been published in the last fifteen years. The publications by Hank Haeusler and by Martin Tomitsch and Gernot Tscherteu offer useful introductions to the topic of media façades and provide an overview about their history and technologies. They feature an international selection of projects and show that digital media façades have already spread all around the world (Haeusler, Tomitsch & Tscherteu 2012, Haeusler 2009). In the current debate on large-scale public media, digital façades and big screens are frequently seen as enriching elements in urban environments, which have a positive impact on public life, which can add value to city spaces, and which have social and cultural potentials. In this context, they are described as community platforms and as devices that can be used in a very flexible manner: They, for example, enable people to contribute original content, to share different ideas in the public realm, or to promote new interactive formats such as networked events (Fatah gen. Schieck & Fan 2012, McQuire 2011, Fatah gen. Schieck 2008, Struppek 2006).

Because they allow for the dissemination of a broad range of content and offer various possibilities for interaction and additional uses of public space, they tend to foster participation, social dialogue, and community building. They even seem to support the creation of a specific identity of place (McQuire 2011, English Heritage and CABE 2009, Yue 2009, Fatah gen. Schieck, Briones & Mottram 2008, Struppek 2006). As these media may also feature different user-generated content and interactive games, they can involve many different people and lead to more participation and the appropriation of the media and public space. One of these games is “City Fireflies,” which was designed by Víctor Díaz and Sergio Galán for the digital façade at Medialab Prado, Madrid, and can be played by multiple users (Medialab Prado 2013).

Figure 1: Digital Games in Urban Public Space: City Fireflies at the digital facade of Medialab-Prado, Madrid, Spain (Image by Medialab-Prado (CC BY-SA 2.0), 2013)



In this respect, these new types of media could, as indicated above, also be useful tools in urban development. They may not, however, be useful in every urban environment, and their effectiveness is likely to vary considerably depending in the context (Vande Moere & Wouters 2012). Diverse artistic projects have been successfully conducted in cities all over the world, such as the “Media Façades Festivals” (2008 and 2010) or the project “Connecting Cities” (2012-2016), supported by the European Union. These projects have had promising outcomes in terms of user participation and engagement, and in this sense, they have proven the potential of digital media façades in urban public space. Besides these kind of artistic events, there have also been several research projects on large-scale digital media in public space, such as “Large screens and the transnational public sphere,” organized by the University of Melbourne, “Screens in the Wild” of the Bartlett at University College London, and the Mixed Reality Lab at the University of Nottingham. These research projects have produced substantial knowledge about the topic, however, many questions still remain unsolved.

The Research project

The research project “Digital Media Supported Intercultural Interactions as a Means of Networking and Transforming Spatially Separated Communities and Places” aims to generate new knowledge about large-scale digital media in public space and tries to find answers to

some of the questions stated. It focuses on non-commercially used digital façades at central locations of big cities and explores the relationship among this kind of new urban media, their respective content, public space, and different features of public life. The research project analyses four different media façade locations and assesses the impact of these digital façades on public spaces and different features of public life. Furthermore, it investigates how these impacts vary due to spatial setting and different media content.

One of the objectives of this study is to reveal under which conditions and at what kind of locations digital media affect public life. It assesses whether these digital façades can have a positive impact on urban environments and how they create inviting public spaces that promote participation and constructive dialogue. In this context, it is also evaluated how public media façades can facilitate the dialogue between different social and cultural groups and how they can promote social cohesion, social responsibility, and community building. The project also assesses the potential of digital media supported interactions between physically separated urban public spaces.

In this respect, the most important research questions are as follows:

1. How do media façades contribute to the constitution of public space?
2. How do they affect uses of public spaces?
3. How do these impacts vary according to the spatial settings and with different media content?
4. How does the connection of physically separated public spaces through media façades affect the uses of these spaces?

The media façade locations studied

The following four public media façade locations are analyzed and compared: 1. Collegium Hungaricum Berlin, Germany, 2. Medialab Prado, Plaza de las Letras, Madrid, Spain, 3. Centro Cultural Fiesp –SESI-SP, Avenida Paulista, São Paulo, Brazil, and 4. Federation Square – Big Screen, Melbourne, Australia. All of these sites share certain characteristics, as they are all situated at central locations in metropolises and very close to busy public streets (Berlin: “Unter den Linden” (ca. 200m), Madrid: “Paseo del Prado” (ca. 90m), São Paulo: “Avenida Paulista” (ca. 10m), and Melbourne: “Flinders Street” (ca. 80m)). However, they also differ in some respects (e.g. population density, number of seating, etc.) and thus offer different conditions for the operation of public large-scale digital media.

Figure 2, Collegium Hungaricum Berlin, interactive content “Binoculars to... Binoculars from...” by Varvara Guljajeva & Mar Canet, Connecting Cities, September 6, 2013 (still from the author’s video).



The first location is the Collegium Hungaricum Berlin, which is a Hungarian cultural and educational institution in the German capital and which is located near the city’s center in “Berlin Mitte” and close to the boulevard “Unter den Linden,” the museum island, and many other cultural and educational institutions. The population density in this area is very low. At this location, one or more of the building’s windows are now and then used for back projections and street screenings.

Figure 3, Medialab Prado, Plaza de las Letras, Madrid, Spain, interactive content, on February 25, 2014 (still from the author’s video).



The second location is the Medialab Prado with its middle-size LED façade (height: 9,4 meters, width: 14.5). It is situated in the densely populated “Barrio de las Letras” in the central district of Madrid besides the “Plaza de las Letras”, a small neighborhood square and near to the boulevard “Paseo del Prado”. It is located in what has been referred to as Madrid’s “Golden Triangle of Art” with many cultural facilities nearby.

The third location that is being analyzed is the Centro Cultural FIESP with its huge LED façade at Avenida Paulista. It is also a central site, but differs because of it is located directly on one of the most important avenues in São Paulo.

The fourth location is the Federation Square and in particular its big screen at Main Square. It is situated in the Central Business District of Melbourne and next to Flinders Street station. The big square and its surroundings are a busy urban public space. There are a lot of cultural and educational institutions close to this location.

Approach and Methods

In terms of methods used, the research project involves location studies at each of the four media façade locations. These locations are analyzed in terms of selected criteria such as accessibility, spatial arrangement, or frequency of screenings. The results of these studies are expected to suggest the characteristic features of each of these sites. They will then be used for comparison, which again may reveal in what way and to what extent the locations differ from each other.

In addition to this studies, videos of the sites are analyzed. This data includes information on the four locations in four different situations while the digital media façade is turned off (a), broadcasting linear non-commercial moving image content (b), offering interactive non-commercial moving image content (c), or connected with another screen or media façade located in a different, physically separated public space (visual or audio-visual connection) (d).

Figure 4, Collegium Hungaricum Berlin, Germany, while the media façade is turned off (situation a.), August 23, 2013, ca. 21:00, (still from the author's video).



Figure 5, Collegium Hungaricum Berlin, Germany, while the media façade is broadcasting linear non-commercial moving image content (Situation b.), during the screening “Summer Selection” on the August 23, 2013, ca. 22:15, (still from the author's video).



During this video analysis, the data is being evaluated through both a quantitative and an interpretative video analysis (Knoblauch 2012). In these analyses it is looked at features such as flows of people, duration of stay, or uses and appropriations of space. The analysis of these criteria will show the type of public life taking place in the location in the four situations described above, as well as reactions to the content screened at each of these four sites.

Current status of research and conclusion

Up to the present various data has been collected and partially evaluated. This data was mainly gathered during public screening events in the European summer and autumn of 2013 and 2014, and also when the façades were turned off. To collect data, two video cameras were used to shoot from opposite directions (See Figure 6). In the coming months, additional videos of the locations at Centro Cultural Fiesp, São Paulo, and at Federation Square, Melbourne, will be filmed and evaluated. The video analysis is expected to be complete by November 2015. The doctoral thesis will be submitted at the end of March 2016.

Figure 6, Collegium Hungaricum Berlin, non-interactive content, Screenings Summer Selection, August 23, 2013, Perspective 1: looking to the screen (left). Perspective 2: looking to the audience (right) (stills from the author's videos).



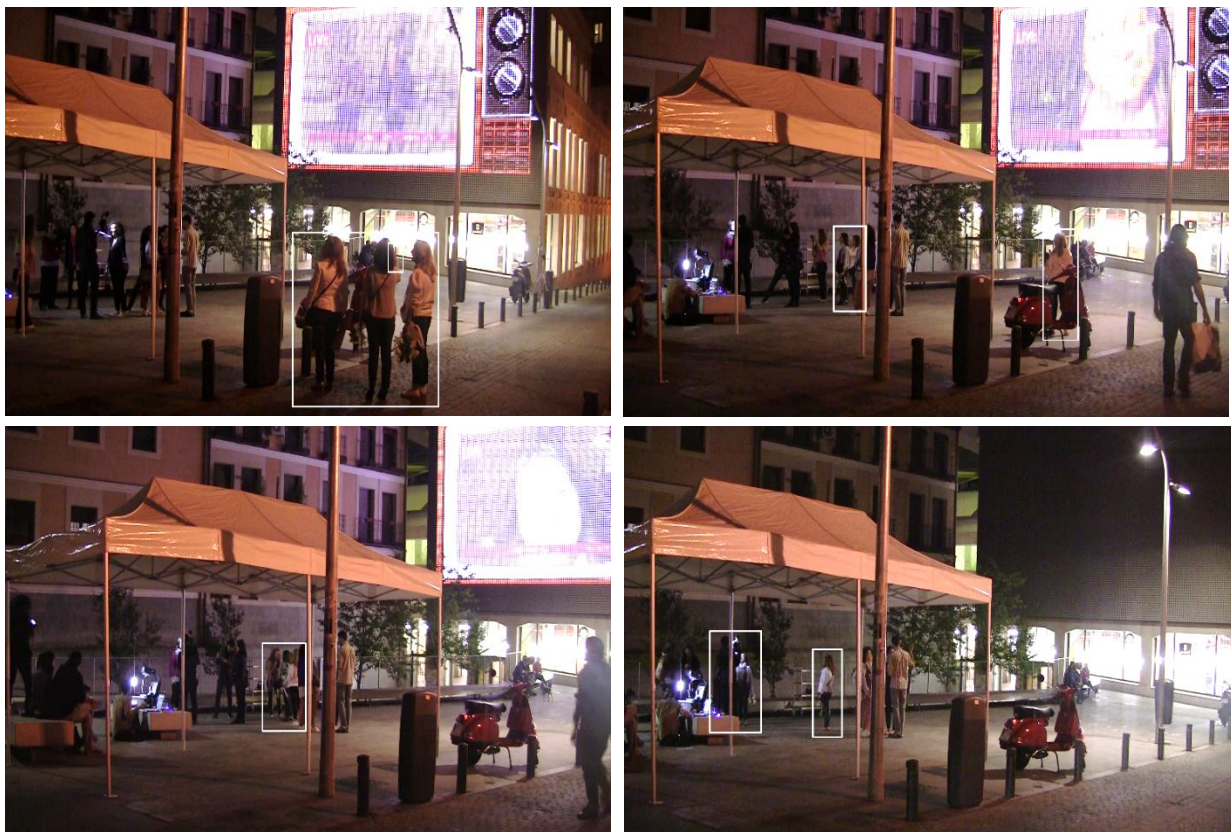
The results of the location studies reveal that the four sites only differ slightly in terms of the criteria considered, and all of them have similar profiles. In terms of population density, there is, however, a considerable difference between the site in Berlin with less than 1.500 Pop. per km² and the others, which all have a density of more than 10.000 Pop. per km².

The analysis of the videos already provides insights concerning the public life taking place at the locations in Berlin and Madrid, and shows where and how digital media façades and their contents affect public space and public life. The videos, which have been analyzed until now display the two locations in Berlin and Madrid.

First results for Berlin suggest that the broadcasting of linear non-commercial moving image content during regular street screenings (b.) has hardly any impact on the public life at this site in terms of the criteria studied. Pedestrian frequency, duration of stay, number of

interactions, or uses and appropriations of space have been very similar in both situations. Moreover, there have been almost no visible reactions to the digital façades and their content. The screening attracted hardly any passerby, although the screen can be seen from the busy boulevard “Unter den Linden.” The screenings at the site in Berlin does not seem to work well if they are not accompanied by related events such as short introductions to the artistic work. These sometimes take place before a screening and inside the building. They tend to attract an audience, which is often informed about the content and can watch it later outside on the façade. On these occasions, alternative uses of public place and diverse appropriations can be observed, for example when a container or other objects in public space are used as seating.

Figure 7, Medialab Prado, Plaza de las Letras, Madrid, Spain, Connecting Cities event, on the September 27, 2014, looking from North to South (stills from the author’s video).



Medialab-Prado, Madrid 2014: Passers-by stop to watch (still in the upper left-hand corner) and then cross the square and ask about the content (upper right-hand corner). After briefly interacting with other people on the square (lower left-hand corner), they begin to interact with the project (lower right-hand corner). Total duration: 03:14 min.

The early results for the media façade location in Madrid, however, are very different, as plenty of reactions to the digital façade and their content could be observed. Although there have been negative effects—homeless people and other regular users of the neighborhood square were not included in the event and dislocated by the audience of the screening—the façade seemed to have a positive social and cultural impact. On some occasions, the screenings led to spontaneous conversations and allowed the people who attended the event to establish new connections. The study shows that digital façades can have a positive impact on public life, but that certain conditions have to be met to tap into their full potential. According to the observations it seems likely that in order to facilitate the important social processes mentioned above, there should not be a focus only on visual arts. A more broad variety of content, including user-generated contributions, needs to be considered, which could make media façades accessible to even more people and could thus promote social inclusion and communication in the public sphere.

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Figures:

Figure 1: Medialab-Prado 2013. Digital Games in Urban Public Space: City Fireflies at the digital facade of Medialab-Prado, Madrid. <https://www.flickr.com/photos/medialab-prado/8488953595/in/album-72157632807716840/>

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**Circular Economy Potential: Waste Minimization Strategy
in the Construction Industry**

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Circular Economy Potential: Waste Minimization Strategy in the Construction Industry

ABSTRACT: *Circular economy is an emerging notion that is focused on the 3R principles of reduce, reuse and recycle; whereby its implementation can be done effectively at micro, meso and macro-levels. This paper aims to explore the existing literature of circular economy and construction waste management with a view to: 1) highlighting fundamental knowledge of circular economy, and identifying the potential of circular economy as an approach to minimize wastes at micro-level. An overview on the scenario of construction industry in Malaysia is discussed to address the needs to evolve the construction process at micro-level in line with the introduction of effective construction waste management. A systematic review has been conducted to understand the key concepts of circular economy and how this can be incorporated as waste minimization strategy without neglecting the aspects of sustainable construction. We found that circular economy, based on the principles of reduce, reuse and recycle, is appropriate to be considered as a platform for sustainable construction waste management in Malaysia.*

Keywords: *Circular economy, 3R principles, micro-level, systematic level, waste minimization*

Introduction

For years, construction has been known as a significant economic sector which has provided an important catalyst to Malaysian economic development. Propelling the engine of growth, it helps Malaysia realize its vision of becoming an industrialized nation by 2020. Directly and indirectly, Malaysia has immensely benefited from its construction sector in the form of economic and social developments. The main problem of the construction industry especially in developing countries is its dependency on labour-intensive method which could influence the waste generation. Waste could be minimized at the source, which means the waste should be avoided at the production level by applying a cleaner production process. Construction industry processes need to be transformed by implementing modern construction methods that enhance resource efficiency. By manufacturing the components at a factory, the efficiency of the resources could be improved and at the same time, waste could be minimized. Therefore, an “environmentally cleaner/greener” product could be delivered to the construction site and assembly could be done with minimum waste. Evolving the method of construction is a virtuous starting point towards waste minimization which could be achieved by getting the

government support, financial aids, change in mindset and amendment of regulations. Rigorous efforts should be taken in order to change the traditional practices in the construction industry by creating the awareness, optimizing costs and avoiding using foreign workforce.

Malaysia has promoted the modern method of construction; known as Industrialised Building System (IBS) for many years. However, IBS is gaining low popularity among construction actors due to lack of readiness and perceptions towards its application in the construction industry. To ensure that the modern method of construction; which incorporate the notion of resource efficiency in getting a great support from the construction actors, a lot of works need to be done in conjunction with the circular economy. In achieving the goal of waste minimization, cleaner production needs to be incorporated in the construction industry by making significant changes at the production level.

In 1990, the concept known as Circular Economy (CE) was developed by two British environmental economists; Pearce and Turner, based on three foundations namely *Reduce*, *Reuse* and *Recycle* (Pearce & Turner, 1990). CE is an emerging notion that is focused on the principles of reduce, reuse and recycle; whereby its implementation can be done effectively at micro, meso and macro-levels. This study focuses on reviewing the potential of CE at a micro-level towards waste minimization in the construction industry. The suitability of CE to be a platform towards waste minimization in the construction industry is obvious by looking at the principles that are behind this concept. Therefore, this study is aimed to seek the potential of CE as a waste minimization strategy at micro-level in the construction industry by looking at the possibility of modifying the construction methods. Abdullah *et al.* (2009) argued that the construction industry must evolve from traditional wet construction method to a more environmental friendly, energy efficient and productive method of IBS.

Scenario of Construction Industry in Malaysia

The construction industry plays a vital role in the economic growth of developing countries like Malaysia. In 2013, the construction industry contributed 10.9% of the country's Gross Domestic Products (GDP) and provided employment to about 10% (1.2 million) of the total workforce in Malaysia (Department of Statistics, 2014). For instance, during the announcement of 10th Malaysia Plan (10MP), the Prime Minister of Malaysia had allocated USD 18 billion to improve the infrastructure facilities and cater for the pressing housing

demand, by targeting to build 78,000 affordable houses by 2015 (Ministry of Finance, 2012). Under the 10MP, the government of Malaysia announced an additional USD 5.5 billion for the purpose of accelerating the sustainability awareness among construction actors.

The aspect of sustainability has been emphasized by considering its ability to protect the environment, with the introduction of the “*Strategic Thrust 5: Building an Environment that Enhances Quality of Life*”. Prior to this, the regulator for the construction industry in Malaysia known as Construction Industry Development Board (CIDB) had introduced the “*Strategic Recommendation for Improving Environmental Practices in Construction Industry*” to encourage the construction actors to consider the environmental impacts of construction activities (CIDB, 2007). Hence, the 10MP announcement is a continuous effort for creating a sustainable future.

Given the increasing amount of construction activities taking place in Malaysia, it is imperative to evaluate the volume of waste being generated and develop strategies for waste minimization in order to achieve a sustainable future. The amount of waste is increasing, though not only a pressing issue in Malaysia, in many countries as well, which suffer a similar scenario due to the rapid economic development and growing populations. The large volume of waste generation is partly due to the way the construction industry has continued to encourage the linear-based practices of “take-make-consume-dispose” paradigm; – this means that since the resources are abundant and widely available, it is cheaper to dispose the used products. The construction industry in Malaysia particularly has emerged as 3D (*Dirty, Dangerous, Difficult*) images. The emergence of this image is due to the conventional way of completing the construction projects which influence a low level of productivity and quality. The inefficiencies of construction processes have led to a high waste generation and directly create negative impacts on the environment.

Ibrahim *et al.* (2010) mentioned about the unprecedented challenges faced by construction industry to evolve from traditional ways of performing and managing the construction processes. Kärnä and Junnonen (2005) added the main reason for the construction industry to improve the productivity, quality and efficiency is due to the growing competition for better construction end-products. The modern method of construction like IBS is an alternative substitution of traditional methods of construction in utilizing the use of resources, improving the quality and productivity and minimal wastage produce from the construction processes.

History of IBS in Malaysia

In Malaysia, the history of IBS can be linked back to the year 1963, where then, the government sent an architect from the Public Works Department to Europe to learn more on IBS. The following year, an architect from the Federal Capital Commission was sent to France for about 6 months for exposure to IBS. In the same year, the Ministry of Housing and Local Government was being set up to concentrate on the development of housing. The minister and his officers then visited West Germany, Denmark and France to gather more information on IBS. Due to suggestions from the Ministry of Housing and Local Government, the Federal Government agreed to build some pilot projects using IBS. This resulted in the construction of 3,009 units of flats in Jalan Pekeliling, Kuala Lumpur in 1966, and 3741 units of flats in Jalan Padang Tembak, Pulau Pinang in 1967.

The housing industry has started experimenting with IBS in the late 1960's with the construction of these two pilot projects of high rise low-cost flats. After four decades, the market share of IBS in the construction industry is still very small. Despite its logical premise and theoretical advantage, it has yet to replace the conventional system as the principal method of construction. The major setback in its greater utilization of IBS is that most industrialized systems available in Malaysia are independent of one another and no coordination between the different systems. Furthermore, total adoption of foreign technologies without adaptation to the local environment has left industrialized buildings with the negative stigma of being problematic, problems such as leakages and inflexible for renovation works being the most common.

An early effort to promote the usage of IBS has not made a headway, therefore, CIDB has redesigned the strategies by introducing IBS Roadmap (2003-2010) in 2003 (CIDB, 2003). The introduction of this roadmap is to ensure that IBS will become a future landscape of the construction industry in Malaysia. Furthermore, CIDB has revised the dimension system in Malaysia by enforcing the Modular Coordination (MC) in the Uniform Building By-Laws (UBBL) in 2004. MC is not only about dimensional system, it complements the IBS implementation in the area of facilitating the achievement of greater productivity in the building industry by virtue of its ability to discipline the dimensional and spatial coordination of buildings and their components, thus allowing a more flexible and open industrial system to take shape. Besides that, IBS Scoring System has been launched in 2005 to provide a well-structured assessment system to the construction actors in Malaysia to evaluate the usage of

IBS in any projects (CIDB, 2005). The implementation of IBS has received a positive response from the construction actors especially in the government-based projects. The outcome in a private-based project is disappointing, therefore, CIDB developed a new IBS Roadmap (2011-2015) to impose high level intended outcomes of implementing IBS in private-based projects (CIDB, 2010). In recent years, there has been a concerted move by CIDB to promote the IBS in Malaysia; one of its aims was to transform the construction industry to be more productive and at the same time emphasizing the element of sustainable development.

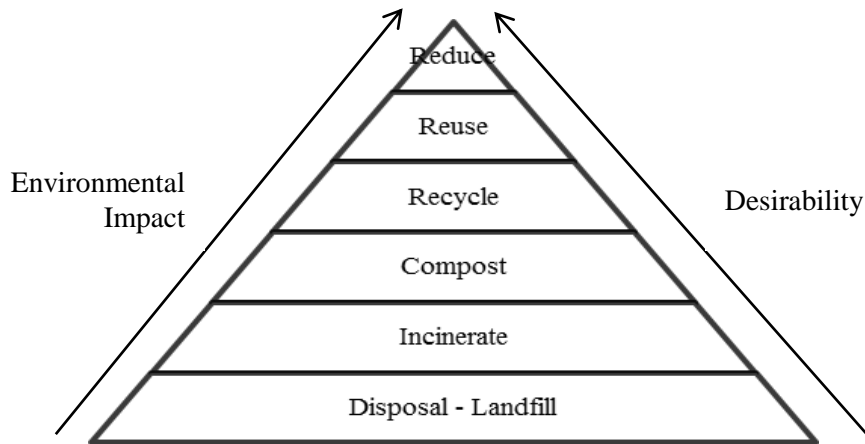
The policies and strategies are well developed to ensure IBS is a priority for all the construction actors to produce more sustainable and greener construction practices. However, the successful implementation of IBS is still faced numerous obstacles as it not an easy task to change the mindset of the construction actors who are already familiar and comfortable with the traditional method of construction. According to Kamar *et al.* (2009), there six (6) obstacles to be embraced by the construction actors in Malaysia to implement IBS which are readiness, awareness, knowledge, cost and equipment, planning and regulation and negative perception.

Construction Waste Management

Construction waste is not only a pressing issue in Malaysia, it is a worldwide concern including the developed countries like the UK, Singapore and Japan. A lot of studies have been done in focusing on the development of construction waste management. The most common strategies used in waste minimization studies are the 3R principles (reduce, reuse and recycle) (Lu & Yuan, 2011). The strategies are derived from the waste minimization hierarchy to ensure that waste should be managed effectively. Figure 1 demonstrates that waste should be treated according to the suitability of the waste to be reduced, reused and recycled before finally disposing the waste into the landfill. Based on the hierarchy, it is important to manage the waste circularly, which means that the waste minimization should start at the planning stage (e.g. selection of materials) in the context of the construction industry. Instead of disposing waste into the landfills, an early planning of selecting the most suitable materials would help in promoting the recycling mechanism. The idea of “turning waste into wealth” should be implemented as early as the planning stage of construction projects.

Figure 1: Waste Management Hierarchy

Source: Based on the work of Pheng and Tan (1997) and Wolsink (2010)



Masirin *et al.* (2008) stated that Malaysia produces about 10,000 tonnes of wastes daily, which is supported by Begum and Pereira (2011), and they added the increase in the amount of waste generated was due to the increasing demands for housing and commercial buildings in Malaysia. Construction waste is generated throughout a project from inception to completion, with the pre-construction stage having a considerable share. Malaysia has been facing an increase in the generation of waste and accompanying problems related to its disposal. Construction waste represents a greater proportion of solid waste in the country, which creates significant problems such as illegal dumping, the loss of valuable raw material, depletion of natural resources, filling up landfill space, high energy usage and causing unnecessary demand on logistics.

As mentioned above, it is important to manage the waste at source, rather than focusing on the waste minimization strategy after the waste has been generated. In this paper, we are therefore looking at the potential of CE to be a waste minimization strategy and focusing at the earliest stage of construction processes – the planning and designing stage, in particular. It is imperative to ensure the concept of CE could be introduced at the micro-level in the construction industry in order to ensure the smoothness of introducing CE at meso and macro levels in the construction industry.

Reduce Strategy

Reduce strategy is the best approach to manage wastes by minimizing them at source before the wastes become a much bigger problem to the construction actors. Reduce strategy should be adopted as early as planning stage and continuously incorporating the idea to reduce the waste generation at every stage of the construction processes. The implementation of reduce strategy should involve every stakeholder in each stage of construction processes to ensure the wastes could be reduced effectively and sustainably. Before reduce strategy can be adopted, it is important to identify the influencing factors of waste generation as many studies categorized the factors into several groups including design, material handling, weather, poor planning and site condition.

There were studies that identified material management as a key component in successfully reducing the waste generation (Skoyles & Skoyles, 1987; Urio & Brent, 2006). The selection of material is very important to reduce wastes as often occurs especially in residential projects where the owner of the house will decorate and change the materials after the house has been completed. This will generate wastes; BREEAM, a sustainable assessment tool in the UK, has identified the problem and try to overcome it by giving the privilege to the building occupants to select the preferable floor and ceiling finishes in order to prevent unnecessary waste of materials.

Kibert and Chini (2000) have identified four (4) key elements in implementing the reduce strategy in the construction processes. The elements are:-

1. Resource Optimization
 - Rethinking design
2. Source Reduction
 - Accurate estimating and ordering
3. Reduce Packaging
 - Reverse distribution to suppliers
4. Prevention
 - Implement efficient material saving construction techniques.

The main obstacles to implement the reduce strategy are the coordination among the construction actors to cooperate and some confusion of the stakeholders that reduce strategy is

similar to recycle strategy. The implementation of reduce strategy in the construction cycle would minimize the waste generation. The construction actors will gain benefit by reducing cost for transporting the waste to the landfill. By considering the growth of waste generation worldwide, the idea of reduce strategy should become the priority in construction waste management.

Reuse Strategy

Construction waste is very difficult to be eliminated altogether. After an effort has been put to reduce the waste generation as early as planning stage, waste is still being generated at the construction stage in which this type of waste can be classified as unavoidable waste. Therefore, reuse strategy should be considered in order to divert the waste from going into the landfill. In Germany, there is a specific process to reuse the waste which consisted of three stages; drying, distillation and burning. Not all waste that is being generated is totally “waste”, some of the wastes can be used as a replacement material or sent to the recycling facility to produce a new material. For example, a broken brick can be used as a material for access road around the construction site.

Reuse strategy is commonly applicable to the demolition type of waste such as door frames, glass panels and concrete (Kibert & Chini, 2000). That type of waste can be reused for new projects and by doing this, it will improve the resource utilization.

Recycle Strategy

Sreenivasan *et al.* (2012) described recycle strategy as a series of activities that includes the collection of used, reused, or unused items that would otherwise be considered waste; sorting and processing the recyclable products into raw materials; and remanufacturing the recycled raw materials into new products. The sorting of waste for recycling purpose could be done on-site or off-site management technique. However, different authors have identified the on-site management technique as a simplified method to sort out different types of wastes compared to off-site technique (Lu *et al.*, 2011; Poon *et al.*, 2001; Wang *et al.*, 2008). According to Kibert and Chini (2000), there are three (3) ways of recycling the waste which includes:-

1. Upcycle
 - Create value-added products
2. Recycle

- Raw materials for the same of equivalent end-use
3. Downcycle
- Raw materials for lower value products

To ensure successful recycling, governmental participation is necessary to enhance the awareness and create recycling programme with the objective of both short-term and long-term perspectives. The short-term programme targets the shift of mindset among the stakeholders and increasing the availability of recycling facilities. The insufficient and inappropriate location of recycling facilities will ruin the objectivity of implementing recycling strategy. Meanwhile, an increased recycling rate as well as diversion rate of waste going into landfill can be set as a long-term programme.

The recycling of waste materials ensures the full utilization of resources and also results in reducing the impacts on the environment. More importantly, improvement in recycling practices brings a positive aspect to the society by providing more job opportunities and generates economic benefits to the construction actors for using recycled materials. Therefore, the construction actors should adhere to use the recycling materials with a view to achieve the sustainability goal set by the government.

The Concept of Circular Economy (CE)

CE was introduced by Pearce and Turner in 1990, but only in 1996, Germany became the first nation to legislate the circular economy by implementing a “Closed Substance Cycle and Waste Management Act” (Su *et al.*, 2013). Su *et al.* (2013) added that the law introduced by the German Government mandated a compatible waste disposal system that focused more on the environmental aspects. Japan was another country that implemented the CE by legislating “The Basic Law for Establishing a Recycling-Based Society” in January 2002 (METI, 2004; Morioka *et al.*, 2005). Both governments were focusing on the element of protecting the environment by encouraging society to recycle. However, in the case of China, its government was applying a CE paradigm in order to give priority to economic development, instead of environmental protection alone (Dajian, 2008; Geng & Doberstein, 2008).

Bilitewski (2012) described the concept of CE as a transformation from traditional patterns of economic growth and production which is more linear, towards a circular system. The transformation to circular system will allow the industries that use resource and produce

waste residuals to work synergistically and symbiotically. He further explained the aspects that need to be followed in developing the circular economy, as shown in Table 1.

Table 1: Development of Circular Economy (CE)

Aspects	Descriptions
Waste and Pollution Prevention	Moving towards cleaner production
Reuse and Recycling Enhancement	Increase the recycling rates by producing more recycling-friendly goods
Establishment of new economic idea of production	Introducing the economic tools such as producer responsibility, tax and fee policies and tax deduction
Expanding the knowledge to the society	Introducing a new idea of consumption, reuse, recycling and waste prevention
Development of relevant legal system	Promoting the circular economy

Source: Bilitewski (2012)

Furthermore, the CE can be successfully implemented by concentrating on the implementation at three different levels; micro-level, meso-level and macro-level (Geng & Doberstein, 2008; Yuan *et al.*, 2006; Zhu & Huang, 2005). Table 2 is a summary of the stages involved in implementing a circular economy.

Table 2: Implementation of Circular Economy (CE)

Stages	Descriptions
Micro	Focusing on the production area – requirement of adopting a cleaner production process and more eco-friendly design
Meso	Environmental friendly design that encourages the introduction of waste trading system
Macro	More advanced collaborative networks among industries which encouraging the element of <i>Reuse, Reduce</i> and <i>Recycle</i>

Clark (2012) explained the needs for an emerging more resource-intelligent CE which eliminates the unsustainable extract-consume-dispose linear economy. Resource depletion is a

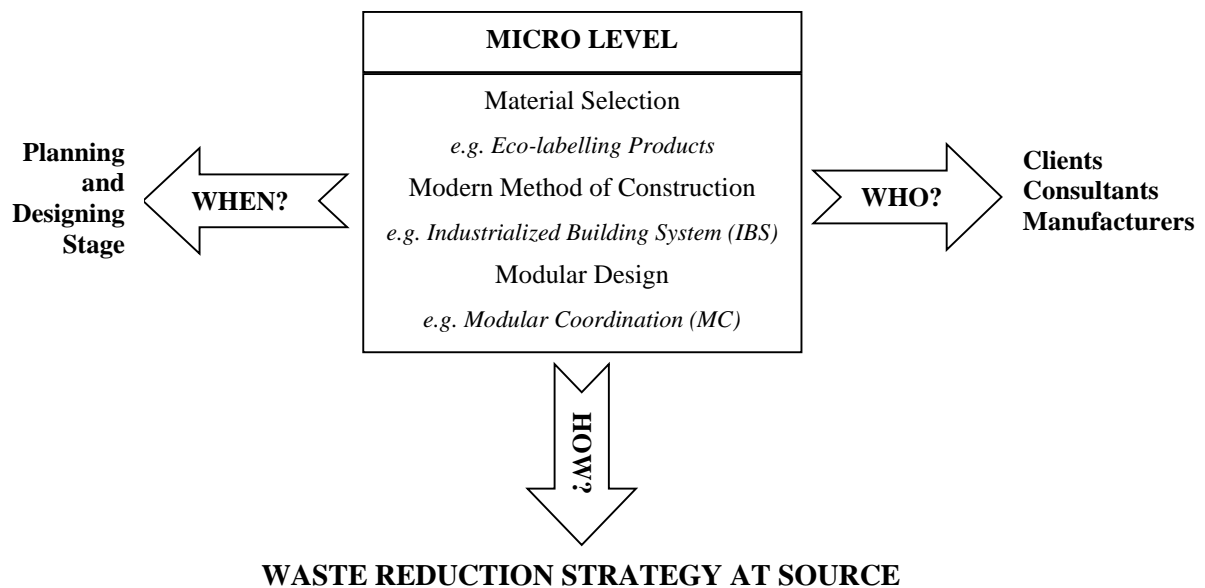
critical issue that will affect the economy of any country and in this scenario, resources should be managed intelligently to ensure that there is continuity in utilizing the available resources. In Malaysia, the introduction of circular economy is very complex due to abundant natural resources that they have, but, the idea of circular economy should be considered in order to ensure that the objective to become a sustainably developed country can be achieved. CE should start from the raw material extraction stage by applying a cleaner production process (Clark, 2012). When applying a cleaner production process, green and sustainable products will be produced and used in all industries including the construction industry.

Utilization of CE as Waste Minimization Strategy at Micro-level

The nature of construction industry involves different stages and each stage represent different stakeholders before the end-products could be handed to the clients. There are five (5) stages that have been applied globally; which are *planning, designing, procurement, construction and demolition* stage. In the context of micro-levels as stated in Table 2, the authors are looking at the early stage of construction processes, namely, planning and designing stage. By implementing a waste minimization strategy at both stages, the waste generation could be controlled. In this paper, the authors focused on the introduction of reduce strategy at micro level in the construction industry in order to ensure that the wastes are minimized at source.

During the planning and designing stage, a lot of decisions will be made by the stakeholders involved. For example, the decision will be made on the type of construction methods to be used during the construction stage. Furthermore, selection of materials also will be decided to ensure the suitable materials will be used for the projects. Basically, the main stakeholders involved at these stages are designers and clients, as contractors also could be involved depending on the procurement method that has been applied to the projects. Transforming the traditional construction methods is necessary to materialize the waste reduction strategy at source. IBS is a clear option for designers and clients in Malaysia to be adopted as a construction method that could reduce the waste generation. MC has to be incorporated with IBS and as such, the occurrence of cutting and modifying wastage could be eliminated, or at least minimized. Figure 2 summarizes the waste minimization strategy at micro-level using CE approach.

Figure 2: Waste Minimization using CE Approach – Micro Level



Conclusion

CE is relatively a new concept especially in Malaysia, though it has been widely used in developed countries like the UK, Germany, Japan and China. Based on the review that had been carried out, the implementation of CE is very important in the construction industry to create a sustainable future. The authors aim to integrate the element of CE that is being introduced based on three (3) principles; *Reuse*, *Reduce* and *Recycle*, towards developing an integrative framework for construction waste management in Malaysia. The principles endeavour to ensure that the waste that is being produced by the construction industry will be properly managed. Currently, there is no specific policy, framework or guideline that is focused on the way the construction waste is being managed, including in the development of *Strategic Recommendations for Improving Environmental Practices in Construction Industry*. *Green Building Index* (GBI), an assessment tool in Malaysia that is being used to evaluate the element of green and sustainable management in building projects only allocates two (2) points out of 100 points for waste management. Therefore, a rigorous effort should be made to make sure that construction waste in Malaysia is managed properly by looking at the possibility of introducing the concept of CE, which could lead to more sustainable and greener construction practices being implemented.

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The Social Life of Commercial Streets

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The Social Life of Commercial Streets

ABSTRACT: *The social life of cities is a key concept related to social cohesion, which has been the subject of extensive studies in several disciplines including sociology, psychology and the built environment. Social life studies conducted in the built environment discipline have mostly focused on city centres; while the significance of neighbourhoods as integral elements have been sometimes overlooked. As a result, this research will specifically explore commercial streets in residential suburbs. Suburbs are frequently perceived to be lacking in vitality and street life. The method of inquiry in this research investigates how the physical characteristics of commercial streets can either promote, affect or mitigate the social life of neighbourhoods and generate a sociable environment. Therefore, this study captures the social behaviour of three commercial streets in Geelong, Australia.*

This paper utilizes a qualitative approach to the study of the social life of commercial streets. The primary methodology used in this research is recording, documenting and mapping users' activities through behavioural observation. The observations have been conducted in four days (on two weekdays and two weekends). The case study has been divided into eight sections that are similar in length. Short movies of 30 seconds have been recorded from each section, every two hours from 8:00 am to 10:00 pm. Afterwards, the movies have been transmitted into street mappings, documenting the type of activities, placement of activities, gender and approximate age by exploiting suitable pictograms.

There are several physical characteristics that are believed to be contributing to the social life of commercial streets. This study utilizes a bottom-up approach to evaluate the complexities of the role that built environment plays in terms of vitality through the three selected characteristics, including typomorphology and street layout, diversity of uses, and soft facades. Better understanding of how neighbourhood environments influence the social life of neighbourhoods can provide academics and professionals in architecture and urban design with sound evidence on which to base future research and design.

Keywords: Social life; Commercial street; Neighbourhood centre, Vitality, Sense of community

Introduction

This study is a part of a Ph.D. research project on the sense of community and social life of residential environments at Deakin University, Australia. Residential environments such as neighbourhoods and suburbs are a combination of residential streets and commercial streets or neighbourhood centres. Therefore, in order to investigate the social life of neighbourhoods, both residential streets and commercial streets are a matter of importance. This paper focuses on the study of social life in the commercial streets through a built environment perspective. Numerous physical characteristics are believed to affect the social life of commercial streets, including density, traffic, scale, sidewalk features, walkability, greenery and urban furniture. As the scope of this paper could not address all the affective attributes, three characteristics were selected (diversity of uses, typomorphology, and soft facades) for detail investigation.

Sociability is a primary role of public places in cities and neighbourhoods. Good public places in cities provide an avenue for communication and socializing behaviours. Social life has been acknowledged as everything that occurs in public spaces between buildings: sitting, chatting, walking, cycling, running, standing and playing, which form “the life between buildings” (Gehl, 1987). In this sense, public life is translated into the presence of people and residents in their practice of everyday life in the public spaces of cities and neighbourhoods.

The social life of public spaces has experienced a tumultuous history. The progress made in modern technologies and the emergence of media and virtual networks has contributed to some transformation in forms of communication, transportation and as a result people’s social life in public places in cities. This was the time when modern architecture and urbanization was criticized for neglecting social needs and marginalizing human interactions and several scholars such as Gehl (1987) initiated the public life studies.

According to the literature of public life, the shopping centre has evolved to be the central feature of late modern urban social life (White and Sutton, 2001). Within the boundaries of neighbourhoods and suburbs, the local shopping centre, commercial street or neighbourhood centre is the context of social life and interaction among residents (Farahani and Lozanovska, 2014).

This paper utilizes a qualitative approach to the study of the social life of commercial streets. The research question to be addressed in this study is: how the physical characteristics may contribute to, or mitigate the social life of commercial streets. While a considerable amount of literature has been published on the social life city centres, plazas and streets, the social life of neighbourhoods and neighbourhood centres has been overlooked. The literature of city centres and street social life is indeed adaptable to the commercial streets in neighbourhoods; however, evaluating the complexities that makes the social life of neighbourhood centres dissimilar to the city centres is a gap in the literature of the built environment. Therefore, this research aims to investigate the social life of commercial streets through observations as the method of enquiry and a comprehensive qualitative approach.

The literature of social life in the built environment discipline

In the periods of rapid urban growth, the social life between buildings declined as a result of automobile dependency, large-scale designing and overly rationalized, specialized processes. Jacobs was a main critic who called for a change in the social life of cities. Jacobs stressed the importance of high-density neighbourhoods, mixed land use and promoting public places in providing a vital and sociable atmosphere. She claimed that the physical structure of cities might lead to experiencing cohesive community and life (Jacobs, 1961). Later in 1971, Jan Gehl in his book *Life Between Buildings* stressed the qualities of urban life and how the built environment can foster and mitigate social life in public places and specifically city centres. He repeatedly criticizes the neglect of the human dimension in urban design, the emergence of car-dominated cities, and the loss of pedestrian-oriented environments for their negative influence on the public life of cities (Gehl, 1987).

Following the research of Gehl, several studies were conducted in order to critique and analyse the social life of cities. However, most of this research has focused on city centres (Gehl, 2010, Gehl and Gemzøe, 2001, Whyte, 1988) and some have addressed city elements such as streets (Appleyard, 1980, Appleyard, 1981, Jacobs, 1993), whereas the role of residential environments in creating social life has been neglected. In most of these studies, it has been assumed that city life is associated with the city centres' sociability. But is the city life exclusively limited to the centre? How are the residential environments able to contribute to the social life of cities?

Only a few studies have focused on the sociability of residential environments; however, some of the factors that have been studied regarding the public life of city centres and streets are applicable to residential environments. Qualities that are thought to provide opportunities for social interactions in public places include the factors that encourage residents to walk or the ones that encourage people to engage in stationary activities. The factors that encourage walking behaviour are density (Amick and Kviz, 1975, Franck and Stevens, 2007, Gehl, 1987, Jacobs, 1961, Pendola and Gen, 2008, Talen, 1999), human scale development (Amick and Kviz, 1975, Gehl, 1987, Langdon, 1997), mixed land use (Alexander, 1977, Audirac and Shermeyen, 1994, Jacobs, 1961, Mehta, 2013, Montgomery, 1998), easy pedestrian access (Cooper Marcus and Francis, 1998, Gehl, 1987, Gehl, 2010, Gehl and Gemzøe, 2004), improvement of cyclist conditions (Gehl, 1987), and soft facades (Gehl, 1987).

The qualities that are studied to encourage stationary activities in public places are provision of seats and sitting areas (Gehl, 2010, Gehl and Gemzøe, 2004, Mehta and Bosson, 2009, Mehta, 2009, Mehta, 2013, Whyte, 1980), provision of community gathering places (Lofland, 1989, Oldenburg, 2009), improvements in sidewalks and building edges (Mehta, 2013), greenery (Al-Hagla, 2008, Sullivan, 2004, Whyte, 1980), and using a fine hierarchy (Chermayeff, 1971, Chermayeff and Alexander, 1966).

Observations-study area

The primary tool or method for studying everyday life in public spaces is direct (yet discreet) observation of behaviours, with a particular focus on how it relates to spatial features (Gehl and Svarre, 2013, Stevens, 2014). Direct observations help to understand why and how some spaces are frequently used, while some others are quite underused. The analysis of people's use of public spaces is identifying links between observed activities and the physical environment and where they occur (Stevens, 2014).

Data was collected through case studies and unobtrusive observations of users in natural settings. There was no interaction with individuals or manipulation of the environment. Data was collected on days with similar weather conditions (temperatures between 15°C and 27°C) from early November till early December in 2014. The selected case studies, which are similar in length (around 280 meters), were divided into eight identifiable shots. Each shot was video recorded for 30 seconds from 8 in the morning till 10 in the evening. The short movies were inspected carefully and mapped in the format of visual tables

registering the type of activities, the placement of activities, approximate age group, the time of the activities and the connection of the activity to the related use on the street (Figure 1).

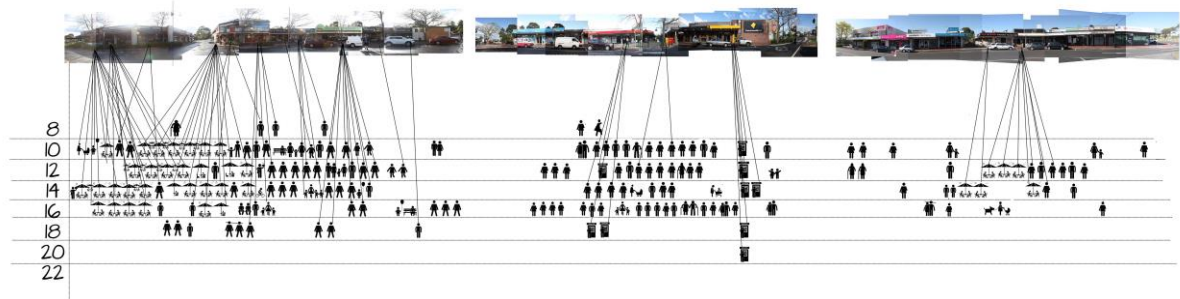


Figure 1 observation mappings and pattern of activities at Highton on Monday from 8 am to 10 pm. Suburban lifestyle is associated with lack of vitality and social life (Davidson and Cotter, 1991, Richards, 1994). Three case studies have been selected for this research. They all are a part of a commercial street within residential neighbourhoods in three suburbs in the City of Greater Geelong, Australia (Figure 2). The selected case studies are chosen to be similar in length (around 270 meters long).

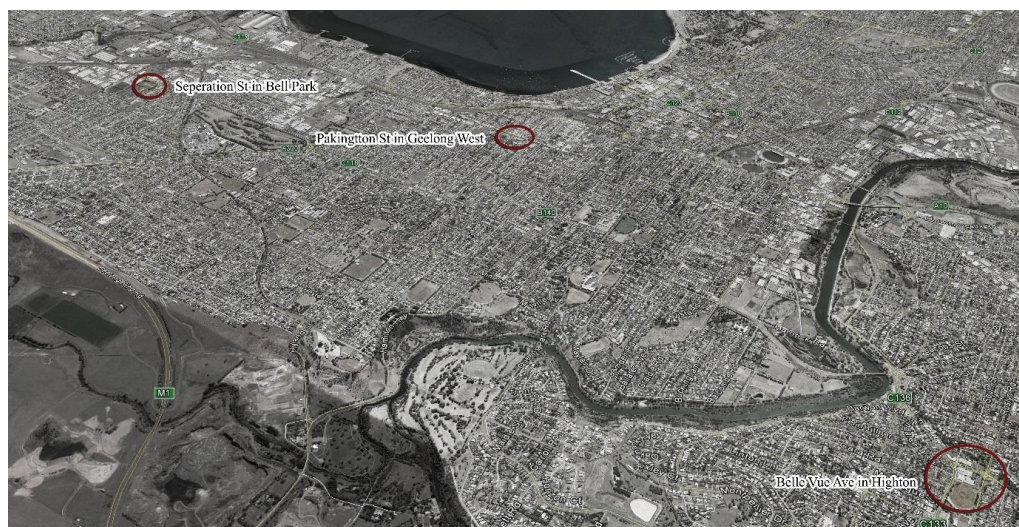


Figure 1 the study area

Study area, typo-morphology of the street

Typo-morphological studies reveal the physical and spatial structure of the city's fabric. They are typological and morphological because they describe the urban form (morphology) based on detailed classifications of buildings and open spaces by type (typology). According to Moudon (1994), typo-morphology is the study of urban form derived from studies of typical spaces and structures. Although the three selected case

studies are all considered as commercial suburban centres, they are quite different in their morphogenesis.

Bell Park is an established residential suburb, with some industrial areas in the east. The selected area of Separation Street in Bell Park is a strip mall separated from the main high-speed lanes through a green filter and a parking area. It is also located in a close vicinity of some industrial land uses and warehouses. Similar to other selected areas, the case study is part of a larger, commercial, educational and recreational development (Figure 3).



Figure 2 Separation Street strip mall

The Separation Street shopping strip is in the format of a strip mall. Strip mall is basically half of a main street pulled back from the main arterial to accommodate parking area in front of the shops (Southworth, 2005). In strip malls, pedestrians are usually unwelcome and civic functions are absent. As the old main street simply could not accommodate sufficient car park spaces, the strip mall design was an attempt to organize a shopping strip, while providing more parking spaces. Easy parking and high visibility of each shop are primary features of the strip mall, while a provision of pedestrian amenity and sociability are usually ignored (Achimore, 1993).

The second case study is a section of Pakington Street in Geelong West (Figure 4). Pakington Street is a commercial street, with shops on both sides and sidewalks and the car lanes in the middle. Known as “Pako” to local residents, the strip stretches between the suburbs of Geelong West at its north end and Newtown to the south. The north end of Pakington Street is home to a myriad of shops including retail, fashion, restaurants, pubs and local services. Pakington Street used to be a main street in the city of Geelong West (known as Ashby).

In traditional main street patterns, the retail activity is lined up along both sides of the street. The street is a place of intense interaction that accommodates the vehicular activity, as well as pedestrians. Retail activity is highly visible and accessible along the street (Southworth, 2005). Provision of more parking behind the retail activity has turned Pakington shopping precinct to a “malled main street”. In Southworth (2005) categorization, “malled main street” refers to the type of classic main streets influenced by the design of malls. The arrangement of car park spaces at the back of retails has provided a pedestrian friendly environment in Pakington Street with a slow traffic in the middle.



Figure 3 Pakington street, malled main street

The Highton shopping area has a more complex morphogenesis. It has a strip mall in the north and the west side of the shopping area, which are connected by two pedestrian alleys providing a bazaar-like atmosphere. There are also car park spaces behind the retail activity, providing a safe pedestrian environment in Belle Vue Avenue (Figure 5). The urban form in the Highton Shopping Centre consists of small local retail stores along with a small supermarket, library and clinic. Belle Vue Avenue performs as a miniature main street with very slow vehicular traffic in the middle. The area has been named as the Highton Shopping Village. The term village in the naming refers to the local sociable atmosphere of the street.

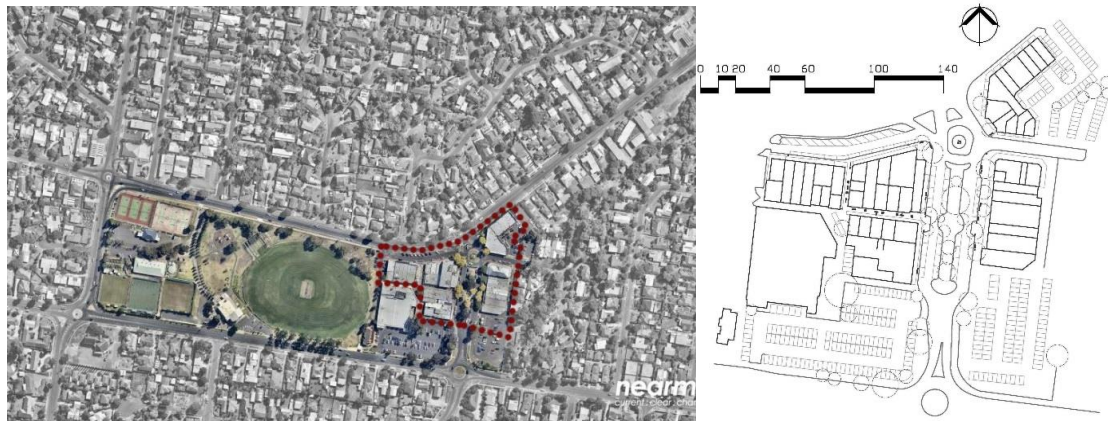


Figure 4 Highton Shopping Village

Diversity of uses

The balance and equilibrium among the number and type of uses can affect the number of activities and the social character of the street. The relationship between mixed land uses and social interaction was first articulated by Jacobs (1961). Mixed-used neighbourhoods are thought to create opportunities for people of different backgrounds to interact through bringing people together for a variety of human activities (Talen, 1999). Although the importance of mixed-use neighbourhoods for walkability and social life has been repeatedly mentioned in the literature, there are few studies focusing on the balance, number and type of uses necessary for neighbourhood centres.

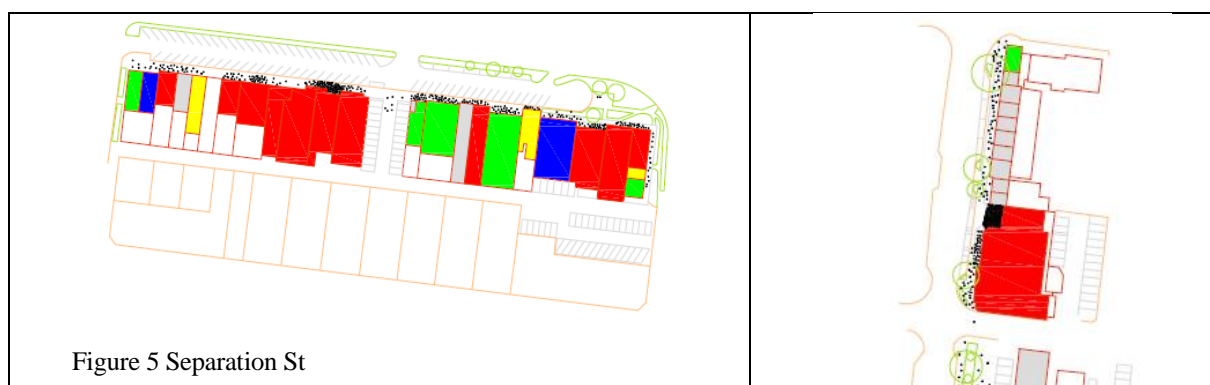
The maps below, illustrate the diversity of uses and the placement of activities observed on the street. The uses have been categorized into five groups, including health/medical related uses (such as pathology, clinic, pharmacy), food-related uses (supermarkets, grocery store, butchery, bakery), services (banks, post office, newsagent), recreational uses (café, restaurants, gaming, bar), and luxurious uses/boutiques (clothes and furniture boutiques, beauty salon, florist, tattoo shop).

The three selected commercial streets are quite different in their diversity and proportion of uses. The proportion of different type of use can be directly associated with the character of the street. For example, a neighbourhood centre with merely food stores, groceries and supermarkets is different from a street with a few cafes and bars and more diverse uses. Additionally, the presence of retails from each type of use will aggregate different type of users from different age groups. For instance, medical uses, library and community centres mostly attract elderly users while recreational activities such as gaming rooms or bars attract a younger population.

Belle Vue Avenue has a relatively equal variety of different uses. The southeast part of the street on Belle Vue Avenue is mostly allocated to the food related uses, while the northeast is the aggregation of restaurants and cafes, a few services and boutiques (Figure 8). The south west is assigned to a small supermarket and a clinic, while several services and different uses have been placed on the north strip. This proximity and companion of uses have brought together a great diversity of uses and users. However, according to the observations, the assortment of uses has not provided a vital night life in the shopping district.

The variety of uses in Geelong West and Bell Park is not as diverse as Highton. In Pakington Street, most of the uses have been assigned to recreational or boutique/luxury. Although there is a huge supermarket on the other side of the street, the street does not seem to provide a local shopping environment for the residents. Rather, it seems that Pakington St is performing as a fashion/recreational hub for the whole city (Figure 7). Observations show that on weekends more than half the activities on the Pakington St belongs to the cafes and bars. This amount drops to one-third on Mondays, which is still a considerable proportion of the whole number of activities.

In Bell Park, all the five categories of uses exist; however, most of the street is allocated to recreational uses and mostly restaurants and takeaways. It seems that the proportion of the uses in Separation Street in order to perform as a local centre is off-balance. In the Geelong strategic plan, this area has been considered as a neighbourhood centre, however the number of food-related stores (such as supermarket, butchery or grocery), existing on Separation Street, are far less than what is expected to serve a local neighbourhood centre (Figure 6). Unlike Pakington Street and Highton, the shops in Bell Park are not luxury/boutique style.





The most significant feature of this shopping strip is a multi-functional building named the Croatian House, which was built in September 1957 by the local Croatian Community of Geelong. It has a function centre, restaurant, bar and a gaming room. Most of the activities on Separation Street relate to this multi-functional community centre (Figure 10). In Bell Park, almost 40% of the residents have been born outside Australia (two times more than other suburbs) and 8% of the residents are from Croatia. Additionally, according to the census data more than 13% of the residents speak Croatian in Bell Park. Development of this community centre in regard to the residents' background has brought vitality and social life to the street, even though the street is not able to perform as a local shopping hub.

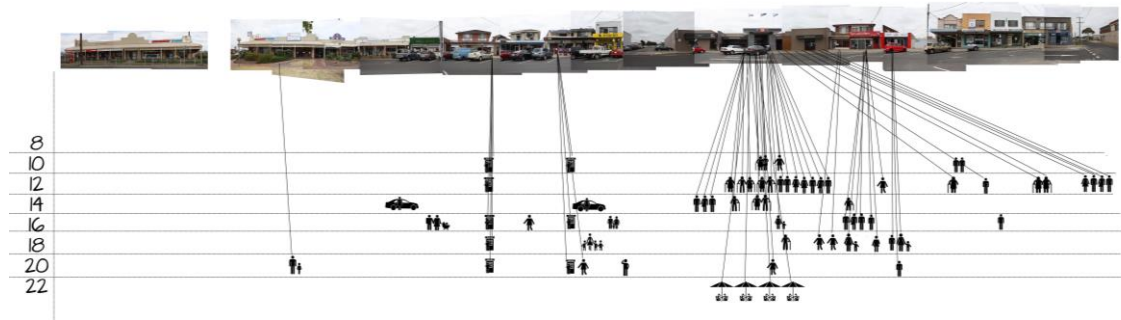


Figure 9 Activities observed on Separation St on Sunday from 8 am to 10 pm

Softness of the edges

“Soft edges” is a term coined by Gehl to describe indistinct boundaries between public and private spaces, also known as semi-private zones in residential streets. Gehl (1987) describes soft edges as a need for feeling safety and communicating with people. Similarly, Mehta (2013) believes that dull building facades are dead spaces, which are not sufficiently welcoming.

The quality of public spaces within the city is of vital importance to creating a vibrant and lively city. “Soft” or active edges containing many details add to the quality of public spaces. A clear demarcation between public and private, active façades and appropriate urban furniture encourage people to stay in public spaces. Active facades refer to the facades where the inside and the outside uses are “connected visually and thus can enrich and inspire each other” (Gehl and Gemzøe, 2004). Gehl argues that no other element has a greater impact on the life and attractiveness of city space, than active, open and lively facades (Gehl, 2010).

Gehl argues that the location of staying activities is related to the location of the edges and transition zones (the entry and exit edges). These spaces are a natural place for a wide variety of potential activities that link the functions inside the buildings with street life in general." The more irregular the façade, the more it invites and supports activities" (Gehl and Gemzøe, 2004). “If the edge fails, then the space never becomes lively” (Alexander, 1977).

The softness of street facades may affect the pedestrians walking speeds, as well. A study of ground floor facades in Copenhagen showed that pedestrian flow was slower in segments of the street where the facades were soft and active (Gehl and Gemzøe, 2004,

Gehl et al., 2006). According to the pedestrian perception of distance, facades with vertical articulation, make walking distances seem shorter and more interesting (Gehl, 2010).

Based on the review of the literature and Gehl' studies, softness of urban facades is defined by three levels: firstly, the physical permeability or connectivity and the degree to which urban facades permit (or restrict) movement of residents (entrance or exit); secondly, the visual permeability or transparency; and thirdly, façade details, articulation, texture, and decoration including lighting.

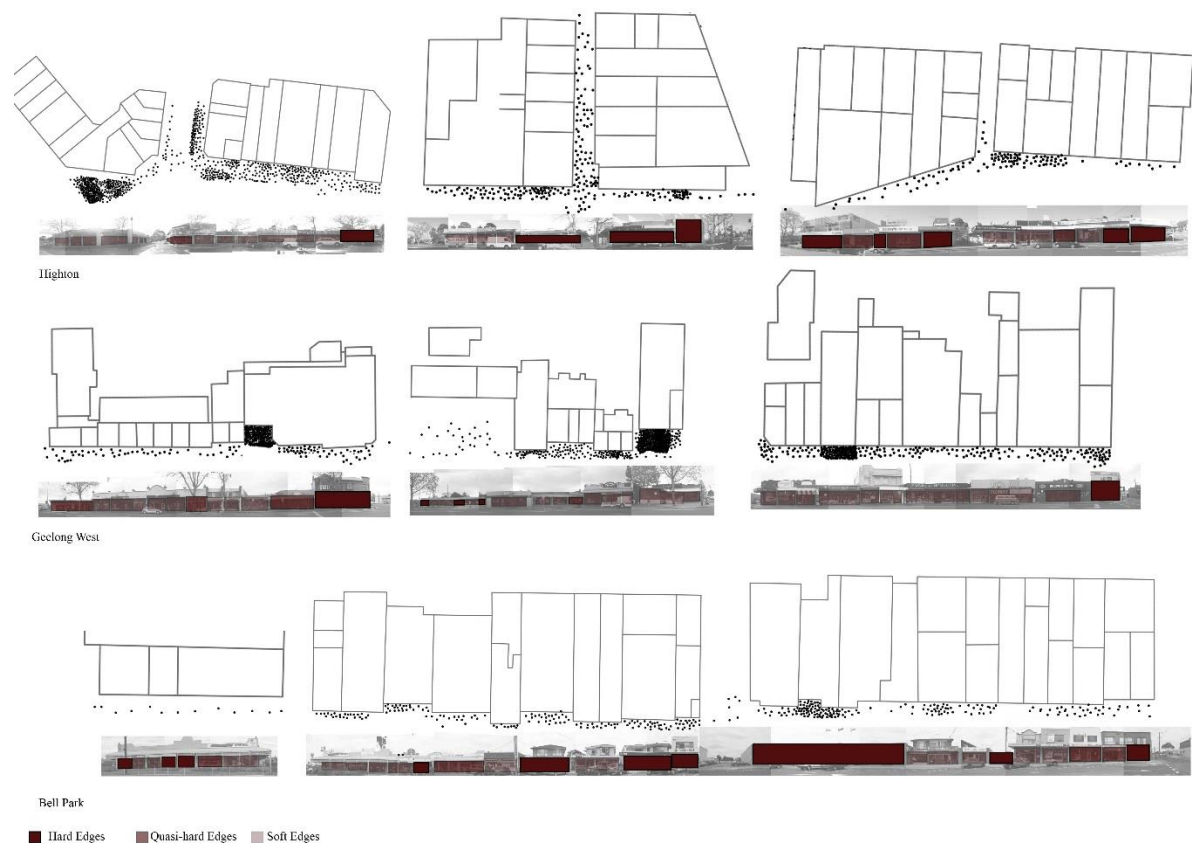


Figure 10 soft facades

Built on these levels and the combination of them, the case studies' facades have been evaluated in terms of softness and have been mapped in three levels. In Highton, the boundary of almost every shop has been defined through a glass window. In this sense, the boundary between inside and outside is transparent and the whole shop acts as a showcase. In a few parts such as the two banks, there are hard, plain brick edges, which have been identified as hard edges. Some of the shops, which do not have a very presentable inside have covered their windows with big banners of advertisement (for example the pathology, bank and pharmacy). These advertisements do not seem to perform as a marketing approach, rather they have been a solution for providing more privacy, where inside has

not been considered as a showcase for passerbys. These facades have been considered as quasi-hard edges.

Geelong West and Bell Park are also very similar to Highton in their facades, where most of the facades have been designed as window shops. In Geelong West, where many of the shops are boutique-style, the window shop is desirable, whereas in Bell Park, it has not been desirable for every use. Some of the shops have utilized these large windows as a bulletin board of advertisements. In all the streets, the complexity of the façade in terms of creating a vibrant and soft edge is missing. Although the facades are visually permeable and transparent and there is a high connectivity between inside and outside. They can be considered as monotone and uniform and are hardly able to engage the passerbys.

Comparing the softness maps with observation mappings and the number of activities reveals that the general pattern of activities matches the perceived softness of the edges, however, there seem to be a few exceptions. The point of exception has occurred in Separation Street, in Bell Park. Although a multi-function use on the street has attracted several activities, the facade is not as soft as other popular spaces on this street or the two other case studies. There is a variety of textures and articulation designed on this facade, however, the physical and visual permeability is hardly evident.

The facade used to be a non-transparent edge with a few openings to the different functions. Through renovation, the engagement between the inside and the outside was reinforced. After the renovation, the façade was designed to be more visually permeable and two private front yards were added to the edge beside the main entrance. However, the front yards were covered by coated reflective glass windows. The windows again have lessened the visual permeability of the inside. The activities on the front yards are not evident from the street. It seems that the outside environment was not pleasant enough to be engaged with the activities inside. The line of cars parked in front of the building does not seem to provide an inhabitable atmosphere. Although there are several of coming and going activities related to this building, there is no sign of activity outside on the sidewalk. The activities have been drawn to the building and inside spaces. The sidewalk and the car park, in front of the building, have not provided a pleasant connection between outside and inside. The entry has also been renovated to be more inviting to attract the activities towards inside.

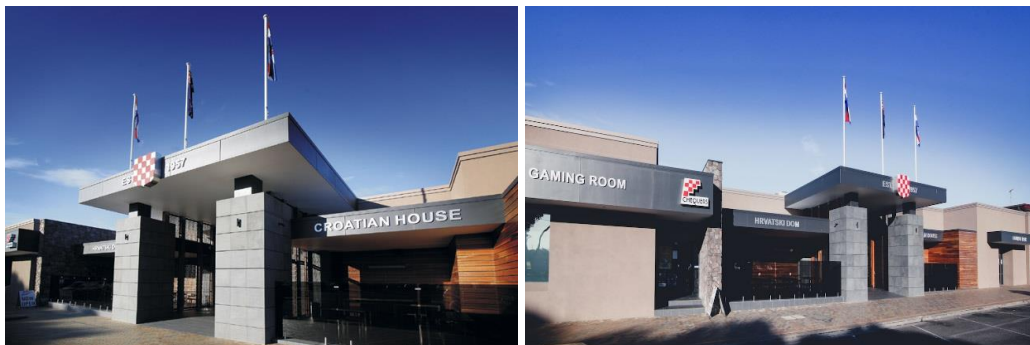


Figure 11 The Croatian House on Separation St, before and after renovation

Hence, the design of the edge itself and its softness is not a guarantee for occurrence of activities. The softness of the edge should be in line with the other built environment characteristics, such as the sidewalk design, orientation, greenery, and furniture. The role of activity repellents such as car parks or industrial sites, also, cannot be neglected.

Limitations

Developing and suggesting methods and tools for evaluation of public spaces inherently has limitations. There are several non-physical characteristics affecting the patterns of socializing behaviour on commercial streets. There are clear limitations in concentrating on the social life of streets without addressing the demographics and the socio-economic condition of the residents. Even considering the census data would not be sufficiently accurate, since the data has been collected based on postal codes and suburbs and a commercial street might be servicing to a few suburbs around.

Different regions and cities (and even parts of cities) have their own cultures and subcultures. Evaluating public spaces in such contexts must take into account the possible changing needs and focus on aspects of public space. For instance, in Bell Park, the number of migrants is approximately two times more than the two other suburbs, which

may affect the patterns of activities on the streets. Additionally, the density of residents is different in each suburb and although all the three streets have been selected from low residential density, they are not exactly similar.

Discussion and Conclusion

Through the observation of three commercial streets, located in residential suburbs of Geelong, we aimed to assess the degree to which the selected physical characteristics are affective in the social life of neighbourhood centres. Elements of typomorphology, diversity of uses, and softness of facades were evaluated through a bottom-up approach in order to investigate the complexities of the built environment and their role in the vitality of commercial streets.

The social atmosphere of a street seems to be manufactured through a hierarchical process in various stages. For instance, the three discussed elements occur in different stages of neighbourhood planning and design. Mixed land use and diversity of uses occur in primary levels of decision making and neighbourhood planning, while morphology of the street and softness of facades take place through the design stage, and there are other characteristics such as personalization which occur through post-design stages and simultaneously with the rate of occupancy and activities.

Although mixed land use is believed to contribute to the social life of neighbourhoods, the balance between uses and supplying the residents' everyday needs can be the key to the success of neighbourhood centres. If neighbourhood centres cannot provide this balance, they might not be able to sustain or might perform as other types of city hubs rather than a local centre (for instance Pakington Street is performing as a shopping-recreational hub). In this sense, the proportion of different type of uses is directly associated with the character and atmosphere of the street.

The typomorphology of the streets and the commercial street layout may affect the social life of the streets in several ways. In strip shopping areas, the placements of car park spaces repel the activities from the sidewalk. On the streets such as Highton and Geelong West, where the car park spaces have been designed in specific areas behind the main streets, pedestrian activity on the commercial streets is at highest. Additionally, the layout of the street can be designed strategically to reduce the vehicular speed on commercial streets.

The general pattern of soft facades seems to be in line with the pattern of activities. However, the exceptions (where the facades are soft and there is minimum activity) show that these attributes perform more effectively when they are consistent with other contributing characteristics, especially the ones that have been designed and decided in earlier stages of design and planning.

Although all the three discussed elements have been proved to be effective on the vitality of commercial streets, providing a sociable atmosphere seem to be the result of providing a combination of all these elements and minimising the role of activity repellents such as traffic. Therefore, creating a sociable environment starts from the earliest stages of planning and through linking and improving all the contributing characteristics together.

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**Low-carbon, Resilient, City Futures - A Design-Mediated Approach:
Visions and Pathways 2040**

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Low-carbon, Resilient, City Futures - A Design-Mediated Approach: Visions and Pathways 2040

Abstract

Transitions to low-carbon resilient futures require structural changes in socio-cultural-technological-physical systems. Cities are increasingly becoming the focus of vision-driven transitions research, which pose creative as well as analytical challenges due to high complexity and uncertainty associated with these projects. In this paper we aim to present an investigation of role of design in projects focusing on low-carbon transitions in cities using Visions and Pathways 2040 (VP2040) project as a case study. VP2040 is a four year long project funded by the CRC low-carbon living stream aiming to develop visions, scenarios and pathways for low-carbon resilient southern Australian cities by 2040 (Sydney, Melbourne, Adelaide and Perth). The project adopts a design-led approach, linking research and engagement in future visioning, for addressing problems of wicked and strategic nature. Our findings indicate that the role design can play in low-carbon transitions projects is various covering very tangible, technical, skills-based roles, to very intangible roles, relating to how information is received, processed and synthesised.

Keywords: *low-carbon, transitions, design, system innovations*

Introduction

We are halfway through the period referred to as “the critical decade” (Hughes & Steffen, 2013), which refers to the time in which our decisions and actions on climate change will determine the success or failure of transitions to low-carbon futures necessary to avoid severe implications for global society. The importance of cities in the success or failure of the global response to climate change is seemingly obvious. There are several reasons for cities increasingly becoming the focus of strategic climate action in this critical decade. First is merely about size and impact: cities are now where more than half the population of the world reside, with urban populations in cities projected to grow nearly to 70% in 2050 (UN-Habitat, 2011). Cities account for around 75% of global energy demand and 75% of greenhouse gas production while occupying only around 2% of the world land area (Hajer & Dassen, 2015; Satterthwaite & Dodman, 2009). Second is about innovative potential of cities: cities can be instrumental in generating the innovation and creativity necessary for low-carbon transitions (Bettencourt & West, 2011; Glaeser, 2011). Third is about the increasing agency of cities in climate change action: on the contrary to failed attempts of reaching global political

consensus for climate change action at level of nation states, individual cities and networks of cities are adopting reduction targets and actively investing in programs to reach them (Inayatullah, 2011; Rosenzweig, Solecki, Hammer, & Mehrotra, 2010). Four is about the historical and current role cities have been playing in social movements reclaiming democratic and environmental rights and thus in re-structuring long-embedded political institutions (Arampatzi & Nicholls, 2012; Harmanşah, 2014; Harvey, 2012; Leontidou, 2010; Walliser, 2013).

Transitions to low-carbon, resilient futures in cities is not just a technological issue as portrayed in many propositions. It is also a social, economic and governance challenge requiring fundamentally different systems, structures and practices to be conceived and implemented in all these areas combined. Ultimately, the transformation of cities requires a (rapid) transition from one set of socio-cultural-technological-physical systems to another set; the embedded (inter)relationships of these systems suggest that transitioning to a low-carbon resilient city involves a re-conceptualization of whole systems and a creative re-imagination of the future city. This is a design challenge of three-fold: The first challenge is conceptualisation of new systems that could support a vibrant, culturally satisfying and productive urban existence in the future based on renewable energy. This challenge involves conceiving new socio-technical systems complete with their institutions, organisational models including new business and governance models, technologies including associated products and services and new social practices including norms, values and behaviour. The second challenge is selecting, designing and developing those system concepts that will increase resilience even as the climate changes. Third challenge is designing participatory and democratic processes that are sensitive to the political nature of transition processes to deliberate and negotiate characteristics of those future systems and the innovation and policy pathways for their realisation with relevant stakeholders.

The distinguishing intellectual and functional characteristics and foundations of design activity has long been a topic of high interest in design discourse, particularly in the areas of design history and design theory (e.g. Archer, 1984; Cross, 2007; Krippendorff, 2006). Design as an approach to defining, framing, and solving problems has been distinguished from engineering and business approaches to problem solving (Gruber, de Leon, George, & Thompson, 2015). An engineering approach is seen as linear and purely attending to technical aspects of problems by first deconstructing the systems into components, identifying and assessing potential solutions and developing a systemic solution to the problem resolving the technical requirements identified during the problem definition phase. A business approach

begins problematizing observations of opportunities in the market, testing the problem definition and potential solutions through market research and finally developing a business plan articulating pricing, market penetration and distribution strategies. Different to both of these approaches, design starts with a focus on observing humans and systems in their context and in relation to each other and frames the problem based on insights acquired during this phase; i.e. it is human-centred. Therefore definition of design problems can accommodate not only technical issues but also socio-cultural and behavioral issues stemming from the dynamic interactions between humans and systems, which together create system behavior. The solution delivery in design is not linear or does not assume presence of a single-most optimum solution but follows an iterative process of concept generation, prototyping and testing, concept synthesis and delivers contingent solution proposals which can be negotiated by stakeholders, who become co-designers of a solution that will directly effect them, therefore, they are given agency and empowered through the design process (Brown, 2008; Frauenberger, Good, Fitzpatrick, & Iversen, 2015). Due to these characteristics, it has been argued widely and for long that, design approach is suitable for addressing problems with systemic, ill-defined and of political nature; i.e. wicked problems, which require generation of breakthrough knowledge and innovation, and, democratic deliberation (Dorst, 2003; Goldschmidt, 1997; Rittel & Webber, 1973).

In this paper we articulate different roles played by design in processes of transitions to low-carbon resilient city futures focusing on Visions, Scenarios and Pathways 2040 project as a case study. In the following section we briefly explain foundations of transitions to low-carbon futures in cities using a multi-layered model we adopt from system innovation and transition theories to use as a framework for our case study analysis. In the third section we present the case study. The paper is finalised with concluding remarks and suggestions for future research.

Foundations of Transitions to Low-carbon Futures in Cities:

Multi-layered Dynamics of Systemic Change

The *Socio-Technical Transition* approach, and particularly the *Multi-Layer Perspective (MLP)*, is a framework that developed out of historical studies of transitions in areas such as energy and transport, and is particularly powerful in understanding the complex interplay of different forces at the macro-, meso- and micro-level in creating disruptive change. The first version was introduced by Rip and Kemp (1998) and in 2000s has been refined and developed with the empirical research of Geels (2005). A central theme is the recognition of the co-

evolutionary development of technologies, institutions and social and economic subsystems. Therefore, although MLP has been developed with a focus on less complex systems than cities and therefore its applicability to cities is still up for debate (e.g. Naess & Vogel, 2012), the framework is a helpful heuristic for studying and activating low-carbon transitions in cities.

The MLP posits three levels to aid in understanding transitions (Geels, 2005): landscape (macro-level), regimes (meso-level) and niches (the micro-level). ***Landscape level*** (*macro*) sets the overall socio-technical setting that encompasses the dynamics of deep cultural patterns, macro-economics, macro-political developments that make up the environment or context of socio-technical transition. It is able to stimulate and exert pressure upon the socio-technical regime and hence plays an important role in stimulating a socio-technical transition. Landscapes are constituted by rapid external shocks, long-term changes and factors that do not change or change only very slowly (Van Driel & Schot, 2005) and they cannot be changed by actors in the short-term (Geels & Schot, 2007). ***Regimes level*** (*meso*) refers to the structures that represent the current practices and routines, including the dominant rules of scientific, business and market activity and technologies that provide stability and reinforcement to the prevailing socio-technical systems. The regimes also represent barriers to change. ***Niches level*** (*micro*) is the level in which space is created for experimentation and radical innovation. The niche level is more loosely structured than the regime and is less subject to market and regulation influences. There is much less co-ordination among actors than there is among the regime actors, but this allows for new interactions between actors to emerge that may support innovation.

Transitions and system innovations, therefore, require (Loorbach, 2010):

- *Strategic activities*. These involve the formation of long term goals and vision development that will lead to changes in the culture of a societal system. This includes dialogues on norms and values, identity, ethics, or sustainability.
- *Tactical activities*. These involve activities directed at implementing a transition agenda towards the desired goal and relate to interactions between actors that can build and align the new vision into the regime level. This can include activities relating to changes in structures, such as investments and other resource distributions, rules, incentives, and underlying infrastructure. Negotiations regarding interests are more common in this sphere. It also involves understanding barriers that may inhibit the advancement of the visions and propose adjustments that may be needed.

- *Operational activities.* These activities relate to the experiments and learning-by-doing at the niche level, often with an emphasis on radical and disruptive innovations that may potentially filter up into the regime and landscape level.

Socio-technical transitions in general, sustainability and low-carbon transitions in particular can be framed as archetypal examples of wicked-problems, especially when considered in the context of cities. Transitions involve identifying and aligning several interventions across different layers of nested socio-technical systems and involvement of both mainstream and niche actors in these activities as well as the general public. These interventions require long-term timeframes to be considered that span beyond election cycles, business strategic outlook and in some cases life-time of the members of currently alive human population (Gaziulusoy, Boyle, & McDowall, 2013; Holling, 2001; Jansen, 2003; Loorbach, van Bakel, Whiteman, & Rotmans, 2010). The outcome of interventions cannot be precisely foreseen and there is a requirement of experimentation and risk taking with a precautionary approach as far the current knowledge can accommodate (Frame & Brown, 2008; Ravetz, 2004; Ravetz, 2006). There is not a single preferable version of the future and alternatives need to be developed attending to different political agendas that are inherent in visions of sustainable, low-carbon futures (Scoones, Leach, & Newell, 2015).

Visions and Pathways 2040: Distinct Roles of Design in City Level Transitions

The Project & Project Team

Visions and Pathways 2040: Transitions to Low-carbon Resilient Futures in Australian Cities (VP2040) is a four year multi-partnered research and engagement project funded by the Australian Cooperative Research Centre for Low-carbon Living (CRC LCL). The project aims to develop visions, scenarios and pathways for low-carbon resilient city futures in Australia. The project is funded by the Australian Cooperative Research Centre for Low-carbon Living (CRC LCL). The CRC LCL has three research programs: 1. Integrated building systems; 2. Low-carbon precincts; 3. Engaged communities. VP2040 is funded under the third program but its content is meant to be capturing all three. The project started in September 2013 and involves collaboration of three universities (University of Melbourne (UoM), University of New South Wales (UNSW) and Swinburne University (SU)) in partnership with local governments from four Australian cities (Melbourne, Sydney, Adelaide, Perth) and several businesses including local branches of three large international architecture, design, engineering and planning consultancies operating across the built environment sector. The

project is led by Victorian Eco-innovation Lab (VEIL) which is a research unit residing in the Faculty of Architecture Building and Planning of the UoM.

The primary methodological content of VP2040 project is a series of participatory workshops bringing together members of the existing socio-technical regimes, niche-innovators, activists, designers and researchers to co-develop visions, scenarios and policy/innovation pathways through a systematic progression over four years. Currently the project is in its second year. Figure 1 summarises the completed and planned activities across four years.

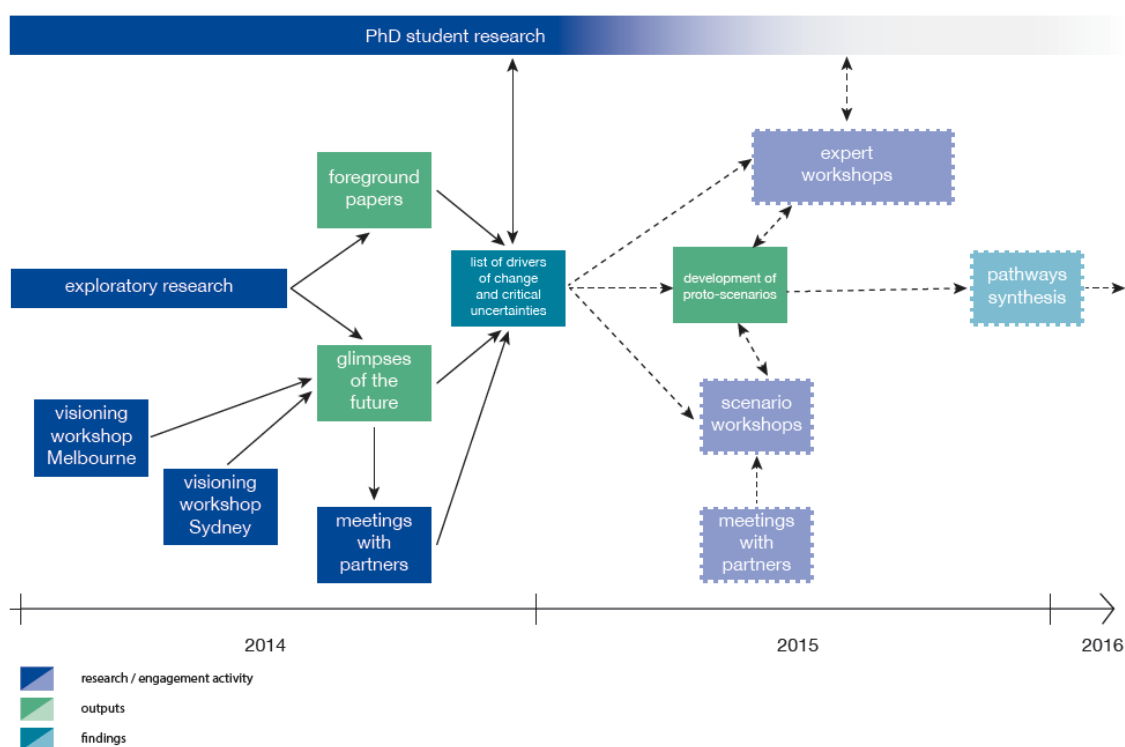


Figure 1 Project timeline

The core project team of VP2040 consists of a group of five members, each with different expertise relevant to the project with some overlaps (Table 1). Members of the team are based in the collaborating three different universities, thus representing a multi-university research partnership. There are also three PhD students, each associated with one of the three universities. These students undertake projects on topics relevant to the project covering energy transitions, governance of open space in cities and urban density.

Table 1. Core members of the research team

Role	Base	Expertise Relevant to the Project
Project Leader	UoM, VEIL	urban eco-innovation, design for sustainability, environmental policy, project leadership

Researcher 1	UoM, VEIL	design for system innovations and transitions, sustainability science, design research, transdisciplinary research, qualitative research, group facilitation
Researcher 2	UNSW, Faculty of Built Environment	climate policy, energy policy, environmental economics
Researcher 3	SU, Swinburne Institute for Social Research	science and technology studies (including innovation studies, sociology of expectations), futures studies, community and stakeholder engagement, strategic management, qualitative applied social research
Research Assistant	UoM, VEIL	cultural geography, qualitative research, consumer insight, event management

Roles of Design in VP2040

In analysing the roles of design in VP2040, we would like to refer to the concepts of diffuse and expert design as proposed by Manzini (2015). Manzini argues that everyone has a natural capacity to design and can undertake design activity. He calls this activity “diffuse design”. On the other hand, the activity that is performed by professional designers is called “expert design”. In projects aiming for systemic change, these two roles intermingle and interact in ways to enable participation of stakeholders in co-design of future visions as well as of strategies to achieve these.

In VP2040 both diffuse and expert design were significantly evident and occurred both individually and in dynamic interaction with each other. For example, diffuse design on its own was particularly evident during designing of the visioning process used in workshops in the first year. Because the team intended for generation of systemic visions of future cities (rather than visions focusing on specific provisional systems for example), there was no blueprint visioning process design they could use. Therefore, the process was designed from scratch with inspiration from processes previously used by VEIL, prototyped in the first visioning workshop held in Melbourne in April 2014 and following a group reflection on its fit-for-purpose, improved and the new design was used in the second visioning workshop held in Sydney in May 2014. On the other hand, expert design on its own was particularly evident in creation of visualisations of the futures envisioned by the participants during the visioning workshops. Following figures show a selection of these visualisations.



Figure 2. Melbourne CBD

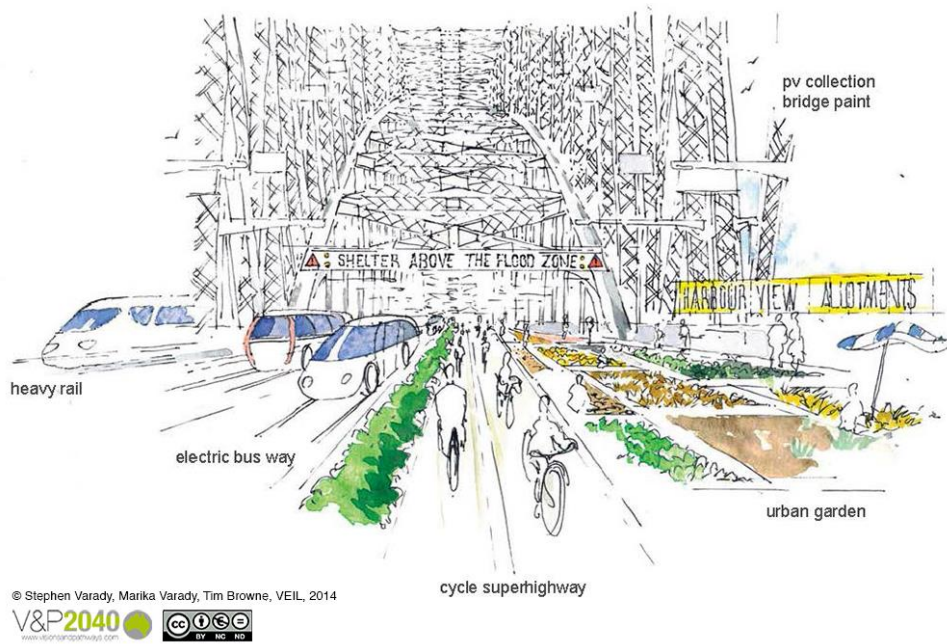


Figure 3 Sydney Harbour Bridge

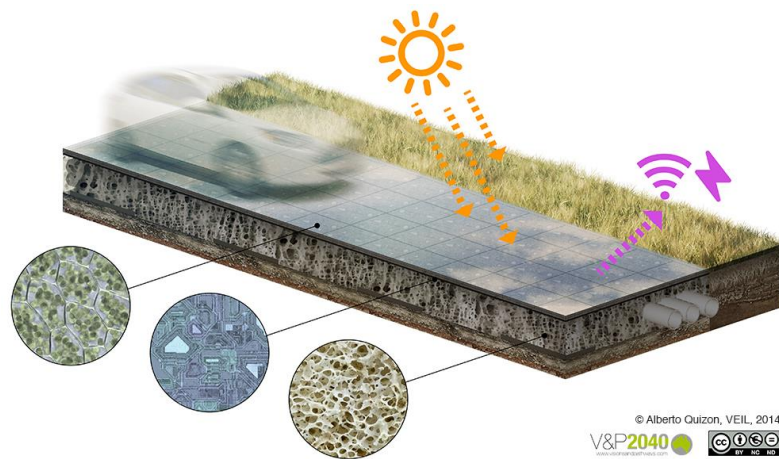


Figure 4 The “Living Road”



Figure 5 Sharing of resources and tracking of carbon footprint in a future neighborhood community

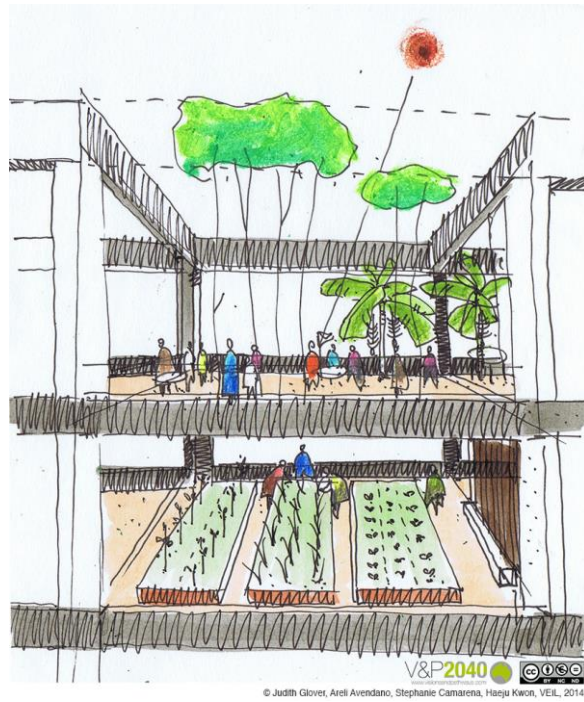


Figure 6 Urban agriculture in reclaimed buildings

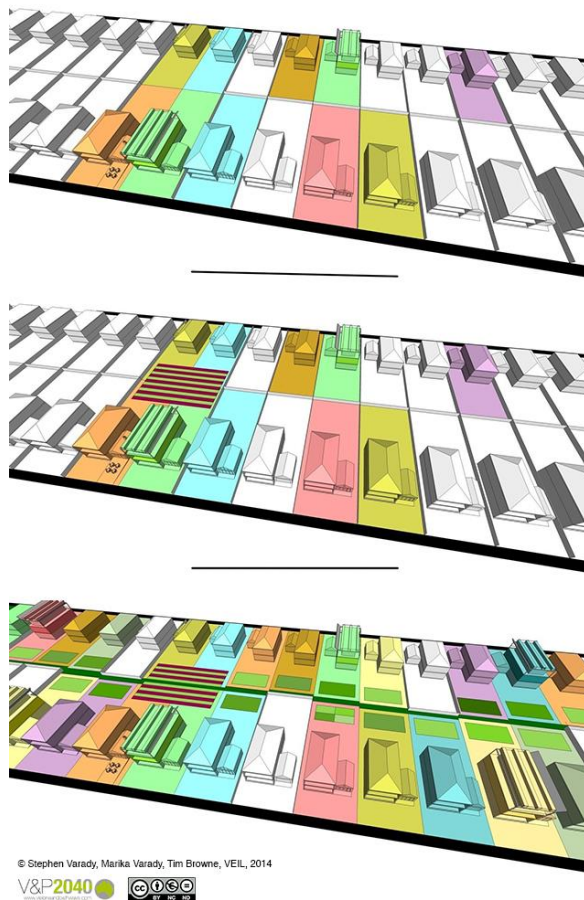


Figure 7 Emergence of “shared space” as a third type space in cities



Figure 9 Selection of details from table covers in Sydney workshop

Although, this was not a controlled experiment as both the participants and the commissioned designers were different in Melbourne and Sydney, and there were professional designers present as participants in both workshops, the higher prevalence of graphic elements as well as the level of detail in Melbourne workshops compared to Sydney may be interpreted as expert design had played a role in connecting otherwise unconnected ideas in a problem domain towards proposing a systemic concept. Also, the level of co-design can be said to be higher in Melbourne workshop as, through detailed sketches of initial design concepts, the participants had a chance to negotiate the proposals for city futures not only at ideas level (functions of systems) but also at design level (physical manifestations of systems). Therefore, it can be concluded that, expert design enabled stakeholder input to be embedded in the design output more effectively. There are numerous examples of this in literature on user-centred design and co-design, particularly focusing on product and service innovation (Bowen et al., 2013; Wilkinson & De Angeli, 2014). Nevertheless, this contribution of expert design has not been systematically documented before specifically in projects about futures of cities and in projects focusing on transformation of large systems in general. This provides proof that expert design can improve the quality of diffuse design not only in small scale and short-term projects but also in longer-term projects focusing on large, complex, socio-technical systems. Asaro (2000), echoing this dynamic resonance between expert and diffuse design, warned against seeing participatory design as merely an insertion of

public dialog within design practices and instead argued that it should be seen as a model for critical practice of design.

During week-long design charettes which were held following the visioning workshops in each city, both the commissioned designers and the members of the research team were present. The aim of these charettes were creation of visualisations depicting, what the research team called “glimpses of the future”, i.e. visual snapshots of desirable and plausible but not business-as-usual, systemic city futures which were radically low-carbon and resilient based on the visioning workshops and the exploratory research the research team members had been undertaking on emerging disruptive technological and social innovations that could assist with low-carbon transitions. The task at hand was complex and started with a debrief of visioning workshops in conjunction with findings of exploratory research. Then, the research team provided the expert designers with design briefs; each designer were given system levels to focus (city, precinct, neighbourhood), particular changes to depict (technological innovations, behavioural elements, products and services) but were not briefed about output format. The designers and the research team met several times during the charrette weeks and discussed concepts until the visualisations were finalised after several iterations. Although mainly a process of knowledge synthesis, this also required generation of new design knowledge by the expert designers. They not only contemplated what might be called could-be systems but also brought a lot of additional information into the process to be able to connect disparate types of knowledge but also system components displaying appropriate relations as a whole (Goldschmidt, 1997; Johnson, 2005).

Although throughout this process, diffuse design and expert design interacted continuously, expert design played a very significant role: a role of mediation between the diverse views on “desirability” and perceived plausibility of visions they observed during the visioning workshops as expressed by the participants and by the research team, thus indirectly negotiating the politics of transformations. The visualisations they developed communicated this diversity and later assisted the research team in developing four distinct future scenarios each with different emphasis on the role of technological change versus socio-cultural change in achieving low-carbon resilient city futures. Akama (2008) identified a similar role played by design in her research as initiating and facilitating a human-centred inquiry which enables surfacing and discussion of politics, agendas and assumptions of both direct and indirect stakeholders within projects and building relationships through which deliberation can take place. This is defined as the “dialogic role” of design.

If we refer back to the activities mentioned in Section 2 as required for system innovations and transitions, i.e. strategic, tactical and operational activities, and break down the roles played by design based on this framework we can draw a picture that directly links roles of design with the activities undertaken in system innovations and transitions. The roles played by design in facilitating human-centred and participatory inquiry in envisioning desirable futures as well as assisting with articulation of diverse politics embedded in these visions is directly related to the strategic activities. We have observed this role in our project so far in visioning workshops and the following design charettes. The dialogic role design plays is also crucial in tactical activities as these involve deliberation between proponents of the new futures proposed and actors embedded in incumbent regimes. In our case, this happened more organically and dynamically during the visioning workshops rather than through a linear progression of visioning followed by vision negotiation. The participants in the visioning workshops covered niche innovators as well as stakeholders who were operating within the existing socio-technical regimes. Therefore the visions generated were not only instrumental in kick-starting a transition project, the key role they have in most transition projects, but they were also operational, i.e. they depicted futures that stakeholders would be inclined to act upon. In a way, the buy-in of incumbents were assured through participation into vision development at the outset. The scope of VP2040 project does not include undertaking operational activities but instead identifying what operational activities could assist in low-carbon transitions, therefore it has a strategic role rather than an implementation role. This role has partly been played by identifying participants' view on emerging disruptive innovations through visioning workshops and the ongoing dialogue facilitated by the visualisations. In the next phase of the project, rather than taking them as given, the disruptive innovations will be exposed to expert deliberation to get a critical view on their actual potential in achieving low-carbon resilient city futures.

Conclusions

Design becomes visible through the outputs it creates, therefore it is understood by the general public with references to these outputs. Nevertheless, the role design plays in knowledge generation within society in general and generation of knowledge and strategies in the context of system innovations and transitions is numerous. In this paper, by using VP2040 project as a case study, we explored some of the roles played by design in participatory exploration of low-carbon resilient futures in Australian cities and we identified several

instances of expert design and diffuse design operating on their own as well as in a dynamic interplay with each other. The particular roles that were explicitly observed include:

Role of Design in Inquiry

Participatory inquiry

Human-centred inquiry

Analysis and synthesis of different knowledge forms

Systematising problem solving methodologies dealing with wicked problems

Attending to different politics and value sets of stakeholders through articulation and option creation

Dealing with uncertainty

Dealing with complexity of socio-technical systems

Transdisciplinarity

Role of Design in Process

Iteration and prototyping

Facilitation of participatory inquiry, design and deliberation

Role of Design in Outputs

Visual communication of future technologies, city forms, products and services and social practices

Scenario prototypes pre-negotiated by the stakeholders

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Social aspects of urban food production: a case study of Coogee Community Garden in Sydney

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Social aspects of urban food production: a case study of Coogee Community Garden in Sydney

ABSTRACT:

Currently a significant movement is underway globally to integrate urban food production within existing built environments. Enthusiasm in people to utilise vacant land, brown-field sites, rooftops and street verges for urban agriculture is creating urban regeneration, positive socio-cultural benefits, improved environmental performance and better public health. A review of qualitative research conducted on two Australian and one international community gardens case studies identify distinctive factors that encourage social participation and community engagement. This paper explores aspirations, motivations and expectations of Coogee Community Garden members in growing food at an early stage of the garden. Outcomes suggest urban food production in community gardens has huge potential to motivate regeneration, sustainability, active lifestyle practices, knowledge sharing, social connectivity and a well knit community.

Keywords: *community garden; urban food production; social participation; sustainability; urban regeneration.*

Introduction

Communities throughout the world are recognising the immense significance of local food production within existing built environments. Community gardens could provide nutritious fresh food close to home; reduce farm to plate distance considerably; deliver useful carbon and storm water benefits; improved public health, better social connections and food security (Gaynor 2006; Thompson, Corkery and Judd, 2007; Turner 2011; Kingsley and Townsend, 2006). They could be established as an alternative food network, and showcase a model of sustainable urban living (Turner 2011).

In recent years, there have been significant rises in the number of community gardens in USA, Canada and also in Australia. Many brownfield sites and vacant land in urban areas have been revitalized to make them suitable for growing food by local communities and as places for social interactions. Research has focussed on understanding specific dimensions of community gardens, but significant gaps exist. Underlying optimism and thoughts of individuals that facilitate these collective efforts at the inception of establishing productive

urban spaces become invisible in the process. Limited research has been conducted on understanding aspirations, motivations and influences that facilitate participation in the early stage of a garden. This paper focuses on understanding these aspects.

The community garden at Dolphin Street, Coogee in the Randwick Council, Sydney (Fig.1) was of considerable interest as it was in the initial set-up process in 2013. This created a unique opportunity for researchers to explore the garden from an initial stage. The garden is also located on a brownfield site, thus, reclaiming land for urban food production. This collective effort of the Community Garden Group in this garden initiates an important urban renewal process in denser settlements recreating green infrastructure and connecting the garden to the existing wider green network of the city. In addition to this case study, interviews and surveys conducted on three national and international case studies at later stages of the garden were analysed.

Fig. 1: Coogee Community Garden, Dolphin Street, Randwick, Sydney



(Aerial photo source: SKM Imagery)

Research questions and objectives

The five key research questions are:

1. What are key expectations of participants at a setting up stage of a community garden to enable community engagement and urban food production?
2. What are the key motivations and influences that guide social participation a community garden?

3. What types of activities, urban food growing and location would satisfy the members the most to enable a meaningful experience of the place?
4. What practical initiatives for managing, funding and time commitment would be useful for the continuation garden over longer time period?
5. What are the existing gardening skills and what essential training needs are there for participants?

Research Methodology

This research adopts a qualitative methodology consisting of two steps. Firstly, a literature review of community gardens, and a desktop analysis of surveys and interviews already conducted in three community garden case studies in later stages of a garden's life were undertaken due to non-availability of research data at an early stage in the life of a community garden. Two Australian case studies: City of Tea Tree Gully, South Australia and City of Canberra, ACT, Australia and one international case study: Cuyahoga County Extension, City of Cleveland, Ohio, USA, altogether three case studies were considered. These case studies were selected based on some similarities of the factors which were explored too in the Coogee Community Garden interviews in Sydney. Important aspects of these three garden case studies that influence social participation and engagement were analysed and compared.

Secondly, semi-structured interviews with a total of nineteen carefully designed questions were conducted with the members of the Coogee Community Garden in Dolphin Street, Randwick City Council. Very limited research has been conducted at an early stage of garden to understand the participating community's hopes and motivations that guide social participation and community engagement in the gardens. These interviews focus on these less explored areas of research. At the time of conducting this research, Coogee Community Garden was in its formative stage and offered a unique opportunity to investigate aspirations of garden members. A community garden could have a small number of members in an early stage, but the group of people involved is likely to have sound capabilities, sustainability awareness, innovation and significant motivations to initiate a social change through urban food production. Sample sizes are governed by the nature of the qualitative research project (Silverman, 2013). A total of seven semi-structured interviews on the Coogee Community Garden were conducted in end of 2013

and early 2014. Although seven interviews is a small number, it is adequate and valuable as it represented a 14% response rate which is very good considering limited number of members, or the total research population. Each participant was considered as a highly competent respondent for an interview; provided better accuracy in outcomes and met reliability and validity criteria for qualitative research (Silverman, 2013). The duration of the interviews ranged from thirty to forty five minutes. An ethics approval from UTS Human Resource Ethics Committee (HREC) was sought and the interviews were conducted after obtaining consents from the respondents.

Interview questions were grouped under mainly four areas: (a) demographic information on age group, ethnicity and gender; (b) motivations to joining Coogee Community Garden Group; (c) level of expectations and satisfactions of the garden members from this garden and (d) skill levels and training needs required. Altogether six factors were explored in these interviews:

- i. Previous experience in growing food;
- ii. Motivations to growing food;
- iii. Expectations, satisfactions and influences;
- iv. Management and financial contributions;
- v. Time commitments;
- vi. Self-reported skill levels and training needs for gardening;

While previous experiences provided connections and backgrounds of the participants to growing food, motivations, expectations and satisfactions provided information on their aspirations, goals, sustainability awareness and participation in a community. Management methods, financial contributions, individual time commitment and skill and training needs were documented to understand the smooth functioning and continuity of the garden as an ongoing collaborative and collective effort. One of the limitations is that the viewpoints of existing and future members shaped by their experiences, potential and quality of the garden may change or remain unaltered over the garden's lifecycle. The semi-structured interviews conducted at an early stage of setting up of Coogee Community Garden provide a snapshot of viewpoints of members at a particular point of time and may transform over time. To address this limitation, similar interviews could be undertaken at different stages of this garden to understand these variations and to form a longitudinal study.

A review on community gardens

‘A community garden’ has been defined differently and defining specifically could be challenging. Lawson (2005) defined the garden as a

‘....neighbourhood garden in which individuals have their own plots yet share in the garden’s overall management.’

City of Sydney’s Community Garden policy provides a comprehensive definition that,

‘Community gardens are unique forms of public open space which are managed by the community primarily for the production of food and to contribute to the development of a sustainable urban environment. They are places for learning and sharing about sustainable living practices, and for actively building community through shared activities.’ (City of Sydney, 2014).

A survey of 1,390 Australian households and interviews with experts and community gardeners in 2013 by ‘The Australian Institute’ (2014) found that one out of two Australian households equal to a total of to 4.7 million households are growing some fruits, vegetables and herbs, either at individual home gardens or in community gardens. Although currently only a small percentage, 1% of the food gardeners surveyed were growing in a community gardens, 13% of Australians reported that they aim to start growing food in home or community gardens within a year’s time.

Literature on community gardens have significantly focused on social aspects community gardens and their potential in building communities (Gaynor, 2006; Thompson et al., 2007; Turner, 2011; Turner and Henryks, 2012). ‘Social participation’ and ‘community engagement’ for building community are two very important contributions of a community garden. ‘Community engagement’ links to collective working of people for action, learning and creating a better community future (Tamarack, 2015), while ‘social engagement’ measures key influences that connect to three factors: social networks, sense of belonging and trustworthiness (Employment and Social Development, Canada, 2015). Community gardens can be categorised as ‘place based’ and ‘interest based’ (Firth, Maye and Pearson, 2011) gardens. In ‘place based’ typologies, ‘territoriality’ and significant rights of local community are important aspects (Firth et. al., 2011). The location of the gardens in various places (such as in a neighbourhood, public housing, refugee centre, schools and universities and hospital) would have divergent aims and objectives and different associated outcomes (such as better health, building sustainable neighbourhood community, a meeting place and therapeutic benefits). On the contrary, ‘interest based’

types of community gardens could focus on diverse and wider communities and mainly attributed to generating social capital (Firth et. al., 2011). Moreover, the contributions of community gardens depend on physical design and the aspirations and motivations of the garden participants (Turner and Henryks, 2012). Community gardens provide significant urban renewal opportunities by revitalising vacant lands to productive uses and creating social and psychological well-being for the community. Montgomery's (1998) review of different design approaches concluded that

'... successful urban places must combine quality in three essential elements: physical space, the sensory experience and activity' (p. 96).

A qualitative study on a community garden located in a high rise public housing estate in the Sydney's inner west, Waterloo established that significant physical, emotional and spiritual well-being are associated with the garden for city dwellers and public housing tenants (Thompson et al., 2007). The outcomes from the in-depth interviews with the key stakeholders and focus groups validate that this garden creates a sense of belonging; builds social capital effectively in multicultural communities and is a valuable strategy for

'...community renewal, empowerment and capacity building' (p.170)

(Thompson et al., 2007)

As this is a transdisciplinary field of research, relevant social capital, community engagement and participation and environmental psychology theories are also applicable.

A comparison of Australian Bureau of Statistics (ABS) 1992 survey data with 2009 and 2013 survey data by the Australian Institute shows that there was decrease in households growing fruits from 35% to 24% in 2009 but increased again to 29% in 2013 but households growing vegetables increased by 3% in 2009 from 35% in 1992 and only by 1% to 39% in 2013 compared 2009 (ABS, 1992; The Australian Institute, 2014). A number of environmental, social and cultural factors, rapid urbanisation and further densification of cities are creating space constraints for growing food especially for people living in flats and apartments. According to ABS data, 8.4 million households live in flats, apartments or units in Australia (as quoted in The Australian Institute, 2014). This 2013 survey outlines that presence of children in the households is noticed as an important demographic characteristic for involving in food gardening and 61% of food gardening households had children 11 years or younger (The Australian Institute, 2014). In the following Table 1, outcomes from qualitative research on three national and international case studies are presented based on the common criteria and important factors.

Table 1: Comparison of three national and international case studies

Case studies and sources	City of Tea Tree Gully, South Australia (City of Tea Tree Gully, 2009)	Cuyahoga County Extension, City of Cleveland, Ohio, USA (Blaine, Grewal, Dawes and Snider, 2010)	Canberra, Australia (Turner and Henryks, 2012)
Survey type, No. of participants	An online survey, a total of 35 community gardens, total 110 participants.	Telephone interviews with 488 community gardeners; a sample size of 390 but 124 completed surveys, a response rate of 32%. 58% female, and 42% male.	17 community gardens, Online Survey of a total of 291 people, 32% men and 68% women Age groups: across 40-50 and 60-70 years
Travel distance and mode to community garden	1/3 respondents willing to be living within a walking distance from a community garden, rest 61% supported a car or public transport travel up to 30 minutes to the garden.	53% walk and 41% travel by car to their plots in the community garden; Two-thirds require less than 10 minutes; only 10% need 20 minutes or more of travel time.	More than 60% participants travel to garden by car. Reasons: transporting gardening tools and produce. Participants travel from surrounding suburbs. Garden location at a walking distance was preferred.
Time commitment/ time spent	Mostly up to 3 hours per week gardening, a 20% worked 4-10 hours. While 43% were unsure, 1/3 was willing to spend extra time on garden related activities.	One third spend less than 5 hours/week. 22% spend 15 hours or more. Every additional garden year spent, weekly 12 minutes worktime is added. For growing every additional vegetable serving an extra 45 minutes gardening required. On average 4.3 hours more weekly needed to donate.	Not included
Current gardening experience and other skills	Administrative assistance (67%) and horticultural knowledge (46%) Only 7% had previous community garden experience;	Wide range of experience among respondents, with 48% involved for fewer than 5 years, 14% with experience of 20 years or more.	67% supported individual plots; only 33% supported communal plots; 25% respondents are community garden members currently and the rest 75% are not.
Social networking & community engagement	63% supported socialising; 37% interested in family involvement;	Approximately one third of gardeners donate produce for charity; those who donate spend about 40% more time in growing food.	70% interested to join for growing better tasting good quality organic produce, enjoyment and outdoors.

Growing good quality local food	14% interested in heritage food production.	All gardeners produce edible products, with 100% growing vegetables. 49% grow flowers	84% of interested to join a community garden to grow food organically; only 16% cited no importance.
Diets for better health and security	Fresh food growing main focus for health; education of young	Over 50% of respondents consume daily 2-3 servings of both fruit and vegetables. 18% of gardeners eat more than 3 daily servings of fruit, but over 1/3 consume 4 or more daily vegetable servings. 29% expect no change, 71% believed in their dietary change. 44% think in 1 year of gardening created significant dietary changes.	50% of the respondents wanted to be food secure; rest 50% were keen to economic savings.
Interests/motivation to join community garden	39% said they would prefer a communal or shared garden; 20% preferred a garden with individually leased plots; 38% had no preference. Limited growing space at home.	Participation reduces with income. Lower income groups participate more in the garden program due more availability of time.	Grow larger quantity of food, reviving urban gardening; building community; food security; developing knowledge and skills; space constraints at home.
Sustainability practices	54% of the gardeners apply permaculture methods; water conservation;	Approximately 2/3 of gardeners do not use chemical pesticides or fertilizers.	30% wanted to re-green unused or derelict land; 40% wanted to showcase growing, recycling and composting practices to the wider community.
Community garden preference to individual garden	Not included	Not included	70% interested to join a community garden. Out of this, a total of 90% had home gardens and only 10% did not have home gardens.

Sixty seven gardeners were interviewed across twenty nine community gardens in Denver, Colorado, USA. Ninety five percent of community gardeners donate to grown produce to food banks demonstrating their social responsibilities to serve the community (University of Colorado, USA, 2011). Similar initiatives have also been demonstrated by community gardeners by working additional time to grow food in Cuyahoga County Extension, City of Cleveland, Ohio, USA (Blaine et al., 2010).

More interesting facts have been noticed in recent years. Community gardeners in Denver, consume at a higher average of 5.7 servings of fruits and vegetables a day compared to the non-gardeners consuming only 3.9 servings (University of Colorado, USA, 2011). In community gardens in Canberra, ACT, Australia, household size of half of respondents is two people and 31% lived in households of three or four people. Distribution of dwelling types where respondents lived are: 77% lived in a free standing structure or separate houses and rest of them lived in flats (9%) and in townhouses (14%). But still joining community gardens was important for people from the different suburbs at different locations in Canberra (Turner and Henryks, 2012). Six motivational themes identified in Australia wide participants were: health promotion; social inclusion benefits; environmental concern; connections to nature; knowledge building and creative expression (The Australian Institute, 2014) significantly link to the social and community dimensions.

Coogee Community Garden interviews

In Coogee Community Garden nearly 100% of the respondents were Australian and five out of seven respondents were female. Participants' ages were evenly distributed in three age groups: 26-40 years, 41-60 years and 61+ years.

Previous experience in growing food

Interestingly, only three respondents out of seven did not have any previous experience of growing food. While rest had some experiences growing different types of vegetables and fruits and herbs, with friends and families at home and other community gardens. This establishes that connections to vegetables, fruit and herbs growing were at both intra-generational and inter-generational levels.

Motivations to growing food

The participants had varied motivations to joining the garden. Most of the participants reported significant interests to grow food although they lived in apartments. There were significant space constraints, poor quality soil and lack of solar access for growing food. Due these problems the participants in spite of their hard work could not grow well vegetables and fruits in their current residences.

'I have lately started growing my own fruit and vegetables, yes. ... not very well, there is not enough sun, the soil was terrible. I built it up but the main problem is there is not enough sun....' (Interview B).

This was one of the important motivations for more than half of the respondents to join the Coogee Community Garden to grow their own food. The garden provided an access to a highly valued space to translate thoughts into reality for the participants living in apartments.

'Having failed in my own garden, if I could do it there that would be great.' (Interview B)

'.....it's a good use of the land and to establish that for the community around here where there are a lot of apartments' (Interview N).

Personal motivational factors shaped by individual qualities, commitments, goals, lived experiences and sustainability awareness were very important for joining the garden. Memories of growing food were connected to distant and local homelands. Some of the motivations were: learning new gardening methods; meeting people informally and making friends; harvesting fresh and nutritious locally grown organic food; active lifestyle through gardening; connecting to nature; experiencing immense joy and happiness associated with growing food and becoming a part of a community.

'I hope I can meet other people, it does not have to be a big social occasion, but for a chat'. (Interview N).

'....the joy of gardening and growing, and sharing that, and yeah, having that communal I think is great'. (Interview G).

Proximity of the garden and ability to walk to the garden required reasonably shorter time for commuting, convenient and was one of the critical reasons for joining.

'Because it is walking distance from here really, so it is easy to access.' (Interview C).

This facilitated effective community building and social interactions across the local community.

'They are trying to promote the growers to be within a one kilometre radius or may be it is one and a half kilometres radius. Really I am meeting my neighbours, most of the people live on the next street.' (Interview G).

Commitments to adopt sustainable lifestyle practices such as worm farming, carbon footprint reduction in growing own food and onsite composting etc. were important aspects for participation in the garden. The garden acted as a useful platform for incorporating knowledge of permaculture principles, companion planting and sustainable practices for some of the respondents within their daily life styles.

'...building a community, growing my own food, not having to travel to get my food, cutting down on my air miles, improving the community by growing a garden, because I think that has a really good impact on the community, getting to know other like-minded people.' (Interview M).

Expectations, satisfactions and influences

Growing better food in this community garden was an important expectation and a useful way for the households to generate new knowledge on gardening and establish community connections. 'Better food' was defined as

'....fresher, organic, more variety, and seasonal' (Interview M).

'.....expectations would be definitely developing knowledge on how to actually grow things and actually take something tangible, physical from the garden. Also creating social contact with the people that live in the area.' (Interview G).

Respondents' expectations were to grow a variety of vegetables, fruits, and herbs. Some preferred choices of vegetables were: green leafy vegetables (such as lettuce, rockets), spinach, artichokes, tomatoes, eggplants, capsicums, potatoes, zucchini, carrots, root vegetables, beetroots and chards. Preferred fruits were: lemon, strawberries, pomegranate and fig and herbs such as basil, parsley, and coriander. Organic gardening practices was an important goal in growing food. Growing own food, meeting other people informally and recreational aspects of the garden would be very satisfying for the respondents.

'I would like to have the satisfaction of having something to eat. That is the success of having something growing and be part of a team, the group that is doing this'. (Interview A).

Randwick Community garden had influences on the members joining this new garden. Connecting the children who live in high density areas to nature, developing their understanding on how foods can be grown locally and creating an intra-generational

communication with the elders in the community were essential.

'I just feel that even if some of the kids can come out of the apartments and get a bit of understanding of what it's like to grow things and some of the older people communicating with them'. (Interview N).

Table 2: Outcomes from Coogee Community Garden Interviews

Factors	Attributes	No. of responses / 7
Previous experience in growing food	Have previous experience with family & friends	4
	No experience at all	3
Motivations to growing food	Harvesting better quality vegetables, fruits and herbs	7
	Community building and social engagement	5
	Meeting people and making friends	5
	Learning new techniques and sharing knowledge	5
	Connections to nature	3
	Adopt sustainable lifestyle practices	7
	Lack of availability of spaces to grow own food	5
	Lack of solar access to grow food	4
	Garden location at a walking distance	6
Influences	Knew someone in the other community gardens	5
	Knew someone in the Coogee Community Garden	1
	Did not know any one Coogee Community Garden	6
Time commitment	1-2 hours per week	3
	3-4 hours per week	4
Management methods	A leadership role and specific responsibilities	3
	Clarity around decisions and consensus	1
	Regular meetings	1
	Working bees, volunteering and working together	5
Financial contributions	Agree up to \$50 to \$120/year plus membership fee	5
	Did not mention	2
Self-reported skill levels in gardening	Excellent	0
	Very Good	0
	Good	2
	Satisfactory	2
	Needs training	1
	Did not mention	2
Garden training Needs	Basic	4
	Intermediate	0
	Advanced	1
	Not required/Did not mention	2

Management, financial contributions and time commitment

While three out of seven participants supported importance of a leadership role and giving specific responsibilities to people for well management of the garden, there were noteworthy supports from five out of seven participants for working in a team, organising

working bees, training sessions and volunteering in the garden activities. Financial contributions ranging between \$50 to \$120 per year plus an annual membership fee for having a plot in the garden was well accepted by five out of seven participants. Potential time commitment for growing food on the rooftop garden varied from one to four hours per week but all the respondents were ready to commit a couple of hours per week.

Skill levels and training needs

Two out of seven participants rate their skill levels in each good and satisfactory levels but none reported their current skills as excellent or very good. This outlines why four out of seven respondents thought basic level training for them would be essential, while only one specified advanced level training is required. Table 2 summarises outcomes from Coogee Community Garden interviews.

Recommendations and conclusion

From the analysis of three selected case studies and Coogee Community Garden case study, it is clear that a community garden can act as a model of social change and a platform for community building, social participation, education and creating active and liveable community. Expectations on social networking and community engagement, joining for enjoyment and making friends, experiencing outdoors, enhancing knowledge and growing good quality local food were highly supported by the participants. Community development potential of a garden was highlighted in all the case studies. Coogee Community Garden is a 'place based' garden type (Firth et. al., 2011), focussed on creating a meaningful local community for now and into the future.

'I think community gardens, can bring that sense of, there is a community in this place, there is actually people who worked together that may not have known each other. That is another point that I think joining a community garden, you suddenly become part of a community'.
(Interview D, Coogee Community Garden).

Space restrictions and shade were important factors to join the community gardens in Canberra and Coogee. Lack of spaces to grow in the housing typology of units/flats/apartments would guide creation of more community gardens in Australian cities. Walking is one of the most preferred mode although people can use different travel modes to get to the community gardens. Time commitments varied depending on personal goals of the

gardeners, for example, gardening for charity (Blaine et al., 2010), commitments and life style patterns. The gardening skills are governed by duration and association of a member with the garden over the time period. A community garden's preference to an individual or home garden is clear in the interviews of City of Tea Tree Gully (39%) and Canberra (70%) in Australia (City of Tea Tree Gully, 2009; Turner and Henryks, 2012).

Recommendations follow based on the outcomes from this analysis are to:

1. Set up more community gardens to improve access to fresh food and establish a local food system of production, distribution (e.g. food cooperatives, farmers' markets) and disposal for creating healthy communities;
2. Develop detailed 'how to' guidelines and plant (vegetables, fruits, herbs and indigenous) selection suggestions for growing year round in the community gardens.
3. Organise events, meetings and cooking classes in the community gardens to showcase and to encourage networking and participation across the local community;
4. Organise relevant training and working together sessions for members for sharing and enhancing knowledge on gardening practices;
5. Promote sustainability practices such as applications of permaculture principles, organic gardening, worm farming, organic composting and rainwater harvesting;
6. Formulate appropriate management processes for smooth functioning of the garden over a longer time period;
7. Develop further funding collaborations with non-governmental organisations (NGOs), government and private organisations, local governments and developers.

Community gardens are particularly valuable in promoting better health, better access to food, education, social networking and for initiating a successful place making or urban regeneration process. This research provides a strong foundation for initiating a discussion on recreating and continuing collaborative efforts in community gardens within denser built environments.

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**TRANSITIONING TO SUSTAINABLE CONSTRUCTION: TOWARDS A DISASTER
RESILIENT BUILT ENVIRONMENT IN MALAYSIA**

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Transitioning To Sustainable Construction: Towards a Disaster Resilient Built Environment in Malaysia

ABSTRACT: In alignment with urban system transformation, smaller and medium countries with low- and middle-income in Asia have been rapidly growing since the year 2000 compared to the other parts of the world. In pursuit of transitioning Malaysia towards urbanization, transportation and infrastructures have been upgraded and more buildings for commercials and dwellings are provided to meet the increasing demand. The massive and aggressive construction activities have taken its toll on the environment. The scorching hot weather, flash floods, landslides and the urban heat island are among the alarming signals to shift towards sustainable approach in development activities. Aware of the destructions caused from the construction industry to the environment, sustainability initiatives have been encouraged by both government and private sectors. In spite of the initiatives, there are still many challenges in implementing a successful sustainable construction practice in Malaysia. However, with the increased vulnerability of the natural environment to “human-triggered” disasters such as floods, landslides, typhoons and etc. we need more than just mediocre sustainable construction practices. The transition towards more sustainable and resilient approach in construction would make a tremendous positive recovery to the current built environment. Thus, this paper aims to persuade awareness for the enhancement of participation within the construction industry towards administering a holistic sustainable disaster resilient construction practice. The objectives are to study the scenario of sustainable construction implementation in Malaysia and to identify the potential of adopting the element of disaster resilience in the sustainable construction practice. A systematic review was executed to evaluate all published research studies that have addressed this issue. Published studies and reports were collected based on a set of specific criteria pertaining to the issue of the construction industry with relevance to environmental sustainability and disaster resilience. From the results, it highlighted that the construction industry in Malaysia is still at its infancy stage of practicing a holistic sustainable construction. Therefore, this opens up an opportunity to adopt the element of resilience in the sustainable construction practice. The integration of sustainable construction framework and post-disaster reconstruction framework is expected to result in a proposed holistic framework for Sustainable Disaster Resilient Construction practices.

Keywords: Sustainable construction, sustainable development, resilient development

Introduction

Throughout the world, the construction industry is responsible for high levels of pollution resulting from the energy consumed and during the extraction, processing and transportation of raw materials (Ding, 2007). It has significant impact on the environment, economy and the society, and buildings are one of the biggest contributors to greenhouse gas emissions for which they are responsible for 38% of all Carbon Dioxide emissions (US Energy Information Administration, 2014). The usage of mostly non-renewable resources also makes construction, one of the least sustainable industries. Table 1 show the estimated global resources used in building:

Table 1: Global resources used in building.

Resource	(%)
Energy	45-50
Water	50
Materials for building and roads	60
Agricultural land loss to buildings	80
Timber products for construction	60 (90% of hardwoods)
Coral reef destruction	50 (indirect)
Rainforest destruction	25 (indirect)

(Hawken, Lovins, & Lovins, 1999)

In spite of its negative environmental impacts, construction activities however are inevitable. This can be evidently seen especially in developing countries such as Malaysia. In pursuit of becoming a developed country by the year 2020, Malaysia has been going through a massive change towards urbanization. The steadfast road to urbanization has seen a lot of major construction activities being carried out and often they are carelessly being conducted in unsustainable practices.

Sustainable Construction

The Brundtland Commission (Brundtland, 1987; Redclift, 2005) had given birth to the concept of ‘Sustainable Development’. The concept has been captured in ‘Agenda 21’, an international blueprint for sustainable development (Du Plessis, 2002), derived from the 1992 Earth Summit in Rio de Janeiro. The concept of sustainable development has been evolving

and widely adopted ever since. In November 1994, the First International Conference on Sustainable Construction held in Tampa, Florida, USA, the conference convener C. J. Kibert (1994) defined sustainable construction as, “Creating a healthy built environment using resource-efficient, ecologically-based principles”. Sustainable construction involves a commitment to:

- i) Economic sustainability – increasing profitability by making more efficient use of resources, including labour, materials, water and energy.
- ii) Environmental sustainability – preventing harmful and potential irreversible effects on the environment by careful use of natural resources, minimizing waste, protecting and where possible enhancing the environment.
- iii) Social sustainability – responding to the needs of people at whatever stage of involvement in the construction process (from commissioning to demolition), providing high customer satisfaction and working closely with clients, suppliers, employees and local communities.

Pearce (2006) defined the term “sustainable” as lasting or perpetual, and he argued the purpose of having an unsustainable development. Sustainability and “green,” often used interchangeably (Knox, 2015) and it is all about maintaining a balance between accommodating to current social and economic needs while sustaining the natural resources and ecosystems to be utilized by future generations (Abidin & Jaapar, 2008; Dickie & Howard, 2000). Researches related to the topic of sustainable development have resulted in the doctrine of an ideal approach to sustainability. The Conseil International du Batiment (CIB) postulated seven principles of sustainable construction which inform decision makers during each stage of the design and construction process throughout the whole life cycle of a building which are: reducing resource consumption; reusing resources; using recyclable resources; protection nature; eliminating toxics; applying life-cycle costing; and emphasising quality (Kibert, 2005). Nonetheless, sustainability is a complex yet, a dynamic concept. Dealing with sustainable development requires crossing across the boundaries of different branches of science and humanities (Hjorth & Bagheri, 2006). It requires decision makers to be flexible and willing to modify their approaches. To achieve sustainable construction, it is very important to balance the basic principles of sustainability; environment, economic and social aspect together (Jamilus Md Hussin, 2013).

Unsustainable Construction and Disaster Risk

Disaster risk reduction as being defined by the International Strategy for Disaster Reduction (2004) is “the systematic development and application of policies, strategies and practises to minimise vulnerabilities and disaster risks throughout a society, to avoid (prevent) or to limit (mitigate and prepare) adverse impacts of hazards, within the broader context of sustainable development”. As stated by Van Niekerk and Campus (2004), the integration of holistic disaster reduction strategies must be able to address the problems pertaining to social, economic and environmental issues which requires the participation of many relevant sectors including the construction industry in order to be successful.

Unsustainable construction practice often leads to environmental degradation which makes it susceptible to disaster (Bendimerad, 2003; Shafii, Ali, & Othman, 2006). United Nations statistics indicate that in the 1990s, close to 70 percent of construction activities in developing countries was built illegally. Disasters are not completely natural phenomena, but rather directly correlated with human development that increases vulnerability to natural and manmade hazards. Hence, exposure to natural hazards is increasing annually as a result of unsustainable development (Bendimerad, 2003). This includes among others, the activity of rapid deforestation (Sumiani, Haslinda, & Lehman, 2007) to cater land for developments, the rising building material demand and the rise of waste production. The increasing production of the waste from construction activities (Uttara, Bhuvandas, & Aggarwal, 2012) and the out of control deforestation aggravate the occurrence of catastrophes such as flooding.

Floods are usually caused by heavy rainfall. It is also now increasingly accepted that climate change is likely to cause an increase in flood hazard in many areas of the world (Jones, 2000). The magnitude, speed of onset and duration of the flood will then be influenced by factors such as topography, vegetation and soils, river alteration, land use and urbanization (Few, 2003). Urbanization worsens floods by reducing the permeability of ground surfaces and increasing runoff rates (Parker, 1999). Construction and development can change natural drainage paths and create brand new flood risks. That is because new buildings, parking lots, and roads mean less land to absorb excess precipitation which can leave an area more susceptible to flooding due to hurricanes, tropical storms, or even heavy rain (FEMA, 2013).

The exasperated nature can be seen prominently by the increasing frequency of disaster occurrence and the intensity of each disaster strike. Recent flood event which hit Kelantan, Malaysia in December 2014 is an apparent evident. With a total of 119,624 floods victims had been evacuated and 45,467 victims seeking shelter at evacuation centres (The Star Online, 2014), it was the worst flood in Kelantan history. 21 people dead and thousands of houses were totally destroyed in the devastating disaster. The secretary of the National Security Council (Azlee, 2015) believed that besides the climatic changes, the other major causes of the flood could be uncontrolled land management and exploitation of land resources. Thus, there is a compelling urge for a transformation of construction practice pertinent to the aspect of being disaster resilient. However, the elemental concept of sustainable construction has yet to be grasped and the implementation of sustainable construction practices in Malaysia is still being hindered by many challenges (Chan, Lee, & Lee, 2014).

Findings and Discussion

1. The Scenario of Sustainable Construction Implementation in Malaysia

The concept of sustainability has recently been introduced to developing countries and is not yet a priority (Du Plessis, 2002). The participation of the construction key players is a fundamental key to the success of sustainable construction practice. In order to increasingly consideration the paradigm of sustainability, the construction practitioners must be willing to change their behaviour and mindset in exploring new territory and willing to adopt new products, ideas and practices (Ofori, Briffett, Gang, & Ranasinghe, 2000).

Rui (2010) described that a successful sustainable construction requires systemization, socialization, information and integration. Unfortunately, there are still discrepancies between the ideal form of a sustainable construction and existing construction because of the practical difficulties in realizing the concept of sustainability (Lam, Chan, Chau, Poon, & Chun, 2011). Even in Malaysia, the concept of adopting sustainability in construction project is yet to be made priority by the construction industry (Ismail, Idris, & Nasir, 2012). Although with the prominent significance, applying this concept seems to be arduous as it requires changes to the old ways (Abidin & Jaapar, 2008). Yoong (Chan et al., 2014) in his research emphasized that, the challenges in adopting sustainable construction were mainly cost and awareness issues, stating that only big construction companies have greater financial capacities to adopt sustainable practices and that they have higher awareness and knowledge of sustainable

construction compared to the medium and small companies. Rostami et al. (Rostami, Khoshnava, Ahankoob, & Rostami, 2012) highlighted that the issues in implementing successful green and sustainable construction are legislative challenge, lack of knowledge and expertise and lack of coordination. In other similar studies (Abidin, 2010; Idris & Ismail, 2011; Ismail et al., 2012), lack of social awareness and environmental concerns had also been highlighted as major barriers in implementing a successful sustainable construction practice. These challenges are summarized in Table 1.

Table 1: Challenges in Implementing a Successful Sustainable Construction Practice.

Research	(Chan et al., 2014)	(Abidin, 2009)	(Abidin, 2010b)	(Rostami et al., 2012)	(Ismail et al., 2012)	(Abidin, 2010a)	(Idris & Ismail, 2011)
Findings (Challenges)	Awareness/ knowledge	Awareness -Majority of respondents rely on written materials (journals, proceedings, newspapers, and websites) to improve their knowledge about sustainable construction. -Sustainability has not been widely applied in many projects.	Lack of awareness (knowledge issue) Enforcement.	Legislative challenge, Lack of knowledge and expertise Lack of coordination	Lack of awareness	Lack of awareness The effort should be directed to small and medium size developers as many large developers are already on board with this concept.	Lack of social awareness

Although the Government and private companies have come forward contributing to the sustainable initiatives in Malaysia, there seems to be many obstacles that hinder the successful implementation of sustainable construction practice in Malaysia. The immensity of positive changes that could be achieved from practicing a sustainable construction is seen as less crucial even in this current stage of disaster prone environment. Just as the success of implementing sustainable construction practices in Malaysia is being scrutinized (Abidin, 2010; Idris & Ismail, 2011; Ismail et al., 2012), it has nonetheless given the rise to a liberating epiphany for an opportunity to integrate the sustainable construction in the disaster resilient context as a fresh start to the concept of sustainable disaster resilient development.

2. The Potential of Adopting the Element of Disaster Resilience in The Sustainable Construction Practice - Integrating Sustainability Construction Practice into Post-disaster Reconstruction Context

The post-disaster reconstruction environment is more dynamic, complex, and unpredictable (Alexander, 2004; Birkland, 2006). Often, people remain uncertain about the future quality of the permanent housing as the initial temporary and permanent housing facilities are of low design and construction standards (Borisarnkhun, 2007). The issue of disaster vulnerability often rise as the primary concern especially in the reconstruction of the housing after a disaster event. Resilience has increasingly become a watchword to refine and reshape post-disaster reconstruction (Chang, Wilkinson, Seville, & Potangaroa, 2010). There is a compelling urge for an integration of sustainability and disaster resilience in new permanent housing, enabling its ability to defy future calamity. Strategies towards achieving a successful adaptation of disaster resilience in a sustainable construction practice must take into account many correlated factors such as location, land use, population, climate condition, availability of resources, products/materials selection, construction method, regulations and enforcement (Bendimerad, 2003; Borisarnkhun, 2007; Weerakoon & Kumar, 2013).

Sustainable approach in construction practice is vital to the preservation of the current built environment and prerequisite to the resilience of future development. For instance, repetitiveness of the damage on buildings due to disaster can lead to other issues such as the scarcity of resources necessary for reconstruction activities. This can be seen in the case of Aceh recovery process where the issues of not having enough materials hindered the recovery process (Zuo, Potangaroa, & Wilkinson, 2008). Such issue could have been anticipated through a comprehensive understanding of sustainability adaptation and good management of the whole recovery process. Therefore, new development could be reformed by integrating sustainable construction approach in post-disaster housing reconstruction practice to foster disaster resilient development.

In a research done by Hendy (2007), a sustainable approach was utilized in assessing two post-earthquake reconstruction projects in Marmara Region of Turkey. The framework which consist of 13 criteria; reflexive, environmental, socio-culturally responsive, participatory, socio-culturally constructive, economic, accountable, coordinated, flexible, informed, institutionally developmental, and financially sustainable, grouped into four key factors of

Compatible, Oriented, Achievable, and Maintainable (COAM) was used as a tool to accomplish a sustainable recovery. Hence, this affirms the potential of adopting the element of disaster resilience in the sustainable construction practice.

Post disaster recovery projects should be well planned, managed and delivered to achieve sustainable outcomes with a comprehensive asset management framework for pre and post disaster situations which can minimize negative impacts on the communities, economy and environment (Weerakoon & Kumar, 2013). The housing reconstruction (after the disaster) calls for a sustainable transformation to achieve a disaster resilient development. The adaptation of integrated sustainable construction approach in the housing reconstruction practice could reduce environmental damage through an enhanced understanding of sustainability concept. Furthermore, the resiliency of the development towards disaster could be maximized by implementing sustainable methods in the planning, design, process and construction of the development such as appropriate planning of land use, outlining the design pertaining to environmental consideration, enforcing sustainable construction method, lowering greenhouse gas emissions, using local and sustainable building materials, reducing waste, and minimizing energy, water, or natural resource consumption. By applying sustainable approach in the design, the new houses to be reconstructed after an event of a disaster could adopt a new concept in such as way it would endure its resilience. For example, a new housing in a flood prone area should be designed lifted above the ground to obviate the risk of being damaged by the flood again in the future. Not only this assures its disaster resilience, but it also increases the sustainability of the built environment where the waste of wreckage from the destructed houses in an event of a disaster is being reduced. With the reducing amount of waste being generated, the use of the building materials can also be cut down and hence preserving the natural resources use such as from trees and limestone.

Sustainability of a development shapes its vulnerability from natural disasters (Gencer, 2007). Therefore, sustainable construction practice is fundamental to reduce disaster risk on the future development and sustainability should be optimized as an integral part of infrastructure recovery projects after a disaster (Weerakoon & Kumar, 2013). Head of the UN office for disaster risk reduction (UNISDR) had emphasized that, without reducing disaster risk what they are doing with sustainable development will continually be under threat (King, 2015). Thus, there is a prominent potential of adopting the element of disaster resilience in the sustainable construction practice. The integration of sustainable construction framework and

post-disaster framework is expected to result in a potential holistic framework to guide the implementation of Sustainable Disaster Resilient Construction practices. This sustainable disaster resilient construction practice envisages a more complete approach embedding the environmental, social and economic elements.

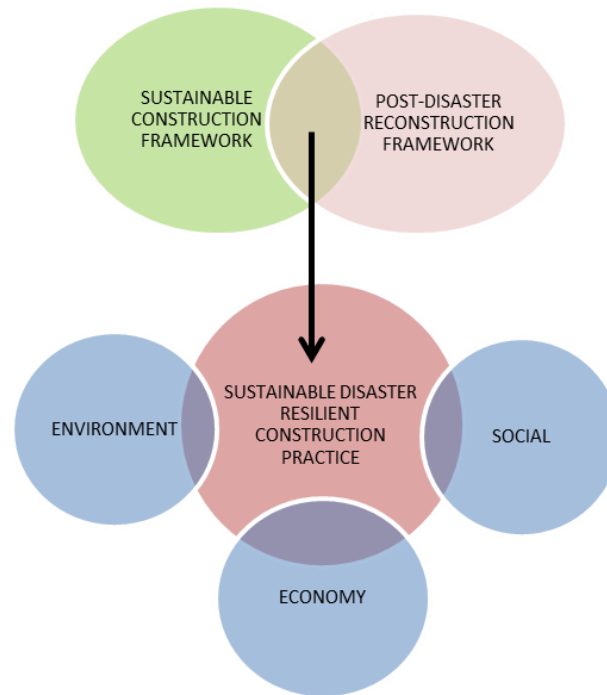


Figure 1: Theoretical Framework for Sustainable Disaster Resilient Construction Practice.

Conclusion

Construction industry in Malaysia is still at the pupillage stage of practicing a holistic sustainable construction. In spite of all the initiatives provided by both the Government and private companies, there seems to be many obstacles that hinder a successful implementation of sustainable construction practice in Malaysia. Lack of awareness among the construction community in Malaysia seems to be one of the main challenges. Moreover, the accessibility towards these strategies is not being made possible to exhilarate the participation of the construction key players towards adopting sustainability in the construction practice. There is an urgent need of guidance for knowledge enhancement and accessible participation to enable successful sustainable construction practice implementation.

Consequently, this opens up an opportunity to adopt the element of disaster resilience in the sustainable construction practice. Therefore, a sustainable disaster resilient construction is an opportunity to intervene where sustainability can be infused from the starting point.

Integrating an approach of sustainable construction in post-disaster reconstruction practice could reform the new development. The resiliency of the development towards disaster could be maximized by implementing sustainable methods in the planning, design, process and construction of the development such as appropriate planning of land use, outlining design pertaining to environmental consideration, enforcing sustainable construction method, lowering greenhouse gas emissions, using local and sustainable building materials, reducing waste, and minimizing energy, water, or natural resource consumption. Besides that, influencing factors of economic and social pertaining to the local context would also be taken into account for a more holistic approach.

Thus, a holistic framework embedding concerns on the environment, society and economy for the implementation of sustainable construction in regards to the disaster resilience is affirmatively a significant solution to the disaster vulnerability of a new development. The framework for sustainable disaster resilient construction practice acts to encourage sustainable construction approach in post-disaster housing reconstruction practice through its applicable indicators to foster a disaster resilient development.

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Accessible Parking: in a shared world

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Accessible Parking: in a shared world

ABSTRACT: *People with disabilities often find themselves excluded from public space, including public transport, due to accessibility issues. Those who are ambulant often cannot walk far nor carry routine weekly shopping purchases. The resultant reliance on private vehicles has historically been accommodated through the provision of Disabled Parking along with permits issued by local government authorities. Such schemes have evolved organically with little, if any, input from people with disabilities.*

Additionally, urban design with its current emphases on walkability, sustainability, cycling promotion and 'shared' space, rarely considers accessible parking, relegating it instead to the domain of traffic engineers who often have no experience of disability. Moreover, accessible parking is the forgotten concern in traffic engineering, with no guidance regarding quantity and very general comments about position. The current Australian Standard for on-street parking is AS 2890.5 – 1993, pre-dating both AS 1428 Design for Access and Mobility suite's current version (published 2009) and contemporary accessibility knowledge practice.

Therefore, how should the needs of disabled permit parking holders be accommodated within current inner-city urban design movements that favour 'street activation' and 'active transport'? How can the widening and lengthening of current permit bays be accommodated where narrow footpaths and roadside barriers (poles, mature trees, storm water drainage pits, street trading, etc) prevail? What do the users of these bays have to say about accessible parking and how can these wants be accommodated in an environment of escalating 'turf wars' engendered by increasing urban density and emerging concepts of shared, public, space? By exploring the disconnect between traffic engineering, urban design and accessibility needs, this paper attempts to answer these questions. The findings of a research project inquiring into accessible parking in an inner-Melbourne local government area will be presented as a Case Study.

Keywords: *People with disabilities, Disabled parking, Accessible parking, traffic engineering, urban design*

Introduction

People with disabilities (PwDs) find themselves excluded from public space, including public transport, due to accessibility issues. Those who are ambulant often cannot walk far nor carry routine weekly shopping purchases. The resultant reliance on private vehicles has historically been accommodated through the provision of 'Disabled Parking' and permits issued by local government authorities. Such schemes have evolved organically with little, if any, input from people with disabilities.

Council-controlled On-Street Disabled Parking (hereafter referred to as accessible parking) is not captured within a discrete regulatory framework. There is no legislative requirement for such parking to comply with any defined Regulation, Code, Standard or Guideline. Nonetheless, within Australia, council-controlled on-street accessible parking could be subject to potential litigation under the Disability Discrimination Act (1992) (DDA). Litigants' claims could include, for example, concerns around deficiency of provision (quantity and position) and inadequacy of technical specifications (features).

In late August 2014 Visionary Design Development Pty Ltd, a transdisciplinary consultancy focussing on accessibility in the built environment, was commissioned by the City of Port Phillip an inner Melbourne municipality, to undertake the *City of Port Phillip Disabled Parking Review Project*. This paper explores the inter-relationship of accessible parking, traffic engineering and urban design using the City of Port Phillip (CoPP) as a case study. Further it presents the argument that increasing the number of accessible parks aligns with policies that seek to reduce car usage. In support of this argument, the Social Model of Disability and the Economic Case for Accessible Parking are discussed through a Literature Review and the Case Study. CoPP's various accessibility, traffic engineering and urban design policies, strategies, plans and guidelines are contrasted with the feedback from PwDs in that local government area. Finally some conclusions on the incorporation of accessible parking within urban design policy and practice are presented.

Literature Review

Searches of academic peer-reviewed literature on "disabled parking" AND "theory" OR "policy" OR "rationale" OR "provision" and "disabled parking" and/or "accessible parking" AND "traffic engineering" OR "urban design" were completed using the following on line

databases: *Proquest*, *Scopus*, *Web of Science*, *JSTOR*, *Academic Search Complete*, *Expanded Academic*, *Informit on Line*, *IBSS* and *Google Scholar*. Additionally the websites of *AustRoads*, *VicRoads*, the US's *Transport Research Board*, the UK's *Transport Research Laboratory*, NZ's *Transport Agency*, and the European Union's *Transport Research & Innovation Portal* were examined for Reports and Publications regarding accessible parking theory or policy. Grey literature was similarly searched using Google search engine using the same boolean queries above.

There is a paucity of academic and grey literature exploring the relationship between accessible parking, traffic engineering and urban design. Policies encountered espousing the virtues of, for example: walkability, sustainable/ active transport, 'shared space', street activation and the like, all fail to pay attention to the *vehicular* mobility needs of PwDs. Consideration of accessible parking is often limited to a reminder to provide some disabled spaces. Although there is ample instruction from local councils on how to obtain a 'Disabled Parking Permit', there appears to be virtually no academic and/or grey literature demonstrating engagement between the users of such spaces and other relevant stakeholders regarding, for example, physical attributes, position and quantity of accessible parking.

To address these gaps the concept of accessible parking will, for the purposes of providing background to this paper, be explored from two perspectives 1. economic and 2. through the lens of the social model of disability. The latter includes rights based/justice and universal design viewpoints.

Economic Case for Accessible Parking

The [Australian] Productivity Commission Inquiry Report (2004) into the DDA found that tangible benefits arise when barriers restricting the range of education, work, consumption, leisure and socialising opportunities available to people with disabilities are removed. An inaccessible urban environment, however, denies people with disabilities access to a full spectrum of consumer choices. Accessible parking facilitates the disposable income of PwDs benefitting the economy. According to Riley (2006) PwDs have been vastly undervalued as customers. Frisch estimated that the value of income foregone in Australia as a result of an environment which is inaccessible was \$300 million per annum (1998 Australian dollars). A

more recent estimate of the total annual disposable income of PwDs was put at \$54 billion¹ (Australian Bureau of Statistics (ABS) 2009).

Barriers encountered in accessing schools, universities, workplaces, sports fields, theatres or other social networks combine to lower income earning opportunities of PwDs below those of people with identical potential without disabilities. Although those barriers might result from prejudice, they might also be a consequence of an inaccessible environment within which accessible parking plays a role. Miller and Singer (2000 Pg 7) suggest that a government-sponsored set-aside program for accessible parking should be considered on both social and economic grounds. From a human rights perspective any economic case, despite cost/benefit, is trumped by issues of equity and justice. The social model of disability is rights-based emphasising the issues of justice and entitlement and the need for inclusive and empowering change in the social and physical environments (Hahn 1993).

Accessible Parking and the Social Model of Disability

The Social Model of Disability views disability as arising from society-erected barriers excluding PwDs from participation. Strongly favouring ‘social reconstruction’ over institutionalisation or medical intervention, the social model seeks to normalise the lived experience of disability within the human spectrum of abilities thereby eroding the false dichotomy of ability/disability. Since everyone is likely to experience transient or permanent disability in their lifetime (Zola 1989), the goal is the delivery of a public good (Wasserman, Asch et al. 2013) in the form of more accessible structures and more inclusive practices benefitting the whole community. Nonetheless, the barriers to realising social reconstruction for PwDs are both social, through the prejudice and stigma of perception of ‘otherness’ as well as physical, within the built environment. The lack of available accessible parking spaces is an example of a built environment barrier.

The Rights Based Approach (RBA) to advocacy first became prominent during the ‘civil rights era’ of the late 1960 and 1970s (Hahn 1994). Local government and road authorities decided to establish reserved parking areas and instigate permit schemes. However, determination of both the number and location of reserved parking was, and remains to a significant extent today, arbitrary lacking any coherent rationale or established policy. While

¹ The more widely misquoted figure within grey literature is \$54 million.

the RBA has been successful in putting accessible parking, albeit often as an afterthought, on planning and traffic policy agendas, there remain some problematic aspects; the RBA is confrontational – my rights against yours – further entrenching the dichotomy of the ablist divide.

Universal Design (UD), founded on the utopian concept of Universalism, aims to accommodate people with as wide a range of physical and sensory impairments as possible. This is a paradigm change from ‘special needs’ RBA-driven code compliance to a more inclusive design process for everybody. From a Universal Design (UD) perspective all parking bays should provide for as wide a spectrum of users as possible. Alongside the implications of enlargement of spaces for parking supply/demand management, some dilemmas remain for such an equality initiative. While it may be reasonable to assume that driving oneself without assistance implies a degree of independent mobility after alighting from the vehicle, what may be an acceptable distance will vary according to the degree of activity restriction. Research indicating that many able-bodied individuals would choose to drive rather than walk even when the distance is relatively short demonstrates how psychological factors further confound any assumptions (Collins and Chambers 2005). However even if spaces were of uniform dimensions, one outcome would remain. Permissive signage, and therefore a complementary permit scheme, would still be necessary to reserve parking as close as possible to likely destinations for drivers with disabilities.

City of Port Phillip: accessibility, traffic engineering and urban design

Various City of Port Phillip: policies, strategies, plans and guidelines across accessibility, traffic engineering and urban design were reviewed. City of Port Phillip Access Plan 2013 – 2018 is the CoPP’s main disability planning instrument (<http://www.portphillip.vic.gov.au/Access-Plan-2013-2018.pdf>).

Located on the City of Port Phillip website under *Council Services* subheadings *Parking in Port Phillip* (<http://www.portphillip.vic.gov.au/parking.htm>) and *Traffic & Roads* (http://www.portphillip.vic.gov.au/traffic_roads.htm) several transport, traffic, road and parking documents with a range of publication dates communicate CoPP’s stance on vehicle management within the municipality.

Council's position on urban design is conveyed through information found under its website subheading *Policies & Strategies* and heading *Local Developments* (<http://www.portphillip.vic.gov.au/council.htm>).

Methods: CoPP Disabled Parking Review Project

Visionary Design Development Pty Ltd was commissioned, via selected tender, by the City of Port Phillip to undertake the CoPP Disabled Parking Review project. Project oversight was provided primarily by traffic engineers from Council's Traffic Engineering / Sustainability unit, in collaboration with Council's MetroAccess Officers. The MetroAccess Officer position is located within the Access and Inclusion unit. Prioritisation of upgrades to business activity centres' accessible parking was the project's main objective. The bulk of the project was completed between September 2014 and early December 2014.

In essence, the project comprised four main components: Literature review including analysis of relevant policies, local disability statistics, regulations and standards; Stakeholder engagement; Investigation of 150 locations of on-street accessible parking (containing 200 bays in total) locations extracted from Council's Geographic Information System (GIS); and Prioritisation.

Literature review regarding disabled/ accessible parking was conducted with similarly unproductive outcomes, as previously described.

Stakeholder engagement consisted of three survey instruments: CoPP Disabled Parking Permit Holder User Survey questionnaire, Trader group and council business unit input obtained via brief email questionnaire and/or telephone interviews and one Focus Group session. Eleven multiple choice User Survey questions covered topics such as: method, frequency, duration and purpose of permit use and satisfaction with quantity, position and features of accessible bays. A further 3 questions asked for specific input about where Users parked (or avoided) and the conditions (good and bad) encountered. Lastly, respondents were invited to provide any comments they wished. Trader groups and/or businesses were invited to answer a shorter question questionnaire. The first two multiple choice questions concerned whether people with disabilities visited the premises and whether better accessible parking would be good for business. Three further questions involved quantity, position and relocation options. (These three questions were also asked in the User Survey and Focus Group.)

Similarly, lastly, respondents were invited to provide any comments they wished. An interview with CoPP's City Business, Business Development Officer was conducted by telephone and summarised. Invitations to attend the focus group were forwarded, via email, to the CoPP's Access Network (CoPPAN) and Older Persons Consultative Committee (OPCC) as well as to persons with a CoPP Disabled Parking Permit. Focus Group Questions were semi-structured with the scope of questions being similar to the User Survey covering utilisation, localities, and useability. It concluded with a discussion on the relevant sections of the Australian Standard AS 2890.5-1993 On-street Parking. Focus Group participants also completed a small section of the User Survey questionnaire to ascertain whether the group was representative of the User Survey group.

Accessible parking investigation comprised four phases. *Firstly*, informed by literature review, stakeholder engagement and in-house expertise Recommended Best Practice guidelines for accessible on-street parking specifications were developed. Best Practice, as recommended by Visionary Design Development Pty Ltd, is generally similar to AS 2890.5 - 1993 requirements. However there are some differences, primarily in respect to dimensions, kerb ramp provision, adjacent clearances and tactile markers, refer Recommended Best Practice Diagram set (<http://www.portphillip.vic.gov.au/disabled-parking.htm>). *Secondly*, existing accessible parking locations were mapped and then investigated by built environment professionals trained as assessors. Working in teams of two the assessors captured data onto a 'tablet' device pre-loaded with the appropriate location's Google Drive spreadsheet configured from the *Master Data Proforma*. Data captured included a wide range of parking bay dimensions and characteristics along with information about relevant surrounding features. *Thirdly*, data was transferred to a custom-built relational database and subsequently analysed. Each location was allotted an appropriate 'Best Practice Diagram' and a 'Complexity Classification' from 1 to 5 dependant on the degree of difficulty in achieving best practice. *Lastly*, an appropriate reporting format was devised to convey the results.

Prioritisation of locations for capital works was determined using a Prioritisation Matrix. Criteria and weightings for the matrix were determined via stakeholder consultation and in-house expertise, are shown in Table 1.

Table 1: Criteria and weightings for Prioritisation Matrix

CRITERIA	UNIT OF INTER-LOCATION COMPARISON	WEIGHTING
User Feedback	Stakeholder Consultation via Permit Holder nomination and rating of accessible parking by postcode.	5
Complexity	Categorisation of Locations: 1 (no changes), 2 (least complex) to 5 (most complex).	5
Percentage Accessible Bays	Accessible parking expressed as percentage of Total Parking Capacity (on-street bays), by Postcode.	3
Number of Bays	Number of Accessible Bays per Location.	2
Permit Ratio	CoPP Known Resident Permit Holders per Accessible Bay, by Postcode.	1

Findings: CoPP Disabled Parking Review Project

Accessible Parking Bay ratios

The literature review was unable to illuminate any theoretical foundations for the quantity of provision of accessible bays or their specifications, so a review of various anglophile countries' (Australia, New Zealand, United Kingdom and United States of America) accessible parking specifications was undertaken. Guidelines within these countries nominate ratios of 4-6% for accessible-to-regular parking. However these ratios only refer to *off-street* parking. The Australian Standard for on-street parking facilities (AS 2890.5-1993) refers to the Standard for off-street parking facilities (AS 2890.1-1993) regarding accessible carpark ratios. This (AS 2890.1) in turn refers the reader to the "Building Code of Australia", now called the National Construction Code (NCC) which, in terms of accessible parking, refers to *AS/NZS 2890.6:2009 Parking facilities Off-street parking for people with disabilities*. The NCC however is not applicable to on-street parking.

Table 2 shows ratios of accessible bays by postcode along with number of disability support pensioners (DSPs). Percentages of on-street business activity centre accessible parking vary from less than 4% for St Kilda Rd Precinct (Melbourne 3004) to approximately 7% for St Kilda and St Kilda West to over 16% for Port Melbourne (by postcode district, where parking

quantities known). Although South Melbourne Postcode 3205 contains the highest number of accessible parking bays (50) the total on-street capacity was unavailable.

Table 2: Permit holders, DSPs, bay numbers and bay percentage and ratios by postcode.

Postcode/ Suburbs	No. of Permit Holders	No. of Disability Support Pensioners (DSPs)	No. of on- street accessible bays	No. of on-street bays	Percentage accessible bays	No. of Permit Holders per accessible bay	No. of DSPs per accessible bay
3004 St Kilda Rd Precinct Melbourne	131	N/A	18	494	3.6%	7.3	-
3182 St Kilda and St Kilda West	409	1076	39	547	6.8%	10.5	27.6
3183 St Kilda East and Balaclava	320	603	25	192	13.0%	4.3	24.1
3184 Elwood	236	332	5	113	4.4%	47.2	64.4
3185 Ripponlea	22	N/A	42	4	9.5%	0.5	-
3205 South Melbourne	330	522	50	N/A	-	6.6	11.0
3206 Albert Park and Middle Park	368	208	26	290	9.0%	14.2	8.0
3207 Port Melbourne	542	578	33	205	16.1%	16.4	17.5

Demographics of Disability

The most recent data available regarding Disability Support Pensioners (DSPs) by postcode within the study area (interpolated from the ABS Survey of Disability, Ageing and Carers Census 2011) is shown in Table 2. As at 29 September 2014, the number of disabled parking permits on issue from CoPP totalled 2,580 (see Table 2 for breakdown by postcode). At that time 2,358 (91%) holders resided within CoPP, 193 (8%) outside CoPP, the addresses of 29

(1%) were missing from the database. The outlier ratio results – DSPs and Permit Holders per bay - for Postcodes 3184 (Elwood) and 3184 (Ripponlea) are the result of there being no large commercial activity centre.

Stakeholder consultation

Access to the CoPP Disabled Parking Permit Database was granted to Visionary Design Development Pty Ltd under a Deed of Confidentiality Agreement. A total of 383 User Surveys were sent to the email addresses of permit holders. This only represents 15% of the 2,852 permit holders but time and budget restraints precluded any mail out. Eighty emails bounced (automatically returned) due to out-of-date addresses. CoPP MetroAccess Officers also distributed hard copies of the survey at the St Kilda Library and Seniors Festival. A total of 71 responses were received. Ten participants, consisting of 9 people with disabilities and 1 carer/driver, attended the focus group session. Focus Group participants were found to be representative of the wider User Survey cohort.

As ascertained from the User Survey, shopping, leisure and entertainment and work are the major reasons for parking in permit bays daily or several times a week, see Figures 1 and 2. Permit holders feel there are insufficient accessible carparking bays reserved at all activity centres; Acland St (St Kilda) and Clarendon St (South Melbourne) were particularly criticised. This forces many to use regular parking that is too distant, for their comfortable ambulant capabilities, from their destination.

Figure 1: Permit use trip type

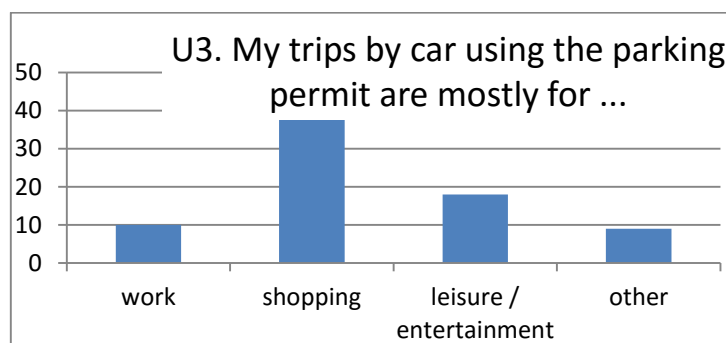
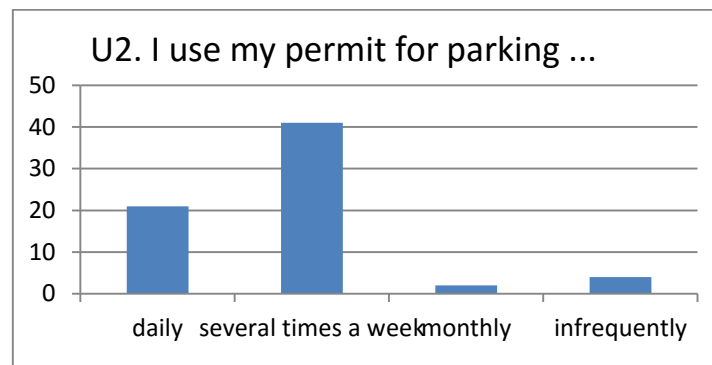


Figure 2: Permit use frequency



User Survey respondents experience difficulty in securing an available accessible spaces also resulting in frequent usage of regular parking bays, see Figures 3 and 4. In general users feel that the current positioning (not quantity) of accessible carparking is satisfactory but there are safety concerns in relation to passing traffic and bicycles. These findings were also corroborated by Focus Group participants.

Figure 3: Finding accessible parking spots

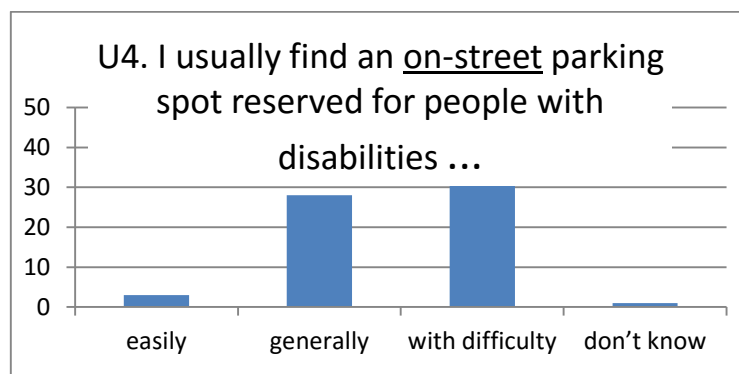
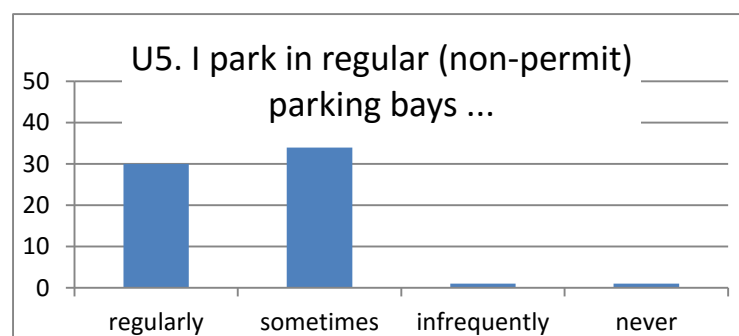


Figure 4: Parking in regular parking bays



Trader groups were approached with a shorter survey but response was poor indicating accessible parking is not a particular concern. CoPPs Business Development Unit advised that Parking is an historically contentious issue in activity centres due to: expense, availability and economic viability. There is, however, no history of trader-related accessible parking issues. Accessible parking is considered valuable for activity centres and placement of parking is important to allow good access around the centres. Traders believe adequate on-street parking is very important for business success and appreciate the requirement for provision of accessible spaces.

Onsite investigation

Within the study area 150 locations, comprising 92 parallel parking locations and 58 angle parking locations and containing a total of 200 accessible parking bays, were investigated. A small majority of the bays (105, 52%) were parallel, 34 (17%) were 90deg, 51 (26%) were 60deg and the remaining 10 (5%) were 45deg. Thirty six locations contained multiple bays, the other 114 locations being individual bays. The orientation of, and the number of bays at, the multiple-bay locations are as follows: Parallel (24), 90deg (22), 60deg (31) and 45deg (9).

Even though six existing locations (4%) were adequately sized, none of the locations assessed fully met Recommended Best Practice. Almost all locations, 144 (96%), were undersize. 126 locations (84%) lacked any provision of required kerb ramps. Tactile markers were present at only 1 location. Line marking was inadequate at 96 (64%) locations. Although 43 locations (29%) can be enlarged in either their current position or nearby (within 10-20m), 101 (67%) locations will most likely require relocation elsewhere due to the presence of kerbside and/or roadside obstructions. Of these, 64 can likely be accommodated in the same street, while 37 locations most likely require relocation to a different street, in order to achieve Recommended Best Practice.

Prioritisation

Two options for a preliminary schedule of works were presented:

- i. Prioritisation by postcode district or
- ii. Prioritisation by individual site.

There were significant differences in prioritisation outcomes with the highest priority location scoring over five times the prioritisation score as the lowest priority location. When prioritised by Postcode, St Kilda & St Kilda West and South Melbourne (representing a

combined 45% of the total 150 locations) were the highest two priorities. This reflects the high weighting given to stakeholder feedback in the prioritisation criteria (see Table 1).

Discussion

Australian Standards regarding on-street accessible parking are incomplete and outdated. AS 2890.5-1993, the current Australian Standard for on-street parking, pre-dates both AS 1428 Design for Access and Mobility suite's current version (published 2009) and contemporary accessibility knowledge practice. Internationally, little attention is paid to accessible on-street parking. Although accessible parking may be ranked quite highly in Councils' parking provision hierarchies, it is generally not considered in the hierarchy of urban design elements. In fact, urban design with its current emphases on walkability, sustainable/ active transport, 'shared space', street activation and the like rarely considers accessible parking, relegating it instead to the domain of traffic engineering. However, the requirements of on-street accessible parking are not well understood by traffic engineers, often having no experience of disability and little available guidance regarding: technical specification, quantity, position and desires of users.

A key component of urban design concepts such as walkability, sustainable/ active transport, 'shared space' and street activation is the encouragement of localised trips and social inclusion at neighbourhood level. Many PwDs do not have the physical or ambulant capabilities to choose these modalities, especially when needing to carry shopping or other purchases. Accessible parking at community business activity centres is therefore vital for equity of access to consumer choices, employment, leisure and entertainment. Policies which seek to decrease car dependence and reduce parking spaces, need to be informed by the need to retain, and increase, accessible parking.

Demand drivers for accessible parking varied widely between the postcode areas. Elwood (postcode 3184) is the outlier with 47.2 known resident permit holders per accessible bay. Results for other postcodes ranged from 5.5 (Ripponlea, postcode 3185) to 16.4 (Port Melbourne, postcode 3207). The inconsistency of these results indicates that people with disabilities have variable access to accessible carparking within their local neighbourhoods. Additionally the two postcodes, St Kilda and St Kilda West (postcode 3182) and South Melbourne (postcode 3207), registering many of the highest priority locations also contain the

two areas – Acland Street (plus side streets) St Kilda and the Clarendon Street Activity Centre, South Melbourne - most heavily criticised in the User Survey.

Lack of availability of accessible parking was of greatest concern to users, who perceive there is insufficient number reserved for permit holders. The second most regularly raised issue was safety from passing traffic and bicycle lanes, the latter of course being championed in active/sustainable transport circles. Some bays in quieter side streets are ‘safer’ but these are often too far away from the desired destination. Size of bay and entry/egress from the vehicle got several mentions including parallel bays not being wide enough to provide space between car and kerb for manoeuvring mobility aids and abuse of footpath trading conditions compounding bay narrowness. Parking is a ‘diminishing commodity’ in CoPP with its increasing residential density, including within activity centres, causing heightened competition for on-street bays. Furthermore, the widening of parallel bays has the potential to further conflict with footpath trading. Even though the expansion of the size of accessible bays could lead to the reduction of regular bays there is reasonable consensus that traders understand that CoPP’s accessible parking bays need upgrading. Reductions in overall on-street bay numbers due to improvements to accessible parking are therefore likely to prove less controversial than reductions for other reasons.

CoPP Policies, strategies, plans and guidelines

City of Port Phillip Access Plan 2013 – 2018, the primary disability planning instrument, states that: ‘Council provides accessible onstreet parking for its residents’ and that accessible parking and drop-off points are needed at and near council owned venues and/or community buildings. The document also calls for consistent design and implementation of public space infrastructure elements such as accessible carparking. Also within the Plan sustainable, accessible, water-sensitive urban design is championed along with the creation of ‘a less car-dependent city’ being affirmed as desirable.

Several transport, traffic, road and parking documents communicate CoPP’s stance on vehicle management within the municipality. Council’s Parking Need Hierarchy for both Shopping Strips and Local Streets places ‘Disabled Parking Bays’ quite highly; respectively fourth and fifth out of 14 (http://www.portphillip.vic.gov.au/Report_6_-_Attachment_1_-_Final_Sustainable_Transport_Strategy.pdf). CoPP Road Management Plan 2013, however, does not mention accessible parking. Although most documents state, or imply, the need to

ensure safe accessibility for vulnerable users, most recent documents also highlight intentions to ‘ Discourage car use and longer term parking in the most accessible and connected areas....’ and to increase walking, cycling and public transport use (CoPP Sustainable Transport Strategy, p 24).

A range of: policies, strategies, plans and guidelines across, for example, sustainability, precinct development, open space and infrastructure, set out Council’s position on urban design. The City of Port Phillip is currently planning upgrades to Acland Street, an iconic Melbourne destination located in St Kilda. Construction of a new Route 96 tram terminus with central platform, in Acland Street, will also be commenced by Public Transport Victoria (PTV) in 2016. Acland Street Upgrade Community Survey does not include any questions about accessible parking requirements. Although the South Melbourne Central Urban Design Framework

([http://www.portphillip.vic.gov.au/default/StrategicPlanningDocuments/South_Melbourne_Central - Urban Design Framework.pdf](http://www.portphillip.vic.gov.au/default/StrategicPlanningDocuments/South_Melbourne_Central_-_Urban_Design_Framework.pdf)) and South Melbourne Structure Plan & Implementation Strategy

([http://www.portphillip.vic.gov.au/default/StrategicPlanningDocuments/South_Melbourne_Central Structure Plan.pdf](http://www.portphillip.vic.gov.au/default/StrategicPlanningDocuments/South_Melbourne_Central_Structure_Plan.pdf)) both contain numerous references to parking, accessible parking is not considered in either document. City of Port Phillip’s Emerald Hill Vision setting out the refurbishment of the South Melbourne Town Hall Precinct notes an ‘accessible’ Town Hall as a Deliverable but lacks any mention of accessible parking.

Towards improvement?

The location, number and specifications of accessible parking bays within the CoPP have, as elsewhere, evolved organically without crosscutting strategic input from permit holders and with limited planning and oversight. This is concomitant with the historical consideration of PwDs, at best, at a peripheral late stage. The CoPP Disabled Parking Review Project investigated the role and specifications of accessible parking as a means of inclusion of PwDs in social and economic activities centred on and around local shops and businesses. Almost all (144, 96.0%) locations were of insufficient size. Although many locations (49, 32.6% of 150) can be adjusted in-situ to meet ‘Recommended Best Practice’, a very large majority of the locations (101, 67.3% of 150) will require either streetscape redesign or relocation. With this in mind, how should the needs of disabled permit parking holders be accommodated? Current inner-city urban design movements favour ‘street activation’ and ‘active transport’.

Yet when it comes to planning for the needs of PwDs, access, traffic engineering and urban design, all essential activities undertaken by local government, tend to be handled by separate areas within councils.

Feedback from CoPP Permit Holders via the User Survey and the Focus Group from residents with a range of impairments affecting mobility confirms their reliance on car transport to visit business activity centres as alternatives are either unavailable, inaccessible and/or unable to cart shopping and other goods. In doing so, many frequently face significant barriers to parking. A very large majority of complaints, regarding and reasons for avoidance of certain activity centres, were the lack of sufficient numbers of spaces. This is despite the percentage of accessible parks in five of the eight CoPP postcode regions being greater than the 4-6% average used internationally as an appropriate guide. St Kilda and St Kilda West which includes the Acland Street Activity Centre – one of the two most highly criticised for accessible parking, primarily due to unavailability of bays – has 6.8% accessible bays. Some guidance might be given by the much lower number of complaints regarding availability of accessible spaces – 16.1% for Bay Street Business Activity Centre in Port Melbourne despite a similar number of comments received.

Conclusion

A socially inclusive society recognises benefits to the well-being of its members by supporting engagement and participation in cultural, civic and recreational activities at a local level. Historically, PwDs face a degree of social, civic, economic and institutional exclusion.

We have sought, in this paper, to argue that the provision of increased quantities of improved accessible parking for PwDs need not compromise urban design approaches that seek to minimise car-use, calm traffic and create shared space. The Social Model of Disability, as relevant to Accessible Parking, and the Economic Case for Accessible Parking were presented. Methods and Findings from the CoPP Disabled Parking Review Project were then discussed within the context of CoPP's various accessibility, traffic engineering and urban design policies, strategies, plans and guidelines.

Best Practice Accessible Parking on-street bays whether 'parallel' or 'angle' not only require more physical space per bay than is current practice, larger, more accessible, 'buffer' spaces are required immediately around them. This, particularly in urbanised environments, greatly

impacts the traffic engineering-urban design interface. However, current urban design knowledge practices appear to not be attuned to the vehicular requirements of people with disabilities. Users unequivocally want an increased quantity of accessible parking bays; augmented availability of which will translate to positive economic outcomes and enhanced social inclusion. Greater numbers of accessible bays also has the consequence of reducing the available space for standard parking. The exclusively signed nature of 'disabled parking' should lead to reduced traffic volumes thereby achieving sustainable/ active transport/ shared space aims. However, we believe that this correlation must be made explicit to avoid being overlooked. Urban design must acknowledge increased quantities of accessible parking as an integral requirement of policies, strategies, plans and guidelines. This case study questions whether the 4-6% ratio of accessible parks is adequate.

Conventionally urban design and traffic engineering separated at the kerbline. Although on-street accessible parking bays have been traditionally viewed as being within the traffic domain they are, due to accessibility requirements such as footpath indentations, buffer zones, kerbramps, wayfinding features and so on, in fact, urban design elements. Therefore urban design, traffic engineering and accessibility policy makers and practitioners must work together to ensure that accessibility for all is achieved.

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Planning Liveable Cities With Big Social Data

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Planning Liveable Cities With Big Social Data

ABSTRACT: *Big social data – data collected from online social networks such as Twitter, Facebook, Foursquare and Yelp – can provide new insights into the dynamics of cities. Billions of data points can be harvested to understand how people move around the city and how they experience the urban environment. Deeper, real-time urban insights provide the evidence base for planning more liveable cities – building more responsive transport systems, developing unique neighbourhood identities, and designing more attractive places.*

These new data sets are especially useful for addressing gaps within the urban planner's toolbox. Firstly, while the pace of change in cities accelerates, conventional data sets (such as Census data or surveys) are updated infrequently. Secondly, there is limited data about the invisible dimensions of cities – sentiment, movement, and social networks.

Using a dataset of millions of social media interactions, this paper will demonstrate three applications where big social data has been collected, analysed and visualised to help understand cities:

- 1. The mood of the city – exploring community sentiment and attachment to place.*
- 2. The economic health of cities – measuring activity in entertainment and retail precincts.*
- 3. The traveller in the city – investigating tourism patterns in cities.*

These case studies demonstrate that big social data can provide valuable insights, but that the data is best used in conjunction with traditional sources of urban insight such as surveys and interviews. As social data becomes ubiquitous and higher quality there will be increasing opportunities to gain new insights into city planning, design and management. At the same time, issues of data bias and privacy will need to be managed.

Key words: *big data, urban informatics, smart cities, social media, city science*

1. Fleeting, Invisible Cities

Over time, city planners, urban designers and architects have developed expertise about the physical aspects of the city – infrastructure layout, lot sizes, building heights, and open space. However, our physical experience is unable to capture the real essence of cities. As Michael Batty, the father of an emerging ‘science of cities’ notes, “...we must dig below the surface of what we see, and reveal the foundations of how cities function” (Batty, n.d.). Batty is referring to the true essence of cities; what he identifies as the “...interactions, flows and networks...” that connect people - communication, trade, movement, and social networks. As both Edward Glaeser (Glaeser, 2011) and Jane Jacobs (Jacobs, 1961) have so insightfully revealed, the city’s ability to connect people is the reason it exists, and the reason it continues to thrive. The physical aspects of the city, buildings, spaces and infrastructure networks exist purely to facilitate these human connections.

Despite the dominance of these flows in shaping the city, until recently, they have largely been invisible. When standing in the centre of a great city, the complexity of social and economic interactions is impossible to perceive, even for an experienced planner or designer. The sheer volume, speed and intricacy of these flows are beyond our natural senses. Ethnographic reflections, such as Jacob’s famous commentary on the social life of cities, have provided rare insights into largely invisible urban social networks and interactions. Jan Gehl’s systematic approach to documenting the flows within urban space has been similarly insightful, although difficult to apply at a wide scale (Gehl, 2011). Urban economists have been aware of the invisible aspects of cities, but have often suffered from a lack of available data.

Perhaps because of the invisibility of this true nature, the city continues to be understood as primarily physical by many ‘built environment’ professionals, especially planners. In fact, planners, ironically more than architects, often focus on the physical over the people, the permanent over the fleeting, and the tangible over the invisible. This is despite the rate of change in cities continuing to accelerate - enabled by greater mobility, new technologies, accelerating rates of population growth and urbanisation, and more dynamic social networks. While the city becomes more fluid, we largely continue to analyse the city as if it were a static beast.

Concrete examples help to demonstrate the contrast between static, physical planning and fleeting, invisible cities. The growing popularity of ride sharing services (e.g. Uber) and car sharing services (e.g. Car Next Door or Flexicar) is rapidly redefining the very nature of mobility in the city, while planning regulation in most places is still preoccupied with car parking requirements for developments. The growing popularity of ‘pop up’ urbanism – temporary parks or other interventions – is testament to the ability of designers and communities to understand the temporal nature of cities, and to respond to it (Lydon & Garcia, 2015). ‘Pop up’ urbanism is representative of urban flows (in this case, social networks and movement) and how they can quickly shift (the ‘fleeting city’) before either returning to their previous state (probably temporarily) or abruptly shifting to a whole new state (again, probably temporarily).

Indeed, a lack of data, and a static view of the city, has been the driver of our still limited understanding of the city. City planners, urban economists, urban designers and architects all rely on geographical data to inform decisions about our cities. However, it is becoming increasingly obvious that our traditional data sets are not only quickly outdated, but also capture a very small portion of urban experiences. Most of the city remains invisible to the professionals that are seeking to influence it.

2. Big Social Data (Everybody is a Sensor)

The emergence of ‘big social data’ provides us with one of the first opportunities to “dig below the surface of what we see”, as Batty has eloquently urged us to do. The *social* dimension of ‘big social data’ refers to the data embedded in social media interactions - posts on Facebook or Twitter, restaurant reviews on Yelp or Urban Spoon, travel tips on Trip Advisor or photos on Instagram. Very often, this social media data is publicly shared by users, and originates from mobile phones where it may include a ‘geo-code’ (a longitude and latitude point) and a ‘timestamp’. Explosive growth in new data sources and computing power has combined to enable the analysis of truly ‘big’ data sets of social media for the first time. Researchers have alternatively referred this type of data as ‘location based media data’ (Ciuccarelli, Lupi, & Simeone, 2014), ‘user generated mobile location data’ (Qu & Zhang, 2013) or ‘participatory sensing’ (Silva, Vaz De Melo, Almeida, & Loureiro, 2013)

The three key dimensions contained within big social data - spatial, temporal, and content - allow us to measure the sentiment or topic of a tweet or photo, and how this content changes over time and geography. Big, social data has been widely leveraged in business – by marketers to gain live insights into consumer behaviour and attitudes toward a product, and in finance to try and predict market behaviour. As mobile devices become ubiquitous, and rates of social media penetration and use continue to increase (Meeker, 2015), the value of this data for all disciplines will increase. In the emerging world of big data, mobile phones are generating a proliferation of information from urban inhabitants – allowing people to become sensors.

Harvesting, and analysing this big social data could provide us with new insights into the city. Until now, however, its application to urban planning, design and management has been limited, especially in Asia and Australia. Emerging research, much of it originating from computer science, is beginning to explore the value of this data and some of this research will be explored in this paper..

In general the research suggests that big social data has the potential to provide innovative insights into the invisible dimensions of cities including the social networks, movements, economic interactions and sentiment of communities (Ciuccarelli et al., 2014). It may help fill the gaps in knowledge that are undermining our understanding of cities. It may also help us move from perceiving only the physical aspects of a ‘static city’, to perceiving the networks and flows that form the foundation of a great, dynamic city, as Batty, Jacobs and Glaeser have all observed.

The opportunities afforded by this data is particularly prominent in places that could be described as ‘data poor’. In much of the developed world, both government and businesses collect significant data about these urban flows. Transport surveys, demographic censuses, and market research provide examples of spatio-temporal data we take for granted, and that planners regularly draw upon. In the less developed parts of the world, this data is often not available. It creates a significant barrier to understanding urban activities and land uses, or planning an efficient transport system.

This article features several exercises that demonstrate how big social data might be applied to help understand the city in real-time. The aim is to explore some of the techniques and

methods that might allow us to better understand our cities. Rather than providing definitive uses, it draws on, and builds upon, existing research and methods, many from computer science.

The exercises below are based on analysis of millions of publicly shared, geo-coded posts, reviews and ‘check ins’ from the likes of Facebook, Twitter, Foursquare and Yelp. Rather than focusing on the technical details of these harvesting methods, the focus is on the techniques of analysis. The discussion is rounded out with a discussion of the constraints of using big social data to understand cities – primary issues of bias, privacy and application.

3. Measuring the Mood of Melbourne

The mood of different places and communities is one of those invisible aspects of cities described earlier and there is little existing data on this; that is, how people perceive and experience the city.. Identifying where people are more positive or negative might help us to measure the liveability of an area – helping us to understand what makes a place liveable in the eyes of citizens, and helping us identify places that require attention. Measuring how the mood of the city or a place changes over time may also improve our understanding of how events shape liveability.

The text contained within social media posts can provide an indicator of localised sentiment, or local mood. *Sentiment analysis* is an established computer science method that uses an algorithm to measure whether a string of text has a positive or negative meaning. It is regularly applied to big social data sets by groups as varied as marketers monitoring consumer sentiment toward a newly released product (Agarwal, Xie, Vovsha, Rambow, & Passonneau, 2011) or emergency services identifying and monitoring large-scale crises (Verma et al., 2011). Researchers have noted strong relationships between social media sentiment and major social and economic events, suggesting that these sentiment analysis techniques are doing much more than revealing trivial patterns (Bollen, Pepe, & Mao, 2009).

It would appear that sentiment analysis or natural language processing has seldom been applied to big social media to understand geographical differences in mood across a city. In this analysis a simple, a Natural Language Processing (NLP) algorithm was applied to

understand the sentiment of 200,000 Twitter and Facebook interactions in Melbourne, Australia over a two-month period. With Melbourne regularly cited as the “world’s most liveable city”, the analysis provides an opportunity to understand which local areas, and what aspects of the city, might contribute to the city’s liveability.

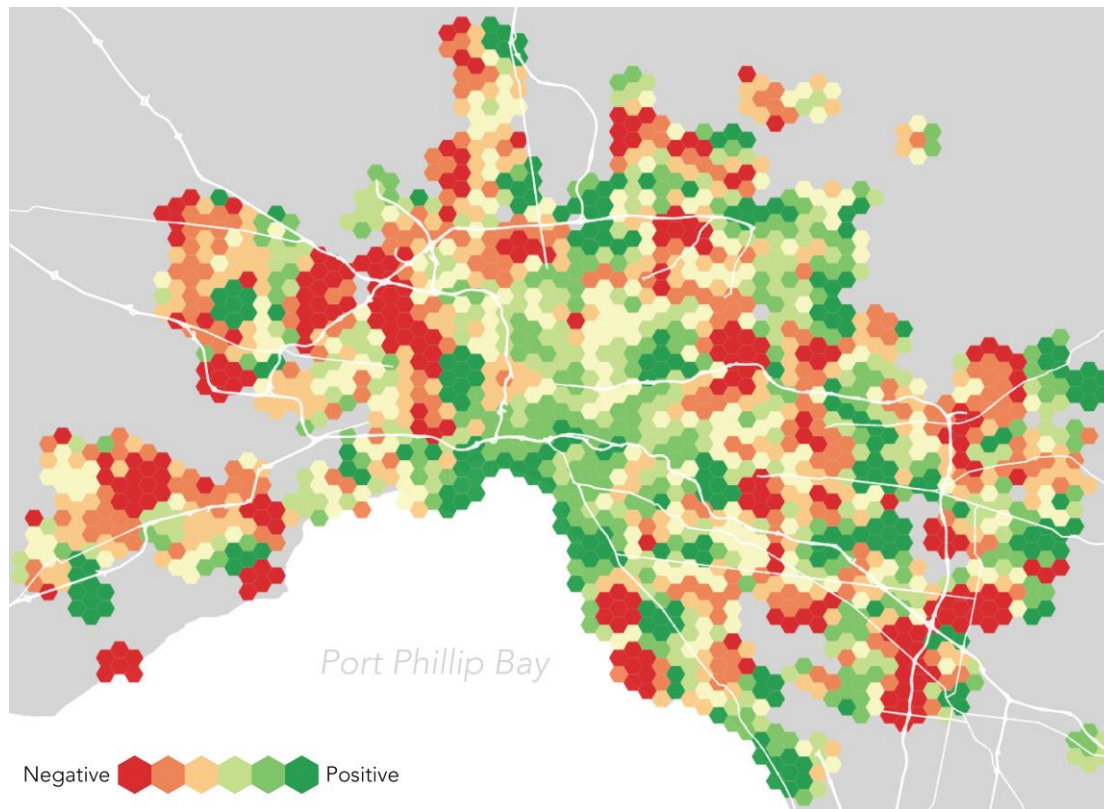
In the analysis, Melbourne is divided into a grid with each cell representing an area of 1500m². Each Facebook or Twitter interaction is given a sentiment score ranging between -20 (very negative) and +20 (very positive). The average mood of interactions within a grid cell is then calculated. Areas with insignificant numbers of interactions are removed from the grid. Interactions originating from Twitter or Facebook ‘bots’ (computers that send automated posts to these services) are also removed. The results of this technique are mapped in Figure 1.

Broadly, the analysis shows that posts in the inner-city are more positive, middle ring suburbs are often neutral, while the mood of outer suburbs is much more varied – extending from very negative to very positive.

Some of the most positive parts of the city are located around Port Phillip Bay, extending from Williamstown in the west around to Brighton in the south. This is likely to have been influenced by the collection of data during the summer months. It highlights Port Phillip Bay’s importance to the city’s liveability, despite Melbourne not generally being associated with water activities or the beach when compared to other Australian cities, such as Sydney or Perth. The predominant discourse around Melbourne’s liveability often focuses on its more sophisticated, urban elements such as laneways, architecture and cuisine, rather than its natural features such as Port Phillip Bay (Frost, Laing, Wheeler, & Reeves, 2010). Interestingly, this mapping suggests that the Bay may play an important role in the life and identity of Melbournians that is often overlooked.¹

¹ It is worth noting that there may be confounding variables that explain this observation. This needs to be considered in future analysis.

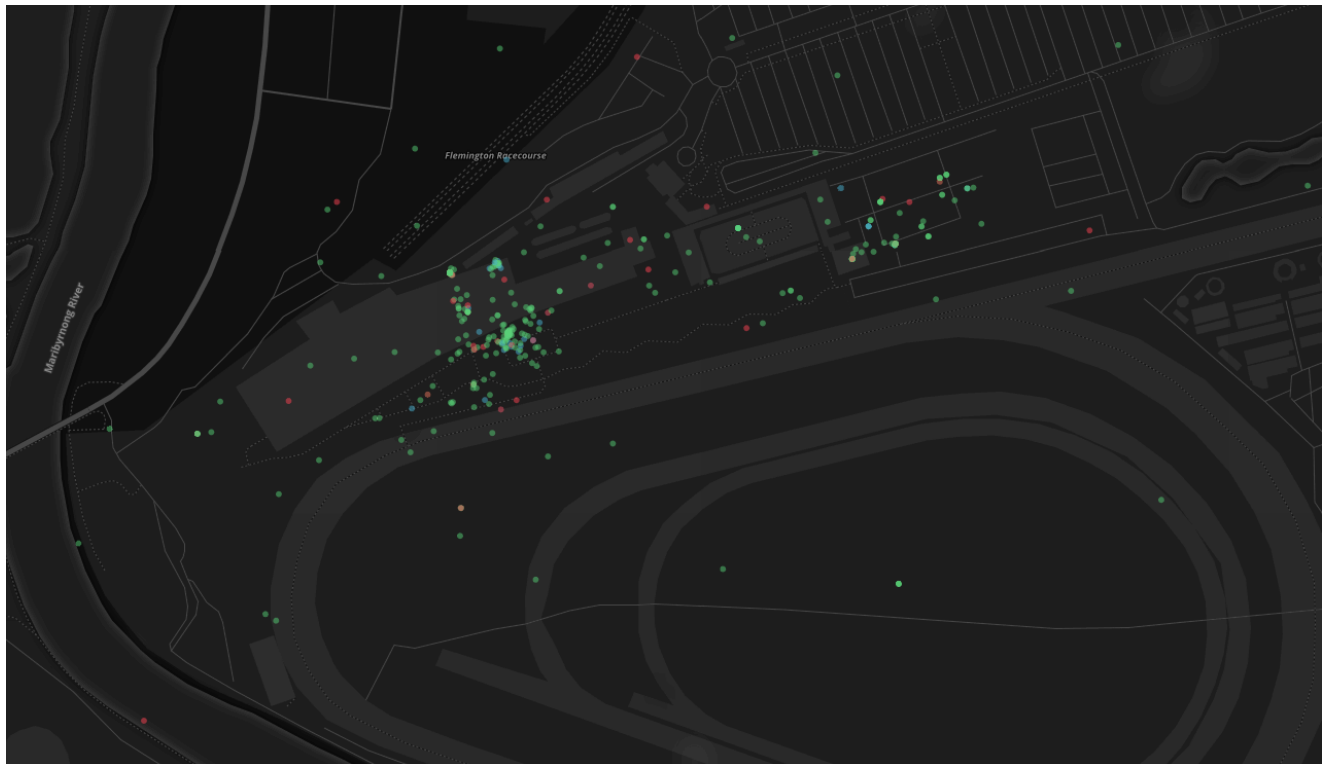
Figure 1 Average mood by small area, Melbourne



The importance of sporting events to Melbourne's identity and liveability is also captured in the data. Figure 2 shows the intensity of positive tweets and Facebook posts around Flemington Racecourse. The strong positive mood around other sporting venues – AAMI Stadium, the Melbourne Cricket Ground and Melbourne Park show similar patterns. In this case, the data reaffirms something we already appreciate - Melbourne's deep affinity with sporting events. However, a comparison to sporting venues in other cities might allow us to benchmark this affinity against other urban areas, to understand whether it is truly unique.

In terms of less positive places, the 'western mood belt' extending from Highpoint/Maribyrnong to Keilor in Melbourne's western suburbs is particularly prominent (see Figure 1). Perhaps it is unsurprising that interactions in the outer suburbs are less likely to be positive, as most of Melbourne's entertainment, leisure venues and attractions are concentrated within the inner-city. Indeed, the map visualises the distinct polarisation that planners identify as emerging between the liveable inner suburbs of the city, and the underserved outer suburbs (Department of Planning and Community Development, 2012).

Figure 2 Mood of individual social media interactions, Flemington Racecourse and surrounds



Base map source: Mapbox / Open Street Map

4. What Happened to All the Hipsters?

The availability of local, diverse, and quality entertainment and retail options helps to underpin liveability and amenity of an area. This is especially important in the inner urban areas of Australian cities (Gulko, 2012). The number of entertainment and hospitality businesses, and their popularity, is also an indicator of the economic health of a precinct or community.

The millions of café, restaurant, retail and bar reviews posted by urban residents on the web, across many online platforms and apps (such as Yelp, Foursquare, or Urban Spoon) can be used as an additional data source to understand the city. These reviews, when aggregated, can provide a critical insight into the economic health of precincts, but also the liveability of a local community. The significance of these reviews to the experience of urban life are significant – around 25% of Australian Internet users reported consuming reviews/ratings of restaurants online in 2013 (Sensis, 2013). 18% of users reported posting reviews or ratings of restaurants in the same survey.

To demonstrate the utility of review and ratings data for urban planning and economics, a data set from a mix of platforms was collected at 2011 and 2014 for the city of Perth, Australia. Figure 3 provides an analysis of the popularity of restaurants, cafes and bars in selected suburbs of the city between 2011 and 2014. The popularity of a suburb is measured in terms of its share of the top one hundred restaurants, bars and cafes according to a mix of review sites and apps. This popularity is then expressed in terms of ‘points’ for easy interpretation.

Figure 3 makes it clear that some areas of the city have experienced notable declines in their popularity. The historical, coastal suburb of Fremantle (once known for the diversity and quality of its hospitality and retail sector) has dropped by around 10% over the four-year period. This reflects the general perception and experience in Perth, where Fremantle is understood to be enduring a slow economic decline (Ramsey, 2013). At the same time, the city’s main restaurant and entertainment district, Northbridge, continues to increase its dominance (+30% over four years), potentially at the expense of the Perth CBD (which neighbours Northbridge). One of Perth’s inner urban villages, Victoria Park, continues to increase in popularity – which is reflected in the visible growth of urban diversity and vitality in this area over the past four years.

From this case study, it is clear that this data can be harvested to provide an insight into urban phenomena, and that it closely reflects empirical ‘on the ground’ experience. Movements in popularity scores, using big data from reviews and ratings, provide an indicator of urban vitality. They can help to explain whether urban regeneration programs are indeed working, or act as an early indicator of urban economic decline. As the railway line that separates Perth and Northbridge is relocated underground in the coming years it will be interesting to note whether the Perth CBD is reinvigorated through new connections to Northbridge.

Figure 3 Change in popularity of restaurants and cafes in selected Perth suburbs (2011-2014)



The figure above shows the change in popularity of restaurants and cafes in suburbs in Perth between 2011 (left hand side) and 2014 (right hand side). Each suburb's popularity is scored in terms of 'points' – an indicator of the popularity of local cafes and restaurants on review websites and apps. The colours of lines represent decreasing popularity (orange) and increasing popularity (blue). The thickness of lines represents the scale of change (in points) over the period.

5. Measuring and Visualising Tourism

Urban planners, urban economists and tourism development agencies are often faced with a lack of data regarding the preferences and movements of tourists in cities. This lack of data means that it is difficult to understand whether tourism campaigns are working, or profile tourists visiting a city. In Australia, Tourism Research Australia (TRA) undertakes a significant survey based research program, but this data is not available at a 'fine grain' spatial level, and does not help us to understand how tourists move around a city.

It is common for tourists in a new city to post photos on social media to show their friends and family where they are. Researchers have used the abundance of tourism related social media updates in Italy to understand the home country of tourists through an analysis of language, and through examining user profiles (Ciuccarelli et al., 2014). A team of map designers and data analysts produced web maps showing where tourists are more likely be found in cities (Fischer, 2015). Similarly, Qu and Zhang tested the accuracy of a mix of methods that sought to infer a user's home city (Qu & Zhang, 2013).

Figures 4 and 5 show an analysis of the location of tourists in the inner urban areas of Melbourne, based on a sample of around 200,000 geo-coded tweets. Using two different mapping methodologies, they show where tourists are more likely to be found in the city.

To differentiate between tourists and locals, a machine-learning algorithm was used. A computer was taught to understand which user profiles and posts were likely to be from tourists, and which were likely to belong to locals from the state of Victoria, Australia. A sample of around 2,000 Twitter user profiles were manually coded, and then used to teach a simple k Nearest-Neighbours (k-NN) algorithm the difference between these two groups. This algorithm was then applied its learning to the wider data set of around 200,000 tweets. The advantage to this method is its simplicity. Validation testing suggests that the machine-learning algorithm performed at around 88% accuracy.

Figure 4 Location of individual tweets by locals (blue) and tourists (red)

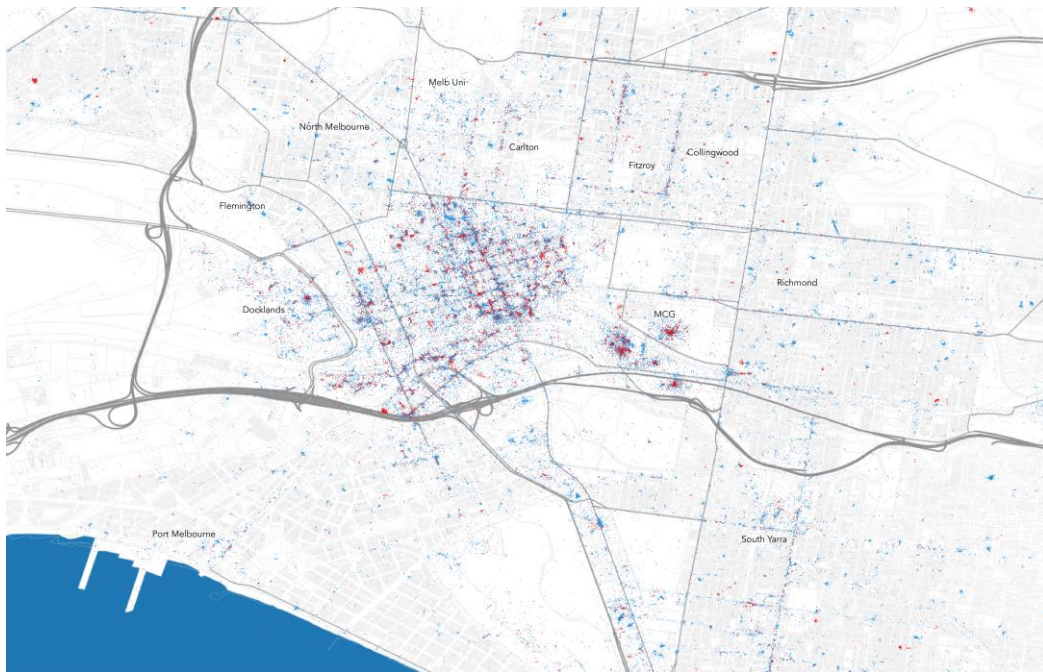


Figure 5 Areas with a high tourism quotient (LQ) in inner Melbourne

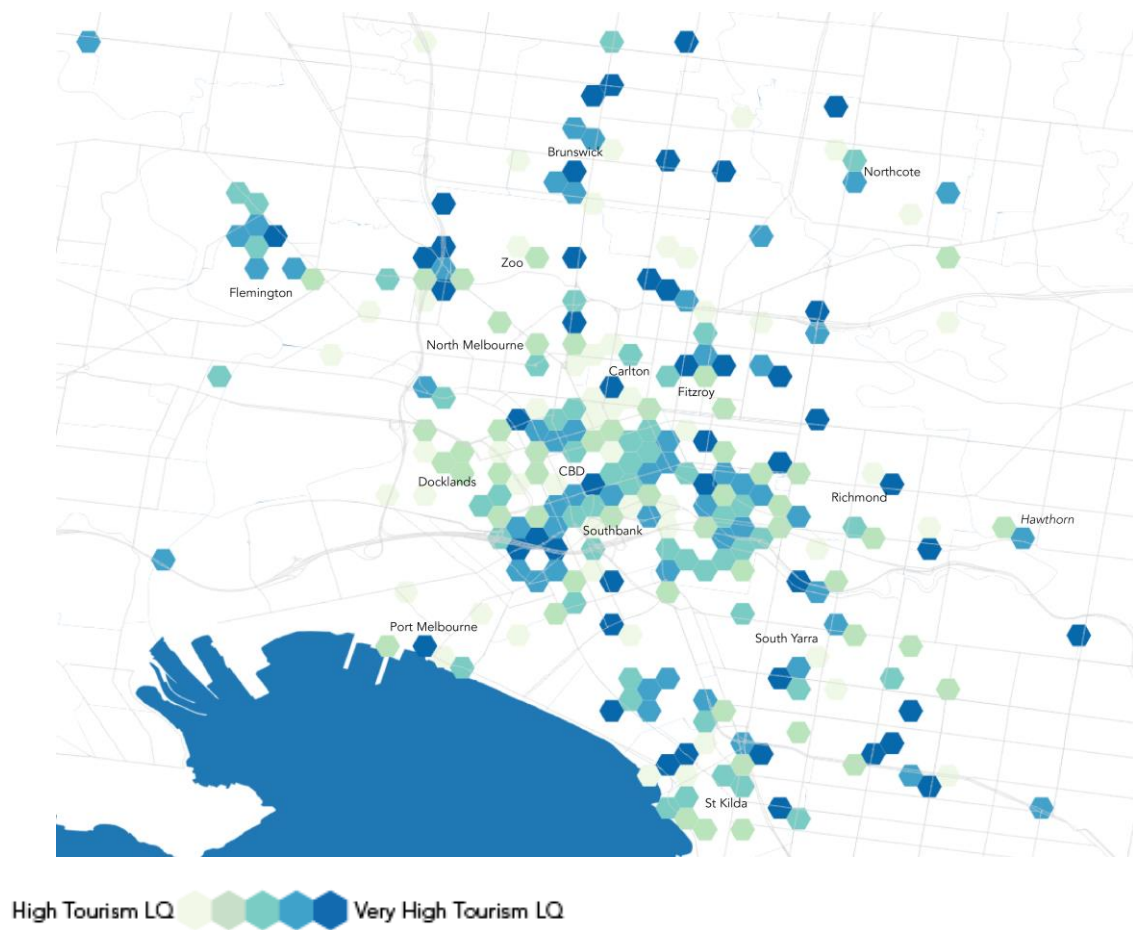


Figure 5 divides inner Melbourne into a hexagonal grid with each cell having a 10-hectare area. A tourism location-quotient (LQ) is then calculated for each cell. A LQ is a metric used by urban economists to identify whether there is a relative concentration of a certain phenomenon in a geographical area (Miller, Gibson, & Wright, 1991). In this map, areas with a high LQ have a large number of tourists tweeting relative to locals. The usefulness of using LQs when exploring big social data has been advocated by other researchers (Shelton, Poorthuis, & Zook, 2015).

Interestingly, the mapping reveals that some traditional shopping strips in inner Melbourne have relatively lower reliance on overseas and interstate visitors. These include South Yarra's Chapel Street, Bay Street in Port Melbourne, and shopping areas in Richmond. Alternatively, other traditional retail streets around Brunswick, Fitzroy, and St Kilda show a much higher level of tourism activity. Unsurprisingly, the Melbourne CBD and Southbank have the greatest tourism activity. Still, there are notable exceptions to this. Queen Street and William Street in the Melbourne CBD, which is known as an area with few entertainment or tourism, related activities has a very low level of tourist activity.

Few tourists cross into Richmond or Abbotsford, despite the proximity of significant tourist activity at nearby sporting venues (e.g. AAMI Park, the Melbourne Cricket Ground and Melbourne Park). It would appear that Hoddle Street/Punt Road is a substantial boundary or barrier for tourists in inner Melbourne.

This is a limited case study of how big social data might be used to understand tourist behaviour and inform tourism policy, marketing and management. The availability of this contemporary data set may also be an opportunity to understand tourist movement patterns, their home city or country, their sentiment, their length of stay, and whether tourism is increasing or decreasing over time.

6. Big Social Data's Shortcomings

As much as there are potential applications for big social data, there are possible limitations.. Two main constraints are levels of bias in the data, and privacy issues.

There is some concern that social media users are not representative of the diversity of urban experiences and behaviour. Surveys suggest that around 14 million Australians use Facebook, around 3 million use Twitter, and 4 million use Instagram (Margin Media, 2014). However, a large proportion of Facebook users, in particular, are unlikely to use the platform through GPS enabled mobile phones, making geo-coded big social data capture more prone to demographic bias (Ciuccarelli et al., 2014). Social media use is also reaching ubiquity in some emerging economies such as Indonesia (Meeker, 2015) that have traditionally suffered from poor data availability for urban planning and management. However, those with less financial resources are likely to remain under-represented amongst smart phone enabled, social media users.

Moreover, some age or demographic groups are much more engaged than others on social networks – using these platforms more frequently, and sharing content more intensively (Meeker, 2015). Younger groups are likely to share data more often than other groups. The frequency of data generation by some groups will introduce a natural bias to data sets.

Finally, only a small percentage of total interactions on these social networks are both geo-coded and publically available. Most users are conscious that they are publicly sharing their location, and are therefore likely to moderate when and where they choose to share this data. In other words, the data that has been harvested for analysis is likely to capture a limited type of behaviour in the city – generally the behaviour that an individual wants to share publicly and widely. The disproportionately large number of geo-coded, public posts from airports (people ‘bragging’ about when they are leaving or arriving in a city) is a good example of this. This phenomenon could be referred to as ‘public sharing bias’.

Despite these issues, there are a number of methods that could be used to understand the level of bias and data, and help control for it. For example, big social data could be compared to traditional survey data to understand the level of bias. There are some contexts that appear to attract wide publically available, geo-coded social media data (e.g. activities involving young people, tourists or entertainment venues). Big social data is more likely to be useful when studying phenomenon related to these groups. Emerging big social data sources could potentially be blended with traditional data sources. For example, Instagram or Twitter data may be best for understanding the movement of younger community members around the

city, but it could be combined with a telephone survey of older residents to gain a more holistic understanding.

The case studies outlined earlier focused on the behaviour of aggregated groups of social media users. However, it is quite feasible to analyse the urban behaviour of individual social media users who publicly provide their location in interactions. This raises important questions about the privacy of individuals. It should be noted that social media users with their location publicly shared are aware the world can see this information. On all social media platforms this requires the user to explicitly 'opt in'. However, it is less likely these users understand exactly how this public data might be used, including in studies such as those outlined here.

While the privacy concerns in this analysis are relatively benign, some computer science and privacy researchers have been able to infer the home location of social media users with reasonable levels of geographical accuracy (Qu & Zhang, 2013). Moreover, there is real potential for urban surveillance or individual/consumer profiling, using big social data. This is a small part of a wider debate about the changing concepts of citizen privacy and the potential for top-down government and corporate control in the emerging era of 'big data' and 'smart cities' (Sheppard, 2011; Townsend, 2014).

7. Embracing the Dynamic City, Embracing Technology

Despite the limitations of big social data in urban planning and management, the case studies here demonstrate that it has the potential to help practitioners comprehend previously invisible aspects of this city. These case studies *allude* to the potential applications and techniques that might be deployed, rather providing a definitive guide to their function. Perhaps most importantly, they explore the urban flows and networks that Michael Batty (2013) implores us to scrutinise.

With technological change, the social and physical morphology of cities is accelerating. Technologists and computer scientists are playing an increasingly central role in shaping the dynamics of cities and urban life – through the development of apps, infrastructure and changing social norms. In this context, traditional 'built environment' professionals could potentially be sidelined. The leading architect, Rem Koolhaas, has pondered what the

growing influence of technologists might mean for the future of cities and for built environment professionals (Koolhaas, 2014). Urban planning in particular has struggled to comprehend the invisible and temporal dimensions of cities, with its natural tendency to focus on the tangible and static. At the same time, planning professionals would appear inhibited by technological capacity, confidence and skills (Houghton, Miller, & Foth, 2013).

If urban planners, designers, economists and others are to actively participate in the future of cities, then there is a need to deploy more and better tools to understand it. Harvesting and analysing big social data provides one means to do this. This contemporary data source has the potential to reveal the temporal and invisible dimensions of cities, and complement more traditional data sets. Researchers from Italy have built and tested tools geared toward urban planners and other city stakeholders, allowing them to understand the city through big social data while minimising technological barriers (Ciuccarelli et al., 2014). Programs such as the Australian Urban Research Infrastructure Network (AURIN) envision more accessible data tools for urban researchers and professionals and there may be potential to integrate big social data into such tools. Finally, greater technological and data analysis literacy amongst professionals would enable planners, designers and others to comprehend and apply the growing abundance of data, and participate in an emerging era of technologically driven urban change.

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Public Attitudes to the Environment — Insights from the New Zealand Values' Survey

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Public Attitudes to the Environment — Insights from the New Zealand Values' Survey

Abstract

While environmental concerns have existed for decades, accompanied by strong advocacy for more environmentally orientated policies, the reality is that such policies will generally only be achieved if politicians can be persuaded the public are willing to accept them. Therefore, any data revealing the public's attitudes to various environmental questions can be enlightening. The 2011 New Zealand Values Survey (NZVS) which forms part of the World Values Survey included a number of questions on environmental issues. The NZVS employs very direct questions about how willing respondents are to change their behaviours and/or pay higher taxes or prices for goods to assist in achieving environmental outcomes. This paper examines the survey's result, with some comparisons to Australian results, and provides some insight into how open the public are likely to be in taking active steps to change their behaviour to achieve environmental outcomes. The paper will also look at how far political parties in a MMP political system reflect or lead environmental opinions.

Keywords: Environmental values, New Zealand World Values' Survey, MMP

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Introduction

While environmental concerns have existed for decades, accompanied by strong advocacy for more environmentally orientated policies, the reality is that such policies will generally only be achieved if politicians can be persuaded the public are willing to accept them. Politics is after all 'the art of the possible' and what is possible is determined by electors and the governments they elect. Discerning the public's attitudes to various environmental questions is not easy particularly in terms of the acceptability of alternative environmental policy options. This becomes all the more complex when those policy options involve economic and other trade-offs against competing issues such as education, health or (un)employment.

In the New Zealand context the public's attitudes become all the more important in a Mixed Member Proportional (MMP) electoral system. Under MMP electors have two votes — an electorate vote and a party vote. If the total party vote exceeds 5% or the party wins an electorate seat, they gain a proportion of the seats in Parliament. For instance the Green Party, an environmentally and social justice focused party, holds no electorate seats but occupies 14 seats in the present Parliament. MMP was instituted in 1996 and since then all New Zealand governments have been coalition governments. This creates a greater potential for alternative

policies to be implemented as part of a coalition agreement or in return for ensuring the ability to govern by offering support on matters of confidence and supply. Since MMP was instituted New Zealand voters have consistently voted strategically, voting for one party with their electorate vote and a different party with their party vote. In this electoral climate there is greater potential for policy diversity and this makes information about electors' attitudes to different issues all the more valuable.

New Zealand has a single environmental statute, the *Resource Management Act 1991* (RMA), which controls the allocation and use of natural resources including land. As such it determines the use of land and planning in urban areas. The RMA has had a chequered career (Miller, 2011) but to date, while it has been very regularly amended, it remains the primary planning statute. Since 2010 Auckland has additional legislation requiring the production of an additional spatial plan. Under the RMA consultation is central to what is a bottom-up plan making processes. When the plans have been produced the process of making them operative includes an open submission process. That process also grants them appeal rights to the Environment Court and to higher courts. For those involved in writing plans, assessing the public's views on potential plan and policy directions is essential if the plan is not to be 'bogged down' in an expensive submission and appeal processes. The public's views on issues are also valuable in central government policy and planning processes.

The World Values Survey (WVS) is one of two multi-national surveys, has been conducted on a regular cycle in New Zealand. Started in the early 1980s it is undertaken on an approximately 5 year cycle (called waves), usually in 50 to 60 of the 90 countries that are part of the WVS (Perry, 2011). While all of the Surveys retain a block of core questions, questions on environmental issues and opinions have been regularly included. The latest NZWVS, which was conducted late in 2011 with a sample size of about 840 drawn randomly from the New Zealand electoral roll. The 2011 NZWVS included a range of environmental questions. The other major survey is the single issue International Social Survey Programme (ISSP) which last focused on environmental issues in 2010, with earlier environmental surveys being undertaken in 1992 and 2000. Thus while the ISSP provides insights into the New Zealand public's views on environmental issues it does not provide for the comparisons the WVS surveys do. The WVS survey was also undertaken in Australia in 2012 and asked 4 questions on environmental issues, making the WVS survey results the most comprehensive source of environmental opinions. Since 2000 Lincoln University has produced the Public Perceptions of New Zealand's Environment (PPNZE) (Hughey, Kerr & Cullen, 2013), with

the latest produced in 2013. It provides a useful complement to the material provided by the NZWVS survey.

This paper will focused on what was revealed in the NZWVS's survey about attitudes to environmental issues and what this may mean in terms of promoting environmental policies and undertaking planning processes. It will also look at some comparisons over time and with Australian results. Respondent's political opinions will also be examined to see if and how environmental views vary according to political preference, important in a MMP political environment.

Environmental Attitudes and Behaviours

According to Best and Mayoral (2013) since the early 1990s an extensive literature on the links between environmental concern and behaviour has developed. This research was both linked to, and a consequence of, the rise in what Bulkeley and Mol (2003) call the 'institutionalisation of environmental politics' that had emerged in the 1960s. That institutionalisation led to a series of changes in environmental policy making and in particular the role of various actors, including the public in those processes (Bulkeley & Mol, 2013, 144). From this recognition a substantial and complex literature on environmental attitudes and their role in public participation and decision making processes, has emerged. The depth of this literature is such that it will only be touched on in this paper to provide a backdrop to the discussion of New Zealanders' environmental attitudes.

Abramson and Inglehart's (1995) were some of the earliest researchers in this area. They proposed a 'postmaterialism' scale which 'shows a worldwide trend away from concerns with material well-being towards a postmaterialist value system that emphasizes the free expression of ideas, greater democratization, and the development of more humane societies' (MacIntosh, 1998, 452). Postmaterialism was however regarded as only being evident in the wealthy, developed and usually highly urbanised and industrialised countries. Equally, it was also seen to involve greater concern with environmental issues. Inglehart expanded on this theory of postmaterialism and his work has been 'most widely used to account for the emergence of environmentalism, green political parties and citizen concern for the environment (Dunlap & York, 2008, 531).

Limiting postmaterialism and its associated concerns to environmental issues in the developed world has been challenged on a number of grounds. Dunlap and York (2008) note

that poorer and less developed countries often experience, on a daily basis, the consequences of environmental degradation. Thus they are probably more motivated to seek environmental change and to express positive attitudes to environmental change. They conclude, utilising both the WVS and the Health of the Planet (HOP) survey that ‘a host of social, political and cultural factors also contribute to the global spread of environmental activism and concern’ (Dunlap & York, 2008, 552).

New Zealand is normally included in the developed world category despite, during the 1980s and 1990s facing significant economic challenges. As a small, physically isolated country economically dependent on a small range of primary produce, it has often been at the mercy of the international trade cycles. This economic stresses was a precursor to the emergence in 1985 with the election of the Fourth Labour Government, of a neo-liberalist government. In New Zealand the neo-liberalism agenda (commonly known as Rogernomics) produced extensive restructuring of both society and the economy with an accompanying wave of redundancies. Somewhat bizarrely the same government produced the environmentally focused *Resource Management Act 1991*. However, an export focused economy and the trauma induced by Rogernomics meant that economic growth and policies are ‘untouchable’ and economic policy in contrast to environmental policies was never ‘opened up to democratisation’ (Buhrs & Bartlett, 1997, 97). This primacy of economic policies has been a central feature of the present government, which is essentially a conservative focused government though it does include the Māori Party.

Views of the Environment as a Whole

In the last two decades concern with environmental issues had become of greater public concern and the state of the environment in New Zealand has become a contentious issue. This debate is well illustrated by the use of the 100% pure advertising campaign by Tourism New Zealand to promote New Zealand as a tourist destination from 1996 onwards (Tourism New Zealand, 2009). As Tourism New Zealand’s (2009) review reveals the 100% pure was part of a process of ‘branding’ New Zealand and was about ‘the purity of the experience’ of the visit. However, it was widely seen to be a comment on the pristine quality of New Zealand’s environment. For planners and scientists there was a clear understanding that 100% pure was largely myth. The issue became more heated when the expansion of dairying into new areas in the early 21st century had an almost immediate and obvious adverse impact on water quality. The issue became a more public squabble after ecologist Dr Mike Joy

suggested, in an *International Herald Tribune* article that the clean green image was ‘was false and misleading’ (Anderson, 2012). This escalated into a debate that continues to the present.

While much was made of the public’s belief in this ‘clean, green image’, the NZWVS survey suggests this might not be as straightforward as was commonly opined as Table 1 demonstrates.

Table 1 ‘New Zealand’s clean, green image is a myth’.

	MALE %	FEMALE %	TOTAL %
Strongly agree	10.7	11.6	11.2
Agree	39.3	39.2	39.2
Don’t Agree	43.6	43.5	43.5
Strongly don’t agree	6.4	5.7	6.0

Source: NZWVS

In 2011 50.4 % strongly agreed/agreed that ‘clean green’ was a myth which suggests a split view on the matter. However, in the 2004 NZWVS only 44.3% agreed/ strongly agreed with this statement, demonstrating there has been a gradual rejection of the ‘clean green myth’. These responses were similar to those reported in the PPNZE where respondents disagreeing/strongly disagreeing that New Zealand was clean and green rose significantly in the 2013 survey when compared with earlier surveys (Hughey et al., 2013, 10). New Zealanders were however pragmatic about what ensured any ‘clean green’ image. Some 65.3% of respondents believed that this was only the case because ‘of our small population’.

The PPNZE throws light on where this gradual rejection of the ‘clean green’ imagery comes from, in the questions it asks about the quality of various aspects of the natural environment. While ‘New Zealand’s natural environment was rated to be ‘good’ or ‘very good’ when compared with other developed nations’ (Hughey et al.,2013,11). There was significant concern about the condition of rivers and lakes and ‘41% rated them as bad or very bad’ (Hughey et al.,2013,11). Internationally, this concern with water quality may seem rather unexpected given that New Zealand is an agricultural country with little in the way of heavy industry, then usual source of significant water pollution.

The decline in water quality can be traced to New Zealand’s agricultural sector, particular the expansion of dairying and the continued use of rivers as convenient discharge points for

‘cleaned’ urban waste water and stormwater. The expansion of dairying has been significant with dairy cow numbers rising by 23% between 2007 and 2012 (Statistics NZ, 2015). The most significant increases in dairy cow numbers occurred in the South Island, a non-traditional dairying area, where numbers grew from 200,000 to 1.2m between 1990 and 2002 (Salmon, 2007, 194). Dairying has contributed significantly to nitrogen and phosphorous run off into lakes, rivers and streams while urban discharges have introduced biological toxins and heavy metals. Concern about water quality has produced sustained public debate much of it ill-tempered and some ill-informed (Miller, 2011). Fonterra, the dairy co-operative which processes 95% of the milk produced in New Zealand, has moved to introduce a Clean Streams Accord to try to improve water quality. This has been supported by the regional councils who are responsible for water management. Federated Farmers, which represent many farmers has been openly aggressive in its defence of farming and its opposition to the use of the label ‘Dirty Dairying’. This all means that most New Zealanders would be aware of water quality issues via the media and given the use of rivers and lakes for recreation, may also have seen signs advising against swimming in a water body because of concerns over water quality. Consequently, the assessment on protection of the environment shown in Table 2 is not unexpected.

Table 2 ‘Protection of the environment is’.

	MALE %	FEMALE %	TOTAL %
An urgent & immediate problem	66.9	72.1	69.9
A problem for the future	22.3	22.2	22.2
Not really a problem	10.8	5.8	7.9

Source: NZWVS

While these results seem to show real concern for the environment a comparison with the same question in 2004 indicates that the degree of environmental concern might be related to the strength of the economy. In 2004 when the economy was stronger 74.5% of respondents saw protection of the environment an urgent and immediate problem. While the difference is not huge (a 4.6% drop) it does demonstrate ambivalence about favouring the environment when economic issues seem more pressing or relevant.

Simple Environmental Actions

Much of what local level planners and other policy makers focus on is getting communities to make changes to their everyday behaviours. The NZWVS provides an excellent insight into the willingness to make such changes and exactly how environmental concerned and committed people are. In response to questions on purchases 74.5% reported they had chosen products they thought were better for the environment and 91.6% have reused or recycled something rather than throwing it away. This provides a picture of a population that is willing to do 'their bit' for the environment as long as it is simple and does not require major changes in their behaviours. In contrast, when asked if they had tried to reduce water consumption for environmental reasons a lower 63.8%, (but only 57.6% of men) had done this. There may be an economic imperative here given the increased metering and charging for urban water. There was little evidence that respondents were deeply committed to environmentalism. Only 26.7% had given money to an ecological organisation and only 4.9% had participated in a demonstration for an environmental cause. These questions were part of the Australian WVS and the results reveal a similar pattern with 29.5% having donated money though a higher 8.2% had participated in an environmental demonstration. Again in both countries simple easy actions were more popular than those which required significant behavioural change.

The Environment and Politics

The NZWVS, particularly in Table 2 and the Lincoln Survey, both enforce the perception that New Zealanders are aware of the nature and quality of their environment and that it might be a great deal less than '100% pure' or 'clean and green'. Addressing these environmental issues will likely require a new policy and legislation. Before any policy or law is advanced politicians need to be convinced that such a move will be appealing to a broad range of voters. MMP has spawned a number of parties including the Māori Party, United Future, ACT and New Zealand First. The Conservative Party, a right wing Christian party contested the last two elections but so far has not succeeded in getting seats in Parliament. The largest parties are National and Labour. National, presently in its third term in office, is a conservative right wing party which does not seem to see the environment as a mainstream issue. It has consistently opposed the RMA calling it a 'road block to development' and has promoted reforms to it to speed up land development (Miller, 2011). National has also funded a major road building projects particularly in Auckland and abandoned the carbon tax that had been put in place by Labour. Labour is supposedly a left wing party but in reality occupies the middle ground. Like National it has been responsible for amendments to the RMA and seems ambivalent about environmental issues seeing them as subordinate to

economic growth and management. The Green Party as its name suggest has a strong environmental focus and has consistently opposed any weakening of the RMA. However, in recent elections it has tried to broaden its appeal by more directly addressing economic and welfare issues. In addition there are a number of other parties with seats in Parliament including New Zealand First (12 seats), United Future (1 seat) and ACT (1 seat).

Politically there is always a tension between economic/growth policy and environmental policy (Buhrs & Bartlett, 1997). This has become stronger under MMP as parties are not only seeking seats but also to make themselves attractive coalition partners. For instance, the Māori Party is a coalition partner and in return achieved policy concessions and ministerial posts. Thus stronger environmental policies could be achieved by a party merely in return for agreement on confidence and supply, which ensures the governing coalition does not fall to a vote of no confidence. The reasons for the politicians' wariness about making environmental concerns a central plank of their policies is demonstrated in Table 3.

Table 3 'Economic growth and the environment.'

	MALE %	FEMALE %	TOTAL %
Environment is the priority	47.3	56.7	52.7
Economic growth is the priority	52.7	43.3	47.3

Source: NZWVS

The results, while showing support for environmentally focused policies also demonstrate that it is a fine balance particularly for men. The degree of support for making the environment priority may reflect the strength/health of the economy. A slightly different question was asked in New Zealand in 2004 when the economy was performing well and at that point 65.4% saw the environment as a priority, while the figure in the economically more buoyant Australia was 60.6%. Taken together this suggests that voters do find it easier to make trade-offs in favour of the environment when the economy is buoyant.

Cross tabulations undertaken on the basis of the respondent's first choice of political party i.e. the party likely to receive a voters party vote is shown in Table 4.

Table 4 ‘Economic growth and the environment’

Parties %	NATIONAL	LABOUR	ACT	GREEN	MAORI	NZ FIRST
Environment is the priority	46.3	53.9	40	87.9	72.7	34.6
Economic growth is the priority	53.7	46.1	60	12.1	27.3	65.4

Comparing these results to those in Table 3 suggest that political parties have positioned themselves very accurately in terms of the relative importance of economic and environmental issues. The highest levels of support for prioritising environmental issues over economic issues were from the Green and the Māori Parties. For the Green Party this reflects its primary role as an environmental party. For the Māori Party it reflects the strong environmental focus of the Māori world view which makes the environment a taonga (treasure). The results for National and Labour largely reflect the results for the community as a whole, probably a consequence of their use of extensive polling they do to ensure their policies have some appeal for the voting community.

This conclusion is borne out when a trade-off element is included in the question. Asked if they agreed with the statement that ‘the government should reduce environmental pollution but it should not cost me any money’, 63.1% of respondents agreed or strongly agreed with the statement. Similarly, when asked if they would give up ‘part of my income if I were certain that the money would be used to prevent environmental pollution’, only 36.9% agreed or strongly agreed with the statement. Finally, only 30.7% of respondents agreed or strongly agreed that they would ‘buy things at 20% higher than usual prices if that would help protect the environment’. For political parties looking to provide as wide an appeal as possible the message from these results is clearly. While environmental issues are important they rarely out-weigh economic concerns. The introduction of trade-offs is likely to see economic and monetary concerns win out over environmental concerns. However, the effects of the on-going global recession (2007-2009), may mean that people simply do not feel sufficiently confident that their financial position could weather additional costs even if that would improve the environment. This also probably enforces ‘policy hopping’ by political parties,

trying to find electorally appealing policies and militates against long term environmental policy making.

Conclusion

The NZWVS survey reveals that while New Zealanders are aware of environmental issues and the nonsense of the 'clean green' imagery employed by tourist publicity. They are willing to take some actions to help address environmental concerns as long as those are simple, cheap and easy to achieve. When environmental change requires a trade-off economic reality transcends environmental concerns. Political parties faced with the complexity of a MMP political system and an electorate somewhat ambivalent about environmental policies will always reflect rather than lead community opinion. Despite the clear ambivalence about committing to significant changes to achieve environmental outcomes, 69.9% of respondents still saw environmental problems as 'immediate and urgent'. This rather perverse result suggests that while the public acknowledge the importance of environmental issues they see the solutions as not, to any great extent, involving them. Given this it is almost inevitable that political parties, except for the Greens, will always have an environmental policy position but not one that require significant changes in peoples' behaviour or significant economic changes.

The message for planners, policy makers and community leaders is that any major changes to environmental policy can only be achieved at minimum cost and with no effect on the economy. Economic concerns are likely to be primary policy drivers and central in individual's decision making. Taken as a whole what emerges for this survey is a picture of people trying to be good citizens rather than committed environmentalists and that New Zealanders, despite 'clean green' imagery and the RMA, are no more environmentally orientated than their closest neighbour, Australia. Given individuals do seem willing to undertake small and direct actions such as recycling to improve environmental outcomes may mean that environmental policies need to be developed incrementally building gradually to achieve significant change.

This preliminary work also highlights the value of the NZWVS in revealing a wide range of material on how New Zealanders perceive the economy, the environment and environmental policies. This is underutilised material and there is room to look at the NZWVS surveys over a longer time period to see if attitudes are changing or staying much the same, as a starting point to identify what might trigger attitude changes. Equally, there is also some useful work

that could be done in cross-country comparisons again to help identify what triggers and sustains a greater awareness of and interest in addressing environmental issues and how economic/environmental trade-offs can be achieved.

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Asset mapping and social innovation for low carbon communities

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ABSTRACT: *Low carbon community programs that encourage citizens to reduce their carbon emissions have been subject to various government and civil society trials in recent years. Behaviour change programs using ‘social marketing’ techniques have had mixed success in community carbon reduction because of a focus on individual control and lack of systemic context. ‘Asset-based community development’ (ABCD) is a strength-based tool that has been successfully used in the community sector to reveal the hidden assets of individuals and views communities as the starting point for change and abundant in capacity for sustainability interventions at the grassroots level. This paper will detail the development of a ‘low carbon community’ trial known as Livewell Yarra, a ‘Living Lab’ action research project funded by the CRC for Low Carbon Living in partnership with Curtin University, the City of Yarra and the Yarra Energy Foundation. This research uses asset mapping as a method to reveal the latent knowledge, interests and skills of Livewell participants and mobilise these strengths to meet carbon reduction goals. Participatory co-design is being used to enable participants to develop social innovations for carbon reduction in their local community which could take the form of community gardens, active transport or neighbourhood-based sharing initiatives. This paper provides an overview of the Livewell Yarra trial and its theoretical underpinnings and explores how asset-based approaches and social innovation can build capacity for groups to take individual and collective action to reduce carbon emissions for their own benefit and that of the wider community.*

Keywords: sustainability transitions; low carbon communities; asset-based community development; asset mapping; participatory co-design; social innovation;

Introduction

Livewell Yarra: background

Livewell Yarra is a ‘Living Lab’ action research project funded by the CRC for Low Carbon Living in partnership with Curtin University, the City of Yarra and the Yarra Energy Foundation. The project commenced in March 2015 and brings together academic researchers, local government and members of the community to build capacity for local action on carbon reduction.

The Living Lab concept originates from the work of William Mitchell at MIT and has spread around the world over the past decade with more than 400 labs as members of the umbrella organisation ENoLL (Salter & White 2013). Mitchell argued that a Living Lab represents a “user-centric research methodology for sensing, prototyping, validating and refining complex solutions” in emerging real-world contexts (Schumacher 2012).

The Living Lab model aligns with the participatory and action-oriented nature of the Livewell research project. Livewell Yarra has developed a self-help approach for participants to act to reduce their own and the broader community’s emissions. Livewell Yarra is made up of local community participants working together to reduce carbon emissions in specific ways for themselves and others. Participants have a significant role in the work and decision-making involved in these activities.

Livewell Yarra uses a peer-support structure called ‘decarb groups’ comprised of six to twelve people who support each other to reduce their carbon footprints and set personal sustainability goals. The term ‘decarb groups’ is used here to describe self-organising support groups with the aim of reducing their carbon emissions. Decarb groups are comprised of family, friends, neighbours or work colleagues. The decarb groups will meet monthly for six months in the City of Yarra.

Photo 1: Livewell Yarra core team meeting at Carlton Library January 2015



Beyond Behaviour Change

Various government and civic interventions to facilitate sustainability transitions have been trialled in recent years. Government-led attempts at community level carbon reduction include the Australian Government funded energy saving initiative *Low Carbon Communities* (Combet & Dreyfus 2011), the *TravelSmart* mobility management program initiated in Western Australia (James 2002) and the *Low Carbon Communities Challenge* in England, Wales and Northern Ireland (Bulkeley & Fuller 2012).

A range of civil society-led approaches have sought to develop more systemic responses to the climate crisis including *Transition Towns* (Hopkins 2011) and Carbon Rationing Action Groups (Howell 2009) both starting in the UK, and the *Sustainability Street* neighbourhood-level program in Australia (Bandicoot 2004). These self-organising initiatives are bottom-up alternatives that mobilise local communities to reduce emissions, influence others around them and seek broader structural reform (Middlemiss & Parrish 2010).

Much of the early literature on carbon reduction programs was informed by the psychology of sustainable behaviour. Community-based social marketing (CBSM) approaches use psychological knowledge to identify behaviours to be promoted and the barriers to this activity to design behaviour change programs (McKenzie-Mohr 2000). Similar psychology-based approaches emphasise social norms, factors that influence individual behaviour and the cumulative effects of individual actions over time (Manning 2009).

A national review of environmental education in Australia viewed social marketing as having limited success in generating social change for sustainability because of its focus on individual control and lack of systemic context, as well as a reliance on experts and government funding (Tilbury et al. 2005). The review also notes that social marketing's behaviourist model has drawn criticism for 'disempowering citizens' (Robottom & Hart 1993) and points towards growing evidence in support of 'action-oriented approaches' (Jensen & Schnack 1997) which support critical reflection and self-selected participation in decision-making (Tilbury et al. 2005).

Further literature suggests that social dilemmas arise when trying to solve collective problems like carbon reduction through the lens of individual behaviour change and that efforts should be focused at the community level by engaging people in their role as active citizens through the context of 'low carbon communities' (Heiskanen *et al.*, 2010). This refocusing on active citizenship and community as the site for lowering carbon emissions emphasises the importance of localised changes and argues that individual action is more likely when embedded in collective action (Fudge *et al.*, 2010).

Low Carbon Communities

The term 'low carbon communities' has emerged since the mid-2000s to describe a range of government policy interventions and civil society-based low carbon energy transition projects that operate at the local level. There is growing recognition that complex issues like climate change require community-level action alongside supporting regulatory mechanisms, policy and technology innovation, for systemic low carbon transformations to be realised.

A Special Issue of *Energy Policy* 38 (2010) on 'Carbon Reduction at Community Scale' observes that low carbon community initiatives can make an important contribution to reducing carbon emissions by developing new models of social innovation, building technical skills and creating demand for low carbon alternatives (Mulugetta et al. 2010). In a book on the subject, *Low carbon communities: imaginative approaches to combating climate change locally*, Fudge et al. (2010) point out that addressing climate change is fundamentally a "challenge for governance" and a "challenge about scale" given the global nature of carbon emissions and the structural coupling of fossil fuels to human systems.

The failure of international climate policy and national reduction targets to adequately curb emissions, along with the growing importance of household energy demand, leads Fudge et al. (2010) to conclude that governance has become "stretched by the demands of climate change" and must reach upwards and downwards simultaneously, but that ultimately "communities must play a crucial part in the protection of the global commons." Communities also provide an important social proof that responses to climate change are readily accessible. As Peters et al. (2010) suggest, there is growing recognition that community action through local projects has the potential to "ground climate change policy" to the energy practices of everyday people thus giving it higher visibility than "top-down" approaches. Despite this acknowledgment, the literature on low carbon communities is influenced by prevailing theoretical frameworks like Sustainability Transitions research that valorise the 'scaling-up' of community action in transition processes and frame systemic

change in a hierarchical conception of social space which contains the impact of community-level actions.

Sustainability Transitions

The emerging field of Sustainability Transitions research has developed a multi-disciplinary approach incorporating innovation theory, sociology and science and technology studies to investigate the dynamics of change in sociotechnical systems like energy, transportation and food. Transitions research posits that sociotechnical systems exhibit strong path-dependencies and undergo incremental change that is insufficient to address current sustainability challenges that instead require radical systems level transformation (Markard et al. 2012).

Sustainability transitions scholars have utilised and developed frameworks including the three-level model (Rip & Kemp 1998) comprised of niches, regimes and landscapes, often summarised as the multi-level perspective or MLP (Jørgensen 2012). Geels describes the multi-level perspective as a heuristic concept for explaining the complex dynamics of sociotechnical change (Geels 2002). The multi-level perspective is conceived as a nested hierarchy comprised at the micro-level of niches which are the site of radical innovations; the meso-level of regimes which provide stability through technological trajectories; and the macro-level of landscapes comprised of deep and slow-changing structural trends (Geels 2002).

Niches situated at the micro-level can incubate “radical novelties”, provide locations for “learning processes” and “space to build the social networks which support innovations” (Geels 2002). Sustainability transitions rely on niches to provide ‘protective spaces’ for ‘radical alternatives’ to develop and become viable (Kemp et al. 1998). A growing body of ‘strategic niche management’ research examines how to ‘replicate’, ‘scale-up’ or ‘translate’ these practices into other contexts (Smith et al. 2010). The multi-level perspective is conceived as a nested hierarchy whereby niches are “strongly influenced” by the prevailing structural context laid out in regimes and landscapes and alignment between all three levels must occur for a regime shift to take place (Geels 2002).

Grassroots Innovation

From the lens of the multi-level perspective, niches are the most relevant site for the analysis of low carbon communities for they provide alternative spaces for ‘experimentation’ in sustainability transitions and have the potential to influence and inform the mainstream (Smith 2006). An emerging discourse on ‘grassroots innovation’ which embeds ‘community action’ in its analysis of changes at the niche level, provides an important development on the role of civil society actors as “agents of change in transition processes” (Seyfang & Haxeltine 2012), albeit framed by the multi-level perspective.

In the mid-2000s ‘grassroots innovation’ developed as a new theoretical approach in response to the UK Government’s ‘sustainable development strategy’, to bridge the divide between ‘technological innovation’ with its emphasis on market-based solutions, and the community-led ‘social economy’ with its potential for systems change (Seyfang & Smith 2007). Grassroots innovations are seen as a “neglected site of innovation for sustainability” with a diversity of niche-based solutions that exist beyond the market economy (Seyfang & Smith

2007). Examples include a range of community projects and social enterprises like community energy, sustainable housing, worker-owned co-operatives and urban agriculture.

Grassroots innovations are a contested space as they involve ‘framing’ of sustainability interventions that can challenge or maintain existing inequality, social exclusion and hierarchies (Smith et al. 2014). Smith & Ely (2012) argue that questions of citizen participation are vitally important, and that grassroots innovation should create spaces that are “inclusive in its process, as well as the outputs” of sustainable development. In terms of framing, there is also a prevalent assumption in much of the grassroots innovation literature of the need to ‘scale-up’ projects, technologies and developments for sustainability transitions to be successful. Smith (2014) makes the point that ‘inclusive innovation’ is often as much about the ‘form’, ‘depth’ and ‘scope’ of the innovation process beyond developing scalable solutions.

Spatial Bias, Scale and Systemic Change

As with the Sustainability Transitions theory, much of the literature on grassroots innovation and low carbon communities is bounded by a hierarchical view of social space, scale and systemic change. The dominance of the three-level model and multi-level perspective results in a bias towards the analytical logic of sociotechnical systems comprised of micro, meso and macro levels. According to this logic, any innovation for sustainability endogenous to the social economy or community sector is by definition ‘grassroots’, ‘niche’ or ‘bottom-up’. This spatial bias can be seen across a range of sustainability transitions literature and works to contain sites of participation to nested hierarchies with its inherent power relations and configuration of social space. Furthermore, this spatial bias reduces the capacity for civil society actors to have significant agency in transitions outside of market-based interventions.

The editorial to the special issue of *Energy Policy* 38 (2010) on ‘Carbon Reduction at Community Scale’ observes there are many community projects around the world achieving positive results “that if scaled-up would play a significant role in climate stabilisation efforts” (Mulugetta et al. 2010). In the same volume Middlemiss & Parrish (2010) suggest that despite the inherently weak position of grassroots initiatives in promoting change because they “rely on people with limited power, limited resources and limited ability to influence others”, these ‘bottom-up’ initiatives can still have a role in creating low carbon communities.

The fields of political ecology and political geography have grappled with questions of scale in relation to theorising spatial relations of environmental conservation, social change and community development. Rangan & Kull (2008) point out that geographers have long argued that scale is ‘relational’ and ‘socially constructed’, not a nested hierarchy “but rather an outcome of material processes and power.” Cameron & Hicks (2014) are also critical of hierarchical models of scale that situate power and influence at the ‘top’ or global level where it ‘cascades’ down to the levels below. They argue that because hierarchical scalar thinking has become ‘common sense’ there is a need to embrace ‘flat ontology’, a ‘relational’ form of thinking that can reveal “possibilities for action that are latent in any site or situation, including grassroots sites” (Cameron & Hicks 2014).

Community Economies

The Community Economies field represents a more relationally grounded approach to transition process than the Sustainability Transitions literature. Community Economies research is interested in ‘re-enacting’ economy, ‘re-subjecting’ communities, individuals and researchers in new worlds of possibility; and promoting collective action (Gibson-Graham & Roelvink 2013). This research is interested in addressing how Community Economies thinking can assist Livewell participants in ‘reframing’ themselves as active citizens capable of reducing their own carbon emissions but also in sharing that knowledge and demonstrating practical alternatives that can mobilise others to take similar actions in communities around the world.

The Community Economies field deals with creating new representations of the economy by ‘reframing’ economic subjects (Gibson-Graham 2006) and placing these subjects as the starting point for change (Ireland and McKinnon 2013). Community Economies’ researchers are concerned with ‘performative practice’ to ‘reshape the world’ through ‘situated politics’ that focus on enabling local communities to take ‘site-specific’ actions (Cameron & Hicks 2014). Community economies mirror aspects of the ‘sharing economy’ with its emphasis on peer-to-peer sharing of goods, skills and resources via social networks (Doctorow 2012). The Community economies field is also related to the ‘social and solidarity economy’ (SSE), a progressive movement comprised of a diverse mix of civil society actors and organisations working to unite economic justice, sustainability and increased democracy for local communities (Kawano et al. 2010).

One of the central tasks of Community Economies scholarship is to imagine alternative realms of possibility and wider roles for communities, researchers and the economy through the process of ‘reframing’. Reframing has been used to develop alternative economic indicators to GDP that are linked to social and environmental wellbeing such as Gross National Happiness and the Happy Planet Index (Gibson-Graham et al. 2013). Reframing has also been used by a variety of social actors from slavery abolitionists and trade unionists to health and environmental campaigners. This research will apply Community Economies thinking to reframe ‘community’ as an important site of participation in sustainability transitions, one that is scale-free and readily accessible to Livewell Yarra participants based on existing strengths, replicable by other communities and abundant in possibilities for interventions to reduce carbon.

Social Innovation

Social innovation is a complementary approach to Community Economies that works with communities to collaboratively develop local solutions to a range of complex issues. It has gained widespread take-up in innovation policy, health promotion and climate change mitigation through the work of organisations like the Young Foundation and NESTA (Murray et al. 2010). Manzini & Rizzo (2011) document numerous examples of local projects that have used social innovation for ‘sustainable everyday solutions’ including Amplify (USA), Dott07 (UK) and Malmo Living Lab (Sweden).

In 2010 NESTA’s Big Green Challenge (BGC) awarded £1 million in prize money to community-led projects designed to achieve “measurable carbon reduction” using social innovation (Cox et al. 2010). The BGC developed an approach called ‘mass localism’ to

mobilise community resources and combine local action to national scale by developing ‘distributed solutions’ which rely less on: “scaling up ‘best practice’ models and creating more opportunities for communities to develop their own solutions and to learn from each other” (Bunt et al. 2010).

Manzini (2011) developed the ‘SLOC scenario’ — small, local, open, connected — to describe distributed sociotechnical systems at the intersection of the green, network and social economies. The SLOC scenario provides a new lens to view sustainability transitions at the human scale of relationships, localities and communities. Networks afford small grassroots interventions new possibilities by creating a “mesh of connected local systems, the small scale of which makes them comprehensible and controllable by individuals and communities” (Manzini 2011). Some important dynamics at play here are the relationship between globalisation and localisation enabled by a globalised network society which affords Livewell Yarra unprecedented opportunities to prototype new solutions, adapt to local conditions and share learnings with other communities. Manzini (2013) describes these “small, diverse and connected” solutions as ‘distributed systems’ that are ‘resilient’ and ‘error-friendly’ due to their localised multiplicity so that the failure of one node cannot destroy the whole system. It is envisaged that a range of small and local interventions will be trialled for the Livewell Yarra research project at an individual and collective level.

Methodology

The methodologies being used in this project have been chosen and developed to match the ontology and epistemologies indicated in the theoretical framework. That is, they are participatory, community-based and empowering.

Asset-based Community Development (ABCD)

A key methodology for this research is asset-based community development (ABCD), a strength-based tool developed by Kretzmann & McKnight (1993) that mobilises a community’s existing resources to find solutions to a range of social challenges. This research seeks to address whether asset-based community development can build capacity for Livewell participants to take actions that reduce their carbon emissions. ABCD has been used by a wide array of projects to reveal the hidden ‘assets’ of communities (Mathie & Cunningham 2003) and create location-specific solutions such as in the Latrobe Valley Community Partnering Project where four social enterprises were created by community participants (Cameron & Gibson 2005).

ABCD operates in stark contrast to prevailing ‘needs-based’ approaches to community development and instead works from the assumption that “effective community transformation starts with the strengths, skills, capacities, dreams and aspirations of local people” (Gibson & Cameron 2001). According to Kretzmann & McKnight (1993) ABCD is a method to release people’s capacities, strengthen the individuals involved, and through this process strengthen the communities and institutions those individuals are connected with.

McKnight & Block (2011) suggest that ABCD enables new community possibilities to emerge by looking within the community to find an abundance of resources and then making

these assets visible, connected and usable. Every community's assets are unique and multi-faceted and include individual capacities or 'gifts of the individual', citizen's associations whether cultural, religious or recreational, and formal institutions like local government, schools and private businesses (Kretzmann & McKnight 1993).

ABCD is also a self-help approach to community development that operates on the principle of "helping people to help themselves" and requires several conditions to be effective including democratic skills, shared interests and increasing the capacity of participants to develop solutions to shared challenges (Green & Haines 2008). Kretzmann & McKnight's (1993) initial conception of assets has been expanded by Green & Haines (2008) to include seven forms of community capital: physical, human, social, financial, environmental, political and cultural that bring new dimensions to community development activities.

ABCD shares much in common with Appreciative Inquiry (AI), another strength-based method which focuses on "peak experiences and successes of the past" as motivators for individual and collective action (Mathie & Cunningham 2003). AI is grounded in theories of 'social constructionism' which argue that all knowledge in human systems is mutually agreed upon through dialogue; that action is predicated on language; and that change happens through the stories we tell about social reality (Cooperrider et al. 2008). This research will use aspects of AI such as 'unconditional positive questions' to catalyse change based on the belief that people are energised to act via the topics they focus attention on, as Ludema et al. (2006) contend: "human systems grow and construct their future realities in the direction of what they most persistently, actively, and collectively ask questions about."

Cunningham and Mathie (2002) from the Coady Institute have developed a set of guidelines to assist ABCD practitioners facilitate community development processes through the following stages: (1) "collecting stories"; (2) convening a core group; (3) asset mapping; (4) building a vision or "organising theme"; (5) "mobilising and linking assets"; and (6) leveraging assets external to the community sector. This approach provides a provisional framework to be trialled with Livewell participants in the peer-supported setting of 'decarb groups'.

It is envisaged that Livewell participants will be inducted into the ABCD process by initially sharing stories of success in reaching personal carbon reduction goals. Storytelling can become a powerful catalyst for 'inside-out' or community-led change when people are invited to participate in a change process as active citizens. Mathie & Cunningham (2003) argue that storytelling can surface "positive memories" while Fuller et al. (2006) contend that stories "revolve around local places and real people" and help "root asset mapping in a local reality." As stories of success are identified, this research will use asset mapping to reveal Livewell participants' knowledge, interests and skills and mobilise these assets for taking action on carbon reduction.

Asset-based approaches work when people believe they have something to offer their local community and come to see each other as the source of the solution to the challenges being addressed (Kretzmann et al. 1997). Livewell participants will be invited to map individual

assets, referred to as gifts of the head (things I know about), heart (things I care about) and hands (skills I know how to do). These assets might take the form of knowledge about home energy efficiency, a passion for vegetarian cooking or hands-on skills in permaculture. These gifts can then become an anchor for individual and collective decision-making around specific actions and help focus goal-setting based on existing capacities.

With the personal assets of Livewell participants revealed the next stage will involve mapping relationships to local organisations, associations and institutions. The resulting asset maps or capacity inventories will then be used to match Livewell participants' assets with opportunities to take actions that reduce carbon emissions, assist decarb groups, projects or the wider community. For example a project group might want to build self-watering garden beds and decide to leverage newly revealed connections to a subject-matter expert for construction advice, approach Council for grant funding and source surplus timber from a local merchant.

Photo 2: Example of an asset mapping exercise



Asset mapping has been used in variety of community development settings including as a planning tool to engage young people in Vancouver (Brown Ed. 2009) and by the NHS to assist in creating a network of volunteer health champions in England (Community health champions 2012). Asset mapping has also been deployed in conjunction with other complementary approaches like public participatory geographic information systems (PPGIS) to produce mapped data via technologies such as Google Maps to support rural development goals in the Lake Victoria region of Western Kenya (Martin et al. 2012).

This research is interested in finding out how asset maps can be used to reveal a ‘system level’ perspective on the interconnected resources that exist within a community for the purpose of enabling action on carbon reduction. Asset mapping is a participant-driven way to make the invisible visible, help local communities connect the dots in their neighbourhoods and reveal new pathways for active citizenship. Manzini (2015) observes that people’s life projects are determined by their “enabling ecosystems” and community mapping projects provide a way to “design for visibility” and create new fields of possibility. It is hoped that as

asset maps take shape during the course of this research they have the potential to reveal hidden connections and amplify the strengths of Livewell participants and the wider community.

Participatory Co-design

The Livewell project is also using participatory co-design, a human-centred design methodology to enable Livewell participants to take individual and collective action for carbon reduction. Human-centred design has been codified through various ‘design thinking’ toolkits which provide a practical framework for social innovation projects. The two main approaches being utilised for this research are the ‘D.School Bootcamp Manual’ (Stanford D.School 2010) and ‘HCD Toolkit’ (IDEO 2014) both of which outline a process of design thinking in practice.

The co-design process will start by assembling design teams of self-selected Livewell participants, known as ‘project groups’, who demonstrate interest in starting projects which could take the form of a community garden, walking school bus or neighbour-based sharing scheme. Structured brainstorming is a common technique used to inspire ‘divergent thinking’ and surface a large quantity of ideas related to a specific design challenge (Brown and Wyatt 2010).

Co-design emphasises ‘heuristic practice’ (learning-by-doing) and following brainstorming the focus converges on a shortlist of ideas which are selected for the creation of simple paper-based prototypes using markers and paper. This ‘rapid prototyping’ is used to generate, test and refine ideas using emergent collaboration. Prototypes are then be reviewed for desirability, feasibility and viability, with the most robust turned into pilot projects.

Photo 3: Example of rapid prototyping



The results of rapid prototyping and any ensuing social innovations arising out of Livewell project groups will emerge following primary data collection in the second half of 2015. In terms of methodological rigour participatory co-design has become embedded in healthcare

through the advent of ‘citizen-led services’ (Leadbeater 2004) and ‘public sector innovation’ (Bason 2010) in what John Thackara (2006) describes as the shift from “designing for to designing with.” Co-design has also been used by a variety of local actors including the City of Greater Dandenong’s development of its ‘food strategy’ (McEoin 2014) and by the Australian Government (DHS) under its reform agenda to improve the delivery of public services (Lenihan 2012).

Action research

This project will occur in four phases of action research, a cyclical process of planning, acting, observing and reflecting through an iterative spiral of practice (Kemmis & McTaggart 2005). Action research is a participatory and collaborative research method that can empower community groups to apply their knowledge and skills towards a common purpose (Koshy et al. 2010).

Asset Mapping (Plan)

The first ‘plan’ phase will use asset-based community development (ABCD) to reveal participants’ latent strengths and build capacity to take action in the areas of carbon reduction. Asset mapping will identify the knowledge, interests and skills (gifts of the head, heart and hands) of Livewell participants through workshops during the course of the Livewell trial. It is envisaged that asset mapping will support participants to take carbon reduction actions, share information, provide encouragement and practical assistance.

Participatory Co-design (Act)

The second ‘act’ phase will involve the participatory co-design of projects that Livewell participants might develop in project groups through ‘rapid prototyping’ during the course of the trial with a view to implementation. As discussed, prototyping is an iterative approach to developing social innovations using basic materials (pen and paper) to quickly test, shortlist and refine ideas with limited upfront investment of human or financial capital.

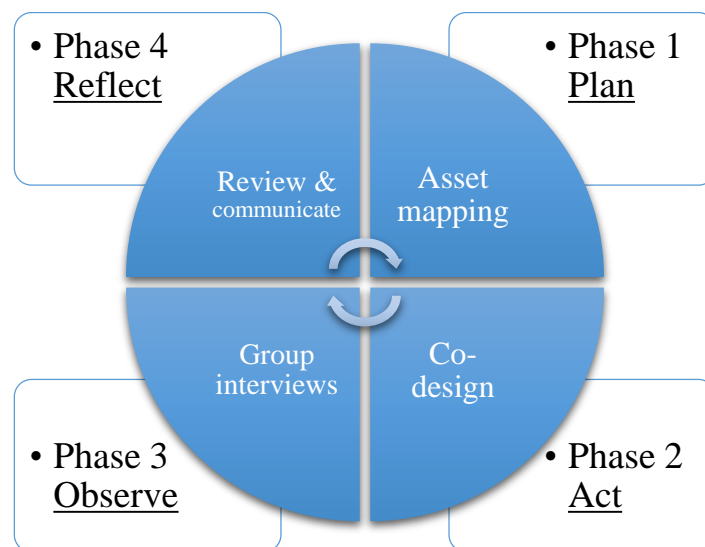
Group Interviews (Observe)

The third ‘observe’ phase will use Most Significant Change interviews to reveal Livewell participants’ experiences to date, document qualitative changes to participants’ capacity to take action and reflect on the success of the Livewell Yarra approach and methodology. This phase also provides an opportunity to engage participants in the evaluation process, discover any challenges that have arisen and reveal opportunities for future learning and improvement. Most Significant Change (MSC) is a participatory evaluation method that will be used to gather stories of change from participants to reveal the personal impacts experienced as a result of their involvement in Livewell. The Most Significant Change interviews will explore any changes in participants’ capacity to take action for carbon reduction and indicate what ongoing actions may be taken from their experience.

Review & Communicate (Reflect)

The fourth ‘reflect’ phase includes a review of the Livewell Yarra trial and analysis of the data collected to date. This phase of the action research process involves communication of findings through peer-reviewed journal publications, conference presentations and reports to project partners including the CRC for Low Carbon Living and Curtin University. These insights will then be used to refine the enactment of any further Livewell trials and continue the action research cycle.

Graph 1: 4-phase Action Research cycle



Conclusion

This paper has developed a theoretical and methodological framework for a new community-based carbon reduction project known as Livewell Yarra. It uses a participatory and action research approach in which participants seek to reduce their own and the broader community’s carbon emissions. It rejects social marketing as being too individualistic for low carbon community trials and instead embraces strength-based approaches like asset-based community development that are focused on capacity-building. It addresses the ‘spatial bias’ in Sustainability Transitions and Grassroots Innovation literature with its hierarchical conceptions of social space by using ‘flatter ontologies’ like Community Economies and Social Innovation thinking to ‘reframe’ both participants as ‘active citizens’ and ‘community’ as an important site of participation in sustainability transitions that is scale-free and readily accessible to all community actors.

Methodologically it uses ABCD through asset mapping to reveal the interconnected resources that exist within the Livewell Yarra participant community for the purpose of enabling action on carbon reduction. Participatory co-design is also being utilised to enable the development

and testing of social innovations by Livewell 'project groups' using 'rapid prototyping'. Primary data collection is expected to commence from July 2015 through asset mapping workshops and following this Livewell Yarra participants will be invited to take part in co-design workshops to prototype community-led projects for carbon reduction. Most Significant Change interviews will be conducted towards the end of 2015 to evaluate the greatest impacts experienced by Livewell participants based on their involvement in the project. The results of the Livewell Yarra research project will be documented and evaluated in future publications.

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The Role of Local Governments in Promoting Corporate Responsibility

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The Role of Local Governments in Promoting Corporate Responsibility

ABSTRACT: Following the recent global economic crisis, the spotlight has been placed on the need for greater corporate responsibility, and the role that governments can play to foster its adoption. In addition, the constrained budgets of governments have increased interest in ways to stretch resources to achieve sustainable development outcomes. Although much of the responsibility for facilitating corporate responsibility falls to national and state governments, local governments also have a role to play. Local governments have a significant impact on the way organisational entities operate. Through areas of control and influence, such as licensing and regulation, softer mechanisms such as awareness raising, partnerships, purchasing and provision of services, local governments can facilitate more sustainable means of operation for organisations within or near their geographic boundaries.

The research is continuing, but this paper focuses on the emerging typology of mechanisms particularly available to local governments to influence the corporate responsibility behaviour of the private sector operating within their jurisdiction.

Keywords: *Corporate responsibility; Public policy; Local government;*

Introduction

As the world recovers from the global economic crisis, attention has focused on the need for greater corporate responsibility from the private sector. In accordance with this, scrutiny of the role that governments can play to foster improved corporate responsibility has also increased. At the same time, governments are working with constrained budgets, and are looking at ways of working with the private sector to improve sustainable development outcomes. Most scrutiny has been directed to the role that national governments can play in facilitating corporate responsibility. However, local governments can also play a role, but they have not drawn as much attention. Local governments, generally closer to the local business community than other levels of government, can activate mechanisms or ‘levers’ that facilitate more environmentally and socially responsible performance of businesses within, or near their jurisdiction. This research sought to identify mechanisms relevant for local government, and to gain a deeper understanding of both widely applied mechanisms, and innovative mechanisms being used.

The following sections present the research findings to date; beginning with an explanation of what ‘corporate responsibility’ actually is, which is not a universally homogenous concept. The paper then summarises the global debate at the national level around the role public policy has in facilitating corporate responsibility. It goes on to focus on the changing landscape facing local governments, where many countries have experienced more than a decade of decentralisation and devolution of responsibilities to local government, and where the focus of local government’s role has shifted from mere service providers, to enablers and creators of local wellbeing. Local government is also defined here, as an overarching terminology for a number of related terms. This introduces us to the role that local government plays in engaging the private sector to achieve better local sustainable development outcomes, and to adopt locally relevant social and environmental responsibility. A typology of policy instruments, or ‘mechanisms’ is presented, with examples from local governments in different jurisdictions to illustrate each mechanism. This research has identified seven categories of mechanisms, or ‘levers’ that can be used by local governments: Awareness-raising, Facilitating, Partnering, Soft Law, Financing, Planning and Mandating mechanisms. Finally, the research begins to look at who has carriage of these activities within local governments, and whether they sit within a guiding strategy, or are implemented in a less coordinated way.

Methodology

The research was divided into four distinct phases, and involved desktop review and analysis, semi-structured interviews and a consultative workshop with academic experts. The interviews are currently ongoing, and the workshop will be held towards the end of the interviews.

1. A review of academic and grey literature, as well as local government websites, was conducted to identify and define public sector facilitation of corporate responsibility across jurisdictions, and to identify the particular policy instruments or ‘mechanisms’ local governments around the world can use to promote and influence corporate responsibility. These mechanisms were then broadly categorised into seven overarching areas, with each area containing a number of mechanisms.
2. Separate to, but informing this research, the Global Compact Cities Programme undertook a broad-ranging survey of its participating cities (n=113), with an approximate 12% response rate (at the time of writing). Two questions relating to this research were inserted into the survey. The responses to these particular questions

were analysed and further informed the categorisation of mechanisms available to local government to influence the private sector, and also identified possible interview candidates.

3. Semi-structured interviews were conducted with current and past local government personnel, and associated local government support organisations. The interviews provided deeper, qualitative insights into the identified policy mechanisms, and provided case examples from different cities and regions around the world. These interviews were continuing at the time of writing this paper. Although semi-structured interviews were useful for this purpose, they have their limitations. A second stage to the research could utilise other techniques such as ranking and perception approaches to gauge effectiveness and preference for each of the mechanisms in different contexts.
4. Finally, a consultative workshop is planned with prominent RMIT urban researchers to critique the ‘mechanism typology’ that evolved from the research, and to test its broad applicability.

Public Policy and Corporate Responsibility: A Global Overview

The terms ‘corporate social responsibility’, ‘corporate responsibility’ and ‘corporate citizenship’ emerged in the 1970’s and 80’s (Ashley 2009), and are often used interchangeably. Many definitions exist, but most describe the integration of environmental and social considerations into everyday business operations, that there should be interaction and connection with stakeholders, and that this should generally be on a voluntary basis, rather than meeting legislated minimum requirements (Dahlsrud, 2008, Frynas & Stephens, 2014, Steurer, 2009, Zappala, 2003), and that it is a mechanism for business to contribute to sustainable development (Albareda et al, 2008; Commission of the European Communities, 2002). At the local level, small to medium sized enterprises (SMEs) represent a large portion of the private sector, and the term ‘corporate responsibility’ may seem inappropriate or misleading. In this context, it is the more specific ‘environmental and social responsibility’ term that is perhaps more relevant.

Whichever definition is used, corporate responsibility manifests in different ways in different contexts. For example, in Europe, much of the focus of corporate responsibility is on the integration of environmental considerations into business operations, along with corporate

governance issues of transparency and accountability, and more frequently supply chain concerns, however, in Latin America, the focus is more attuned to social justice and poverty alleviation. Thus, the same term takes on a different hue depending on the particular socio-economic and also political context it is being implemented in (Bertelsmann Stiftung 2007). In this paper, the term ‘corporate responsibility (CR)’, is used to broadly encompass these multiple terms and concepts.

When considering public policy in relation to CR, CR can be considered a useful framework that enables collaboration between government, society and business, and facilitates cooperative solutions, to societal problems, (Albareda et al, 2008; Bertelsmann Stiftung, 2007). The role that governments and public policy plays in facilitating or influencing the adoption of CR by companies varies, however across jurisdictions, and over time. Nevertheless, Ascoli & Benzaken (2009) found that across seven countries, ranging from developing nations such as Brazil and China to developed countries of UK, Canada and Sweden, there were also strong similarities. Governments implemented awareness-raising campaigns, introduced voluntary and binding standards, and made funds available to the private sector to implement CR programs.

In recognition that there is a role for public policy to play in influencing CR, several researchers (Bertelsmann-Stiftung, 2010; Fox, Ward, & Howard, 2002; Steurer, 2009) have sought to develop frameworks or typologies of policy instruments at the national level that can be used to influence the CR agenda. Bertelsmann-Stiftung’s (2010) typology for government intervention in CR is reproduced in Table1. Bertelsmann-Stiftung (2010) do not suggest or recommend one type over another, recommending that several mechanisms be employed to achieve nationally specific goals, depending on the socio-political and economic context.

Table 1: Bertelsmann-Stiftung Types of Government Intervention in CR

Types and Instruments	
Awareness - raising	Award schemes, information platforms, campaigns, training and capacity building measures, disclosure of payments to public institutions, naming poor performers, labelling, toolkits
Partnering	Multi-stakeholder involvement, public-private partnerships, collective action efforts, roundtables
Soft Law	Corporate governance codes, codes of conduct, implementation of international principles, guidelines for CR reporting, tax exemptions for philanthropic activities,

	linking CR aspects to public procurement procedures and export credit boards
Mandating	Company laws, regulations for pension funds, stock exchange regulations, laws on CR reporting, penalties for non-compliance

Source: Bertelsmann-Stiftung (2010)

While this typology is useful to some extent for local governments, many of the elements are not available to local governments to implement, and the typology omits other areas where local government can have real impact. The following sections look at the changing roles and responsibilities of local government, and suggest an emerging typology of mechanisms that may be more applicable at the local government level.

The Political Landscape: Changing roles, responsibilities and expectations of local government

The phrase ‘local government’ is used in this paper to represent the level of public administration that is given responsibility for delivering a range of services to a (generally) small geographic area. It is often considered the level of government ‘closest to the people’, and in the hierarchy of national government systems, is considered the lowest tier of administration. Naming of this tier of government differs both between and within countries. Common names encountered during the research include: province, council, county, borough, village, municipality, shire, city, township and prefecture. This research has elected to use the term ‘local government’ to represent all these different terms, although it recognises that each of the listed terms can carry specific meanings in different contexts.

The roles and responsibilities of local government differ significantly between, and even within national jurisdictions. Within their geographic boundary, local governments may have the ability to enact legislation and raise taxes, they can be responsible for a diverse range of services including public health, public housing, education, business licensing, waste and pollution management, road maintenance, public and street lighting, parks and recreation services, stormwater and drainage systems, and utilities. Alternatively, they may be constrained by state or national legislation that severely limits the breadth of their responsibility and authority. This situation is also not static, as in recent decades, many countries have seen an increasing delegation or devolution of responsibility to local government, for example, across the United Kingdom, India and the Pacific (Sansom & McKinlay 2013), as well as Indonesia.

With an increasing level of responsibility, inherently comes an increasing expectation upon local government, from just efficient service delivery to the role they can play in creating broader community wellbeing. This expectation can reasonably be extrapolated to an expectation of engaging with the private sector to facilitate improved environmental and social responsibility. Local government have certainly taken to this role, with research demonstrating local government's role in influencing the private sector on specific issues such as reducing Greenhouse Gas Emissions from SMEs (Bradford & Fraser 2008) or pollution reduction (Gombault & Versteeg 1999), and also on their role as stewards of the local environment and as caretakers of social and economic conditions for their locality. The following section outlines a typology of mechanisms that local government can apply to influence the private sector within their jurisdictions – for broad-based corporate responsibility, but also for issue-specific activities.

Local policy for Corporate Responsibility: A typology of mechanisms

The research to date has identified that a number of mechanisms are regularly used by local governments to engage the private sector in social and environmental responsibility, and that some innovative approaches are being applied. To assist local government to consider and apply these mechanisms in a structured and meaningful way, the emerging mechanisms have been grouped into a typology of policy mechanisms, based on the Bertelsmann-Stiftung (2010) framework presented in Table 1. This modified typology is presented in Table 2.

Table 2: Typology of Local Government mechanisms to influence corporate responsibility

Categories	Local Government Mechanisms to influence corporate responsibility of private sector	Examples at the local government level <i>Refer text sections below table for further detail of examples</i>
Awareness-raising*	Award schemes, information platforms, campaigns, training, toolkits, demonstration	Local green business award, sustainable business web-page, small business energy efficiency education campaign, climate awareness training for business, adoption and promotion of good practice
Facilitation**	Networking, linking, multi-stakeholder dialogues, collective action efforts	'Networks' and forums of local governments, as well as local initiatives creating formalised networking and engagement with the local business community on an ongoing basis
Partnering*	Public-private partnerships, environmental protection agreements, voluntary planning agreements	PPPs for urban renewal and development, Environmental Upgrade Agreements for buildings
Soft Law*	Codes of conduct, endorsement/adoption of international principles, linking corporate responsibility to public procurement, socially responsible investment.	Local government purchasing, green fleet, divesting funds from unsustainable businesses, adoption of certified EMS, such as ISO 14001 or EMAS.

Financing**	Targeted grants, differentiated rating	Small business efficiency grants, differentiated rating for preferred business activities
Planning**	Planning schemes, regulations to set out the operational rules and criteria for development	Implementing special planning conditions and overlays
Mandating*	Licensing, enforcement of state or national laws, by-laws and codes.	Enforcing food health standards, National Building Codes, pollution licenses.

**These categories were taken directly from the Bertelsmann-Stiftung (2010) framework, and modified to suit the local government context.*

***These categories emerged as a result of the interviews with local government personnel*

Each of the seven areas contains a number of mechanisms that can be used by local government that will be outlined below, with examples provided. Some mechanisms do not sit neatly within an identified area, but may contain elements pertinent to multiple areas, and could be called ‘hybrid’ mechanisms.

Awareness-raising

A popular instrument that many local governments undertake is that of raising awareness of not only particular environmental and social issues, but also helping to provide solutions, illuminate the business case for action, and provide encouragement and incentives for business action. The mechanisms that fall within this category include:

- Business awards that reward sustainable practice: Examples include Manly Council’s (Australia) ‘Sustainable Business Awards’ – which recognises excellence in a number of categories such as management of Water, Waste, Energy Efficiency, Fair Trade, Contribution to Local Community and Excellence in Sustainable Business Management (Manly Council 2015), or London’s ‘Sustainable City Awards’ (City of London 2015c).
- Information platforms: These include web pages managed by local governments, or printed information, guiding business on a range of sustainability issues. City of Kingston’s (Australia) ‘Sustainable Business’ page on its council website (City of Kingston 2015), or the very comprehensive City of London ‘Business and Sustainability’ page, which outlines a range of sustainability guidance services for London city businesses (City of London 2015a).

- Campaigns: Issue-specific programs implemented by local government, generally for a limited period of time, for example, to encourage the uptake of Fair Trade purchasing by local business, or perhaps reducing greenhouse gas emissions.
- Toolkits and training: Toolkits and training may be specifically designed and offered by local governments, or local governments may promote third party toolkits and training. An example is City of London's 'Local Purchasing Toolkit for City-based firms' (City of London 2015b), or their co-funded 'Heart of the City' initiative providing advice and training for businesses to establish and successfully implement a Corporate Responsibility program (Heart of the City n.d.).
- Walking-the-talk or Demonstration: Essentially, this is where the local government demonstrates environmental and social responsibility in the way it operates its own business. This can be through an integrated Corporate Social Responsibility program (like that of City of Pula in Croatia), or through targeted initiatives such as investing in environmental upgrades of their own building stock (City of Melbourne).

Facilitation

This area has emerged as the most frequently mentioned in interviews (City of Melbourne, ICLEI, Porto Alegre, City of Leeuwarden). It covers a broad range of elements that are perhaps more loosely defined than other categories, but revolve around local governments linking capabilities, both between businesses, and between businesses and other entities. It can include:

- Coordinating regular local business networks and forums: An example is the Hume City Council (Australia) 'Business Efficiency Network', which addresses predominantly resource and energy efficiency challenges of local businesses (Hume City Council 2015).
- Facilitating alliances for sustainability: An example is City of Melbourne's (Australia) work to facilitate a business group joint purchase of renewable energy by some of the largest energy users in the city (City of Melbourne, interview with senior official, 15 May 2015).
- In-kind support: This is a particularly broad mechanism, as it can include provision of space free of charge (to hold a sustainable business forum for example), or expertise and staff time through mentoring programs. City of Melbourne, for example, work with RMIT University to place students in city-based businesses to deliver a

sustainability project. City of Melbourne staff facilitate the contact with the business, and staff from the Sustainability Department provide ongoing support and mentoring for the student for the duration of the project (City of Melbourne, interview with senior official, 15 May 2015).

- Networks (of local governments): Many networks exist for local governments to share and learn about sustainable business engagement in other jurisdictions. Connecting their businesses to national or international networks can sometimes give legitimacy to otherwise independent initiatives. Examples of networks include ICLEI – Local Governments for Sustainability, a global NGO which runs a number of initiatives targeting business through working with local government, national networks such as the Northern Ireland Sustainable Development Forum and regionally-based networks such as the Local Government Association NSW which hosts a Sustainable Business Network.

Partnering

For this collection of mechanisms, the research has defined partnering in the legal sense, where a binding contract exists between the local government and the private sector, which is entered into voluntarily by the private sector, rather than being a legislated requirement. Many ‘facilitation’ efforts may roll into partnering over time, such as the City of Melbourne collective purchase of renewable energy, mentioned above. The identified forms of partnership, include:

- Public-Private Partnerships (PPP): These are the most prominent form of partnership demonstrated by local governments. At the local government level, these are generally entered into to achieve local sustainable development outcomes. Where the local government has the opportunity to influence the private sector, is by carefully choosing their private sector partners, working collaboratively with them to develop a sound relationship, and including binding environmental and social outcomes for the local community as part of the contract deliverable. The Holdfast Bay (South Australia) development of the foreshore in the early 2000’s was cited as a positive example of PPPs (ICLEI, interview with senior official, 30 April 2015).
- Environmental Protection Agreements: This is a generic term, but includes such things as Pollution Control Agreements, which are common in Japan (Matsuno 2007), and are a contractual agreement entered into between a local government and a

business, with regard to environmental and pollution measures of the business. This can be in relation to air, water and land pollution measures. City of Melbourne introduced Environmental Upgrade Agreements to facilitate efficiency improvements in commercial buildings within their jurisdiction (City of Melbourne, interview with senior official, 15 May 2015). As this particular mechanism involved access to specialised funding instruments, they could also be classified as *Financing* instruments.

Soft Law

Soft law interventions are defined by Bertelsmann-Stiftung (2010) as “non-regulatory interventions” (p16). In the local government field, soft law generally involves an alteration of the way the local government itself carries out its operations, that then impacts or rewards the private sector towards environmental and social responsibility.

- **Procurement:** The inclusion of environmental and social criteria in local government procurement policies is one of the most common forms of soft law adopted by local government across jurisdictions (City of Melbourne, City of Oslo, City of London, City of Belfast to cite just a few examples). This can be for everyday items – through to major capital works and infrastructure programs. Preferred purchasing from businesses that meet these criteria, acts as a stimulus for preferred behaviour, and a reward for those businesses that can demonstrate environmental and social credentials.
- **Codes of Conduct:** City of Oslo requires contractors for significant projects to adhere to a Code of Conduct, specifying particular environmental and social behaviour from the contractor business.
- **Socially Responsible Investment (SRI):** Although local governments across many jurisdictions were legally allowed to invest funds in reputable SRI vehicles, interviewees were either unable to comment on the investment strategies of their local government, or noted that the local government did not choose to invest in SRI. City of Oslo, however, has recently divested its pension fund investments from coal fired power (WWF 2015).
- **Adoption of international standards:** The adoption of international standards, such as operating an ISO 14001 standard environmental management system (City of Oslo, City of Nuremburg) demonstrates commitment and when changes are communicated

to the business community, can help demonstrate the business case for action. This therefore links in with *Awareness-raising* for its demonstration and communication value.

Financing

This particular area includes direct cash mechanisms such as targeted grants, and differentiated rating.

- Grants: Many local governments offer small grants to businesses for targeted behaviour changes. This may be to influence the built environment (refer to City of Melbourne's Environmental Upgrade Agreements discussed previously), or to facilitate improved operational management (such as offering environmental or energy audits, and providing recommendations for improved operational management). City of Oslo's climate and energy fund is an example (City of Oslo 2006).
- Differentiated rating: Rates are one way that local government interacts financially with businesses within their jurisdiction. Differentiated rating can apply different rate levels based on environmental and social criteria. For example, in South Africa, differentiated rating has been used to encourage farm businesses to provide social housing for workers, by offering a significant discount in annual rates paid (Sansom & McKinlay 2013).

Planning

One group of mechanisms that falls within the jurisdiction of many local governments is planning, incorporating land-use planning and development regulations. The role that local governments play in local statutory planning varies across jurisdictions, and the level of "mandating" compared with "discretionary" planning instruments also varies. However, through the inclusion of locally relevant environmental and social requirements, local governments can influence the social and environmental outcomes of developments and business behaviour of developers within their jurisdictions. It is one mechanism where local governments would be perceived to hold the relative power balance, compared with other mechanisms.

Mandating

This is a contentious group of mechanisms to include, as once a particular environmental or social behaviour is required by law, by definition, it is not “corporate responsibility”, as it is no longer voluntary. It is included here, in recognition that changing regulations (perhaps moving a requirement from a voluntary initiative to a mandated one, or even the reverse), is a recognised policy instrument to influence business behaviour.

- By-laws and licensing: At the local level, by-laws and licensing requirements are the two main ‘mandating’ mechanisms.
- Enforcing state or national legislation: Local governments are often required to monitor and enforce state and national legislation in regards to business environmental and social regulation, such as state pollution laws or health standards.

The typology outlined above is not rigid, and mechanisms are rarely applied in isolation. For example, a local government may provide a whole suite of information (including business case information, site visit, instruction guides and training) in support of their own building environmental upgrades, and then move on to developing a partnering or financing mechanism to facilitate similar upgrades by the private sector. However, providing this grouping of mechanisms may simplify the task for local government of identifying mechanisms, and designing coordinated programs to facilitate CR uptake by the private sector.

Overarching strategies or independent actions?

Bertelsmann-Stiftung (2010) suggest that to achieve effective change within the private sector, government activities should be undertaken to achieve defined objectives, form part of a coordinated plan of activities and be coordinated centrally. To date, the research suggests that activities undertaken by local governments sit within issue-specific plans or strategies, rather than as part of a deliberate ‘corporate responsibility’ strategy, for example, many of City of Melbourne’s (Australia) activities sit within their ‘*Zero Net Emissions*’ strategy. One exception is the City of Kingston (Australia) ‘*Sustainable Business Framework 2011 - 2013*’, which outlines a clear set of objectives for the local government to engage with business to influence their activities, predominantly to improve their environmental performance, reduce costs and facilitate innovative, cleaner production approaches.

The coordinating department depends on the underlying strategy. For example, the Sustainability department of City of Melbourne coordinate many business activities focused on environmental improvement (City of Melbourne, interview with senior official, 15 May 2015). In contrast, the Department of Economic Affairs in City of Leeuwarden (Netherlands) coordinates many collaborative activities that aim to achieve improved environmental and social performance, while contributing to job creation and economic growth for the city (City of Leeuwarden, interview with senior official, 29 May 2015). Further interviews and analysis needs to be completed to provide a definitive view regarding the current status of whether activities fall within a coordinated CR strategy, or are undertaken in a more ad hoc manner across several issue-specific strategies and departments.

Limitations and areas for further research

The research did not set out to critique the effectiveness of the identified mechanisms in different political, economic and social contexts, nor to determine preferred mechanisms in the different contexts. This is a proposed second stage for this research.

Additionally, the research did not look at the nature of the relationships between local government and business beyond these mechanisms to identify positive or negative influences and power biases. Further research to identify and analyse these areas would help ascertain why some mechanisms are more effective or preferred in different situations.

Finally, an important next step is to identify where CR should be situated in the local government organisational structure to achieve effective and efficient social and environmental change in business.

Conclusion

The research to date indicates that local governments do have a role to play in influencing the corporate responsibility of the private sector within their jurisdiction. While the term ‘corporate responsibility’ itself may be less relevant, alternative terms such as environmental or social responsibility indicate the more issue-focused nature of the influence they exert. The mechanisms utilised can be categorised into seven areas: Awareness-raising; Facilitation; Partnering; Soft Law; Financing; Planning; and Mandating. Within each of these areas, several mechanisms, or ‘levers’ are available to local governments.

Reflecting that local government are often closer to the businesses they are trying to influence, the “*Facilitation*” group of mechanisms is a predominant area for local government to exercise. Working collaboratively with business to achieve particular outcomes was commonly cited.

Very few local governments interviewed to date had a single ‘corporate responsibility’ strategy or similar to coordinate activities, however, most actions sat beneath an issue-specific strategy, such as a carbon reduction or climate mitigation strategy. Coordination of this strategy was the responsibility of a single department, and this varied between Sustainability and Environment departments, and variations of Economic Development departments.

The research is continuing, with several local governments still to be interviewed both in Australia and internationally. It is hoped that these interviews will reveal further richness and innovation in the range of activities being undertaken by local government. Finally, a workshop with expert urban researchers will critique the typology for its theoretical soundness and its ability to be applied practically.

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