# Exploring the Potential of Technology in Enabling the Inclusive Co-Production of Space

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# ABSTRACT

The potential of emerging technology to address poly-urban issues is a growing focus on the agendas of cities worldwide. However, there is a lack of consensus regarding how and in whose interests it should be applied – should the aim be to establish 'smart cities' or to encourage 'smart citizens'? The 'bottom-up' approach advocates the latter and recognises the potential of technology to facilitate the prioritisation of issues and co-production of spaces. Particularly in a developing context where resources are severely limited, the ability to prioritise interventions to have maximum impact is exciting. However, these projects and the processes which enable them are under-researched. In this dissertation, a combination of Network Action Research and case study methods are used to guide the application of a selection of digital tools in combination with semi-structured and in-depth interviews, surveys, and focus groups to a specific context. The products of this are insights regarding the processes which enable inclusive bottom-up smart city projects; the application of the Network Action Research method; and a context-specific resource of information to guide the future prioritisation of projects and planning in the study area. This dissertation explores the value of inclusive participation in planning, and the role that technology can play in facilitating this. However, it also uncovers the complex and non-linear nature of these projects, ultimately arguing that although technology is a valuable resource, it is not a catch-all. A hybridised approach to bottom-up smart city projects is crucial to their success.

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| | | |
|---|---|---|
| CCT/CoCT | - | City of Cape Town |
| ICT | - | Information and Communication Technology |
| I.T. | - | Information Technology |
| NMT | - | Non-Motorised Transport |
| CoP | - | Community of Practice |
| NAR | - | Network Action Research |

*This chapter introduces the research problem to be explored in this dissertation. Firstly, it will outline how the 'smart city' debate has emerged and the issues of ambiguity and internal conflict which it faces. Secondly, the opportunity for further-research regarding the potential role of technology in urban environments will be explored. Lastly, attention turns to the methodology and research questions which have guided the fieldwork process and the overall structure of this dissertation.*

# 1. INTRODUCTION

## 1.1. 'SMART CITIES': PROBLEMS AND OPPORTUNITIES

The focus on poly-urban issues advocated by the United Nations Sustainable Development Goals (SDGs) for 2030 signifies a shift in the scale at which current and future international issues will be addressed (United Nations, 2016). Urban and global issues are no longer considered mutually exclusive. The problems present in individual cities are recognised to have a growing global impact as urban populations increase. Particular focus is on cities in the global south where rapid urbanisation is forecast to be the most intensive (Soja & Kanal, 2007). The development of cities within Africa and Asia will have a significant impact on international agendas. As such, the strategies being implemented in these places should strive to set a precedent for finding innovative responses to issues of demographic pressure, and building resilience to the threat of climate change.

One of the main potential resources to enable this process is the ever-increasing range of available technology. If applied effectively, it could have positive long-term impacts on the development of cities and their response to global issues. To encapsulate this potential, the term 'smart cities' emerged. As a concept, it has become ambiguous and includes many conflicting interpretations of how technology could best be applied to an urban context. The implications and spatial manifestations of these different approaches are under-researched in real urban contexts. In order to address the question of what technology can and cannot contribute in the future planning of cities, more case study research must be undertaken.

Two dominant approaches to integrating technology into development strategies can be categorised as 'top-down' and 'bottom-up'. The top-down approach involves addressing poly-urban issues through master-planned and similar projects. Information Technology and engineering companies are frequently found at the helm of this vision. The projects which result can be implemented at a grand scale in isolation of an existing context (Watson, 2013; Datta, 2016). Particularly within developing cities, resources are severely limited and implementing these large and often extrinsically-motivated projects can have severe negative implications for the existing urban context and the people who inhabit it.

The bottom-up smart city is an alternative approach. It advocates a context-specific vision of future urban development which is not dominated by trained professionals. Instead, it acknowledges the potential of the people who inhabit a space to become co-creators through collaboration with those who govern it. The approach therefore focuses on enabling the rise of the 'smart citizen' through

the use of technology to foster inclusive participation. There is a definite need for this within the South African context. Unresolved and unheard frustrations have accumulated for people who face marginalisation due to the legacy of past planning approaches. These valid grievances require a platform for representation. This is a potential role for technology. However, in order for this to be enabled by digital tools, they need to be implemented in a manner which does not perpetuate existing marginalisation. If applied inclusively, this approach could allow for the prioritisation of issues to be influenced by the people who actively use a space. Co-production could be a method to ensure that limited resources are directed to have maximum impact and address issues rather than mask or avoid them. More research is required in order to further explore the intentions and processes behind this dimension of the smart city discourse and the potential for technology to enable co-production.

This research project aims to contribute to this niche area of research through the use of a case study which incorporates data collection techniques associated with network action research methods. The aim is to address some of the main research questions which have arisen in relation to gaps in existing knowledge. These questions are:

- How do bottom-up ICT-based local projects for civic engagement start and how do they stimulate inclusionary engagement of the diverse groups that use a common space?
- How can the data collected through these platforms be processed in order to be a tool for evidence-based long-term planning and the co-production of space?
- What needs to change in current planning policy and practice in order to enable this bottom-up approach to stimulate participation in order to establish a bi-directional flow of information between authorities and local communities?

The research questions were used to determine which research methodology would be the most effective to meet the overarching goal of the dissertation which is to contribute to the existing body of knowledge regarding bottom-up smart city initiatives. The questions were also used to structure the fieldwork process, the narrative which records it, and were a major informant in the choice of case study area. A location was needed which I was familiar with and was used by a diverse group of people with varying levels of accessibility to online platforms. The area chosen was a small public open space on the banks of the Disa River in Hout Bay. This site fulfilled the stipulated criteria, and the presence of a freshwater source added an additional element to the research. In order to enable the process of co-production using available technologies, a specific research method was required.

## 1.2. LINKING THE RESEARCH PROBLEM TO AN APPROPRIATE METHODOLOGY

Bottom-up smart city projects are dynamic, action-oriented, and context-specific. In order for effective further research in this field, a methodology is required which acknowledges the potential of available technology and is capable of combining theory with practice and experimentation. Network Action Research (NAR) is a relatively recent addition to Participation Action Research (PAR) methods. It incorporates the use of digital tools for public participation (Foth, 2006). As an emerging research method, the processes and data collection techniques used as part of NAR also require further study. Research projects using this method will produce different types of knowledge. The most transferrable knowledge relates to the processes behind the research methodology and the application of technology to stimulate inclusive participation and address issues in a specific context. This knowledge can only be expanded through the addition of case study research in which the NAR methodology is applied in response to diverse issues and contexts. In addition to knowledge outcomes regarding the process itself, context-specific data is produced which could be a resource for the case study area and research participants.

NAR requires a shift in the traditional relationship between a researcher and the participants in a project. Co-production is the focus and issues and solutions should both be found through a collaborative process between the researcher and participants. In this case, the role of the researcher is to provide the blank canvas of tools which can then be adapted according to the values, ideas and experiences of all involved.

## 1.3. THE STRUCTURE OF THE DISSERTATION

The structure of this dissertation is strongly influenced by the research questions which it aims to address. However, before following the format of these, it was first necessary to situate the research within the broader context of the existing literature. This is done in chapter two, where literature was synthesised in order to identify theoretical knowledge and subsidiary questions which would inform the fieldwork process of the dissertation. Chapter 3 outlines the research methods which were chosen for this project. There are two methods which complement each other: case study and network action research. Focusing on a small case study area allowed for the network action research method to be applied effectively within the short amount of time available for fieldwork. The data collection techniques which these methods advocate are also complementary and allow for a combination of qualitative with quantitative data. Chapter four provides a contextual overview of the study area chosen for the project. The aim in this chapter was to situate the reader in the spatial and social context of the case study area so that the findings of the research could be interpreted. Additionally, to identify key contextual factors which would influence the outcome of the fieldwork such as the differing levels of access to the internet experienced between the users of the space.

Chapter five, six, and seven constitute the findings and analysis sections of the dissertation. They

are structured according to two over-arching themes. Firstly, the role which technology played within the chapter, and secondly according to which research question the chapter aimed to address.

Chapter five is titled 'Technology as a 'Collector'' because it details the crowdsourcing process of the research. It is structured according to the first research question: how do bottom-up ICT-based local projects for civic engagement start and how do they stimulate inclusionary engagement of the diverse groups that use a common space?

Chapter six is titled 'Technology as an 'Aggregator''. In this chapter, technology is used to connect the information collected in chapter five with the identified main user groups of the study area. It is structured in response to the question: how can the data collected through these platforms be processed in order to be a tool for evidence-based long-term planning and the co-production of space?

Chapter seven is titled 'Technology as an 'Enabler''. The purpose of the chapter is to reflect on the main findings of the fieldwork process and the recommendations which they inspire in terms of future research and action. One of the main discussions within this chapter is informed by the last research question: what needs to change in current planning policy and practice in order to enable this bottom-up approach to stimulating participation in order to establish a bi-directional flow of information between authorities and local communities?

The last chapter concludes the dissertation by providing an overview of the research objectives and the method used to. Some of the main findings are identified as well as the overall contribution of the research to the existing body of knowledge. Lastly, the opportunities for further research which have emerged in response to the findings and process of this project are listed.

*This chapter aims to provide a synthesis of some of the dominant arguments and theoretical perspectives regarding the potential of the relationship between technology and urbanism which are relevant to this dissertation. It is structured in two main parts. The first section will be looking at a top-down interpretation of what technology is able to accomplish in bringing cities into the 21st century through optimisation and improved efficiency. The second section will look at an alternative to this interpretation which argues that technology could play a role in promoting a more inclusive planning process. Precedents are used to show how these approaches have manifested in real applications. The chapter concludes by situating the dissertation within the broader body of research and objectives.*

# 2. LITERATURE REVIEW

## 2.1. INTRODUCTION

The close relationship between technology and cities is not a new phenomenon. Throughout the 20th century people sought to adapt urban structures to respond to past inadequacies and make optimum use of emerging new technologies. It is argued that to go against the smart city idea and concept of technology being integrated into urban systems is counter-intuitive (Hollands, 2016; Townsend, 2015). The need for urban adaptation is often spurred on by significant advances in technological progress or changes in the status quo. In the 20th century, rapid adaptation of urban systems was required to accommodate the new technologies of industrialisation and the urbanisation that this led to. In the 21st century, the need to adapt urban systems is being driven by prolific advances in technology as well as severe and unprecedented changes and challenges in local and global contexts, and the realisation that technological innovation underpins economic production, distribution and infrastructure management.

The role of cities is changing within the context of a point of confluence between rapid urbanisation, globalisation and environmental change. The global human population is increasing at a fast pace and for the first time in human history the majority is distributed in urban areas (Soja & Kanal, 2007). This process is not expected to slow any time soon with urbanisation over the next 50 years expected to surpass that of the last 200 (Shelton et al, 2015; Freire & Hoornweg, 2013). Most of this urban growth will be concentrated in Asia and Sub-Saharan Africa – currently home to some of the most fragmented, unequal, poor and populated cities in the world. This trend has prompted recognition of the important emerging role of cities (in particular those in the developing world) in shaping a common global future. This is substantiated by the urban scale of focus of the United Nations Sustainable Development Goals for the year 2030 (United Nations, 2016). The influx of demographic pressure needs to be adequately supported through parallel changes in how we inhabit and develop cities. These changes must be informed by a broader context of environmental degradation and the responsibility to address common issues such as climate change. The focus of coping with this pressure has been on optimising and increasing the efficiency of urban infrastructure and service capacity. This is quantified by the World Bank in the prediction that over the next 20-30 years $30-50 trillion will be invested globally in infrastructure. Globalisation is contributing to the perception of infrastructure as a ‘catch-all’ for urban issues. As communication

and transport technology advances, cities are becoming more exposed to global market forces and politics. The attachment of terms such as 'global' and 'competitive' to city names is becoming common place as localities vie to harness some of the potential of this new context (Hollands, 2014). In combination, these forces contribute to emerging responsibilities, opportunities and challenges for cities. The smart city discourse has risen from the need to harness these opportunities, adhere to responsibilities and build resilience to current and future challenges.

Townsend defines smart cities as: "… places where information technology is combined with infrastructure, architecture, everyday objects, and even our bodies to address social, economic and environmental problems." (Townsend, 2013). Instead of industrial, the current revolution is one of information. The discourse takes an interesting turn, however, when we question who is at the helm of this revolution. Depending on who you ask, the idea of 'smart' can have a completely different meaning and application. The broadness of the smart city definition lends itself to manipulation by those using it to pursue specific agendas. On one side of the spectrum, smart city terminology is an essential tool for place-marketing and selling or legitimising large-scale infrastructure projects. These visions are guided by technology giants locking horns for a share of the growing smart city market by preaching often standardised solutions to perceived recurring urban problems. The result is an engineering and economic-led hegemonic approach to the integration of technology and urban systems. These approaches are extremely marketable for local governments wishing to convey a smart image. They are often centred on goals of efficiency and prestige (Hollands, 2016). However, the failure to adequately acknowledge political, social and environmental dimensions of development can lead to the over-simplification of problems and thus, short-term solutions.

On the opposite side of this debate is the bottom-up smart city. This approach to development embraces the potential of the manipulation of emerging flexible technologies to address existing urban problems. Often occurring on a local scale, grassroots projects are anchored in a political and social context. Based on the premise that cities have something to offer everyone and vice versa, technology is used as a bridge between people and their environment. The main theme here is the decentralisation of decision-making processes. A more participatory and integrative approach to development results in long-term benefits in terms of the resilience and flexibility of urban areas (Jacobs, 1961).

This literature review aims to establish a contextual and theoretical framework for this project and to situate the research within the existing body of knowledge. In order to achieve this, the ambiguity and conflict within the theory of smart cities will be briefly detailed before the chapter is structured in two main parts. These interrogate two of the dominant perceptions of smart cities and the application of technology to urban problems: 'top-down' and 'bottom-up'. A central theme in this is identifying what technology can and cannot accomplish when being applied in these different ways. By exploring the conflictions between top-down and bottom-up approaches it is possible to align this dissertation. This project aims to contribute to the existing body of knowledge regarding bottom-up smart cities and argue for the potential of using technology to pursue inclusive participation, the valuing of local knowledge and decentralisation of decision making. Precedent studies of smart city initiatives are considered throughout the chapter. However, particular focus

is on examples of bottom-up strategies which utilise crowdsourcing of information or mapping techniques. This is the type of strategy being used in the action research methodology for this research project. It is important to observe how other strategies were implemented, whether or not and why people engaged with them and how the resulting data was used and by whom. In this way the potential of co-production will be explored.

Due to the topic of this dissertation and the context in which it is taking place, the scope of this review is narrowed. The existing literature on smart urbanism is extensive and broad. The principle themes guiding what is covered in this chapter are the context of the research being undertaken and the bottom-up/grassroots style of smart urbanism intervention.

## 2.2. THEORISING THE SMART CITY

There is no single body of theory regarding smart cities. The malleable concept of smart has resulted in many different models emerging under the same banner. This is problematic as it can lead to ambiguity in research as the reader is left with the job of grappling with exactly what the author means when referring to a 'smart city'. Progressive cities which have in the past adopted ICT as a development strategy have been referred to as wired cities, digital cities and sentient cities among others (Kitchin, 2014). These terms are designated according to how the relationship between ICT and urbanism is manifested in that specific context. This section of the literature review is dedicated to exploring some of the main contrasting interpretations in the discourse. Based on this, a definition can be developed to be applied in this dissertation and narrow the scope of the literature review to projects which directly inform this research. Two dominant definitions of what it means to be smart have been identified: top-down and bottom-up. The fundamental variable is not the application of technology but rather the manner in which it is applied. This is directly informed by the values and priorities of those implementing it as well as perceptions of what technology can and cannot achieve for urban systems. How these factors align may determine whether technology should be shaping urban systems or vice versa (Townsend, 2015).

### 2.2.1. The Top-Down Approach

The task of developing a legitimate all-encompassing utopian vision for a city is an incredibly difficult albeit marketable process. One of the main challenges is that it requires a prediction of what the future will hold. It becomes easier when there is a fundamental tool around which this vision can be built and a willing 'professional' to enforce it. This is a role that the smart city discourse has latched onto at the hands of technology companies – where technology can become the fundamental urban vision for the future with large technology companies reliably and predictably enforcing it. This dimension of smart as a tool of marketing rhetoric has resulted in its integration into agendas of place-marketing and urban entrepreneurship. To be known as a smart city has become a desirable trait. Technology is captivating and stimulates the imagination of what is possible. To embrace it conveys an image of being progressive, innovative and, perhaps above all, investible. Smart cities with a reputation for good broadband infrastructure and a spirit of experimentation backed up with flexible policy can attract creative, mobile and lucrative

companies (Bakici et al., 2015). The universal desirability of technology-driven solutions is often unquestioned and bypasses processes of public participation. This can be a factor which adds to this approach's marketability to local governments and technology companies because grand projects can hit the ground quickly. This section aims to explore the processes and logic driving these developments as well as the contrast that can arise between the original vision and actual manifestation.

The aim of large technology companies to drive local governments towards corporate and market-led approaches to smart cities is not suprising with the global market for smart city technology and services predicted to be worth approximately $408 billion by 2020 (Saunders & Baeck, 2015). The focus of these smart strategies is often narrowed to optimisation, efficiency, security and prestige (Hollands, 2016). Information and Communications Technology (ICT) is one of the main weapons in the smart city arsenal. Information Technology (IT), engineering and building firms have emerged as some of the main proponents of this interpretation of 'smart'. The technology giant IBM falls into this group. They approach cities as a "complex network of interconnected systems" (IBM, 2012). To improve a system such as this is to make it more efficient and this is done through the collection of data to inform decision-making. As a result, interventions are often guided by rational and scientific methods with comprehensive data analysis. This vision of a smart city lends itself to a technocratic form of governance in which surveillance and top-down thinking becomes a principle tool (Shelton et al., 2015). Through this process, political power is decentralised between local governments, tech and engineering companies with little being distributed to the end users – urban residents. A top-down surveillance approach is easily marketed to local governments which find themselves in a period where security concerns are at the forefront of international focus (WEF Risk Index, 2016). Also on the Global Risk Index list for 2016 produced by the World Economic Forum is the threat of poor and fragmented urban planning and the concerning disconnection of citizens from decision-making processes in the places they live. Technology and top-down smart city approaches have been criticised for over-simplifying urban issues and detaching them from their social context through the rationalisation and quantification of complex urban processes (Sampson & Small, 2015).

#### *2.2.1.1. Urbanism Driven by Big Data & Surveillance*

The vision of the city as a 'machine for living' has resulted in a race for urban optimization between IT companies. The pursuit of urban optimization is being enabled by the rise of 'ubiquitous computing'. In 1950, philosopher and mathematician Norbert Wiener predicted a future in which messages between people, people and machines, and between machines themselves would play an increasing role in how people live. He concluded that in the future, to live effectively would be to live with adequate information (Wiener, 1950). In the present, this prediction has manifested in the form of the age of "calm technology" where relied upon technology recedes into the background of our everyday experiences (Weiser, 1991). Technology has advanced to a stage in which digital and physical space can be seamlessly bridged. Townsend refers to this phenomenon as "the Internet of Things" (Townsend, 2013). At the urban scale, the embedding and integration of technology into infrastructure combined with the increasing availability of personal mobile technology allows cities to accumulate significant amounts of data through processes of active and passive sensing.

As more people establish more connections to each other and to things through ICT, a longer and more detailed paper trail of information is created. The resulting data is vast and collected in real time. It is referred to as 'big data' and has been loosely defined as 'any data that cannot fit into an Excel spreadsheet' (Batty, 2013). In finer detail, some of the main discerning characteristics of big data are: (1) large quantity, (2) collected in or near real time, (3) diverse (Kitchin, 2014)
Approaches to development and governance are becoming increasingly driven and informed by data. Local projects in Cape Town are emerging which follow this approach. For example, the ECAMP project by the City of Cape Town is a tool which uses collected data to analyse the economic potential of different areas within the city (CoCT, 2016). Smart city technology is generating intimidating quantities of data featuring excruciatingly detailed accounts of everyday occurrences. The potential for this data to be used constructively to find patterns and even predict future scenarios hinges on the analytical processes used in interpretation and how this is translated into action (Ratti & Claudel, 2016). This process requires complex algorithms which are capable of consuming large quantities of detailed data to produce outputs to be used constructively in the urban decision-making process. As with most of the facets of the smart city discourse, it is easy to get carried away with optimism regarding the potential of big data as a tool for the transformation of urban knowledge and governance. However, as is taught in even the most rudimentary of introductions to statistics, data is only as good as the interpretation and use of it.

How big data acquisition is used is one of the aspects of smart city thought through which the contrast between top-down and bottom-up approaches becomes most evident. Variation in the potential of big data and smart cities arises depending on who has access to the information and tools. The temptation for local governments can be to horde the data that they collect for interpretation by 'experts' in order to enable a technocratic and efficiency-driven form of governance. An example of this can be seen in Rio de Janeiro, Brazil. The Rio Operations Centre – the result of a partnership between the government and technology company IBM – has become a globally famous example of a smart city approach using technology for data collection and surveillance. The project arose in response to significant flooding and crime events which reached a point of climax in very close proximity to the city's election as host for the 2016 Olympic Games (Townsend, 2013). To recover the global image of the city and faith in its ability to host such an event, the mayor turned to IBM to develop a disaster management system to be introduced as rapidly as possible. The result was a system for data collection which enabled both the prediction of and response to future climate events. However, the system stretches far beyond weather to comprehensively monitor diverse indicators in the city. The project was driven by perceived urgency to address urban problems and international pressure to convey an image of progress and stability which was added to by the prospect of hosting a prominent international event. This scenario is not unique to this example but is common for many leaders in developing cities. It can be utilised to justify the adoption of invasive strategies such as the Rio Control Centre (Townsend, 2013). The danger of smart city projects emerging in response to crises or a sudden need to boost the appearance of a city is that this inspires hasty solutions which mask the surface of deep systemic issues instead of addressing their root causes (Agyeman & Mclaren, 2016). Failing to find the root of an issue can result in more severe future manifestations which threaten the quality of life and character of a city in the long-term.

The result of the Rio project was a control room bunker which could act as a control panel for the entire city (Townsend, 2013). Instead of focusing on big events, the surveillance extends to every day occurrences. This information is reflected on large screens and maps informed by a live stream of data. The project arguably restored the international image of the city and faith in its ability to host such an event. However, it is unclear if it has had a meaningful impact on actually addressing the root causes of the (in particularly social) issues that it was trying to mitigate. The obsession with appearing smart may be obscuring the pursuit of a more meaningful interpretation of what technology is able to achieve for a society. As Jacobs argues, a lack of participation in the decision-making process is a key contributor to short-term urban solutions (Jacobs, 1961). The realities of individuals collectively portrayed and quantified for centralised interpretation and decision-making is a bitter pill to swallow for those who advocate an integrative and participatory approach to urban planning. This is where the conflict between top-down and bottom-up approaches becomes clear. Smart city projects such as the Rio Operations Centre can create a disconnect between people and their environments and instead shift control to the governments and technology companies developing and enforcing them. It must be questioned in whose favour these projects tip the balance of urban power and whether this is desirable in the long term. If the decentralisation of urban power is desirable then it leads to questions of whether projects such as the Rio control centre will stand the test of time or be ousted for an alternative approach to harnessing the potential of human experiences, data and technology in the future.

From a bottom-up perspective, accessible digital platforms have the potential to promote interaction and bring people together to collaborate in the creation of space. The same mechanisms and data used for the optimisation of urban space can distribute power to residents to take ownership of their environments and address issues that they experience (Ratti & Claudel, 2016). In this way a 'reverse flow' of information can be enabled through which local knowledge and action can meet and challenge (or enhance) the vision of urban optimisation (Sassen, 2001). Open source technologies and data which are rapidly emerging can allow diverse knowledge, experiences and ideas to inform and motivate tangible changes in communities. This approach, although portrayed as mutually exclusive with a top-down approach should not be considered as such. The main difference between these is that a top-down approach begins with a concept at the broadest possible level and then systematically breaks this down into smaller components. A bottom-up system does the opposite to this, starting at a small scale and building from this in both size and complexity (Ratti & Claudel, 2016). An alternate smart city model could aim to combine these two approaches and become a hybrid. The same network technologies which can enable greater control over space and people could also be used as a tool for citizen engagement. This point of convergence focusing on engagement could lead to better decision-making and implementation, essentially combining goals of optimisation with humanisation (Ratti & Claudel, 2016). This aspect of smart cities is examined further in a later section of the literature review.

The collection of big data goes hand in hand with the current iteration of the smart city idea. As people and things become increasingly connected the data that is available regarding how we live will become more overwhelming in volume and accuracy. Trends once captured through laborious

processes and updated per decade will be able to be mapped in a significantly shorter and more frequent period. However, this surge of information needs to be grounded and linked within a local context and the years of existing thought and theory in urban planning. The smart city cannot be viewed in isolation as a tool for governance and engineering. Over-reliance on what can be quantified is also a danger in the smart city framework. Quantification is a human response when aiming to simplify complex issues and processes. This is demonstrated, for example, in applying numbers to priceless natural resources in order to legitimise their exploitation. To avoid the oversimplification of issues in smart cities, quantified evidence needs to be interpreted in relation to the unique social, environmental and economic characteristics and nuances of a city. Big data can record what is happening in real time and in minute detail within a city. Diverse local experiential knowledge can enrich this by providing insight into the dynamics which have shaped the existing status quo which big data records. As Lynch argues, the people inhabiting an urban space over time develop their own conceptions of its structure according to their experiences within it (Lynch, 1960). The top-down approach to using big data and applying technology to cities may neglect the participation process necessary to harness the value of this public insight. An alternative method combining these sources of knowledge would result in a balanced representation of an urban context. The next section explores one possible scenario which a top-down approach can result in.

#### *2.2.1.2. Urban Utopias*

One of the earlier visions of the city of the future was proposed by Le Corbusier in 1922. He proposed a city of optimum efficiency with sophisticated engineering enabling a clockwork-like urban mechanism (Le Corbusier, 1922). He envisaged a balance between the shade of trees and vast green spaces with impressive widely-spaced 'crystal towers'. Almost a century since this vision was conceived, the similarities between it and some current conceptions of the future of smart cities is striking. This demonstrates that the preoccupation with the optimisation and efficiency of cities is not a new concept. However, as a broader range of actors such as multi-national technology companies become more engaged in determining urban futures, these goals are being reflected in the agendas of international cities. The urban realities which arise from the corporate-led vision of a future city manifest according to a form of blueprint planning which imposes a set of universal and depoliticised projects focussed on the interests of the suppliers more than the end-users. The projects often rely on prolonged input from the multi-national technology company that introduced them in order to be maintained and survive (Shelton et al., 2015). Watson argues that this input has promoted fragmented planning and the development of detached 'satellite' cities (Watson, 2013). Master plans closely aligned with the realities of Dubai (large, futuristic glass skylines) have been suggested and in some cases implemented in multiple different African contexts from Nairobi to Accra. Although the context changes drastically, the central themes of the plan, the large scale and design does not seem to adapt. This results in the plans being implemented in isolated areas away from existing development – a place for the elite to urbanise with a clean slate supported by the symbolic power that labels such as 'smart' and 'eco' supply when attached to cities to stimulate investment (Watson, 2013). Often these labels are combined, based on the premise that a city running more efficiently through the use of technology must, in turn, be more environmentally sustainable. The landing of 'smart' and 'eco' master planned fantasy cities in Africa has been a recent development, only really gaining traction in the last decade. However, the

vision is certainly not unique to Africa; nor is it the only dimension of smart cities to have landed in the global South. However, it is a powerful example of the danger of master planning smart cities.

One of the main criticisms of this approach is that cities cannot become 'smart' solely through the introduction of new IT hardware and infrastructure. Hollands argues that the true goals of 'smart' urban projects are often ambiguous – whether they be for innovation with a positive effect or place-marketing and urban entrepreneurship (Hollands, 2008). There are human and social dimensions of 'smart' that cannot be ignored. Achieving a balance between the infrastructural and social dimensions of 'smart' is one of the key challenges of bringing about effective long-term change which Watson argues is lacking in existing African urban fantasy visions (Watson, 2013).

It is often assumed that technology-centred development projects in cities are desirable by the majority of people affected by them. However, this is not always the case. Watson points out that when led from the top, smart projects can assume buy-in from the public – that people would never not want to live in an 'intelligent', connected' and 'innovative' society (Watson, 2013). However, there are clearly two sides to this coin as Datta discovers in India. She elaborates on an ambitious national-scale plan announced in 2014 to develop 100 new smart cities (Datta, 2016). This project is an example of a top-down utopian vision of entrepreneurial urbanisation. Her main line of questioning is how, for whom, and with what consequence these cities will be produced. From the case study of Dholera, Datta finds that there is an assumption that new cities will be built on vacant land in order to avoid democratic processes and public debate (Datta, 2016). However, this is misleading. In reality, a population of rural farmers relying on the land for their livelihood have been displaced by the project. Resistance, particularly in Dholera, has been in response to the forced dispossession of land. In response to resistance and in an effort to speed the project process, the Indian government is introducing changes to the Foreign Direct Investment (FDI) law to allow for direct external investment into construction. This top-bottom conflict has brought up questions of citizenship, inclusion and belonging and lead to significant grassroots mobilisation in contention to the smart city project. Both Watson and Datta highlight the importance of space in the smart city vision.

The effect of a large-scale smart city development project on space and on an existing urban context is important and has been neglected in the past. It is a noticeable trend of utopic smart city visions to break ground or be proposed in satellite areas where it is assumed that they can start a new urban process without adapting to an existing urban context which seems to be considered as more of a hindrance than help. As demonstrated in the Dholera example, these projects can have severe consequences through their processes of land acquisition which can fail to adequately consider and respect existing (possibly rural) land uses. There is perhaps a disconnection between the vision of the smart city put forward in rhetoric and marketing and the way in which this manifests on the ground – the real smart city is forged at the meeting point between the top-down utopian vision and local resistance to and engagement with this.

Examples such as Masdar City in the United Arab Emirates demonstrate the aims to establish a

blank canvas of a city for best practice principles of smart urbanism which align with optimisation visions to be developed and implemented. However, although the strategies and quality of life developed within these experimental smart cities may statistically be outstanding, their flexibility and application to different existing urban contexts may have significantly different and perhaps detrimental ramifications. Reliance on a specific technology, large-scale infrastructure projects and ignorance of an existing context and the capacity of citizens to co-create spaces can have far-reaching and long-term negative implications for the spatial and aspatial composition of a city. One of the most famous examples of this can be seen in the adoption of cars as the primary mode of transport in cities around the world. Despite short-term efficiencies, the long-term effects of an over-reliance on private vehicle transport has resulted in negative social implications and severe fragmentation and sprawl in urban areas (Townsend, 2015). The dangers of rhetoric and short-term solutions is well documented and a dark-side of smart cities that cannot be ignored.

## 2.3. AN ALTERNATIVE SMART CITY

This section explores an alternative vision of a smart city. Its focus and scale are different to those of the top-down approach. Emphasis is on how technology can enable participatory planning, a greater understanding of space and, ultimately, better long-term planning interventions. This involves a fundamental change from considering how technology can shape the future of urban places to how places and people can shape and use technology to change their environments. In the previous section it was shown how the perceived potential of technology being integrated into cities can skew the focus of planning to optimisation, efficiency and place-marketing. This vision is shaped by big technology providers and is often not accommodating of bottom-up approaches in a city and instead advocates top-down blueprint planning as way to circumnavigate broad engagement (Hemment & Townsend, 2013) Technology is definitely capable of enabling optimisation through the use of big data and ICT. These tools allow officials to observe previously invisible patterns in urban life and respond to them – often in real time. There is a place for this application of technology which can play a big role in increasing quality of life and reducing the carbon footprint by monitoring and challenging the wasteful metabolism of cities. However, there are fundamental issues with the approach which have been highlighted. It is important to be weary of falling into the trap of the 'there's an app for that' mentality where focus on the efficiency of technology-led solutions results in distraction from the factors causing the manifestations of a deeper systemic issue (Agyeman & Mclaren, 2016). These problems resonate with the debates grappled with by prominent urban academics in the past. It leads to the question of whether the top-down projects approach will actually have the civic or economic benefits that it claims (Hemment & Townsend, 2013).

Geddes argued that addressing urban issues requires total participation, which is only achievable when large interventions are broken into a series of small, incremental changes (Welter, 2003). Jacobs builds on this with her argument that the centralisation of decision making in an urban environment could be detrimental and exclusionary in the long-term (Jacobs, 1961). Historically, the process of city development was collaborative, co-productive and locally focussed (Townsend, 2013). Participation takes time, and this is one of the major limitations in a context of global competition

and issues requiring quick response such as climate change and the pressures of urbanisation. The use of technology is seen as a possible tool to enable a more organic local development process which is able to respond quickly to local and international trends (Townsend, 2013). There is a call for a shift in thought regarding cities and development to include the promotion of bottom-up innovation, collaboration and experimentation (Hemment & Townsend, 2013). This is not an argument that historic approaches to urbanism should be applied to contemporary urban contexts but rather that an approach to development should be introduced which embraces complexity instead of minimising it. Technology can play a substantial role in enabling this through the creation of new and merging of existing networks to allow for the complexity and capacity necessary to make change. More research is needed to explore how citizens can become co-creators of space through the increasing availability of technology and freedom to experiment in their environments. It is not suggested that bottom-up innovation and collaborative planning should work in isolation from top-down approaches. Rather, the two approaches should complement each other. However, one of the obstructions in the realm of smart city understanding is how grassroots projects are triggered and gain traction in a community. And, how large-scale infrastructure approaches offered by global corporations could possibly co-exist in symbiosis with local technology projects and citizen interests. This is where the 'smart citizen' aspect of smart cities which is neglected in the previous approach comes in to play. However, as is the case with much of the smart city discourse, the optimism in the literature from those who advocate this approach is contagious. In order to gain a rational understanding of this alternative model, certain gaps need to be filled. Some of the questions to be answered are: what can readily available technology and networks achieve in citizen participation? Is this desirable? And, if so, how is it enabled?

### 2.3.1. Technology Access and the Rise of 'Smart Citizens'

The spaces which we inhabit are steadily becoming hybridised as the separation between the physical and digital realms becomes blurred. When they first appeared approximately 25 years ago, personal mobile devices were limited both in terms of functionality and accessibility – a luxurious commodity for the elite. In a short time, this market has become increasingly accessible – there are currently more active cell phones on the planet than there are human beings (Ratti & Claudel, 2016). As mobile technology advances, costs decrease and the available features in the low-end phones multiply. This diffusion of access makes the cell phone a powerful tool for social empowerment and engagement. The ability of this communication platform to coordinate and align initiatives and campaigns can be seen in its most raw form in protest actions around the world. Technology has the potential to connect people living in cities with information about their local environment; engage them in planning, policy and redevelopment processes; and, most importantly for this research; enlist their participation in reporting conditions and taking action to introduce change through co-production (Shepard & Simeti, 2013). When observing the applications available for use on smartphones, there is a dominance of platforms which form connections – of people to each other and to their environments. These technologies work on the premise that people want to be neighbourly, social, share experiences of where they live and what they do, and gain knowledge of the people and things around them. Given the right platforms, the smart city can give rise to equally, if not more powerful, smart citizen.

The small civic organisations and people enabling the rise of 'smart citizens' are often referred to as "hackers" (Townsend, 2013; Ratti & Claudel, 2016). This name would in the past have been associated with a hooded IT-skilled vigilante based in a poorly lit room and using their skills to redistribute power in digital space through the manipulation of protected data. The spirit of power redistribution is still there, however, this concept of a hacker exists in plain view and the power redistribution extends between both digital and physical space. Citizen hacking refers to people adapting existing technology in order to address issues within their local context. Or, even closer to the root of development, citizens can collaborate by using available technology to identify needs and develop possible ways to address them. The development and introduction of these projects is no longer limited to professionals with backgrounds in computer science. Not only are social media tools becoming more flexible and adaptive to different contexts and needs but there has been an increase in 'no coding required' app-building resources. For example, 'Tinkerspace' is a platform for collaboration between coders and people wanting to build smartphone applications (Tinkerspace, 2016). A crowdsourced collection of 'program building blocks' allows users to create applications without any coding. This platform is already being used by the 'OrganiCity' initiative in Europe to encourage citizens to build applications which incorporate open-source data (Organicity, 2016). Bottom-up approaches enable a level of flexibility and cost-effectiveness which is not attainable with large-scale top-down projects. This approach requires an environment where the vulnerability and willingness to fail that experimentation brings is embraced. In such a setting, the approach has potential to be an important step in establishing a conduit between bottom-up and top-down agendas and actors for planning future spaces.

There can be no smart cities without smart citizens. Hill argues that the most important dimension of cities is the people who live, work and create within them (Hill, 2013). This is why the top-down pursuit of smart cities which circumnavigates processes of participation is argued to be a costly, grand, but ultimately short-term approach. Truly smart cities will emerge when inhabitants and their personal mobile devices are enabled to become agents for change (Ratti & Townsend, 2011). Enabling bilateral connections to be made in cities allows inhabitants to challenge assumptions of what should be prioritised in their spaces and collaborate in the process of planning, design and management. Perhaps socialisation and engagement should then be the point of departure when developing smart city solutions. It is for this reason and due to the imperative to consider the existing and historical context of a city in interventions that Townsend proposes the local scale as an ideal platform for bottom-up smart city initiatives. This is the point at which the smart city discourse intercepts with the notion of a 'sharing city'.

### 2.3.2. The Sharing City meets the Smart City

The smart city enabled by smart citizens and the connectivity between them and their environment is becoming closer aligned with the concept of the 'sharing city'. Sharing is argued to be a socio-cultural, evolutionary trait which played a large role in enabling the development of hunting, agriculture, manufacturing, and, in turn, cities. Increased marketisation, industrialisation and consumerism in the urban context have resulted in this crucial practice becoming weakened – particularly in places of affluence. This trend is evident as social capital erodes, trust becomes

seconded by drastic inequality and the togetherness of cities is replaced by processes of private withdrawal from communal space (Mclaren & Agyeman, 2015). In the South African context, this process is illustrated through the dramatic increase of gated community development projects such as Century City in Cape Town which isolate the financial elite from the realities of the urban environment and are often sold-out before completion (Marks & Bezzoli, 2000). In contrast to this, the presence of increasingly accessible and ubiquitous technology is shaping the emergence of the sharing economy. Arguably, this could be seen as nothing new – a deeply engrained and neglected trait of human nature reasserting itself through new platforms enabled and mediated by technology. Throughout human history, cities have been centres for collaboration and sharing and this has played a role in shaping many cities to be as they are today. This collaboration was largely enabled through public spaces. In the current context, digital spaces could provide a setting for this collaboration.

For the future of cities, the coupling of smart with sharing means the harnessing of technology in an urban context for sharing, solidarity and cooperation instead of competition and division (Mclaren & Agyeman, 2015). The rise of the sharing city paradigm is also one of the most exciting developments supporting local-scale smart urban projects. In an economic sense, the sharing paradigm in cities has begun to show in the emergence of activities and business models such as crowdfunding which allow people to share their ideas on an open online platform and appeal to the public for investment to take them from concept to reality. There has also been an emergence of the 'circular economy' with platforms allowing for the sale and trading of privately-owned items. The concept has been challenged by questions regarding who benefits from this interpretation of 'sharing'. Is this form of sharing really a way to make the market inclusive? Or does it benefit the central authorities emerging behind the sharing initiatives such as 'Uber' (sharing transport) and 'Airbnb' (sharing spaces) and the people who already have access to resources which can be 'shared' for profit? Many writers have concluded that it is the latter and that these initiatives also reduce the accountability of the central authorities because they have plausible deniability regarding products and services rendered by public actors (Poole, 2016). This interpretation is referred to as 'commercial sharing' and is extrinsically motivated to achieve coproduction and open-sourcing in business. This is a concept which could potentially enable civic hacking in the future as people can collectively fund their own initiatives to alter their communities. However, in order for this to happen, the concept of sharing must extend between individuals, collectives and the public, and beyond profit to political, social and cultural agendas. This leads to the concept of 'communal sharing' which is intrinsically motivated. It involves peer-to-peer sharing activities not motivated by profit which aim to establish a collective commons – public space and services. The sharing of expertise and knowledge is becoming easier through the progress and availability of ICT. Whether or not this movement represents the first signs of a post-capitalist society is beyond the scope of this research. However, it is certain that the marriage of the sharing and smart paradigms has potential to be an incredibly powerful union. In particular, the solidarity aspect of this discourse is of interest. It refers to the processes of interdisciplinary collaboration between public actors in order to recognise global interdependence and address issues at community level by replacing dynamics of unequal power with cooperative grassroots leadership (Mclaren & Agyeman, 2015). The concept of sharing is not restricted to financial capital. Within a community, participants using existing

and new networking platforms can share knowledge, observations and networks. The processes of the solidarity economy include community crowdfunding, participatory budgeting open source projects, etc. These projects do not need to be executed in the blind spot of public service providers. In fact, one of the main focuses is on co-production. Mclaren and Agyeman define this concept as:

"producing and delivering goods and services in a reciprocal relationship between producers and users; recognising the resources that citizens already have, and delivering spaces, services, and goods with rather than for users, their families, and their neighbours. Co-production of collective goods extends to the social and cultural milieu of our communities – their physical, social, and cultural environments. These are common resources, managed and sustained by our collective activities forming the "urban commons". In these ways sharing and collaboration are key aspects of the conduct of daily life that underpin social reproduction and social relations between people. The same processes of informal (and sometimes formal) commons management extend to the natural environment – the air and water, the parks and thoroughfares of the public realm – and thus to humankinds relations with nature" (Mclaren & Agyeman, 2015).

This approach of a 'collaborative commons' is directly related to the research of this project. By using technology to enable collaborative innovation grounded in a specific context, it is possible to create bi-directional flows of information between communities and governance. Essentially, challenging what informs the traditional parameters of service delivery and enabling public participation in the provision of common resources. This research explores how this mass effort can be coordinated through a digital platform. Academic institutions could have an important role to play in this collaborative effort as centres for research and interdisciplinary collaboration. Partnership between academic institutions, public and private sectors, and civic society is the foundation of the smart city strategy of Barcelona (Bakici et al., 2012). Within the smart city discourse, a city aiming to facilitate this collaboration is sometimes referred to as an 'intelligent city'. Academic institutions are often an untapped potential resource for society by operating with a theoretical focus in isolation of their surrounding context. Bridging this gap using participative action research projects which overlap from theory to practice and engage with the public as equals as opposed to a researcher-participant relationship is a possible way to introduce and explore grassroots projects. The Senseable City Lab at MIT is one of the pioneers in this field – with the findings of open-source projects focussing on data capture in cities becoming a theoretical resource as well as a practical community one. If effectively coordinated, public energy can support a transition from transactional sharing to transformational sharing. This is where sharing involves a shift in power relations and an increase in value for all participants (Mclaren & Agyeman, 2015).

It has been argued that technology can enable the delivery of public goods and services through co-production. A digital platform for sharing in cities has also been shown to potentially enable more open and collaborative urban politics. When these two aspects merge it promotes citizen participation in procedures of governance (Mclaren & Agyeman, 2015). Already, there has been a push for cities to gain some level of autonomy from national governments. In planning, the argument has been made that strategy should begin by creating context-specific local plans and working backwards from these to establish a broader national vision – and not the other way around. However, a common issue with this restructuring of power occurs at a local scale where

new local responsibilities are not matched with sufficient resources and skills to carry out the process. Bulkeley et al. argue that to address this cities need a form of co-production referred to as 'distributed autonomy' (Bulkeley et al., 2013). This involves the networking of existing and new sources of autonomy in cities – including empowered communities and citizen networks. It draws on the existing capacities of citizen organisations to strengthen urban democracy. The idea of embracing complex networks in cities is raised by Christopher Alexander in 'a city is not a tree'. He argues that complexity is the way to avoid 'artificial designs' built for simplicity (Alexander, 1965). The linking and navigation of existing networks through citizen hacking and mobile technology can enable highly complex urban systems to emerge which allow for local-level innovation and response. Existing social media and communication platforms such as Twitter and Facebook offer different characteristics and strengths which allow them to be manipulated to complement each other and expand the contexts and issues which they could be applied to. Increasing numbers of people are sharing more information and personal experiences using technology. Through this, the platforms have the potential to enable the masses who use them to become sharers, reviewers or co-creators. From a planning and governance perspective, it must be explored whether there is a way for this potential to be harnessed as a tool in the local planning process.

Despite the need to address the shortcomings of traditional processes of public participation in planning, the optimism regarding technology's role in this is hotly debated. It is argued that the potential use of digital tools to enhance democratic processes has been greeted with an overly optimistic response. One of the main critiques is that the use of technology will not necessarily enable more inclusive participation and instead that it perpetuates the existing obstructions to participation faced by marginalised communities (Dechief et al., 2008). It is argued that differing levels of access to technology could potentially increase the centralisation of power with the elite social groups who already play a dominant role in the participation process and management of space. Digital platforms and meaningful civic participation are not inherently inclusive of each other and a link needs to be established between them instead of implied. This means that in order for ICT in communities to enable greater participation, they need to be on platforms which the majority of people can engage on and supplemented with training for those who cannot. Particularly in the South African context, it is imperative that marginalised communities have an equal opportunity to utilise implemented community networking resources. It is important that projects recognise and address the 'digital divide' so that innovative methods can be developed to ensure that projects do not perpetuate existing economic and spatial barriers. Grassroots projects aiming for co-production of space need to strengthen a sense of place and community by enabling diverse and inclusive collaboration from the inception of the project. Grassroots-level appropriation of ICT emerges through the opportunity for unregulated amateur action which in itself should allow all interested parties to participate in its development (Gaved & Mulholland, 2008). As part of this, it is important that the pioneer, subculture or cooperative grassroots 'civic hackers' be grounded within the local community in which a project is implemented. This makes for a more relatable and engaging project where the initiator can also be a participant (Gaved & Mulholland, 2008).

Hamdi argues that one of the key conditions for effective participation is a strong local organisation

(Hamdi, 2010). This organisation could be facilitated online through social media platforms which allow a consistent channel of communication for those who access them. Alternatively, it could be coordinated through physical local organisations. Finding a common cause, building trust and identifying the roots of issues are ways in which a more inclusive co-production offers benefit (Hamdi, 2010). In projects using technology and participation, there is often a lag between the introduction phase and the adoption phase. This pattern corresponds with the one applied in marketing: the Rogers Adoption/Innovation Curve as seen in Figure 1 (Conway & Steward, 2009). The progression in adoption from 'innovators' to a broader audience could be enabled through of tangible product from an engagement process. For example, in the next section community mapping is explored as a possible tool for co-production. It enables participants see their

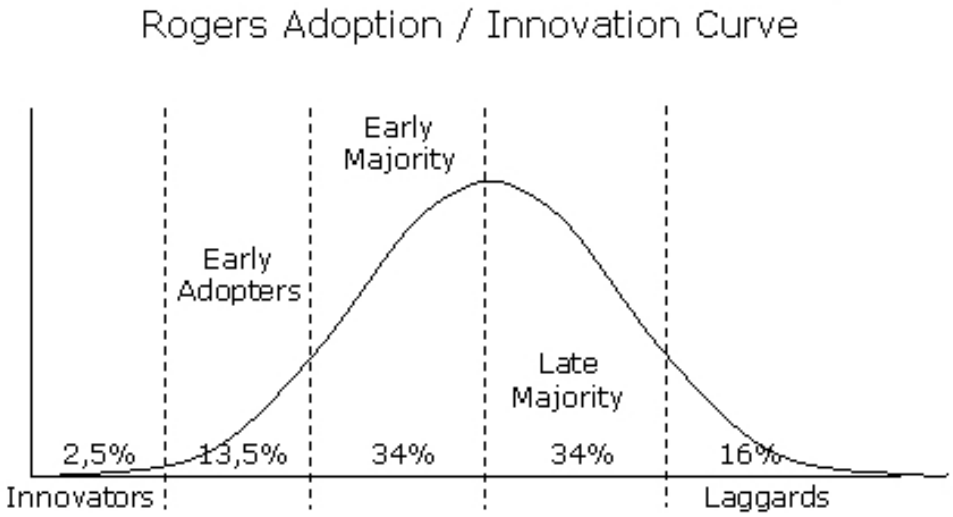



*Figure1:The Rogers Adoption/Innovation Curve (Source: http://www.valuebasedmanagement.net/images/picture_rogers_adoption_innovation_curve.gif)*

contributions becoming a potentially powerful tool for accountability and partnership through their spatialisation. Before this, it is necessary to gain an in-depth understanding of the different networks, organisations and hierarchies in a community – seeing where these could possibly be connected and which groups are included or excluded in current planning activities (Hamdi, 2010). Flexibility is key in the process of identifying stakeholders in a project. It is argued that citizens have a right to the digital city which needs to be claimed (Foth et al., 2015). However, it is also important that this right is enabled through inclusive design and implementation of digital tools and projects. To recognise the wealth of knowledge and experiences held by citizens is crucial for the longevity of urban development strategies. This right to be recognised and have an input in the transformation of space is something that has become overshadowed by the focus on engineering and technology and the drive for optimisation and efficiency. Now, with the rise of the Internet of Things and citizen hacking, platforms are emerging which could enable the right to be restored in the future.

## 2.3.3. Participation and Digital Mapping for Co-Production

As mentioned, one of the ways in which the co-production of space can be enabled is through

community participation in reporting and, in some cases spatialising this in mapping projects. James Corner argues that while mapping has often been a tool used for authoritarian, top-down approaches to development, there is huge potential for it to be a collaborative and enabling enterprise (Corner, 1999). This can take place when it becomes a participatory process where a diversity of perspectives can unveil previously unrecognised issues and opportunities. If used in an inclusive way, ICT has the potential to draw on extensive and complex networks to collect diverse perspectives of a space and prioritise issues based on different uses of space, values and imaginations. It is important to understand why participation and the views of the public are important in planning. Hamdi argues that in development work, participation is central to all planning programmes and projects regardless of context. He draws on the views of Geddes that 'ordinary citizens' should have a vision and comprehension of the possibilities of their cities. The way to enable this is through giving citizens the freedom to respond to stimuli in their localities (Hamdi, 2010). Participation is about balancing responsibility and authority to allow for partnership towards common goals. It is more about forging partnerships with local communities vertically with authorities and horizontally across other networks than the 'tick-box' version of participation as gathering and responding to comments before a project commences. It has been found that people in local communities do not want to be referred to as 'beneficiaries' or 'end-users' but rather as partners or co-creators whose inputs translate into policy and spatial change (Hamdi, 2010). Foth argues that this is the next progression in the relationship between urban governance and civil society in cities (Foth, 2016). Table 1 shows how over time this relationship should shift from 'administrator' and 'residents' to 'collaborator' and 'co-creators' – demonstrating a shift in the recognition of the value of public engagement. Participatory mapping through crowdsourcing and collaborating using digital platforms could enable the relationship of the 'City 4.0' relationship by establishing a two-way conduit of accountability and information.

Etienne Wenger produced a theory of learning as a process of social participation. Innovative tools

| | City Government | People |
|---|---|---|
| **City 4.0** | Collaborator | Co-Creators |
| **City 3.0** | Facilitator | Participants |
| **City 2.0** | Service Provider | Consumers |
| **City 1.0** | Administrator | Residents |

*Table1:The Evolving Relationship between City Governments and People (Foth, 2016)*

for participation have the ability to increase the opportunity for mutual learning between urban planners, citizens and authorities. He argues that the way to do this is through the identification of 'Communities of Practice' (CoP) (Wenger, 1998). These are social groups which emerge around practices which members have in common. These can include a broad range of groups from families, religious groups and colleagues to virtual networks and people who use a space for the same activity. These groups are an integral part of human social interaction and organisation. The challenge for smart city approaches is to identify these CoPs and explore where their experiences and agendas can align in order to collaborate in the production of a common resource. In doing so, conditions become more conducive for social learning and awareness and the city becomes more effective as a collecting actor or collaborator. The effective functioning of cities can be inhibited when CoPs are excluded from participation processes. Alignment between CoPs can be promoted through the introduction or identification of a common 'boundary object' or over-arching goal or issue (Wenger, 1998). The differences in how each CoP interprets and approaches this goal or issue is desirable as diverse knowledge and values can result in a more informed, complex and balanced overall view of an issue and more effective plan to address it.

In planning, one of the greatest dangers is addressing the symptoms of an issue rather than its source. These 'band-aid' interventions may provide short-term relief but can lead to more significant manifestations of the same issue in the future. Participatory mapping allows for the triangulation of a diverse group of perspectives on perceived issues. Through synthesis, it can detect trends and clusters which can lead to more in-depth and targeted studies of the dominant issues in a space. In order for this to be reflected on the ground, however, there needs to be a respect for local knowledge and a mitigation of the mappers influence on the information generated. This can allow the prioritisation of the issues of the many rather than of the elite minority. Sandercock argues that platforms should be built for knowledge-sharing. She identifies five qualities of planning imagination which are very relevant to the argument for the co-production of space. These are: 'therapeutic approach', 'expanding political horizons', 'daring to break the rules', 'creativity' and 'managing critical sensibility'. And lastly, the duty of planners should be 'organizing hope, negotiating fear, mediating memory, and daring to break rules, as well as developing the habits of a critical/analytical mind' (Sandercock, 2003). These qualities relate directly to the arguments put forward by advocates of the grassroots approach to smart cities. If the use of technology in planning can be guided by these principles then it progresses from questioning how technology can be used to why it should be used. In this case, the growth of access to mobile devices and simplicity of mapping through a digital platform could be used to address issues of skewed participation in common issues. In order to understand how ICT and, in particular, mapping practices can address instead of perpetuate existing marginalisation, precedent studies can be used.

This section aims to briefly highlight some examples of bottom-up smart city projects from around the globe. The aim is both to illustrate the extent to which this approach is spreading and to isolate some of the key lessons learnt from these cases in terms of how projects are triggered, how they stimulate broad and inclusive public engagement and how the results are transferred into tangible planning interventions.

Townsend argues that cities already have an extensive sensor network at their disposal in the

form of smartphones (Townsend, 2013). There are international examples of local government and public-led projects where this network is being used to inform urban decision-making. Many of these projects revolve around the crowdsourcing of data from citizens. For example, in Jakarta the provincial government developed a smart city platform consisting of an issue-reporting map as well as crowdsourced maps for flooding and traffic management (Saunders & Baeck, 2015). The idea of creating a system of 'collective intelligence' where digital tools enable a more democratic planning process is seen in Bogota through the website initiative: 'My Ideal City'. As a forum for debate, this platform enabled residents to make suggestions and comment on proposals. The platform was widely engaged with by residents. The success of this could possibly be attributed to the way in which the platform sourced ideas instead of observations and was set up for debate rather than selling a predetermined idea – allowing for a partnership of production to develop. It was also supplemented through advertising on other media platforms such as local radio stations. The site received over 100,000 suggestions about projects or changes that the public wanted to happen in their city (Saunders & Baeck, 2015).

In France, a similar concept of enabling debate for co-production was introduced, however it features an online mapping platform. This enables citizens to spatialise ideas and issues. These are collected on a map which is open-source and becomes a platform for the public to vote for their favourite suggestions and most pressing problems. The platform is called Carticipe and the results coming from it are collected to directly inform the plan for the city – showing another crucial element in getting people to engage on a platform: tangible results from contribution. Already, a trend emerges in these smaller case-studies that people do not necessarily just want to report problems but also solutions and imaginings of how the potential of a space could be realised. This seems to be a critical distinction in getting people to actively engage on the platform. It must be raised how this approach of co-production could be applied to the South African local context to establish a more inclusive platform of debate. The Carticipe platform has been so successful in cities in France such as Marseilles, Montpellier and Strasbourg that adaptations of it are now being launched in Luxembourg and Canada. This spreading of local scale smart innovation to a broader scale corresponds with Townsend's argument for bottom-up smart city strategies starting at the local scale and then being adapted for other contexts (Townsend, 2013).

Just as infrastructure alone cannot make a city smart, applications cannot assume engagement and enabling of smart citizens. The extent of engagement correlates with the freedom given to the public to contribute in ways which are meaningful to them. For example, in some contexts people may not be inspired to report issues that they observe in isolation from a vision which they have for how these issues could be addressed. The long-term success of adapting ICT for a more participatory urban planning process seems to hinge on to what extent the platform allows for inclusionary debate and transforms this into tangible results through policy or spatial interventions.

## 2.4. CONCLUSION

This literature review set out to explore some of the dominant arguments within the smart city discourse. It was found that there is a broad recognition of the importance of cities, technology and the relationship between the two for the future. Particular emphasis is placed on the potential to address issues such as climate change and the demographic pressures linked to population growth. The smart city discourse emerged in response to this recognition as well as other factors. However, the concept can be ambiguous and this renders it vulnerable to re-interpretation according to who uses it and for what purpose. Two of the main approaches to harnessing the potential relationship between cities and technology have been identified. There is a corporate-led utopic vision of using technology to optimise the efficiency of urban spaces and processes. This is a very marketable vision, with cities around the world buying into it through investment in large-scale infrastructure projects which aim to integrate technology into the urban environment. These projects can bypass critical processes of participation and focus on an engineering-led approach to development. The result, is the centralisation of decision-making around engineers, tech companies and governments. This can have powerful and damaging spatial manifestations such as the 'African Urban Fantasy' cities (Watson, 2013).

The argument for the decentralisation of decision-making in cities was made by prominent academics such as Geddes and Jacobs. The right for inhabitants to have an impact on how their cities develop is something that can arguably be reclaimed through digital platforms. This is enabled through grassroots projects where technology is adapted to a specific context rather than vice-versa. A smart city approach which focuses on bottom-up projects at a local scale may be closely connected with the notion of a 'sharing city'. The main element of commonality between these discourses is the co-production of space and the role technology can play in enabling this.

Exploring these different interpretations of what it means to be a smart city and how this manifests generated questions. Clear under-researched areas emerged as the literature review progressed. In relation to the topic of this dissertation, this was particularly noticeable in the literature regarding bottom-up approaches to smart cities. For example, further research is needed to determine how these projects are initiated, facilitate inclusion, and yield tangible results. In order to address these questions, it is also necessary to query which research methodology is the most effective to document and analyse these projects. Finally, it must be questioned whether it is possible to hybridise the top-down and bottom-up approaches and how this point of intersection would look. These are some of the main points from the literature review which would inform the research questions and methodology of the dissertation. One of the main themes identified through the precedent studies was that public participation cannot be in the form of tokenism or a 'tick-box' approach. The public should not be considered 'beneficiaries' or 'end-users' but rather partners in the development of the spaces which they use. This must be factored into the tools used for engagement. Their functionality should extend beyond allowing citizens to simply report issues but also to co-produce solutions and engage in debate regarding the future of a space.

The literature review has identified a position for this dissertation within a niche which features several gaps in knowledge. It has also allowed existing theory to be synthesised into a format which can allow it to be an informant of the fieldwork component of the project. This dissertation will aim to contribute to understanding the role that academic institutions could potentially play in facilitating the agency of grassroots projects through the use of emerging adaptations of the Participation Action Research method which harness the potential of available technologies. It will also explore how inclusive participation can be enabled through increased choice and flexibility in how the public can participate through a digital platforms. Additionally, it argues for the importance of the positionality of the researcher for situating a project in a local context.

*The aim of this chapter is to outline the research methods used in the project and to substantiate why they were chosen. Two methods were used: Participatory (Network) Action Research and the Case Study method. The site chosen for the case study is a portion of the Disa River public open space in Hout Bay – within the urban edge of the City of Cape Town. This chapter will begin with an explanation of the nature of the problem that this research aimed to investigate and then discuss the objectives and questions around which the research process was structured. The chapter will explore the emergence of Participatory Action Research and substantiate why it was applicable to this project. Secondly, the qualitative case study method will be discussed as well as associated research techniques such as a literature review, a desktop study and interviews which were used to collect data for this research.*

# 3. METHODOLOGY

## 3.1. NATURE OF THE RESEARCH PROBLEM

The Smart City discourse has wandered into the realm of ambiguity. Conflicting perspectives continue to emerge regarding what it means to be 'smart' and what technology is capable of achieving in its application to urban systems and issues. On one side of the spectrum we find a top-down corporate vision of the smart city. The focus of this vision is often on place-marketing, efficiency and optimisation. The result can manifest spatially as large-scale infrastructure or urban projects led by multi-national IT and engineering companies and designated to the periphery of existing urban contexts (Watson, 2014). On the opposing side of the spectrum there is a bottom-up approach to the use of technology to address perceived urban challenges. With exponential increases in the accessibility and functionality of personal mobile technology, the ease with which connectivity can occur is unprecedented. 'Civic hacking' is a term used to encompass the action of local individuals and organisations taking existing, flexible ICTs and manipulating them to establish a tool to be used in their local context either to address issues, re-imagine an environment or perhaps both. In contrast to the top-down approach, these projects begin at a local scale grounded deeply in a context and then, if successful, can possibly migrate and be adapted to other localities (Townsend, 2013).

In order to build on the existing body of knowledge of this bottom-up participatory approach to smart cities, there is a need for more context-specific case study research. There are international examples of projects being introduced at a small scale which rely heavily on engagement through ICT. These projects should be documented and studied in order to advance the advance understanding of how they start, manifest and continue. It is important to interrogate aspects such as whether these projects could potentially unite and network different 'Communities of Practice' in a locality and how data from these processes could be presented in a form which could be a tool for bi-lateral communication, co-production and long-term, evidence-based planning. There is a need to rethink the public participation process of existing planning practices – in particular the recognition of context, and inclusive acknowledgement of user experience and knowledge. It is necessary to question the roles of academia, the public and private sectors, and civil society in this process and what needs to change in terms of policy, hierarchy and approach in order to enable

bottom-up experimentation and the exploration of possible future scenarios for change.

## 3.2. RESEARCH OBJECTIVES AND QUESTIONS

The main objective of this research was to investigate how ICT could potentially be used at a small scale to establish a platform for the crowdsourcing of observations, knowledge and debate. And whether the data resulting from this could be processed in order to inform evidence-based long term spatial planning processes and the co-production of space. In addition to this overarching objective, the research aimed to explore what obstructions exist and what would need to change in policy, planning approaches and actor roles in order to allow for bottom-up ICT projects to manifest in the Cape Town context. A common criticism of using ICT to establish a more participatory planning process is that in changing the platform of participation to a virtual realm the existing marginalisation and inequalities in the process are perpetuated with more barriers to accessibility. In the context of Cape Town this is a particular concern as severe inequality can translate into a 'digital divide' of unequal access to devices necessary in order to engage with established platforms (Odendaal, 2006). Therefore, another element of investigation was to explore how the process of introducing a digital platform for collaboration would unfold and how this could be made inclusionary and address rather than perpetuate social marginalisation – i.e. what external/physical factors would need to support the project in order to achieve this? Lastly, as mentioned in the problem identification section of this chapter, there is a need for case study research in this field in order to build on existing knowledge and address some of the currently insufficiently explored aspects. Therefore, this research aims to contribute to the existing body of research regarding case studies of local-based smart city projects. In relation to these objectives, the following research questions were established which the dissertation aims to respond to:

1. How do bottom-up ICT-based local projects for civic engagement start and how do they stimulate inclusionary engagement of the diverse groups that use a common space?
2. How can the data collected through these platforms be processed in order to be a tool for evidence-based long-term planning and the co-production of space?
3. What needs to change in current planning policy and practice in order to enable the bottom-up approach to stimulating participation to establish a bi-directional flow of information between authorities and local communities?

In order to address these questions, subsidiary questions were developed to complement the main research questions relate them to the field of city planning.

1. What are the roles of planning professionals, private and public sector, civil society and academic institutions in this process?
2. What are the existing ICT and planning tools that can be drawn upon in order to establish platforms for local participation and engagement?

In order to answer these questions, it was first necessary to ask broader questions in order to determine the position of this dissertation in the existing research. The following questions were

asked:

1. What are the issues and debates within the existing research and literature on the dynamic relationship between urbanism and technology?
2. What examples and case studies exist in the literature regarding projects where technology was used at a local scale in order to stimulate participation and inform planning interventions?

Other questions identified relate directly to the context of the case study. This promotes the applicability of the Network Action Research (NAR) method to the project (Foth, 2006). The public space chosen as a case study is a relatively highly frequented area used by diverse users for a broad spectrum of activities. A more detailed description of the case study site can be found in the context section. The diversity of users and activities calls for dynamic and inclusive management of the space. In order for this to be achieved, it must be addressed how the issues and experiences of each group of users or 'Communities of Practice' can be integrated into future planning interventions and co-production of the space. Additionally, how to make these CoP's more conscious of each other's experiences and needs. And lastly, will this NAR approach lead to higher levels of clarity, flexibility and creativity in the management of the space? I.e. Can the action be translated into a resource for future planning and what is the role of the researcher and/or planner in this process?

## 3.3. RESEARCH METHODS

Before the initiation of the fieldwork process, a desktop study was essential. The purpose of this was to develop an understanding both of the broader context of the discourse which the research project ties into and of the location for the case study. In order to establish this, it was first necessary to conduct a literature review which aimed to coherently order existing relevant literature. The literature drawn on for this project was diverse in terms of date and focus. From more classical planning literature such as that of Patrick Geddes and Jane Jacobs who advocated decentralised decision-making to recent books and articles published by academics at the forefront of navigating the emerging Smart City discourse such as my supervisor, Nancy Odendaal, and writers such as Anthony Townsend and Marcus Foth. The literature review was structured according to different themes. Firstly, exploring the contrasting views of the top-down and bottom-up approaches to the smart city debate. Secondly, the scope of the review was refined to the bottom-up approach. Specifically, considering its relationship to other theories such as that of the 'sharing city' and determining where this dissertation was situated in the broader discussion.

It was found that there is an unresolved tension between the often corporate-led vision of a top-down smart city which uses big data to enable governments to make faster and more informed decisions and the emerging smart city approach which is built around ideas of 'smart citizens' (people-centred cities) and 'sharing cities'. Essentially, using people and place to guide the application of technology through the encouragement of bottom-up initiatives. In these cases, the technologies emerging centre around ideas of participation and crowdsourcing. One of the main issues is to understand how bottom-up and top-down strategies could meet and benefit each other.

In order to decipher this, it would be important to depart with a working knowledge of how both approaches manifest in terms of process and spatial outcome. To build this body of knowledge, particularly in the case of bottom-up approaches, requires the study of multiple cases in order to explore and understand the processes which enable a grassroots 'civic hacking' approach. This was identified as the niche in which this research project is situated.

As part of the desktop study, ArcGIS was used to map the case study area and get a better understanding of the natural, mobility and social networks which constitute it. After this had been established, there was sufficient information to select relevant research methodologies which would suit the context and allow the dissertation to aim to perform its potential role in the broader discussion as identified in the conclusion of the literature review.

The research methods used in a project can have a decisive impact on its effectiveness and outputs. It is important to match methods which are relevant to the topic and questions posed. As Yin argues, research methods can complement each other (Yin, 2004). Therefore, in some cases it may be applicable for multiple research methods to be used in a single project. For this dissertation, two research methods were chosen which are relevant both to each other as well as to the questions being posed and the context of the research. This section is divided into two clear parts and aims to briefly define and contextualise the methods chosen, and substantiate their use through the identification of their respective strengths and weaknesses.

### 3.3.1. Participatory/Network Action Research Method

Action research methods have a complex origin. The approach has evolved over time through its adaptation and use in diverse academic disciplines. The method is still a work in progress and is highly adaptive to specific research projects. However, two dominant and consistent themes are civic engagement and social justice (Brydon-Miller et al., 2003). Foth and Brynskov argue that the future of civic engagement lies in technological innovation and the use of emerging resources and practices such as personal mobile devices, open data etc. (Foth & Brynskov, 2016). There is a top-down interpretation of how these resources can be used to optimise and enhance cities and ultimately make them more efficient and, in turn, lucrative. This approach is enabled through large-scale infrastructure projects focussing on energy, transport and healthcare sectors and led by IT companies, engineers and governments (Foth & Brynskov, 2016). Arising in contrast to this vision is an argument for the use of technology in cities to enhance democracy by using the resources to engage with citizens, gain a deeper contextual understanding of a locality and co-produce space. It is in this niche of civic action utilising ICT's to challenge and shape the dynamics and structure of urban governance that the participatory action research (PAR) method becomes an appropriate and effective research paradigm. This does not only include civic technologies aimed at enhancing the efficiency of governance but those that aim to foster citizen engagement in a broader sense – engaging civil society in debate and action.

Within the field of planning and in particular the smart city discourse, there is a dominance of rational technology and engineering-based knowledge. It is argued that civic engagement may

require a different epistemological model for acknowledging local knowledge and social context (Foth & Brynskov, 2016). Academics such as Leonie Sandercock have stressed the importance of valuing different sources and manifestations of knowledge (Sandercock, 2001). In an urban context, knowledge can exist in many diverse forms and originate from a variety of sources. There are traditional methods for assessing knowledge. However, these often fail to recognise the incredible wealth of knowledge and experiences held both collectively and individually by the individuals and groups who interact with an environment (Foth & Brynskov, 2016; Hemment & Townsend, 2014; Hill, 2013; Lynch, 1965). Sharing cognitive authority and utilising methods such as storytelling and oral histories can be particularly valuable – especially when trying to foster inclusive participation and challenge marginalisation (Odendaal, 2006). By recognising this body of knowledge as a valuable resource for planning research, the invisible barrier often existing between researcher and research subject becomes blurred and permeable. In order to introduce and harness the potential of this shifting hierarchy, it is necessary to create and implement new models for researching and addressing urban problems (Foth & Brynskov, 2016).

PAR takes inspiration from the philosophical perspectives of critical pedagogy which challenges the traditional roles and hierarchy of researcher and research subject (Foth & Brynskov, 2016). In the research process, the researcher and participants are co-investigators. The process extends beyond theory to practice with the imperative not only being to understand the research problem at hand but to provoke change to address it. Action research incorporates a broad spectrum of methodologies and approaches. However, a point of commonality is the focus on participation in the and research of a project. In order to enable this approach, the method needs to include consistent and continuous planning, acting, observing and reflecting. In addition to this parameter, the following principles are identified by Foth & Brynskov to apply to most PAR methods:

1. The research is ‘applied’ rather than pure, basic or strategic. Meaning that the production of knowledge informs action and change which can be measured.
2. The project has a level of accountability not only to academic project participants (in this case examiners) but also to the people who use the study area and who were co-investigators in the project through their participation.
3. Academic contributions to the project are seen as equal to those made by community members and representatives.

It is possible to further narrow the scope of the PAR method used in this research project according to the data acquisition methods. Network Action Research (NAR) is a branch of PAR advocated by Marcus Foth as a method to integrate the potential of emerging digital media and communication tools in action research projects (Foth, 2006). It allows the traditional approach to action research to be supplemented with a strategy using social networking platforms. Foth & Brynskov argue that, if used correctly, this supplementation could address some of the challenges arising in traditional methods of PAR. The main benefit is argued to be an increase in access to participation leading to a more balanced representation of the diversity within a community. Communities of Practice (CoPs) refer to the groups with in a community which are defined by a common activity of some kind. Each CoP may have their own agenda regarding the production and management of a space.

Some CoPs are often more dominant in the overall participation process. The resulting hegemony in the participation process within a community can be challenged through NAR approaches through providing marginalised groups with access to platforms to express their views. Diverse CoP's may become more integrated and coordinated through the use of digital platforms to arrive at common goals (Foth & Brynskov, 2016).

The NAR method is used in this project due to its focus on the integration of different CoP's within a community in order to crowdsource information, ideas and debate to establish a tool for long-term, evidence-based planning and the co-production of space. The method allows for unrestricted flexibility in the digital tools being used and the manner of interaction. It is a people-centred form of research which allows for an exploration and challenge of the existing relationship between academic research, theory and practice. NAR is a way to recognise this relationship and the significance of human social networks and knowledge within a locality using digital means as a tool to assess and explore the potential of this (Foth, 2006).

#### *3.3.1.1. Strengths and Weaknesses*

NAR is an emerging research method that is not as well documented and tested as other more traditional research methods such as case studies. It is important to be aware of this when using the method. There is a need for small-scale case studies which draw upon NAR in order to develop a better understanding of its scope, potential and viability (Foth, 2006). Due to the context specific focus of this method, some of the knowledge gained cannot necessarily be applied to other situations. Lack of transferability of research can be seen as a weakness. However, findings can contribute to the networked community of practice of action researchers (Keane, 2004). Knowledge regarding research process is particularly valuable in terms of the platforms used, how participation was enabled and how results were processed.

The lack of clear parameters in this research method is a strength as well as a weakness as it allows for flexibility in response to context and available digital resources. It allows the use of multiple digital platforms for engagement which promotes broader and more diverse interaction. Although there is a common theme of the integration of different community groups for participation, the questions which can be addressed using this research are broad and inter-disciplinary. The use of digital platforms promotes collaboration and for the extent of engagement to be quantified. For example, two of the digital tools being used in this research are a Facebook page and an interactive SMS platform called 'FrontlineSMS'. Both platforms allow the quantification of people sharing information and participating in the research. This is a strength as it complements the richly qualitative approach of the case study method which is discussed next in this chapter.

NAR may require a significantly longer amount of time than other traditional research methods. Firstly, the digital platforms need to be developed. Secondly, these need to be released to the public for a long-enough period that it allows for meaningful engagement. This means allowing for enough time for people to understand the project and begin to engage with the new tools available. The amount of time for this is variable according to the level of complexity of the systems being

used and the level of prior knowledge that participants have with navigating online networks. The longer the time allocated, the more credible and rich the outcomes of the research will be. The project must allow not only for collaboration but also debate. In the context of this project where time is a significant research constraint, this could be seen as a weakness. However, if given sufficient time, one of the strengths of the method is that it leads to some form of action and mutual benefit for the researcher and participants. This could be in an intangible form such as an increased respect for the diversity of perspectives within a community.

The method also brings unique ethical parameters to navigate as part of the research process. Due to the high level of engagement proposed, protection and anonymity for contributors must be prioritised. It is also imperative that participants are represented as they intended to be. The overlap between theory and practice results in a tricky paradigm. It is important to outline the research clearly and in a format which all participants can understand and to ensure that no false promises are made for the continuation of the project following its conclusion.

In the context of this project, the main weakness of this method is the requirement of a significant amount of time to be effective. Ideally co-production should be promoted in each phase of the process. The amount of time for this is variable according to the level of complexity of the systems being used and context of the research.

#### *3.3.1.2. Sources of Data*

NAR entails the use of available technology resources for the purposes of participation and the co-production of space. Four different digital platforms of communication were established for this research project and these were supplemented through the creation and distribution of digital and printed maps and markers to spatialise public interactions. This is a short description of each of the platforms used and how they were adapted to be suitable for the context of the case study chosen. Each platform was adapted for a different use in the project. However, as a complete package they provided a comprehensive set of tools for public engagement.

1. **FrontlineSMS**

Although access to smartphones and the internet is increasing in the marginalised population groups of South Africa, the issue of the 'digital divide' cannot be ignored. This refers to the phenomenon of differentiated access to digital technologies and connectivity (Odendaal, 2006). It is particularly important in the context of this research where one of the main problems identified is how to ensure that the digital platforms introduced do not re-enforce or mimic existing patterns of exclusion in decision-making. Despite being perceived as an outdated messaging practice, SMS is the most accessible platform of messaging using a mobile phone. The function of SMS is the same on a smartphone as it is on a non-smart phone as it does not require a connection to the internet. This renders it a more inclusive form of communication.

The software company 'Frontline' have developed a platform called 'FrontlineSMS' for the management and automation of SMS communication with large groups. It is a free platform which

is used internationally for uses from political campaigns to disaster relief efforts. It was chosen for this project due to the universality and inclusivity of the SMS platform; The experiences outlined from case studies of other projects using the platform for public engagement; and because the platform does not require coding which is outside of my knowledge. FrontlineSMS has been particularly successful in Africa where it is recognised to provide the tools for people to 'create their own projects that make a difference' (Frontline, 2016).

FrontlineSMS uses a connection established between an Android phone and a laptop in order to create a desktop inbox for SMS engagement. It does not require an internet connection to work which is a strength for the platform as a tool for fieldwork. The really exciting functionality of the platform lies in the ability to automate 'activities' based on the content of messages received. For example, I was able to dictate that if a message is sent in with certain keywords, the person sending it will automatically be added to a specific contact group. I can also automate a response thanking the participant and providing sources of more information regarding the research project.

One of the main weaknesses of the platform for this research project is that received SMS's do not have attached location information. Therefore, reports and suggestions from participants could not be automatically located on a map of the study area. In order to get this information an alternative strategy was needed. In response, the study area was divided into three sections using physical landmarks (crossing points) and signage. A map was made publicly available with attached instructions for how to participate. This allowed participants to spatialize the issues or solutions that they had in the space by sending SMS's in the format:

ZONE (#): ISSUE/SOLUTION

This platform is by no means perfect and its limitations will be discussed later in this dissertation. However, as a proof of concept and research technique within the NAR method it fit well. The platform is inclusive, accessible and easy to use.

2. **Facebook Page**

When using social media platforms for an interaction project it is impossible to ignore the giant which is Facebook. With consistently growing membership and interactions it has potential to be a powerful tool for most contexts of participation action research. As the platform has evolved, it has become more suitable for community projects and campaigns through the development of 'pages' which allow for incredibly flexible interaction with the public or specific groups. I created a page for this research project under the name "Smart Disa: A Community Research Project". There are already a few significant Facebook pages which are regularly used by a large amount of residents in the Hout Bay community. The most prominent example of this is 'Hout Bay Organised' which has over 12,000 members. The fact that some members of the community are already engaging on this platform meant that it would be easy to promote the page created for this research.

The Facebook page would have a different but supplementary role to that of FrontlineSMS. Although the reporting of observations or ideas was not restricted on the platform, it was intended

more for debate and conversation. Taking lessons from the case of the Carticipe project in France (refer to literature review), it was found that people may want to engage beyond simply reporting issues to debating how they may be prioritised and addressed in spatial planning. In an effort to provide this type of platform through the Facebook page, the observations and ideas generated through participation were mapped on the study area. This map was shared on the Facebook page and a poll was conducted in order to debate which issues and ideas should be prioritised and addressed.

3. **Twitter**
As a platform, Twitter is characterised by speed and succinctness. With only 140 characters per post, it is an ideal platform for people to report observations and ideas and for those collected through other platforms (e.g FrontlineSMS) to be re-distributed. People may want to monitor the observations coming in if they use the space regularly in order to determine whether there are problems such as safety concerns that may impact their use. This is another supplementary role which adds a new element to the type of engagement being encouraged in this project. This ties into the ideas of smart cities allowing for real-time information to impact how we use and monitor a space. Although this can be achieved through other tools, this project has sought to adapt existing tools to specific needs. Using twitter as a means for passive crowd-sourced real-time surveillance of a space is an example of this.

4. **Email**
An email address specifically for the project was made. Its intended use is for participants wanting to ask questions about the project or engage in a different way – i.e. through an interview because they may have strong feelings towards a specific aspect of the project or an observation or idea that resulted from the public engagement process.

5. **Google Form**
Part of the intention of this research is to demonstrate how bottom-up smart initiatives can be implemented using existing platforms with little cost or IT knowledge being required. Google Form is a great example of this. It is a completely free platform which allows users to create and distribute interactive online surveys. The information collected through crowdsourcing, surveys and interviews was spatialized into a map. This was divided into the zones used for the project and the reported issues and ideas were included. Participants could vote per zone for one issue and one idea which they thought should be prioritised. In order to ensure that pedestrians had access to this voting process, a tablet was used at the Bethal Road crossing point.

## 3.3.2. The Case Study Method

There is a close link in this research between the NAR and case study methods. The NAR approach may require a small-scale case study approach in order to enhance its viability – especially with a limited time-frame. A small 1km long stretch of public open space following the banks of the Disa River in Hout Bay was chosen as the case study for this research. This site was chosen for a variety of reasons. Firstly, due to the high level of diversity in terms of who uses the space and

for what purpose. This was a parameter established through the research questions which sought to explore how technology can enable broad and inclusive participation in common issues and how this can be used to inform planning processes. The high level of diversity and energy in the space results in a richness which is required in order for the research question to be addressed. Secondly, the existing patterns of use and management of the site allows for an examination of how the space is currently being managed and the planning approach to balancing and prioritising the needs of the different groups who use it. In particular observing whether there are noticeable trends in which Communities of Practice currently participate in the planning process in order to measure whether a higher level of engagement can be achieved through the introduction of digital platforms. Lastly, I have lived in close proximity of this site for the majority of my life and therefore have amounted a good contextual knowledge of the space and how it is used.

Yin identifies two scenarios in which a case study method is applicable:

1. When the research question is descriptive or explanatory, asking what has happened? And why or how it has happened?
2. When the researcher wishes to make observations of a specific scenario or situation. (Yin, 2004)

The research of this dissertation fulfils both of these parameters. The research questions proposed are mainly explanatory in nature. In order for the NAR method to be viable a robust understanding of a context is required. The case study method allows research which seeks to understand how global issues may manifest on a local scale. It has been identified as particularly useful in developing a flexible way to gain in-depth understanding of an institutional, socio-economic and environmental situation (Yin, 2004). The flexibility permitting an in-depth exploration of the social context of a situation is of particular interest and the aptitude of this method in addressing this is a significant factor in promoting its use. The process is rigorous and embraces the resulting complexities of interactions and relationships between variables on a local scale.

Despite the method's rich history of use in academic projects, there are some significant criticisms of it which Flyvberg discounts as 'misunderstandings' (Flyvberg, 2011). The dominant theme of these criticisms is the lack of transferability and scope for generalisation from the knowledge established through case study research. This relates to the criticisms identified of the NAR approach. The approach of case study research is becoming more open to the idea of collaboration and supplementation of the approach with other methods (Flyvbrg, 2011). This development could play a part in addressing and perhaps nullifying some of the identified weaknesses. It will be interesting in this research to explore how the NAR and case study methods can complement each other and address individual and common weaknesses. A possible example of this would be the complementation of the qualitatively strong case study data with the quantitative aspect of data collected through NAR.

#### *3.3.2.1. Strengths and Weaknesses*

In the context of this research, one of the most relevant strengths of the case study method is

its flexibility in using a variety of data sources (Yin, 2004). This variation is essential in order to embrace and explore the complexities within a given context. It allows for a combination of techniques to be used in the acquisition of data which best fit the chosen case study. These techniques may highlight similar patterns through the data that they produce. When the data from multiple sources points towards a similar outcome the result is an increased validation of the results from the research. Yin refers to this phenomenon as 'triangulation' and it is one of the significant strengths of the method.

The next strength of this method is particularly relevant to the context of this research. The ability of case studies to provide the researcher with an in-depth understanding of the research is a prominent strength. In particular, the way that case studies allow for a globally-relevant discourse or issue to be understood in terms of its local manifestations. In this case, the smart city discourse which is highly contested in terms of its scope and best-practices can be tried and tested in one of its forms in a small-scale context.

The main perceived weakness of this method has already been eluded to. The context-specificity inherent in case studies can mean that the outcomes of research cannot be generalised or applied to other contexts. Although perceived as a weakness, the specificity of case studies is also a strength as it allows contribution of knowledge in terms of the research process itself instead of form. Also due to this, case studies are argued to be more subjective research methods than other more quantitative approaches. Specifically, it is argued that the case study contains a bias toward verification and to confirm the pre-conceived ideas of the researcher. Both of the research methods chosen for this project (NAR and case study) require specific ethical considerations to maintain their credibility. These will be elaborated upon later in this chapter.

### *3.3.2.2. Sources of Data*

1. **Interviews**

Yin argues that interviews are one of the most valuable tools in the case study research method (Yin, 2004). In the context of the chosen case study and particularly in relation to PAR/NAR methods, the interview process should be as fluid as possible and allow for deviation into specific experiences and knowledge of the participant. As a result of this, a semi-structured interview format was chosen. This means that there are central questions (see appendix) developed and posed to guide the interview. However, there is also flexibility to explore certain questions and responses in more detail than others. The interview is also a form of the co-construction of research data which is a shared theme with the NAR data collection method.

In this research project, a combination of focus groups and individual interviews were conducted. The focus groups were used in order to identify Communities of Practice within the community and to assess and compare their knowledge, experiences and imaginings of the space. Individual interviews were undertaken with people who used the space for different activities – i.e. commuting, horse riding etc. This was be an interesting approach to see how different Communities of Practice and people viewed the space and what it should become. In an effort to incorporate a variety of

different groups, I interviewed adjacent property owners, pedestrian commuters, horse riders and dog walkers. The point of the interviews was to get a better understanding of how people use and perceive the space and whether they would engage in a digital platform for participation. At a later stage in the fieldwork, further interviews would be needed to determine whether people engaged with the platforms or not and for what reasons. Also, because the project largely revolves around co-production it would be imperative to find out what people would do differently in establishing a platform for participation. Interviews were conducted at two stages: concurrently to the release of the platforms to the public and once after a three-week period where people had had a chance to engage with the system.

Interviewees were given a complete explanation of the project and its objectives before the process began. The semi-structured format allowed participants to be selective in what information they shared and to have an opportunity to guide the process according to their values and outlook.

2. **Questionnaire/Survey**

The questionnaire can be a controversial qualitative research technique. This is mainly because it can be easy to format a questionnaire in such a way that it pulls certain responses from participants through leading questions and limited response options. It is important to be aware of this tendency in the construction of a research questionnaire. Despite this, it can be a valuable tool for collecting a large amount of easily-categorised and graphically-representable data in a short amount of time. Due to the substantial time requirements of the other techniques being used to collect data in this project, a questionnaire is a good addition for the collection of preliminary information. It was used in this context to get an idea of who uses a space, for which activity, and if/how they would want to collaborate in the development of that space in the future.

Two methods were used in order to distribute the questionnaire and collect responses. Firstly, the online survey platform 'SurveyMonkey' was used to distribute a digital version. This was distributed using existing community Facebook pages as well as the digital platforms established specifically for the project. Without supplementation of hardcopy distribution of questionnaires this approach would be significantly flawed as it would only consider the views of the users of the space who are able to access the internet. Therefore, in addition to this, copies of the questionnaire were printed and distributed in-person during peak times of use in the area (for example in the evening when people were walking home from work).

A survey was also conducted on foot using the periodical maps of reported issues and ideas. This would mean a more even spread of feedback that did not solely rely on internet access and be more representative of the overall group of users of the space. If the poll was only conducted online, then it would perpetuate the prioritisation of issues to be address being in the control of an elite group of users.

## 3.4. LIMITATIONS TO THE RESEARCH

The main limitation identified is the strict and limited time constraint for the project. The methods chosen for this research aimed to collect a mix of primary and secondary data. Collecting data from secondary sources through processes such as the literature review were less time-consuming and therefore more viable. However, due to the nature of the research topic, objective and proposed methodology, it was unavoidable to undertake complex primary research which relied heavily on processes of public engagement. The time pressure was a significant hindrance to the overall scope of the project. However, in order to prevent this from undermining the viability of the findings of the dissertation, it was ensured that instead of cutting corners and making processes less effective, they were altered and reduced slightly in order to make the execution of the fieldwork a faster and more feasible process which could be carried out accurately and ethically. For example, choosing to use existing technologies to develop a platform for participation as opposed to developing a new online platform from scratch.

In addition to the time constraints, the nature of the NAR method is such that it requires the development of digital tools and platforms. I had the working knowledge to develop the tools used in this project. However, I lacked the coding and Information Technology specialist knowledge to execute more complex tasks. Ideally, the NAR method calls for an inter-disciplinary approach which allows for collaboration between planners, IT specialists social workers and others. It takes time to develop the networks necessary for this type of collaborative team research to be enabled. Although I did collaborate with an interaction designer (Laura Flint) and other community actors, in future research it would be beneficial to have more time to explore the prospect of broadening this input and engagement. Digital platforms were released concurrently to the qualitative research process. In an ideal situation and as a suggestion for future research, this process would be staggered. Focus groups and citizen engagement should be used first to co-produce the digital platform itself to ensure that it is aligned with the context which it is being used in.

## 3.5. ETHICAL CONSIDERATIONS AND POSITIONALITY

Prior to the fieldwork component of this research being initiated, a completed ethics consent form was submitted to the Ethics Committee of the University of Cape Town for review. The purpose of this was for an independent group to ensure that the research topic and methods being used were not overly sensitive or harmful. This research project was given clearance to commence following the review. The ethics clearance report is attached as Annexure A at the end of the dissertation.

The consideration of ethics was one of the major concerns for this research due to multiple factors, but mainly the inherent focus of the project on public participation and involvement which the NAR method entailed. There were considerations which had to be kept in mind to mitigate bias and other ethical faux pas in relation to the research methods chosen. My positionality would have a direct impact on these. I have lived in close proximity of the case study area for approximately 18 years. Due to this I could have preconceived ideas of the space and potential results of the

project shaped by my own experiences which could be reflected in the research process. This could potentially be a weakness in the research. To ensure that the influence of this was limited, the ideas and reports collected from the public were unchanged when transcribed and were all reflected equally on the open source public map. My positionality also supported the use of the narrative method for recording the findings and analysis of the research. This method also complements the NAR method because it focuses on relaying events as they happen and focussing on the process rather than individual findings. As a resident and active user of the area I would play the role of a participant in the project as well as a researcher. This challenge of the traditional hierarchical relationship between researcher and participant is also advocated by the principles of NAR. Therefore, in this regard, my positionality would be a benefit to the methodology.

During the interview, focus-groups and survey processes, all participants volunteered to participate and were not coerced in any way. The scope and intent of the research was explained clearly and it was ensured that all participants could ask questions and raise issues in order to clear any confusion with the research. Each interview participant signed a consent form for the information that they shared to be used in the project (refer to appendix). Anonymity was a primary concern and was given as an option to all participants. This was particularly necessary for the pedestrians who use the study area as a commute to work. Many were foreign refugees and did not feel comfortable sharing personal information. In the transcription process, it was ensured that responses were not filtered or manipulated in any way which could alter the context or intent of the views expressed by interviewees.

## 3.6. CONCLUSION

This chapter aimed to record how the research for this dissertation was instigated and conducted. It was explained how two research methods were drawn upon for the project: case study and network action research. Each of these supports a diverse set of techniques for data collection. It was found that they were symbiotic and when used together increased the viability and richness of the research. Through the NAR method it was possible to introduce multiple digital platforms for engagement with the public on issues related to the case study area. The case study method allowed for these digital tools to be supplemented with qualitative methods such as interviews which actually played a substantial role in increasing community uptake of the digital tools established. Collectively, the data from these research methods constitutes a case study of the process of grassroots level civic hacking (a smart city approach) which could add to the existing body of knowledge in this field.

*This chapter establishes a contextual overview of the case study area. Firstly, an overview will be provided of the geographic and historical situation of Hout Bay within the Cape Town Metropolitan area. Next, the lens will be narrowed to the study area and its role within Hout Bay from a mobility, natural systems and social perspective. This is intended to 'set the scene' for the narrative report of the findings of the research which follows.*

# 4. CONTEXT

## 4.1. HOUT BAY: A "MICROCOSM" OF SOUTH AFRICA?

Hout Bay is a coastal suburb of Cape Town located approximately 22km south of the Cape Town Central Business District. Hout Bay falls within the jurisdiction of the City of Cape Town Metropolitan Municipality (Figure 3). It features a freshwater catchment, fertile soils and a naturally sheltered ocean bay. As a result, the natural environment has been a strong asset for the settlement and has shaped primary economic activity throughout its rich history. The settlement was built largely on activities such as forestry, farming and fishing. However, currently Hout Bay is associated with residential areas, commercial centres, and tourism activities (Gawith, 1996). Despite this economic transition, natural processes continue to shape the area and for some, natural resources continue to be the basis of livelihoods. The main example of this is the fishing activity which occurs at both a subsistence and commercial scale. The presence of a freshwater catchment adds to the imperative to protect the natural resources of Hout Bay (Figure 7). This is particularly relevant currently, with national and provincial focus on building resilience to the tumultuous and unpredictable future of human settlement with climate change processes.

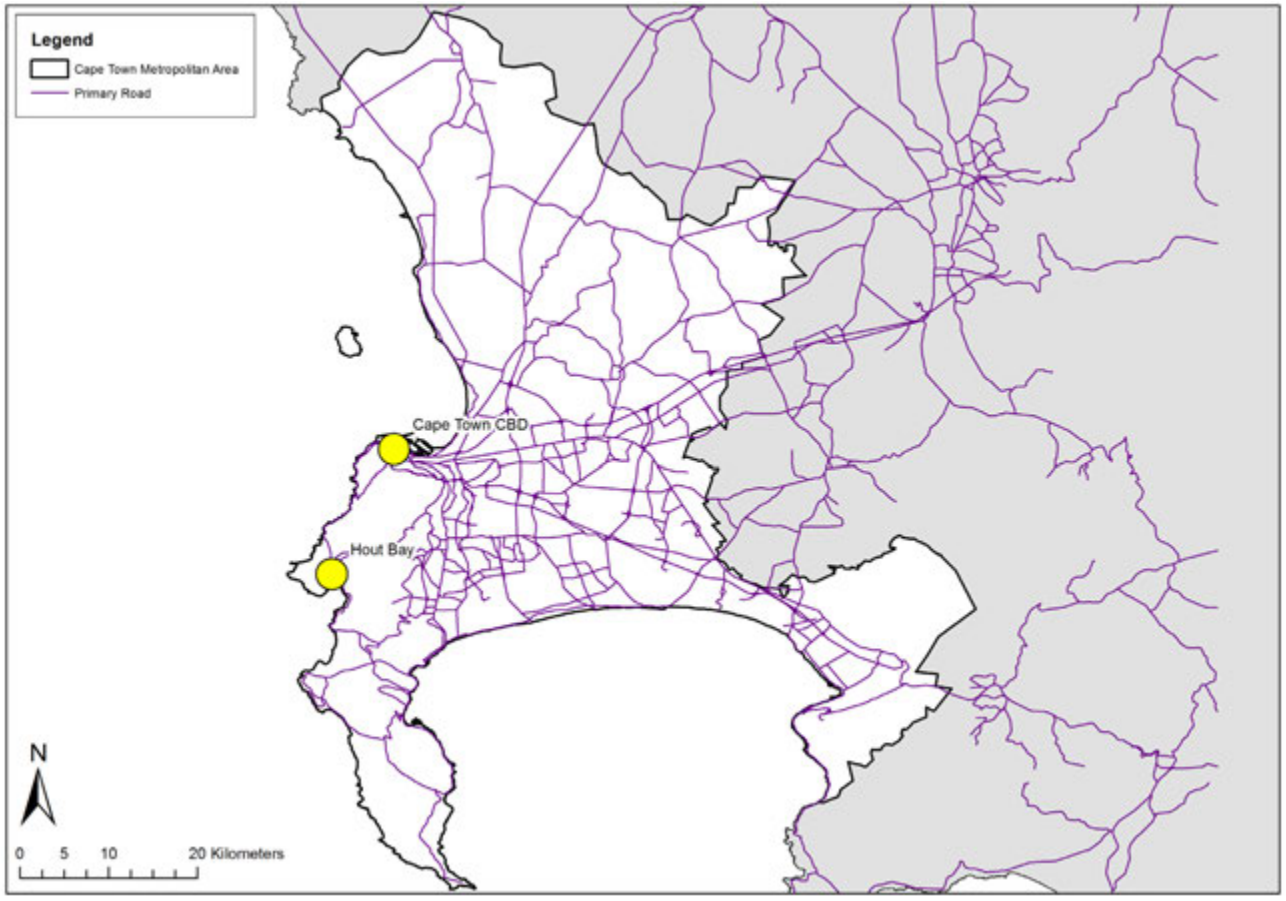



*Figure2:Map showing Geographical Location of Hout Bay in Relation to the Cape Town Central Business District (Source: Author, Data: GIS, CCT)*

The spatial composition of Hout Bay was altered and shaped significantly by the policies and proposed model of apartheid city planning. The foundation for this vision was the spatial segregation of residential and working zones according to race. This was enforced through a variety of physical and political methods. One such approach was the use of both man-made and significant natural features such as rivers or green spaces to enforce division (Oelofse & Dodson, 1997). The result of this was the forcing of a significant portion of the population to the periphery of urban areas. In South Africa, there is an obligation to address the existing spatial manifestations of these past discriminatory policies which have resulted in a lack of opportunity for the marginalised population and a perpetuation of a flawed and unjust system. Hout Bay has been used in academic case studies as an example of persisting spatial racial segregation. It has been referred to as a "microcosm of the problems in South Africa" – largely due to the significant land inequalities that exist (Le Roux, 2007). Figure 3 maps the distinct spatial divides present in Hout Bay between the residential spaces of the different communities who inhabit the area. The main areas are listed below (Figure 4):

- **Llandudno**: Although technically a suburb of Hout Bay, Llandudno is detached from the town centre. It is a residential area featuring large houses in a medium-density layout. The average resident in this area falls within the upper- or middle- socio-economic status.
- Harbour: The harbour area has high density public housing and most inhabitants are closely linked to the economic processes that the close proximity to the harbour presents (ranging from fishing to processing and commercial activity). The majority of residents can be classified in the low socio-economic status bracket.
- **Imizamo Yethu**: This area was once the site the Regional Services Council Forestry Station. It was allocated by the Government in 1991 to meet the housing needs of the growing squatter community in Hout Bay. Since its establishment, Imizamo Yethu has grown exponentially and has become a densely populated informal settlement. The majority of residents are of a low socio-economic standing and face many hardships in the form of inadequate basic services, frequent fires and high crime rates (Oelofse & Dodson, 1997).
- **Lower Valley**: This area contains most of the commercial and civic activities of Hout Bay, including tourism. This is the most developed area in Hout Bay and densities are medium-high; particularly in the central area. There is a mixture of residential and commercial uses in this area. It is surrounded by large open spaces including the wetland and estuarine area of the river system.
- **Upper Valley** (Study Area): This is the area in which the study area for the project is situated. It mainly features residential development which is low-medium density and includes large privately owned smallholding properties which exist as subdivisions of what was a single farm. These properties flank the public space around the Disa River. Some agricultural activity still occurs in this area. Residents mostly fall into middle- and upper- socio-economic status. However, the use of the space is definitely not limited to those who live in close proximity of it.

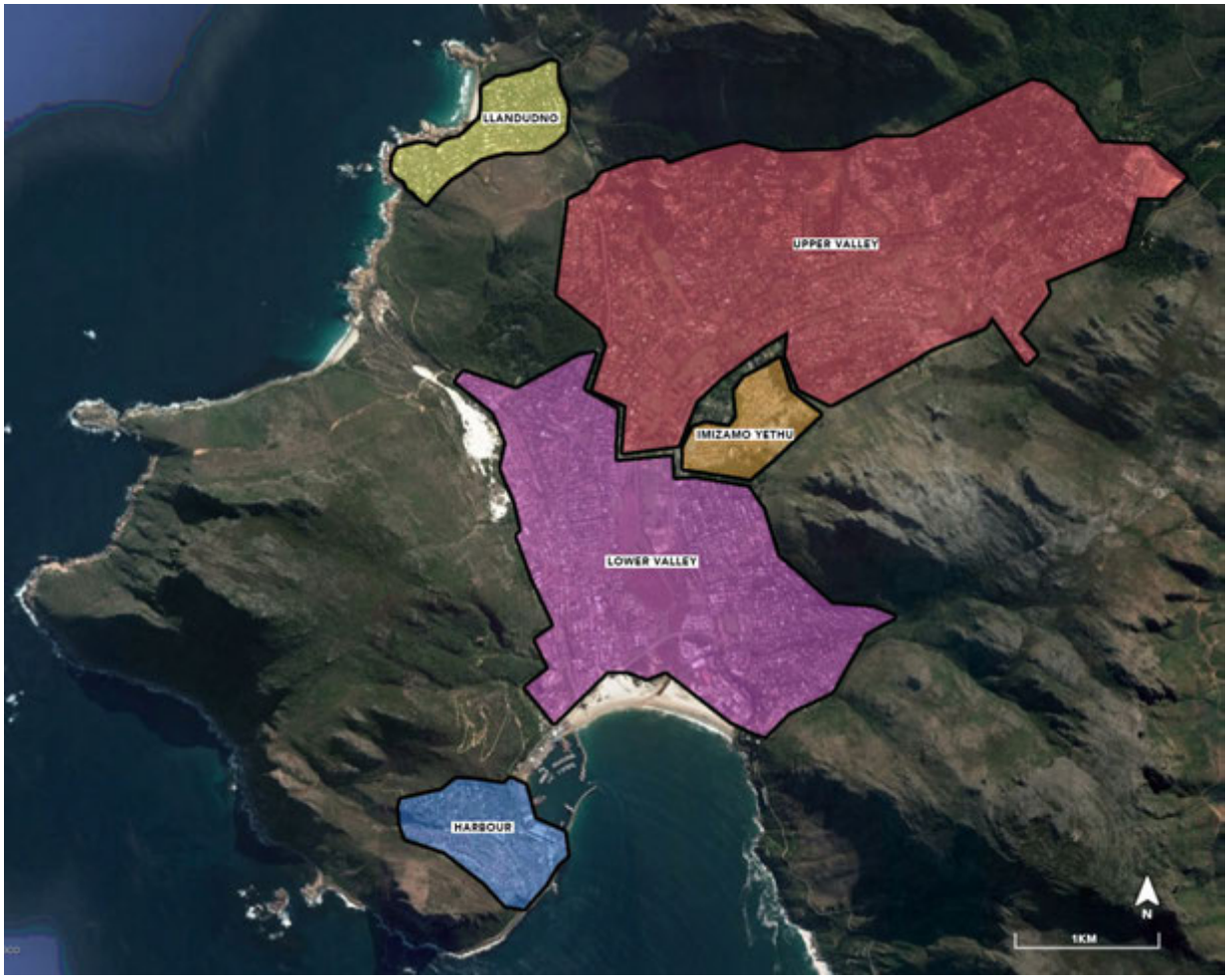
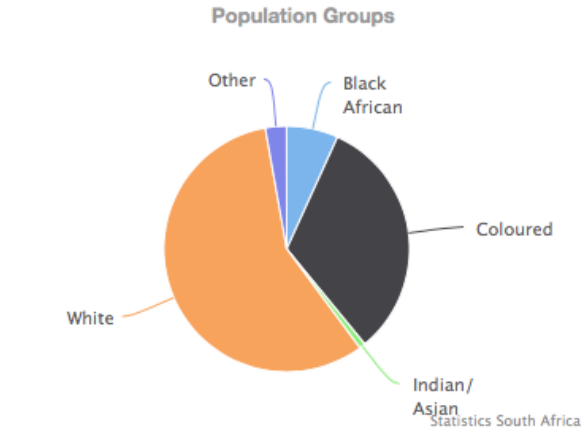


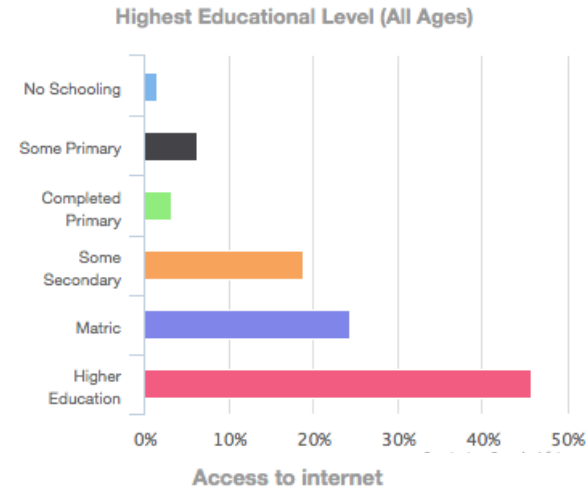

*Figure3:Spatial Distribution of the Different Communities within Hout Bay (Source: Author, Data: Google Earth)*

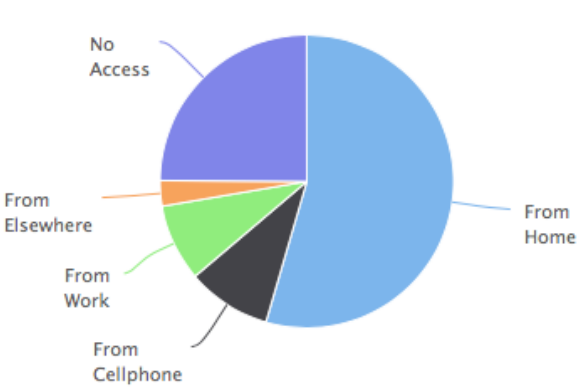
The living situations, services, available resources, and opportunities within these different areas are incredibly diverse. Statistics South Africa separates the data for the area into 'Hout Bay' and 'Imizamo Yethu'. Although the reason for this is unclear and it is ethically problematic to separate the township from the surrounding context, it does provide insight into the stark inequalities which are present. The marginalisation of Imizamo Yethu Township extends beyond education and economics to include a digital divide which has consequences for the methodology used in this project. This information is tabulated on the next page.

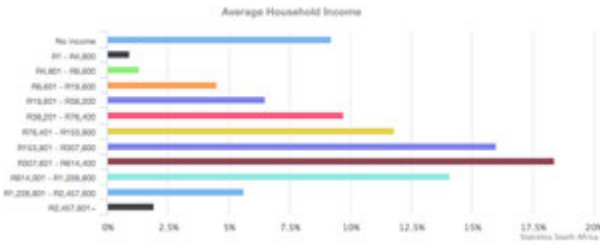
This demographic diversity combined with the dynamic natural resources in the area makes planning processes complex. The needs of the different communities must be assessed in relation to each other as well as to the ecological imperatives of the area. The case study chosen for this project is a good example of what happens when these factors converge in a space.

# HOUT BAY
(StatsSA, 2016)

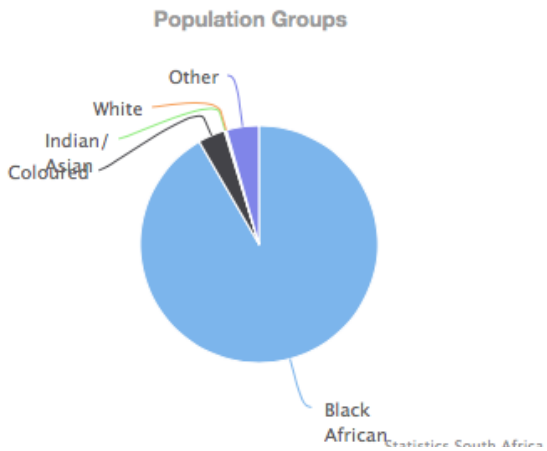


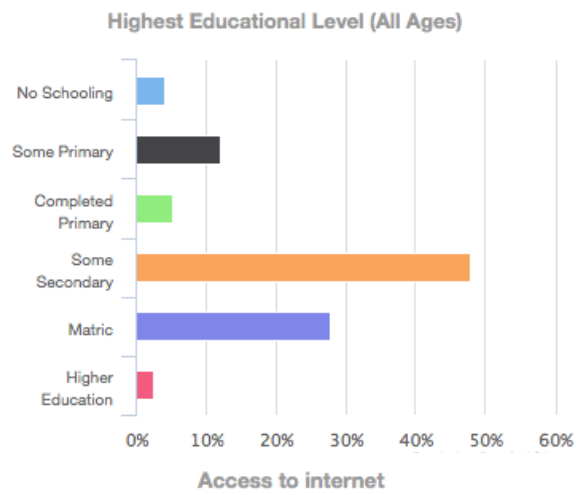




# IMIZAMO YETHU
(StatsSA, 2016)



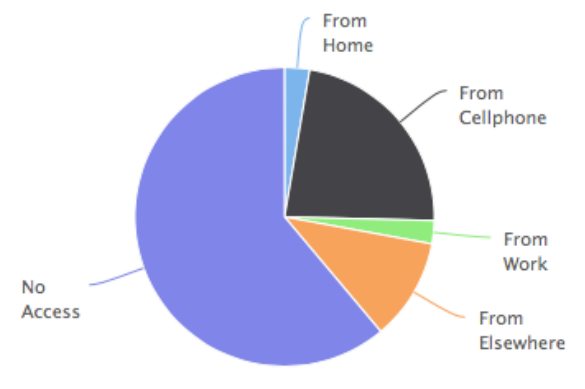





*Figure4:Context Infographic Page (StatsSA, 2016)*

## 4.2. THE DISA RIVER CASE STUDY AREA

### 4.2.1. Mobility

One of the objectives of the research is to further explore the importance of the site from a mobility perspective. Through initial observation, Bethal Road which dissects the area is one of three formal opportunities for pedestrians to cross the river in the upper-middle course. However, "formal" is a loose term when describing this crossing as in comparison with the other bridges, it is neither safe nor functional (Figure 6). The pedestrian flow that the bridges must accommodate has changed over time as Imizamo Yethu township has rapidly expanded in a northerly direction (Figure 5). The majority of people crossing the river are commuting to work either on foot or bicycle (Non-Motorised Transport) from Imizamo Yethu. Figure 5 shows a clear spatial disconnection between the people living in the North-Eastern portion of the township and the formal river crossings. It is clear that despite the clear hazards and shortcomings of the Bethal Road crossing, as shown in the aerial photograph (Figure 7), there are advantages for saving energy, time, and money which advocate the use of this route.

Further into the study area, there are clearly-identifiable pools which serve as crossing points for recreational users (Figure 7). However, according to the aerial photos it is evident that this permeability is threatened by erosion and plant growth. It will be explored further whether the functionality of these crossing-points has changed over time.

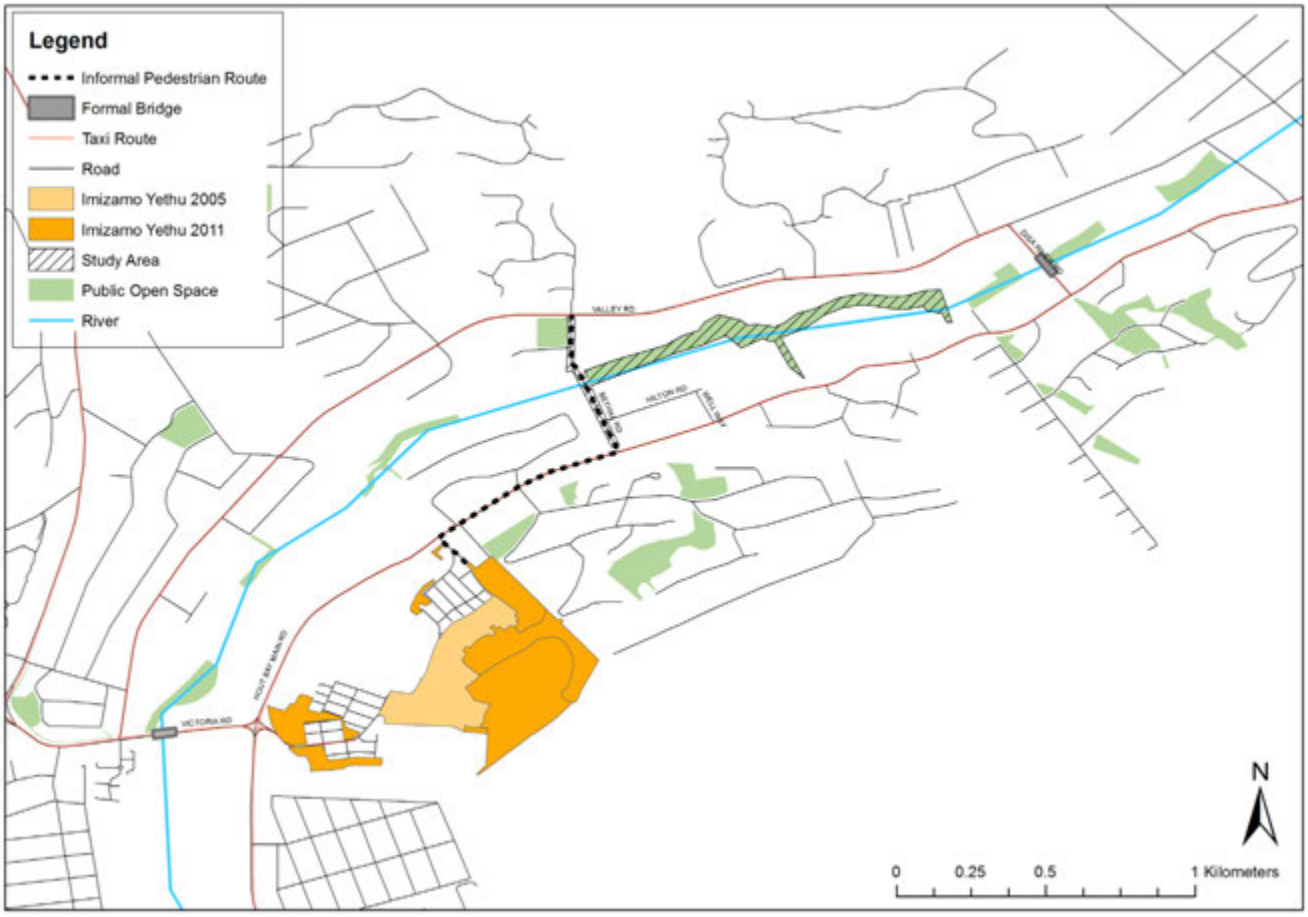



*Figure5:Map Showing the Rapid Expansion of Imizamo Yethu and the Formal and Informal Points for Crossing the Disa River (Source: Author, Data: GIS, CCT)*

## 4.2.2. Natural Systems

The case study area is a section of public space in the upper-middle section of the Disa River. This river is unique as the only remaining one which rises on Table Mountain that has not been canalised to facilitate development (Westby-Nunn, 2005). Within any catchment system, what happens in the upper reaches will have a significant impact on processes in the lower areas. For this reason, it is necessary to briefly give context to the river in its entirety before focussing on the section which falls within the study area.

The total area of the catchment is 33,8km2. The Disa River is the perennial and main branch of the Hout Bay River network within the catchment. It rises on Table Mountain and drains the Back Table. Along its 12km course to the lagoon and meeting point with the Atlantic Ocean, the Disa River encounters a variety of environments. From the pristine endemic mountain fynbos in which it originates, it flows at a fast pace through a series of small-holding properties before slowing as it reaches the flatter lower reaches, along which denser development occurs. In this section, there is a significant problem of pollution. One of the main culprits of this is inadequate service provision and sanitation - particularly in Imizamo Yethu. This, combined with intensely dense development has resulted in effluent leeching into the water system and contaminating it from the wetland area to the outlet. In 2010, the water quality became dangerous and the river was featured on the South African investigative journalism television programme: Carte Blanche. The dangerously high levels of E. coli bacteria measured at this time resulted in a call for the river and beach area to be avoided (FLOW, 2010).

The flow of the river has been altered by various factors. Firstly, the damming of water on Table Mountain slowed the flow of the river. Water collected in these dams is piped to Camps Bay via a subterranean tunnel. The relationship between the river and development is tenuous. Encroachment in the riparian zone and the piping of storm water and tributaries directly into the river have had significant negative effects in the past – particularly through development-induced erosion (Westby-Nunn, 2005). Invasive alien plants pose another severe threat to the river system as they out-compete indigenous vegetation for nutrients and are easily washed away by storm-flows which adds to the erosion problems. The river is a sensitive and passionate topic for many Hout Bay residents as to many it represents an opportunity lost. This feeling of neglect has led to residents taking maintenance of the area into their own hands. The impacts of this will be explored further in the findings section of this dissertation.

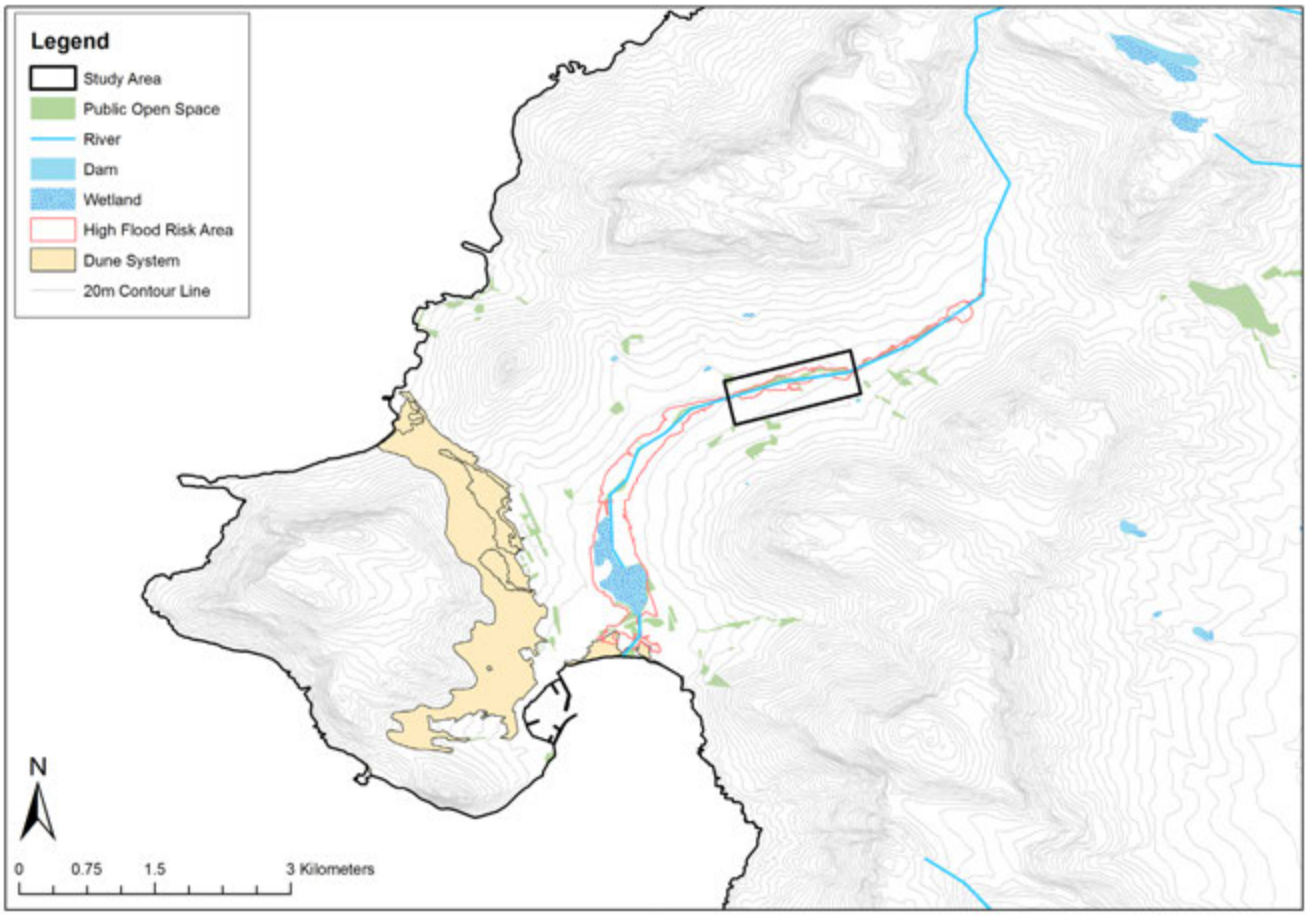



*Figure6:Map Showing the Location of the Study Area Relative to the Natural Systems of Hout Bay and Public Open Spaces (Source: Author, Data: GIS, CCT)*

## 4.2.3. Social Dynamics

The Disa River public space is a relatively highly frequented area used for diverse activities. The diversity of users and uses of the space was one of the main supporting characteristics for its choice as a case study. One of the objectives is to understand who uses the space and whether it is possible to identify groups of users based on common activities or interests.

A general overview of the socio-spatial composition of Hout Bay has already been provided. From within this, the main groups of users of the space are currently based in Imizamo Yethu or the Upper Valley areas. As a result of this, the user group incorporates a broad range of socio-economic backgrounds and situations. This implies that the space means different things to different users according to the role that it plays for them. For example, a person commuting to work will have a different perspective of the area than someone who uses it for recreational purposes. Briefly, some of the main groups which are evident are pedestrian commuters, adjacent land owners and recreational users. These Communities of Practice, their interactions and assumptions of each other will be explored further at a later stage in the research project.

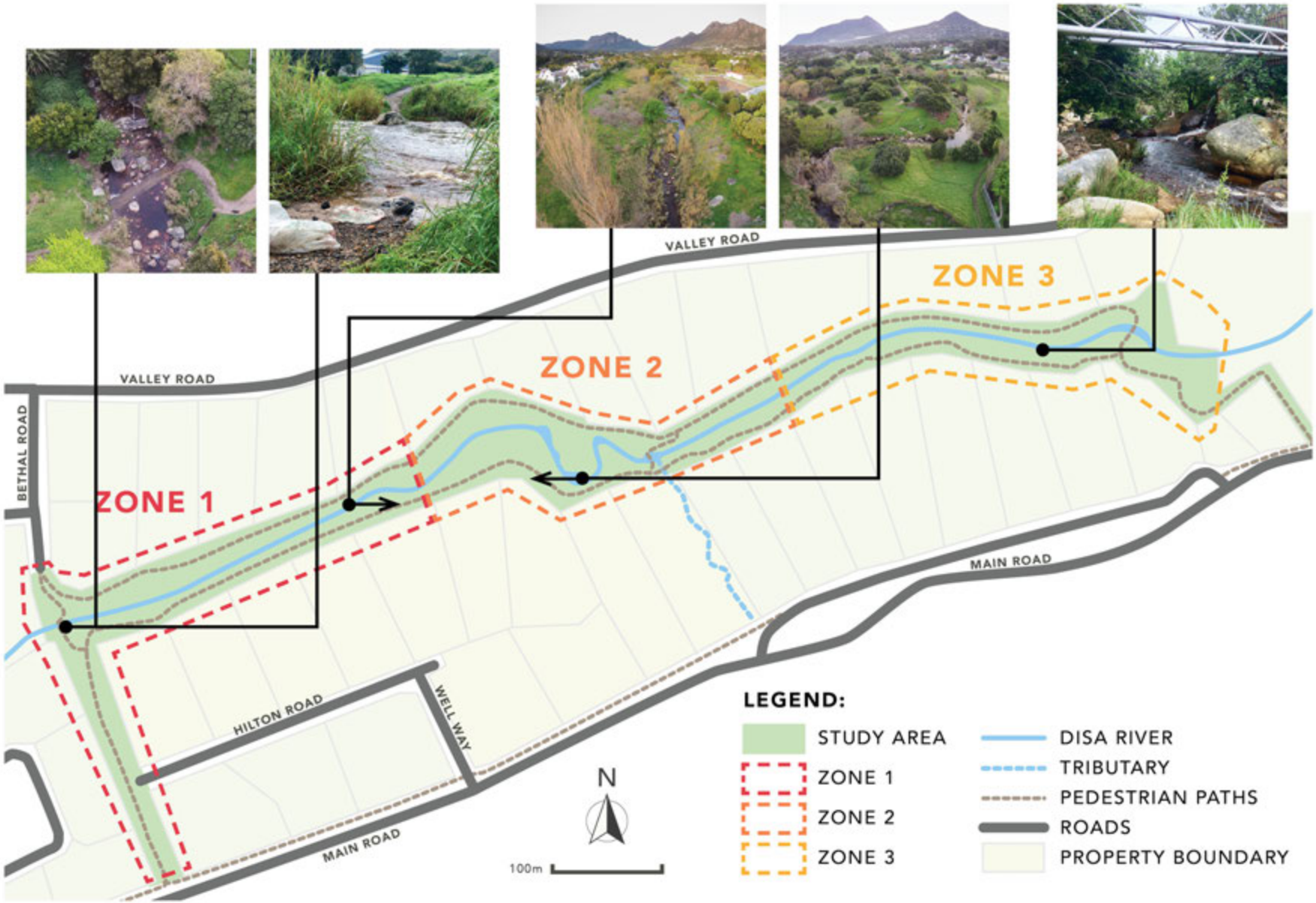



*Figure7:Aerial Photographs Spatialised to show the Context of the Study Area (Source: Author)*

## 4.3. CONCLUSION

This chapter has briefly outlined the context of the case study area for this research. It has provided an overview of the complex dynamics at play in Hout Bay and the study area from a social, ecological and mobility perspective. From this overview, it is clear that the site is ideal to explore how technology can potentially help to isolate key issues from within a complex context. In relation to the research questions posed in this project, it is possible to identify some main contextual factors which will have a substantial impact on the fieldwork process. Firstly, the social context is one of division and contrast. A digital divide plays a role in this. The pedestrian users of the area from Imizamo Yethu were identified as the main group of users suffering this marginalisation. The project will need to adapt to this reality by finding innovative ways to ensure that the participation process is inclusive of this user group despite the barriers to accessibility. Secondly, it was clear in this chapter that natural systems play a significant role in the economy and sense of place for Hout Bay. This is an important to keep in mind for the fieldwork process as it will be interesting to identify which user groups are the main advocates of an ecologically-centred approach to management.

# TECHNOLOGY TELLS THE TALE

## AN INTRODUCTION TO THE FIELDWORK PROCESS

The methodology for this project included a diverse range of data-collection techniques. The result of this is a complex mix of quantitative and qualitative data. This, combined with my positionality as both a researcher and participant in the process substantiated the choice of the narrative method to record the findings. This approach involves giving a detailed account of events as they transpired from the first-person perspective (Flyvberg, 2001). It is particularly effective when recording the complexities and contradictions of real-life characters and events, and capturing how the research process unfolded.

Figure 8 shows the chronological structure of the research process. It was not linear but rather iterative. Periodically, it felt like 'organised chaos' as the techniques being used were altered according to the real-time feedback received from interactions. In order to make sense of this process and relate it to the research questions, this section of the dissertation is divided into two chapters. The division is based on the research questions of the project and the way that the fieldwork responded to these. Table 2 shows the structure of the chapters according to these questions. The chapters are headed according to the role that technology played within the process. Firstly, chapter five will explore the role of technology as a 'collector'. I will detail the process behind the initiation of the project; how inclusive engagement was promoted within it, and lastly how the collected data was synthesised to allow for participative aggregation.

Chapter six follows after the synthesis process, during which key issues were mapped and Communities of Practice identified. I will explore whether the data collected could be processed to become a tool for long-term spatial planning and the co-production of space. In order for this to be achieved, technology must play a new role as 'aggregator': not only collecting data but filtering it to detect links of commonality. This chapter culminates in reflection regarding the following key themes:

- The potential roles of technology (collectively and as individual platforms)
- The current (dis)connection between planning practice and technology
- The role of Network Action Research in planning and participation processes
- The need for further research in this field

| FINDINGS & ANALYSIS SECTION STRUCTURE | | |
|---|---|---|
| CHAPTER | RESEARCH QUESTION | DATA ACQUISITION TECHNIQUE |
| *5. Technology as a "Collector"* | 1. How do bottom-up local projects for civic engagement start? And how do they stimulate inclusionary engagement of the diverse groups which use a common space? | Physical signs and flyers; digital participation platforms; survey; semi-structured interviews; Hout Bay River Catchment Forum Meeting |
| 5.1. The Implementation Process | | |
| 5.2. Who knows? And how do I ask them? | | |
| 5.3. Synthesis : Identifying Dominant Issues and Communities of Practice | | |
| *6. Technology as an "Aggregator"* | 2. How can the data collected through digital platforms be processed in order to be a tool for evidence-based long-term spatial planning and the co-production of space? | Focus groups with identified CoP's; in-depth interviews; online voting |
| 6.1. Linking Communities of Practice to Issues | | |
| 6.2. Voting for a Planning Tool | | |
| *7. Technology as an "Enabler"* | 3. What needs to change in current planning policy and practice and research in order to enable a bottom-up approach to participation using digital tools? | |
| 7.1. Planning, Governance and Technology | | |
| 7.2. Is Hybridisation the Future? | | |
| 7.3. The Emerging Role of Network Action Research | | |

*Table2:Table Showing Structure of Research Fieldwork and Discussion in Relation to Research Questions (Source: Author)*

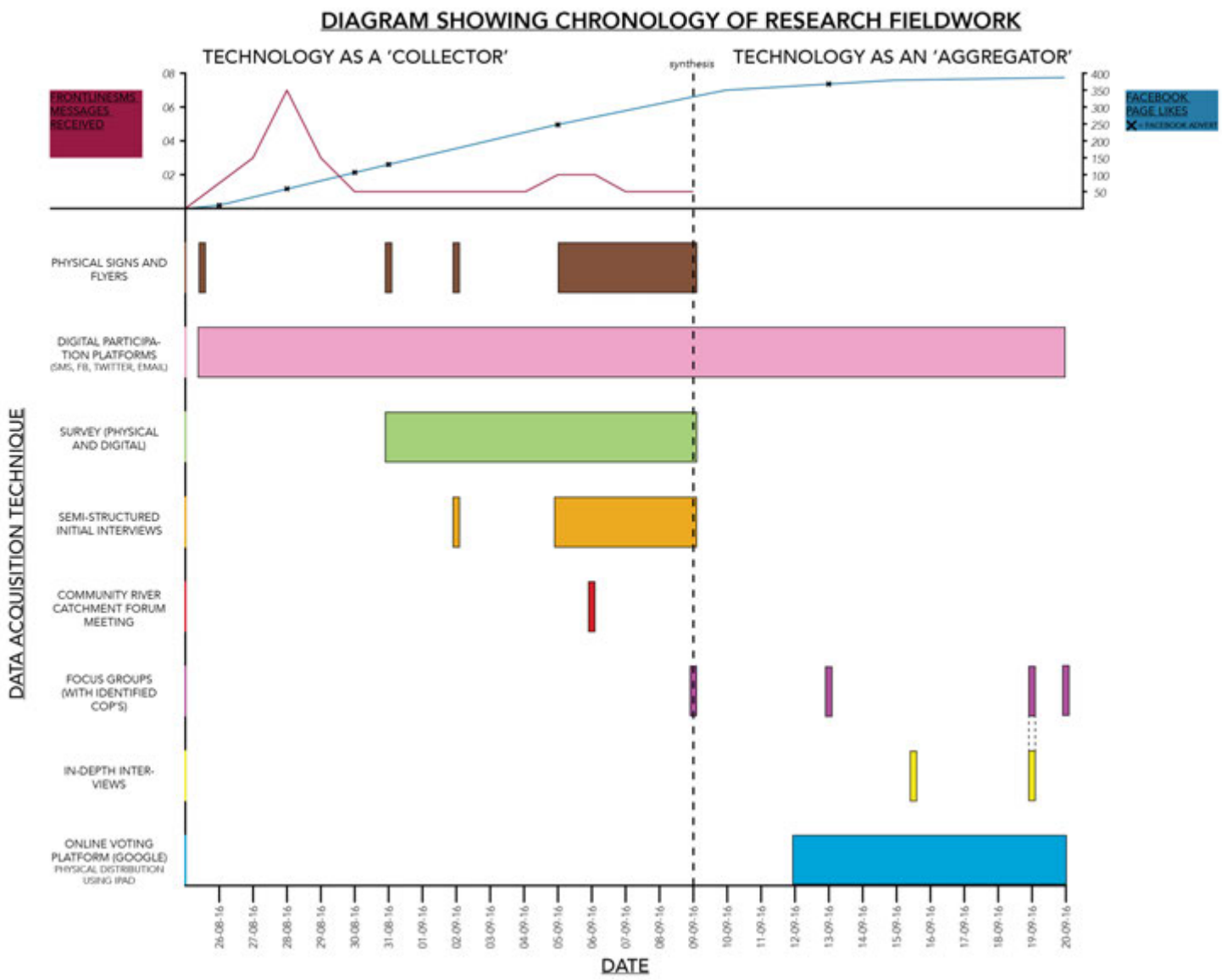



*Figure8:Diagramatic Summary of the Research Process and the Level of Engagement (Source: Author)*

*In this chapter, I analyse the role that technology played in the project as a tool for participative collection of information i.e. crowdsourcing. The research question which this chapter responds to is: how do bottom-up local projects for civic engagement start? And how do they stimulate inclusionary engagement of the diverse groups which use a common space?*

# 5. TECHNOLOGY AS A "COLLECTOR"

To crowdsource is to enlist the help of others in the pursuit of information. For this research, crowdsourcing meant using existing technology to collect the ideas and experiences of the diverse groups of people who frequent the case study area. The aim of this was to collect as much information from as many participants as possible and to identify different Communities of Practice. This would inform the process of aggregation where points of intersection between different CoPs and issues could be identified as well as recurring problems and themes to process the data into a tool for long-term planning and co-production. In response to the research question, this chapter will begin with the process of implementation – recording what was required in order to establish the platforms which made public interaction possible. One of the objectives of the research was to challenge rather than perpetuate the marginalisation of existing planning and participation processes. The second theme of this chapter deals with this objective directly – outlining the challenges that I faced in identifying marginalised user groups of the space and developing a strategy to ensure their inclusion in the project.

## 5.1. THE IMPLEMENTATION PROCESS

Prior to the digital platforms being launched, there was work required in order to develop them in relation to the context and aims of the research. Physical signs and flyers were made that would supplement the online presence and play a crucial role in spatialising collected information. Most of this work was design-based: establishing a legible and consistent brand and aesthetic for the project which would convey a level of professionalism and promote trust in the validity of the research. I collaborated with a local Interaction Design student in order to achieve this. I recognised that the level and inclusivity of participation in the project from an early stage would directly impact the success of the later process of aggregation and overall quality of the results. Therefore, although the process would need to be flexible and responsive to future interactions, it was imperative to establish an initial framework which would give the project a chance at success. This framework is split into the physical and digital elements which together constituted the crowdsourcing process of the project.

### 5.1.1. Physical Components of Crowdsourcing

Through the progression of the project, it became clear that the physical supplementation of an online presence was essential to stimulating public engagement. There were two main roles of the physical components of the research. Firstly, signage played the role of spatialising the crowdsourced data from the project. This was essential as it allowed participants to locate themselves within the study area so that at a later stage, I could easily map the data collected through public online

contributions. This would be required because I was using platforms such as SMS for which geo-referencing data is not publicly available. A smartphone application requiring a data connection could potentially solve this, but in doing so could exclude people from participation. Secondly signage and flyers were used to promote the project to people who used or lived close to the space. This was essential to trigger initial interest in the project and gain a following.

The case study area was divided into three zones of approximately 300m. As Figure 9 shows, each of these zones featured a crossing point. These areas were physically marked with signs on both sides of the river bank signalling each zone's beginning and end. There was an infographic on each sign which included a suggested format of messaging so that the zone number could be recorded in interactions. Figure 10 is an example of one of these zone signs. I ensured that the signs were positioned correctly before launching the online platforms in order to promote a uniform participation format from the beginning of the process. One of the flaws of this system identified by users was that if they were not carrying a writing instrument or cell phone while in the area, they could not record the project's various contact details in order to participate at a later stage. The context of the space as a natural system limits response to this problem as I did not want to introduce a solution such as detachable flyers attached to the posters in order to avoid pollution associated with the project.

The flyer design was similar to that of the poster. As Figure 11 shows, it featured the same infographic and a map of the complete study area. However, at a smaller A5 size, it could be carried while in the study area. I distributed the flyers by depositing them in the mail boxes of properties in close proximity of the study area. I also distributed them to participants in semi-structured interviews and to attendees of the Hout Bay River Catchment Forum at which I was given the opportunity to briefly describe the project. The pedestrians who participated in the initial interviews and survey were particularly interested in taking multiple flyers to use to explain and share the project with other users of the route. For this Community of Practice, word of mouth was one of the most effective methods to share the intent of the project.

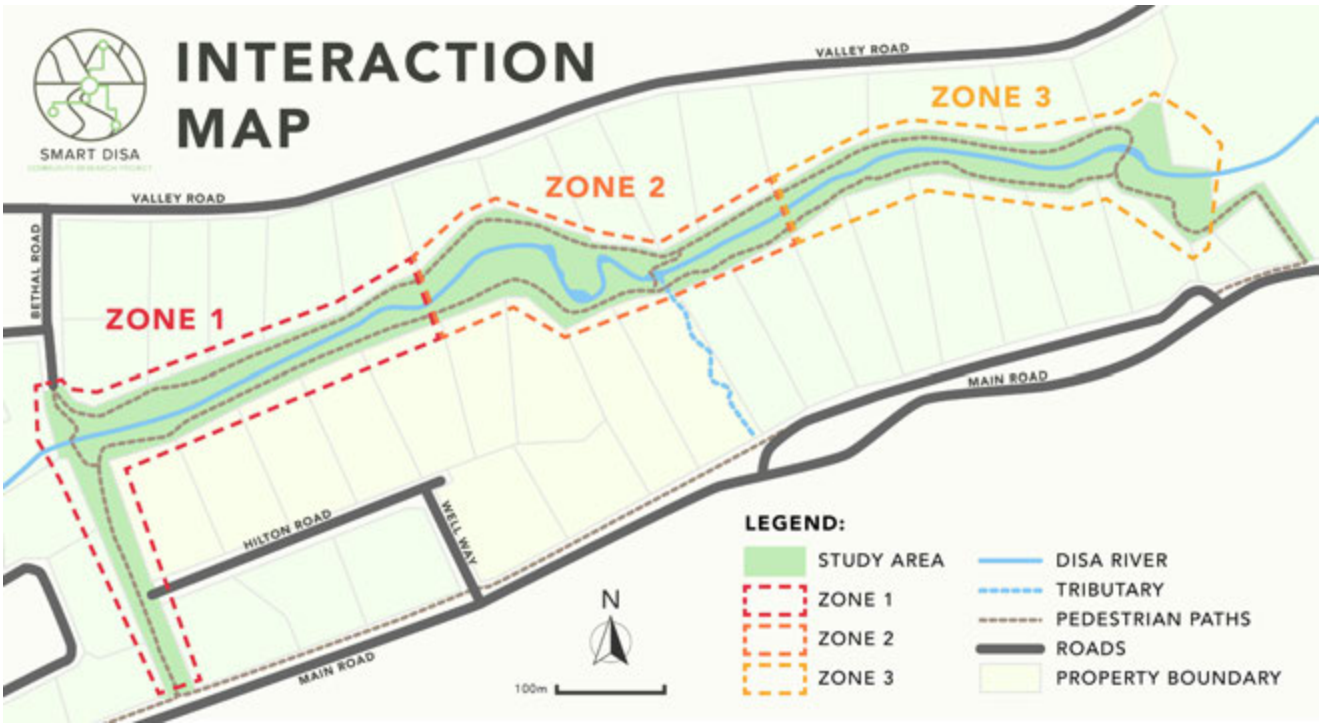



*Figure9:Study Map used for Interaction with Participants (Source: Author in collaboration with Laura Flint)*

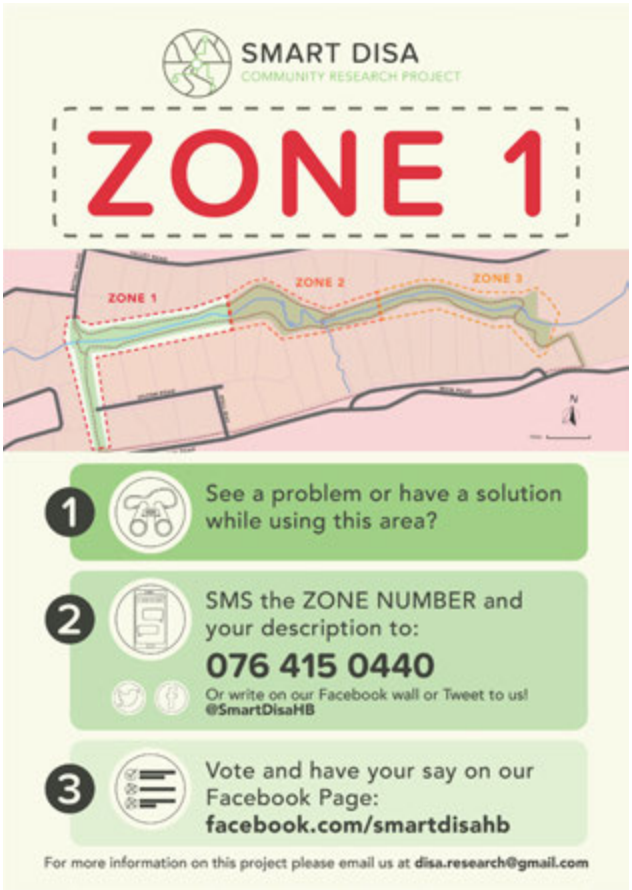


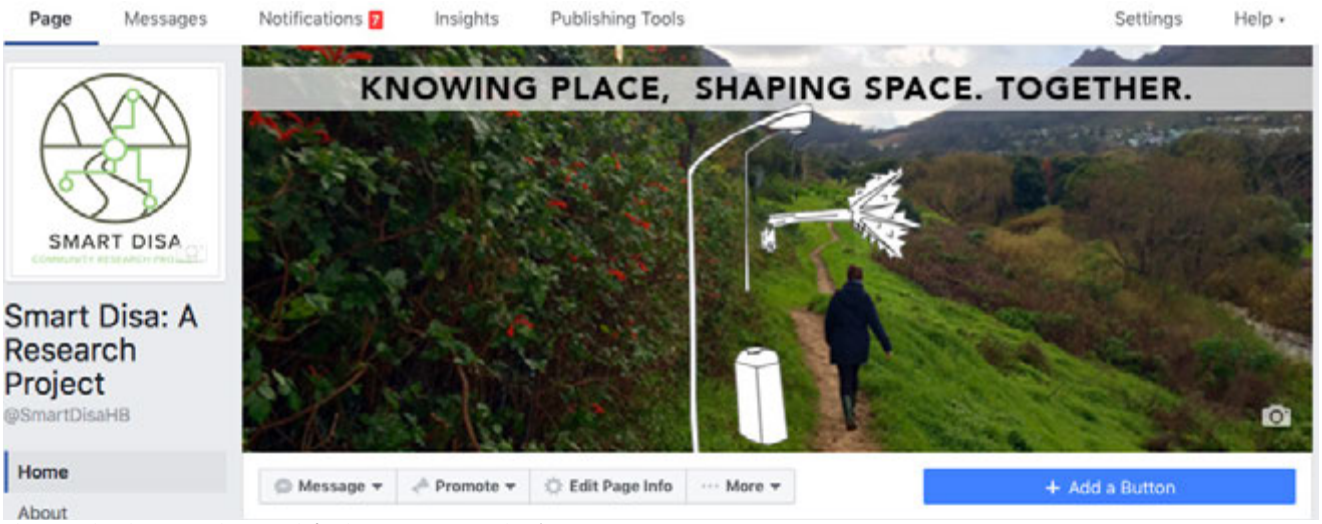

*Figure10:An Example of a Zone Poster used to Spatialise Collected Information (Source: Author in collaboration with Laura Flint)*


*Figure11:The Design of the Flyer which was Distributed (Source: Author in collaboration with Laura Flint)*

## 5.1.2. Digital Components of Crowdsourcing

The digital platforms were arguably the most important part of the crowdsourcing process. They were the only method of data collection which functioned throughout the research period. I used a variety of platforms in order to explore the alternative roles that they could play and to allow participants to interact in the manner most familiar and convenient for them. The amount of time, effort and resources required to set-up the platforms varied. The engagement which each one generated was also diverse. This section describes the process for each of the platforms and the role they played in the collection process. A more in-depth reflection on the potential of technology to play multifaceted roles will feature in the next chapter as it requires a more holistic overview of the research process.

### *5.1.2.1. Facebook*



*Photograph1:The Cover Photograph for the Smart Disa Facebook Page*

Facebook was the most successful platform in terms of the number of people it reached. The overall Page Likes increased from zero to 384 over the short 26-day fieldwork period (Refer to Figure 8). I named the page 'Smart Disa: A Research Project'. Hout Bay already has an established online presence on Facebook. There are several community pages and groups. The page with the most followers is "Hout Bay Organised" (HBO). It already has over 12,000 Likes and this number is growing consistently. It is not a public page and users must request permission to engage with it. These requests and all posts are reviewed and filtered by a local resident and property developer. This results in the content being biased and adhering to what this individual deems to be 'acceptable'. Despite this flaw, the diversity of people engaging on the page seems to be increasing. The types of posts vary from complaints regarding service delivery to naming and shaming dangerous drivers and promoting local businesses. The momentum of HBO was an asset for the project. I shared the Smart Disa page and posts on the HBO wall in order to gain traction in the online community of Hout Bay.

Initial progress was slow. There were a lot of views of the Facebook page. However, frustratingly, this was not translating into the bilateral communication which I wanted to establish. People seemed content to engage passively by liking the page and following the progress of the project

from a distance. It was only at a later stage that people began using it to share their experiences in the space. To progress to more active engagement required certain actions by me and more time for participants to develop a higher level of interest, investment and trust in the project. My impression was that people were waiting for someone or something to break the ice and confirm the legitimacy and intent of the page. This related to the Adoption/Innovation curve which was included in the Literature Review chapter (Conway & Steward, 2009). The concept is usually applied in marketing. There is always a varying rate of adoption according to context. However, slow initial uptake is a common issue with projects which challenge and diverge from traditional approaches. In order to break the stalemate of interaction, I established a plan to target the 'Innovators' and 'Early Adopters' of the Adoption Curve (Figure 1 in the Literature Review Chapter). I assumed that the limited time frame of the project would not allow me to target beyond these groups. In order to increase overall engagement and transition to more active interactions on Facebook, I undertook to do the following:

1. **Target established social media groups of people who use the study area**

Hout Bay Organised has already been mentioned as a valuable resource in the initial success of the Smart Disa Facebook page. I also used other local pages to promote the project. These were managed and followed by more specific groups. The main one was the Hout Bay Riders Club (HBRC) page. It is actively used to coordinate the club and its efforts to make Hout Bay a more user-friendly experience for horse riders. The study area is one of the spaces actively used by riders. Therefore, I was confident that the project would be relevant to at least some of the HBRC page's audience.

2. **Use 'artificial/prompted' interactions to promote more active public engagement**

This idea was informed by a well-known marketing technique. People are positioned using a new product or place in order to establish a level of comfortability and security for new users. I applied this theory by getting local people I knew to initiate active engagement such as commenting on a post on the Facebook page. I was aware that too much engagement of this kind could potentially skew the results of the project. Therefore, I minimised it and only used it for a brief period in the early stages of the page.

3. **Use Facebook promotions**

Facebook collects a vast amount of data from its users regarding their interests, location and basic information. This can be harnessed by public users through the advertising service for Facebook pages. It is a paid service which can be used to target a specific 'market' in order to promote the page more effectively. The user controls who the advert targets (e.g. people who live in Hout Bay and have an interest in 'ecology', 'community issues' and 'walking') and how long it is active for. The length of the advert dictates its price. The amount that I paid on these promotions ranged from R15 – R500. The more expensive adverts were for seven-day periods of marketing for the page itself. As Figure 12 shows, I used this service intensively in the beginning of the crowdsourcing process due to the short time period allocated. I also used it to promote essential posts containing URL links to the survey and online voting platforms. This was the most effective part of the plan to increase active engagement. Figure 12 shows the wide reach of audience that Facebook

Marketing was able to establish.

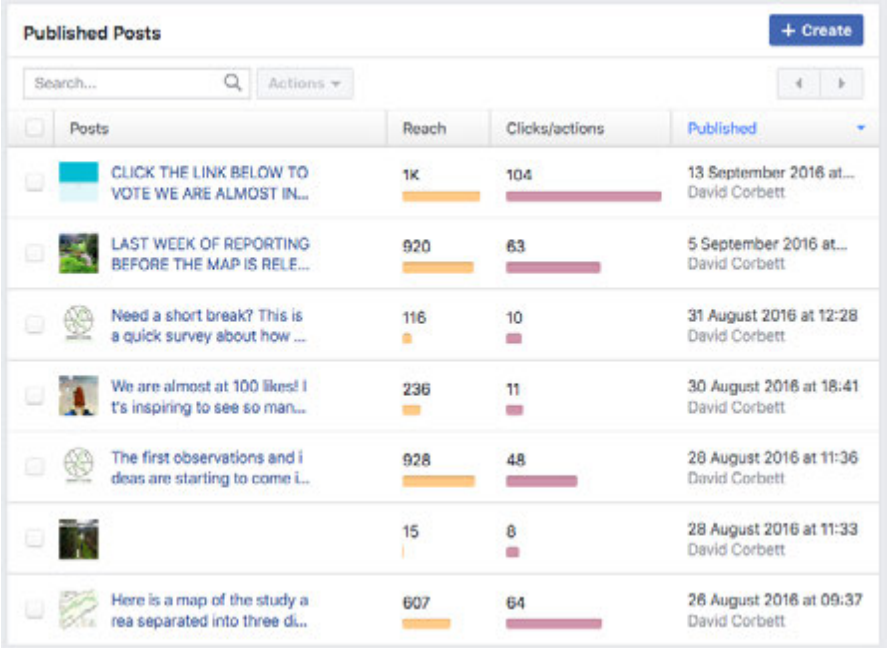



*Figure12:The Effect of Facebook Marketing on Engagement (Source: Facebook)*

Overall, the numbers of people engaging through Facebook grew quickly and consistently during the crowdsourcing process. I began synthesising collected information 14 days after the launch of the page and by this stage there were already almost 350 likes. The majority of people engaging were women between the ages of 18-24 (Figure 13) . In both genders, this age group was the most active. This indicates that younger people who use the space were most comfortable engaging on this platform. It could also be indicative of how active the horse riding community are in the space as the majority of these users fit the profile.  Once it gained momentum, Facebook could be used throughout the project to communicate with interested parties and provide a forum for contributing issues, ideas and debate.

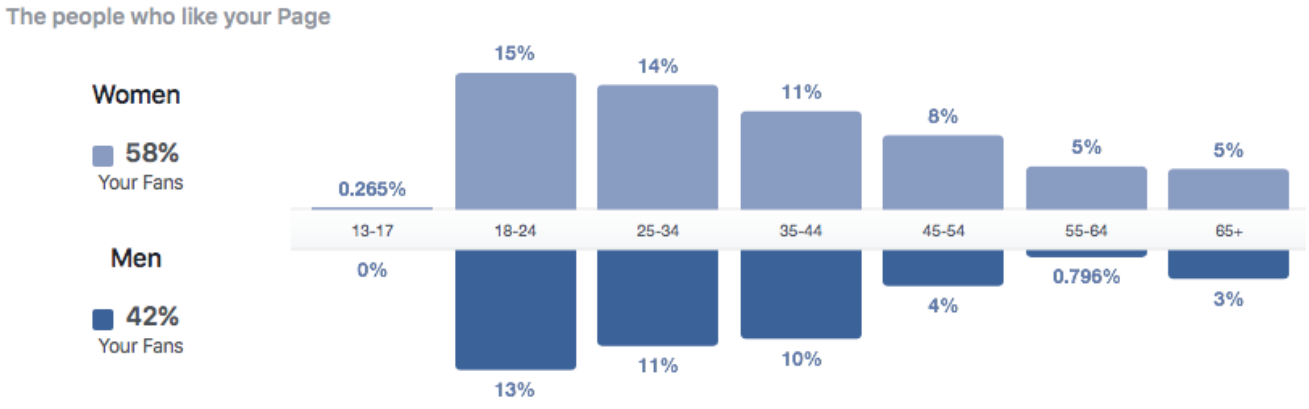



*Figure13:Chart showing the Demographic Distribution of Engagement through Facebook*

### *5.1.2.2. FrontlineSMS*

One of the foremost objectives of the research was to ensure inclusivity. Within the crowdsourcing process, I recognised FrontlineSMS as a potential tool to achieve this. It is a free platform which uses an internet browser as a base to organise SMS communications. It is commonly used for projects where extensive accessible public interaction is required such as political campaigns and disaster relief projects (FrontlineSMS, 2016). Although SMS is becoming challenged by alternative data-using messaging platforms, it retains relevance as an affordable and familiar universal built-in feature for all mobile phones (SALGA, 2014). I wanted to capture information from a broad variety of people with different economic means who use the study area. With increasing cell phone use statistics in mind, I recognised that SMS would be the most commonly accessible platform.

FrontlineSMS uses a smartphone application to establish a link between a phone and computer. This allows for SMS communications to be stored, filtered and responded to via the computer interface. The software can categorise and initiate programmed responses to received messages based on keywords. For example, if a message was received which included a zone number, this could trigger a specific response for that scenario.  I bought an entry-level (R700.00) Android phone so that the platform could operate consistently throughout the crowdsourcing process.

The amount and type of engagement received through this platform was unique from the others. It was the only platform where I stipulated a specific messaging format. Most messages adhered to this. The majority that didn't were from participants wanting more information regarding the project who did not have access to Facebook. Most of these incorrectly formatted messages were from property owners in close proximity of the study area. The amount of interaction received through this platform did not increase as the Facebook Page did. Instead, there was rather a relatively consistent number of SMS messages being received per day (Figure 8).

Based on my experience using the platform and those of participants, I was able to identify some initial strengths and weaknesses. One of the main strengths was the anonymity which the platform gave the participant. This was a unique characteristic of the SMS platform. It allowed for more candid reports and for marginalised groups to feel less intimidated by the platform. This was particularly relevant for pedestrians who were not from South Africa and already felt socially vulnerable in the space. The second strength is from my perspective as the collector. The platform's ability to filter information is extremely useful in organising the collected data. It also allowed for standardised responses to messages to be triggered. This was a strength from my perspective as it saved time. However, users commented that it felt impersonal at times and that it would be more effective to receive responses which were empathetic to their issues and ideas.

One of the most immediate weaknesses of this platform was that messages could not automatically be spatialised. This meant a trade-off with the less accurate method of locating engagement through the mapped zone system (Figure 9). The study area is small and I know it very well so this was not a significant issue and the system worked sufficiently. The second weakness was that SMSs cost money for the sender. This cost diverted engagement to Facebook which only used data. Although

the cost of an SMS is a relatively small amount, it could be enough to prevent marginalised groups from participating in the project. Particularly pedestrians who use the space do so in order to save money on taxi fares. The tangibility of results would have a bearing on making the value of interaction worth the initial cost. However, more time and buy-in from authorities would be required to test this. Lastly, a standard phone number was used for the platform. In marketing campaigns, it is common for the number to be shortened. This would have potentially increased the legitimacy of the project and provided more opportunity for users of the space to remember the number for later correspondence if they did not carry their cell phone with them.

#### *5.1.2.3. Twitter*

I set up the Twitter account for the project in a similar way to the Facebook page. However, in contrast it did not gain any meaningful public interaction or following throughout the research process. I realised approximately one week into crowdsourcing that the platform was not going to perform in the manner that I had anticipated and subsequently focused attention on the Facebook and FrontlineSMS platforms. I had envisaged the role of Twitter to be real-time communication with participants in the project. However, there seemed to be no demand for this as people seemed more interested in the longer-term issues with the space. I did not receive urgent reports from participants which would warrant real-time communication. The volume of reports being received was not sufficient to establish the steady flow of information which successful Twitter accounts generate. It could have potentially become more active if the project had run for a longer period of time and a niche role for the platform could be found with a greater volume of interactions. The low levels of engagement corresponded with the survey results where Twitter received the lowest number of public votes for the question: "which platform would work best for you to share your ideas and experiences for/of the area?" (Figure 17). A low public demand for the platform is one of the main factors in its lack of success. However, I think that there were other factors to be considered.

Although Twitter and Facebook are both classified as social media platforms, the roles that they perform are different. I also had more familiarity using Facebook and was therefore able to understand the role that it could play in the research. In the limited time-frame of the project and with the types of reports being received, Facebook was a more useful tool. I found that in the beginning of the crowdsourcing process I was trying to force Twitter to play the same role as Facebook and adapt it to the type of information being received. However, there was no demand for a second platform less-effectively performing the same role as another. This made it clear that in order to be effective, the digital platforms needed to play to their unique strengths. Their functions within a project should be clearly designated according to these. This is an issue which is reflected upon in more detail in the next chapter.

#### *5.1.2.4. Email*

I made a simple Google Mail (Gmail) account for the project. The platform received more engagement than I expected it to. This was potentially due to my prediction being influenced by my personal preferences of platforms used for communication. The engagement came either from older members of the public who wanted to know more about the project or from community groups

which wanted to establish a more formal form of communication with me. This demonstrated that people want to engage in a manner which is most familiar and convenient to them. In the case of older participants, email was the norm. Especially for projects such as this where newsletters and updates are distributed through this method. Although this was not done for the project, it is something to consider in the future as there is a clear demand and audience for it. Email was an important platform for establishing connections for collaboration with public interest groups that already exist within a community. I was contacted by the Friends of the Rivers of Hout Bay (FORHB) and Hout Bay River Catchment Forum through the platform. Without this contact, I would not have been aware of the community meeting which I attended or had the in-depth interview with the chairperson of the FORHB whom I met at this meeting.

## 5.2. WHO KNOWS? AND HOW DO I ASK THEM?

The digital platforms played a key role in crowdsourcing. However, in order to respond to the research questions, I needed to develop a more in-depth and personal approach to understanding what was required for participation to be inclusive. At the beginning of the fieldwork, I was equipped with the theory from my review of existing literature. From this I knew that in order to establish a planning tool and make sense of the problems within the space relative to its users, I would need to first identify who they were and whether they could be categorised into Communities of Practice. This would allow me to further understand how I could best collect information and suggestions from each of these groups. I could adapt the digital platforms accordingly to maximise the social scope of the collection process. In order to achieve this, I supplemented the digital collection methods with a survey and semi-structured interviews. The intention of these was to discover who the users of the space were, some of their experiences and how I could ensure their participation in the project. This section records some of my findings from these methods.

The combination of these methods with the digital tools laid the foundation necessary for the synthesis and aggregation processes to occur. It became clear that the execution and responsiveness of every aspect of the process from beginning to end would influence the value of the final output.

### 5.2.1. The Survey

I introduced the survey close to the beginning of the crowdsourcing phase. In addition to the objectives listed above, I hoped that it would help to generate interest in the project and engagement with the online platforms. I used 'Survey Monkey' to make the online survey. This website offers a free version which is a very basic platform for creating, distributing and analysing surveys. I found this survey inferior to the completely free Google Form online platform which offers more built-in features (I only found this platform in the later stages of the project). I shared the link to the survey on the project Facebook Page and HBO. I received 24 online responses. None of these 24 responses were from people who used the space for non-recreational activities such as commuting to work. This was an initial indication of the 'digital divide' which existed in the area. It was clear that in order to get a balanced response to the survey, I would need to supplement the online version with a physical one. I printed hard-copies of the surveys and used them as part of

semi-structured interviews conducted informally with people crossing the river on their way home from work. The majority of pedestrians whom I approached in this manner were happy to engage – especially in groups. The responses from physical surveys were manually entered into Survey Monkey and combined with those from digital surveys. Below are some of the most important results.

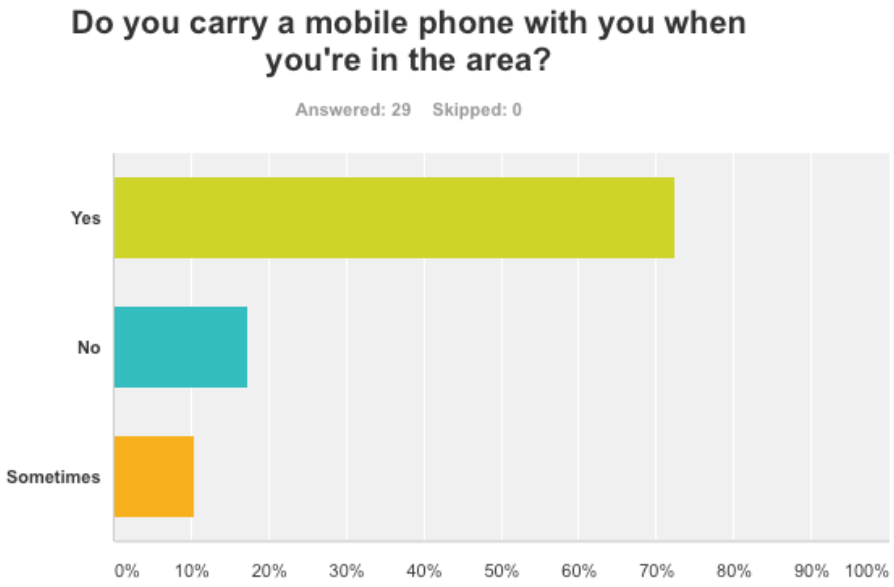



*Figure14:Chart showing the Number of Survey Respondents who Carry a Mobile Phone while in the Study Area (Source: Author, Data: SurveyMonkey)*

This was a positive sign as it meant that the majority of people would be able to engage with the digital platforms for the project while using the space.

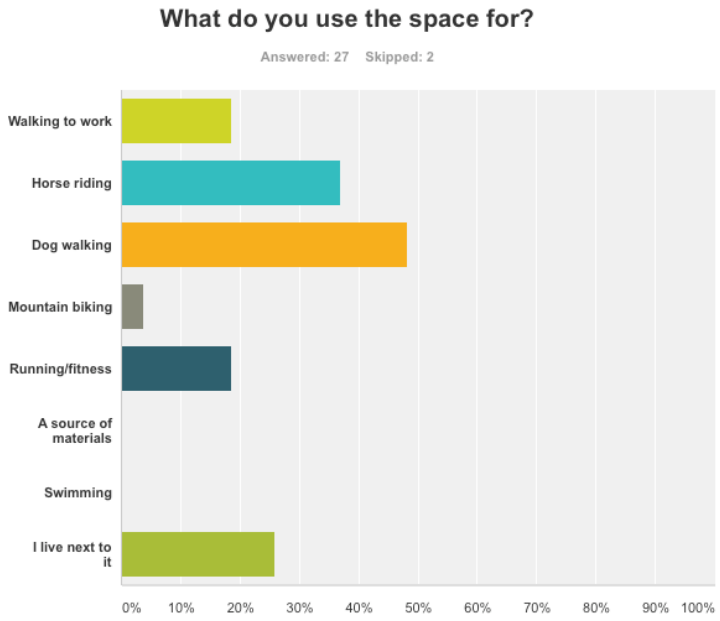



*Figure15:Chart showing which Activities the Survey Respondents do in the Study Area (Source: Author, Data: SurveyMonkey)*

Already from this survey, I could begin identifying some of the main Communities of Practice active in the study area. Many of the people who used the space for dog walking also lived next to it or used it for horse riding. It was clear at this stage that some of the main groups were the pedestrians, property owners and horse riders. I needed to substantiate this information through further research.

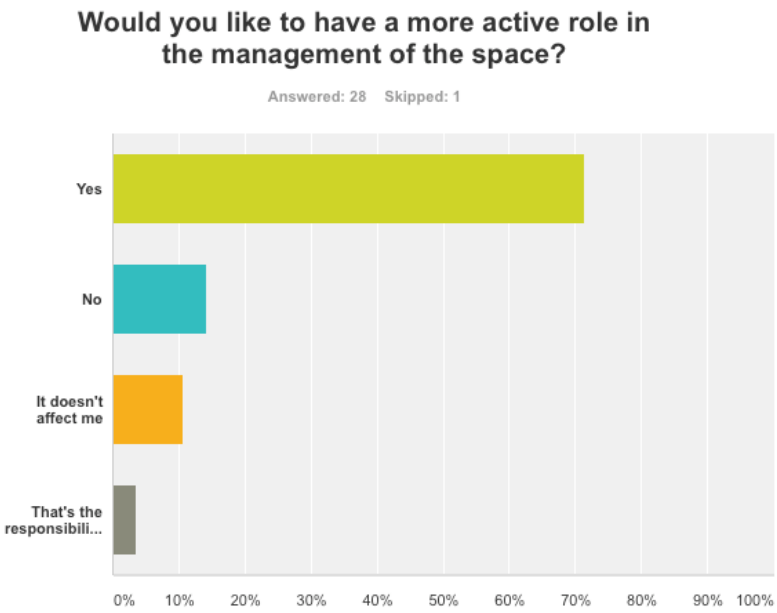



*Figure16:Chart showing whether Respondents would want a more Active Role in the Management of the Space (Source: Author, Data: SurveyMonkey)*

A common theme among respondents was a feeling of isolation from the management of the space. The majority of participants voted 'yes' to having a more active role in this. It was promising to learn that very few respondents thought that they should not be involved in management because this was 'the responsibility of professionals'. It was becoming clear that people were looking for an opportunity to contribute.

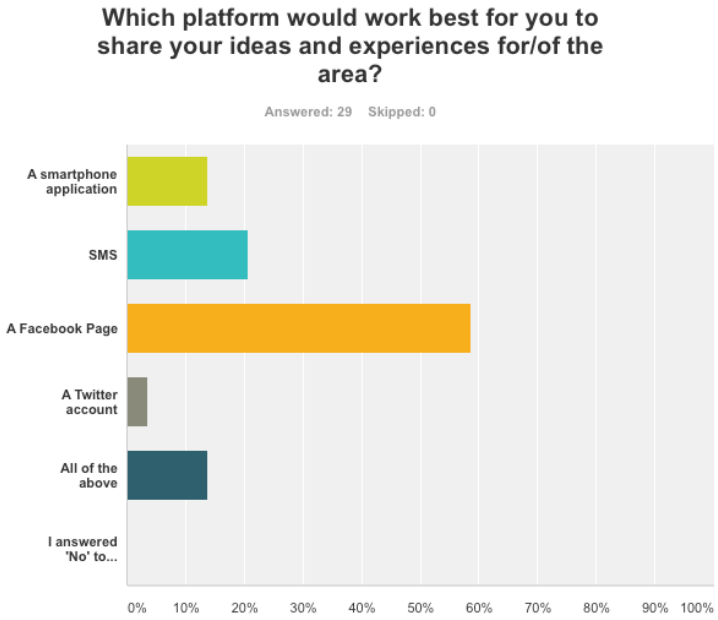



*Figure17:Chart showing which Platform Repondents would use to share their Ideas and Experiences of the Study Area (Source: Author, Data: SurveyMonkey)*

This question was important as it could be used as a guide for which platforms I should give the most time and attention to in order to get maximum engagement. It seemed that a mix of digital platforms or smartphone applications were both appealing to the participants. However, there were two clear winners out of the platforms I had introduced: Facebook and FrontlineSMS. This finding is reflected in my actual experiences with the success of the platforms as detailed in the previous section.

In addition to these charts, one of the questions of the survey required a short typed response. The question posed for this was: 'if someone were to use the area for the same activity which you use it for, what advice would you give them?' The majority of responses to this centred around two recurring issues: flooding of the Bethal Road river crossing in winter and criminal activity in the general area. I would observe if these issues continued to surface through other data collection methods as well.

## 5.2.2. Semi-Structured Interviews

I conducted semi-structured interviews with pedestrians and owners of property in close proximity to the study area. This was an opportunity to further explore whether there were enough points of commonality for these groups to be classified as Communities of Practice. I also used the interviews as an opportunity to distribute flyers and make use of word of mouth as a way to increase awareness of the project. The main findings of these interviews are documented below.

### *5.2.2.1. Property Owners*

I conducted semi-structured interviews individually with two property owners. They both had lived in the area for a long period of time and had witnessed changes within the space first-hand. These interviews were therefore insightful for understanding how the area changed over time as well as what the respondents identified as the main issues.

One of the participants identified vulnerability to natural events as a main cause for negative changes in the area. More specifically, a flood which in 2001 had raised the water level to the 100m flood line. She noted that the scale of the resulting damage required a level of intervention which was not within the maintenance budget. As a result, the space was subsequently neglected and has never recovered from this event. Prior to this, there had been annual maintenance and a grand plan to develop a greenbelt following the river from the Orangekloof Mountains to the ocean.

Although the flood was a catalyst in the overall deterioration of the study area the respondents identified other factors contributing to the cycle of mismanagement, lower levels of use and ultimately a loss of accessibility. They agreed that there had been deterioration of the quality of the paths and accessibility of the area on foot. The places where this was most apparent to them was at river crossings. Multiple respondents agreed on the following key factors, which contribute to this problem. These can be summarised in point form:

- Private actors take management matters which fall outside of their property boundaries into their own hands. This results in a lack of accountability because (a) people don't know who is performing the services and maintenance activities in the space or (b) who should be. The actions are also not controlled by an overall vision for the space or set standard. One respondent noted that an example of this had happened just days before the interview took place. A resident and the 'Friends of the Rivers of Hout Bay' group had solicited help from a local tree-felling business to clear the low-lying branches of the river area. The main motivation for this was security. The interviewee was angered because there were too many branches removed

and the offcuts had been left on the river bank instead of being removed or, as she suggested, spread on the path to improve the surface. She observed that "… they've done the easy part which is cutting the trees but have left all the mess which is no good." Actions like this are common. The response of officials to these actions is generally slow. Perhaps a digital platform could be extended to take these suggested actions and ideas, which are often motivated by good intentions, into the public realm before they are implemented in order for other residents, users and authorities in the area to review and contribute to them.

- It was reiterated that the area is vulnerable to natural processes – especially flooding. The Disa River is a significant drainage point for a catchment and this means that water levels can fluctuate drastically in the rainy winter season. Fast-flowing water can carry debris and damage paths and crossing points. Future interventions needs to respond to this through resilient design which does not inhibit these processes. A digital platform could potentially help by crowdsourcing issues from users quickly after these rain events and allowing a faster response to assess damage and rebuild so that a resource is not permanently lost.

Both respondents agreed that there were decreasing numbers of people using the study area for recreational purposes. They saw the walkability of the area as a significant factor in this. They noted that a lower level of recreational use in the space had contributed to some of the ongoing social and safety issues. They reflected that when they first moved to the area, none of the properties adjacent to the river had electric fences. There were now only two properties without these security measures and one respondent claimed that this had a negative effect on the aesthetic and 'feel' of the space.

"… It feels like a whole big open park … It feels bad not to be using it more, you know?"

It was clear from these comments and reflections that both of the interviewees had not only had negative experiences in the space but had spent time considering the underlying causes of these. When I asked whether they acted on these, they both responded negatively. One respondent used to report issues to a local employee at the forestry department. However, she had not done this in many years and was apprehensive to try to navigate the process of finding the relevant person to contact in the council. Their frustration at this lack of clarity and communication supported their interest in participating in the research project.

Both participants had already attempted to engage with the digital platforms for the project. This meant they were part of the earliest adopter group. One of the respondents raised some important issues regarding the platforms. Firstly, she does not carry a cell phone when walking in the study area. She does not feel the need to because she is in such close proximity to home. The other respondent also did not carry a phone with her. However, this was mainly for security reasons. This meant that despite seeing the physical signs on the river and wanting to engage, she had not been able to take down the necessary details. Instead, she had tried to use Facebook to engage. However, she was not familiar with this platform and found it frustrating. As a result, she reverted to the platform that she was most comfortable using: email. This was also the preferred

platform of the other property owner. As a result, I ensured that I used email and direct phone calls when communicating with property owners for the duration of the project to ensure their inclusion in the process.

I wanted to find out whether participants' frequent use of the space meant that they had become aware of the experiences of other users. I was particularly interested in their perception of the pedestrian experience using the river crossing. One respondent claimed that if the pedestrians continued to use it then it must be safe. However, as I found out in my interactions with the pedestrians, this was not the case. It is actually a particularly hazardous action to cross the river – especially in the winter season. This disconnect between the perception of one user and the reality of another would be of particular interest later in the project when I would be trying to identify common issues between different Communities of Practice in order to enable co-production of the space. Promoting awareness of others' experiences through inclusive participation would need to be a focus point of the project in order to achieve this. During this interview, I shared some of the pedestrians' experiences of the crossing with the respondents. They were both empathetic and seemed surprised with the severity of the situation. They stated that intervention would be necessary to improve the crossing through a formalised bridge of some kind. This was a promising sign for the later stages of the project.

The fragmentation of management efforts and lack of a coordinated strategy had left one participant disillusioned and cautious of large-scale projects. She argued that if the space is going to be improved, it needs to be done through small-scale, high impact efforts which are achievable and make a positive difference to the user experience. By introducing projects at a smaller scale, it would be easier to monitor and maintain them in the future and prevent perpetuating deterioration and neglect.

#### *5.2.2.2. Pedestrians*

I conducted a series of informal semi-structured interviews over the course of three consecutive evenings with pedestrians who use the river crossing on a daily basis in order to travel to and from their place of work. Each person whom I engaged with through this method was walking back to their home in Imizamo Yethu in the evening. These interviews were an extension of the survey questions which respondents deviated from at times according to their experiences of the space. When crossing the river, pedestrians have the choice of using a flooded weir with fast-flowing water or stepping-stones which are often slippery. The majority of people use the stepping-stones because they do not want to get wet. Alternatively, there is an innovative ferry system where people pull a plastic recycling bag over each leg, wade through the river and then leave it on the opposite bank to be used by someone crossing in the other direction. Both men and women use this river crossing regularly. Although some experiences are shared, others are more gender-specific. The majority of pedestrians are on foot with only a couple brave enough to attempt carrying a bicycle over the stepping-stones.

As mentioned in the context chapter, there are two formalised crossing points of the Disa River: Victoria Rd and Disa River Rd (Figure 5). The rapid expansion of Imizamo Yethu to the north east

means that a large proportion of residents find themselves isolated from these formal bridges and with limited choice if working on the opposite side of the river. For many, the Bethal Road crossing is the most viable option. Respondents claimed that it represents far more than just a shortcut. It provides significant relief from the possible financial, time and physical costs of the alternative routes. Users save up to 7km of walking in their daily commute if they use the Bethal Road crossing. This is a significant percentage of time and physical exertion which can be eliminated. For the users who I interviewed, this reward normally outweighs the risks which they face on the route. It is only during periods of significant rainfall that this becomes questionable. Two respondents recalled a recent accident where someone had slipped on the stones and broken their jaw. There were also stories of people being robbed on their way home from work. The challenges associated with the route keep the numbers of pedestrians relatively low. One man was using the crossing for the first time after being convinced by a friend that it was the most convenient route. He remained sceptical, however:

"It's my first time using it. I'm scared of crime because there are lots of trees and hiding places for criminals. Also the flooding makes it hard to cross. I usually walk around because it's safer."

He was not the only one to have feelings of vulnerability. In fact, the same themes emerged from all of the 22 people who I spoke to either individually or in groups. The dangers of crime or flooding were at the forefront of the issues being faced by this group of users. Participants noted that they would not use the route after rainfall or if it was dark when they finished work. The alternative was to get a taxi which was a financial expense. In winter, this is a significant issue because it gets dark earlier in the evening.

Despite experiencing these severe issues on a regular basis, none of the participants had ever reported an issue to the authorities. For some respondents it did not appear as though reporting issues was something that they associated with. For others, the main issue was that they were not aware of who they could contact regarding the management of the space. This was a problem which they shared with the property owners. Participants who were not South African seemed particularly intimidated to engage with governance and management.

"I haven't done anything about this. I don't know who I would contact about it or how." Was a summation of the issue provided by one of the men who was originally from Malawi and currently worked as a horse groom in the study area.

Pedestrians were very positive about the research project and eager to be more involved if it meant having a stronger voice (or a voice at all) in the management of the space and an opportunity to have their grievances heard. The commuters from Imizamo Yethu are a tight-knit community and word-of-mouth is an incredibly effective way for spreading information. Many respondents from this group asked for multiple flyers in order to share the project with other people who used the route. They liked the concept of using SMS to report issues. However, this interest did not translate into messages received. I do not think that there was sufficient time to build the level of trust required for the SMS platform to gain support. This would have first required some tangible

results from the project. The most noticeable level of engagement from this group came through Facebook and face-to-face and word of mouth interactions.

My engagement with the pedestrian group was shadowed by a strong feeling of marginalisation. All of the people I interviewed were eager to engage and seemed thankful that someone seemed to be taking an interest in their experiences and issues. Despite understanding the parameters and limitations of the project, it seemed that the most important thing for some of the respondents was to be able to express their ideas and issues. I found it frustrating that the most frequent users of the space seemed to be the most isolated from its management. Some of the most popular suggestions in the public voting process originated from the pedestrian user group and this is testament to the value which this marginalised group had to offer once included. Perhaps a role of this process could be to demonstrate the value of inclusive participation and to challenge existing stigmas.

#### *5.2.2.3. River Catchment Forum Meeting*

I was invited to attend the River Catchment Forum Meeting by members of the Friends of the Rivers of Hout Bay. In attendance were city officials and public interest groups. Despite being a local resident and active user of the river area, if I had not received an email regarding the meeting due to my research project I would not have known about it.

The meeting covered a large number of different topics of interest regarding the Hout Bay water system. It was proposed that future meetings could take place between more specific interest groups to avoid this extensive and untargeted meeting format. The forum consisted of a series of presentations. Most of these were delivered by professionals and proposed engineering- and ecology-led solutions to issues of pollution and storm water management. The meeting demonstrated the fragmented nature of existing management strategies and the exclusivity of the current participation process. The majority of attendees were professionals from engineering or ecological backgrounds and were advocating top-down solutions to issues in areas they were detached from. There was a severe lack of diversity and I did not think the meeting was representative of the demographics of Hout Bay or the users of many of the spaces being planned for. My impression was that people were aware of this disconnect, but that in their opinion a more professional and uniform audience would make it faster to find solutions and implement projects. One of the main focuses of the forum was solving problems of storm water pollution and run-off in Imizamo Yethu. However, there did not appear to be any representatives from this community present at the meeting.

Although it was promising that discussions such as this are happening and the motives behind the meeting were good, it is imperative that they become more inclusive. In order for this to happen, the current management of the forum need to become aware of the potential value of including users of a space in the discussions as well as the ‘professionals’. They need to develop a strategy to extend their reach beyond people who are already involved in the community groups which attend the forum. Some of the attendees were open to this concept of more inclusive participation. The one person in attendance who lives in the study area was particularly interested in the project. I

was given the opportunity to briefly present my project to the group. It got mixed reviews – some of the officials seemed sceptical and concerned that the amount and variation of information which I received would make the process more of a hindrance to projects than an asset to them. I left the meeting rather disillusioned but determined to substantiate my argument for the value of inclusive participation and the role which technology could play in achieving this.

## 5.3. SYNTHESIS: IDENTIFYING DOMINANT ISSUES AND COMMUNITIES OF PRACTICE

At the end of the crowdsourcing process, I had collected a substantial amount of information through the digital platforms and other data-collection methods. The challenge was now to put this into a format which could be used in order to establish a resource for future planning efforts. To enable this, I first needed to identify the Communities of Practice which had emerged through the crowdsourcing process. Secondly, I would need to develop an online voting platform which would take the process from initial crowdsourcing to a final hierarchical representation of the key issues and ideas within the study area.

The main Communities of Practice which I identified were:

- Adjacent property owners
- Pedestrians
- Horse riders
- Friends of the Rivers of Hout Bay

The next step in the research process was to coordinate focus groups with each of these CoPs in order to discuss their views on the project, how they engaged with it, and to identify how they related to the issues and ideas which were reported through crowdsourcing. To do this, I needed to map the issues and ideas which were collected so that they could be easily understood and engaged with during the focus groups. The resulting maps are shown on the next page.

# ISSUES

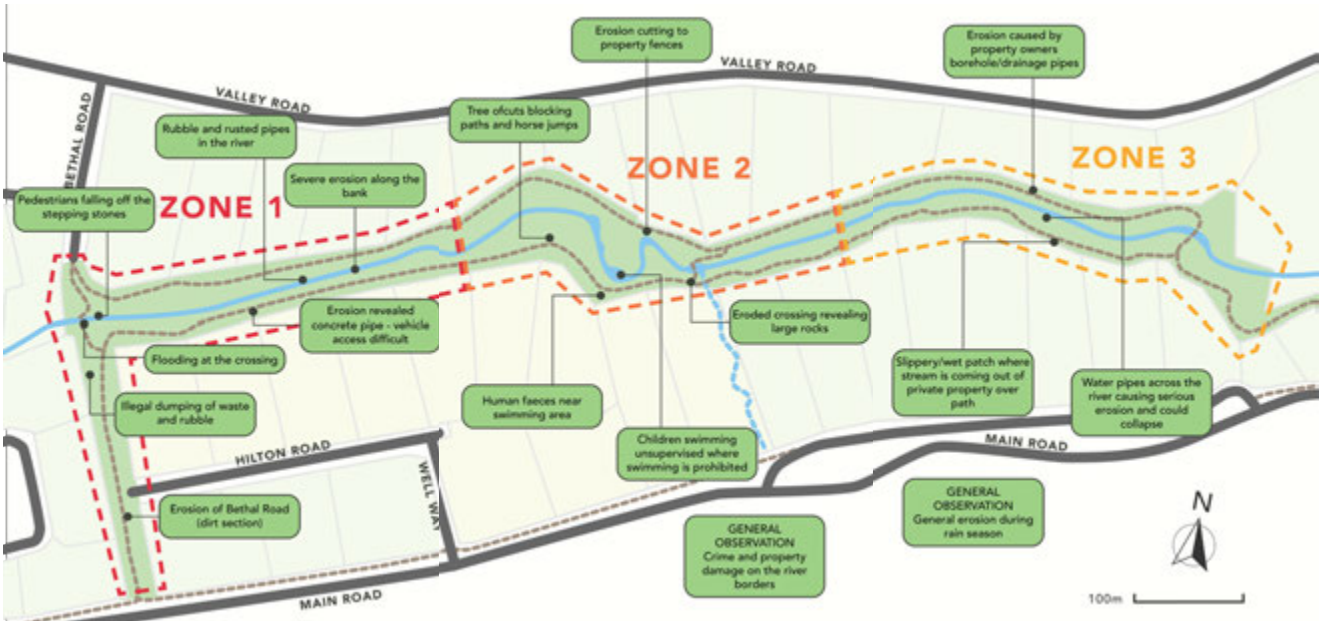



*Figure18:Crowdsourced Map of Issues to be used for Voting in the Focus Groups with Communities of Practice (Source: Author, Data: Crowdsourced)*

# SOLUTIONS

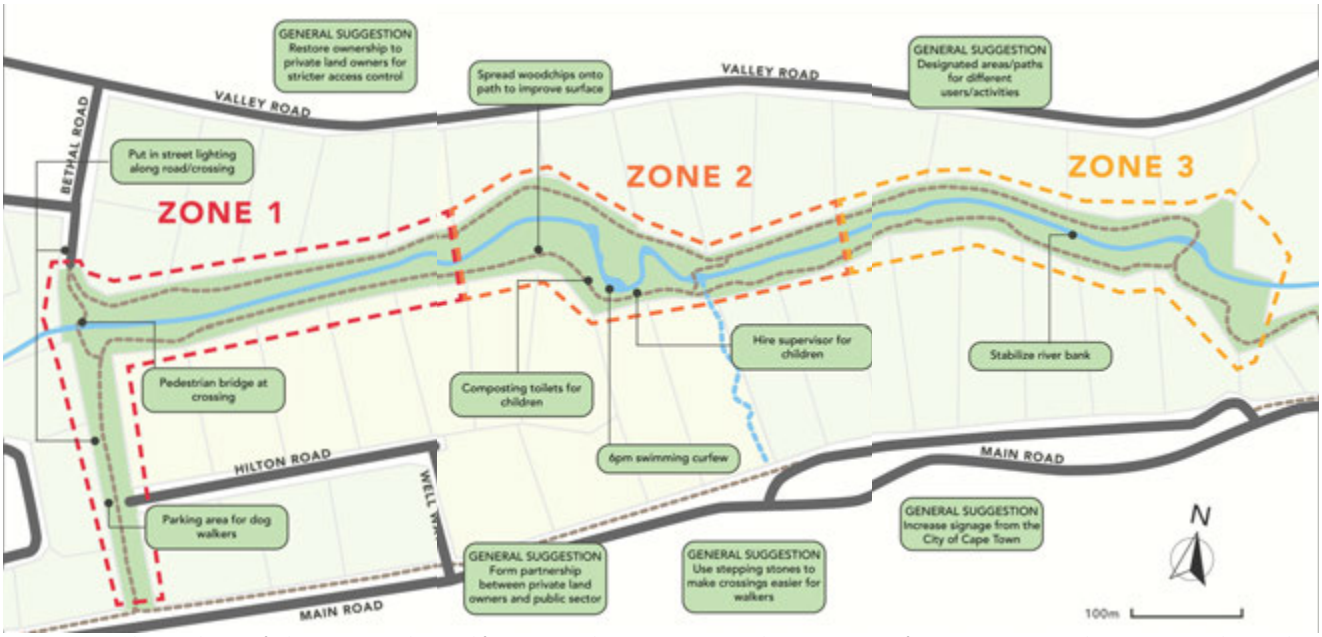



*Figure19:Crowdsourced Map of Observations to be used for Voting in the Focus Groups with Communities of Practice (Source: Author, Data: Crowdsourced)*

The different CoPs were each given the opportunity to vote on which issue and idea should be prioritised per zone and overall for the study area. I would use the results from this process to identify points of commonality and emerging themes between the different groups and in the different zones of the area. Participants were also given the opportunity to add any issues to the maps which were not already submitted through the crowdsourcing process. I added these to the database of issues and ideas and used this to produce a set of maps which would be used for the final voting process.

In the next chapter, I aim to address the remaining research questions for the project. In order to do this, I go into more detail regarding the outcomes of each of the focus groups conducted with different CoPs. I then conclude the findings of the fieldwork through a representation of the results of the final voting process. Lastly, I reflect on key themes and questions which emerged through the research process in order to establish the role that this project has played and the emerging roles for future research in this field.

*This chapter is directly informed by the synthesised results of chapter five. I had identified the main Communities of Practice and mapped all of the information which had been collected thus far using the digital platforms and other methods. The next research objective was to use the resources from the crowdsourcing process to develop a valuable tool for long-term planning and co-production of the space. This chapter records the process which I employed in order to achieve this. The guiding question for the first section of this chapter is: how can the data collected through digital platforms be processed in order to be a tool for evidence-based, long-term spatial planning and the co-production of space?*

# 6. TECHNOLOGY AS AN "AGGREGATOR"

The role of technology shifts in this chapter from collecting information to aggregating it. This means to group similar content and identify trends and interactions. I aim to record and explain how I used technology and other methods to perform this function. The chapter is structured according to the different objectives and steps in the process which were used. The first objective was to link communities of practice to the main issues which were identified. In order to do this, I needed to conduct focus groups with each of these CoPs, enabling participants to reflect on the process and propose alterations and additions to the project maps. Secondly, I needed to use the information aggregated through these more intensive and focused interactions to refine the overall mapped issues and ideas for the space. Lastly, I distributed the new maps which were more comprehensive and reflected the values of each CoP through an online voting platform. This was the final step in the process of establishing a clear and concise resource to guide future planning initiatives.

## 6.1. LINKING COMMUNITIES OF PRACTICE TO ISSUES

I had the main CoP and crowdsourced information. The question which arose now was how to use it to best address the research questions and objectives. Inclusivity and participation had been a focus of the crowdsourcing process and I wanted to carry this through the rest of the project. The value of co-producing the planning of the space could best be demonstrated by actually doing this in some form. The resulting plan was to organise focus groups with each of the CoPs. I used the same format for each of the meetings. Firstly, I would explain the project in-depth to the participants. Secondly, I would introduce a discussion regarding the project itself. The aim of this was to establish to what extent each group contributed and what their main platform of choice was. I also wanted to establish what they perceived to be the problems with the crowdsourcing process and how it could potentially be improved and attract more active engagement. Lastly, I printed a set of large (one A2 page per zone) maps (Figures 18 & 19) – one for the issues and one for the solutions which were collected through crowdsourcing. Each participant at the focus groups was given the opportunity to vote for one issue or solution which they thought should be prioritised per zone and for the overall area. They were also given the opportunity to add any issues or suggestions to the maps which were not already accounted for. I then ended the session with a reflective group discussion on the results of this internal voting process and what the results would mean for future interventions and management of the study area.

I should mention that it was not possible to hold a focus group with the Friends of the Hout Bay River (FORHB) CoP. Apparently, it would be too complicated to coordinate the schedules of the members of the group. As an alternative, the chairperson made herself available for an in-depth interview. She wanted to make it clear that she was not speaking on behalf of other members, but I think that the interview was a fair reflection of some of the priorities and values held by the group. I had intended for the focus groups to be relatively short (approximately 45min). However, once the discussions began, it became clear that people felt too passionate about the space for this amount of time to be sufficient. The average length of time for a meeting was approximately two hours and I think they could have continued past this if allowed to. All of the groups commented that there is a need for more regular meetings such as these where debates can happen and agendas can be aligned. Below, I undertake a more in-depth analysis of the individual focus groups (and in-depth interview).

### 6.1.1. Adjacent Property Owners

Nine participants attended this focus group. This made it the largest of the meetings which I conducted. Its size was both a strength and a weakness. It meant that there was a greater diversity of ideas and experiences, but also that it was harder to coordinate and allow each person to participate equally in the discussion. I initiated the conversation by explaining the project and determining whether and to what extent people had engaged with it. The responses to this varied. Some of the participants had used the SMS and Email platforms and/or had liked the Facebook page. Others who do not enter the study area regularly were not aware of the project until they received a flyer in their mailbox. Some of the inhibitors of engagement were identified to be:

- Not carrying a cell phone while in the study area and therefore not recording the necessary details of the project.
- One participant noted that while he was in the area he wanted to focus on the activity which he was busy with and would not want to take time to participate.

I asked the group what they would want to change with the crowdsourcing process in order to encourage their participation. There were three main changes which they identified:

- The project should run for a longer period which gives time for people to acknowledge and engage with it. This would also allow for the value of the project to become more apparent to the public. One of the participants summarised “Give it a bit more time and when you get responses then you can start presenting what is happening with it and that will enrich the story and draw more people’s interests.”
- There should be an affiliation of the project with the official management of the space to ensure that it resulted in tangible results.
- One participant noted that I should use methods such as the community newspaper ‘The Sentinel’ to share the project with people who did not actively use the digital platforms.

The property owners agreed that they would engage with the platforms. They also identified common goals despite some individuals being influenced by the agendas of public interest groups which they had an affiliation with. I found the allegiances with other groups problematic as some participants saw the meeting as an opportunity to market the work of their respective organisations. I wanted the participants to think as property owners in a common space. To achieve this, it was important to find a way to detach people from the outlooks of these groups. This changed in the duration of the meeting. Participants gradually became less defensive when issues were raised and more empathetic towards them. I noticed a clear shift as they realised that their individual concerns and goals for the space were similar and complementary.

The property owners saw the potential of establishing bilateral communication between the public and authorities as one of the most positive aspects of the project. To enable this, they identified that the method and intent of the project must be transparent and should recognise everyone who uses the space – as one participant noted, "Everyone needs to have a very clear understanding of the inputs that they can make."

Participants suggested that the way that the outputs of the project were presented would have a bearing on this. The document should be accessible, stimulating and it should be easy for readers to navigate to parts which were of specific interest to them. By the end of this initial stage of the discussion, everyone in the group had bought in to the project and the concept of using digital tools for engagement. The positivity towards this was backed both by their financial and emotional investment in the space as well as frustration caused by a lack of communication and management.

"We as the public want to be part of the process."

There was a call for greater coordination and clarity regarding who was responsible for the management of the area in order to improve accountability and facilitate the collection of issues and suggestions for the planning of the area. Participants noted that in this regard, digital platforms created convenient opportunities for communication. Digital reporting also meant that it would be easy for authorities to categorise information and keep a record of it.

"If you send a message in, it is tangible, can be found and people are accountable for that."

One of the main issues which the group identified was the competing agendas within the space. This was noticeable within the Community of Practice through private landowners introducing projects beyond their jurisdiction. The need for a public platform for communication, coordination and monitoring of these projects was made clear throughout the focus group. Various stories were shared of projects which had left the participants with questions such as: who wanted this? How was it organised? And why had the job not been finished? The lack of accountability that this resulted in was the most frustrating part for many of the respondents.

I was surprised to find that despite living in close proximity of the study area, some participants had a limited knowledge of how the area was used and how many people passed through it on a

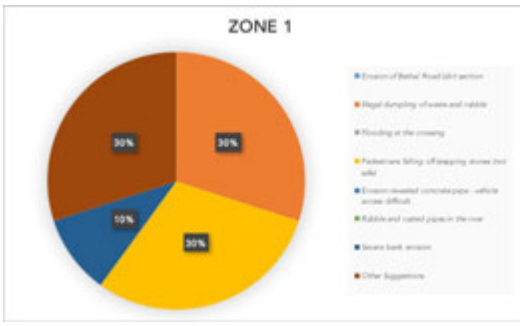
daily basis. Some property owners were surprised when I shared the numbers of pedestrians using the crossing and the common accidents that occur there. However, after being informed of this, there was a general agreement that a formalised bridge is needed and that reactive planning is not a viable option where public safety is threatened.

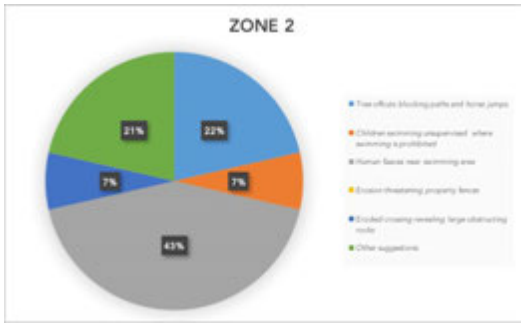
“Someone will fall in that river and drown and then they’ll come and build a bridge.”

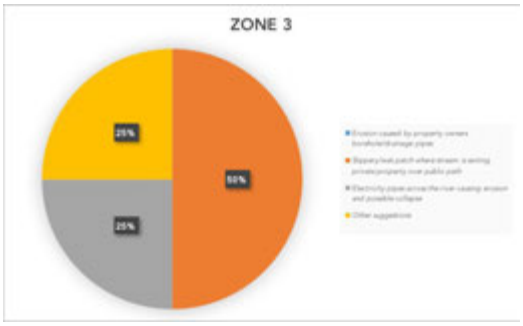
It was interesting to see if this empathetic approach would be carried through into the voting process as there were some conflicting opinions on the matter. “They don’t have to cross the river,” was stated by one of the participants. This participant also commented that the marginalised user groups are adequately represented through provincial and national voting processes. Although from an individual, these sentiments demonstrated the broader disconnection between the pedestrian and property owner groups. From this property owner’s perspective, formalising the route would bring more pedestrian traffic and increase levels of crime. However, as the focus group with the pedestrians will show – they are equally, if not more concerned about security and crime as the property owners. An alternative argument was put forward that more pedestrian traffic in the area could in fact decrease crime through passive surveillance.

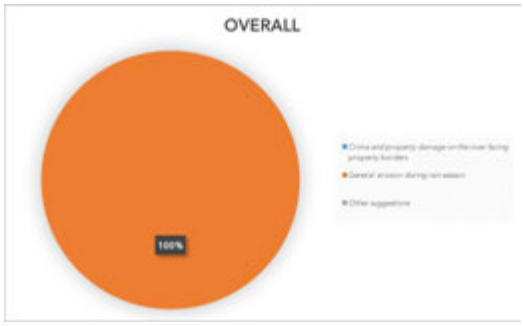
I initiated the voting process next. There were some issues in the participants’ understanding of the process. This may have skewed certain zone results where the vote does not match with what was said by participants (for example the voting for suggestions in zone 2). However, there were still clear trends within each zone which could be identified. Some of these are reflected in the charts in this section. Participants also added many new suggestions which were not represented. These additional comments are referred to in the charts as ‘other suggestions’. They were included in the digital maps for the final voting process. The zone with the most significant trend was zone 2 where the main issue was human faeces around the river area. However, the participants thought that this was symptomatic of a deeper issue. Mainly, a lack of awareness and knowledge of the importance and sensitivity of the freshwater system. There was a call for supervision programmes for the children from Imizamo Yethu who regularly swim in the area. Although the idea of education rather than restriction as a possible solution was promising, there was definitely a sense of ‘us’ and ‘them’.  Some participants commented that only the ‘right people’ should be encouraged to use the space more actively. By this, the participant meant ‘people who respect the river and respect society.’ This sense of entitlement to decide who is permitted to frequent the public space was challenged by other respondents one of whom made the valid point that: “If I don’t use the river and we as the landowners on the river don’t use it then we don’t have a right to manage it”.

# ISSUES

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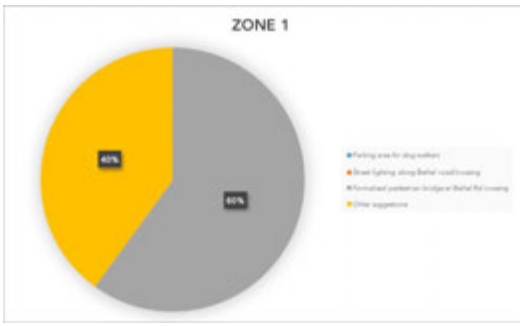


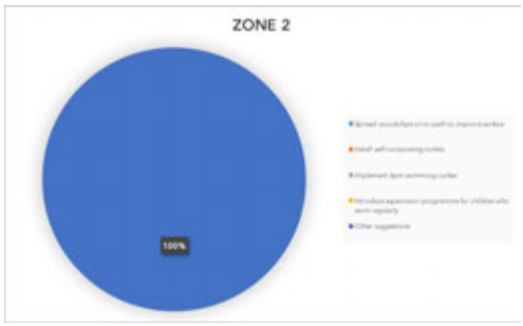


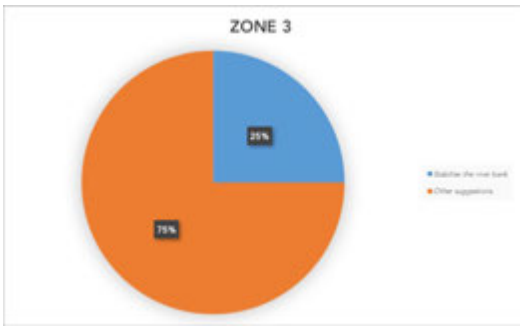


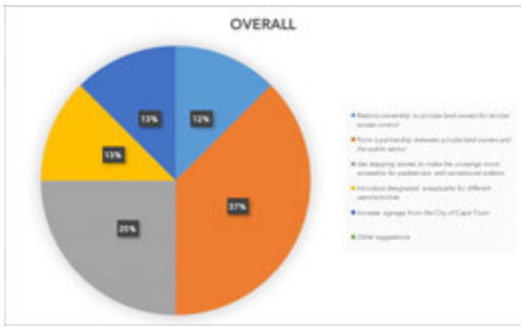


*Figure20:Charts Showing the outcome of Voting in the Property-Owner Focus Group (Source: Author)*

I was amazed at the transition which occurred within the short time of the focus group. As participants were exposed to diverse crowdsourced issues and experiences in the zones, their opinions seemed to change. This was particularly true of one man who entered the group with the attitude of restoring the land to private owners and restricting access. By the end of the meeting, he was in support of building a pedestrian bridge. This focus group was not as focused as the others due to its large size. However, it was possible to determine where the group was positioned in relation to some of the key crowdsourced issues and this was the main objective. At the beginning of the meeting, I was worried that the commonality of property ownership would not be strong enough to detach participants from the views of the other CoPs which they were part of. However, as they became more comfortable with each other and the space they were able to develop a position as a group.

*Photograph2:Property Owners Debating Voting during the Focus Group*

### 6.1.2. Horse Riders

The horse rider CoP are among the most frequent users of the study area. They are a more familiar and close group than the property owners. Their commonality is not just based on the place but also on the activity and membership of the Hout Bay Riders Club (HBRC). This group are involved in local projects which aim to improve the rider experience in Hout Bay. There were four participants in this focus group – two of whom were part of the HBRC organising committee. They all stable their horses at the same yard on a property adjacent to the study area. They therefore visit the area on a daily basis to care for and exercise their horses. Two of the participants not only stable their horses in this area but also reside close to it and therefore had in-depth knowledge of it.

The feedback from this group on their engagement with the project was generally more positive than with the other focus groups. They had engaged with the platforms – mostly Facebook because they found it the most convenient. This was not surprising as the HBRC has an active presence on this platform. The participants would report issues after being in the space rather than when they were busy riding in it. This was another reason why the Facebook page was favoured over the SMS platform. They were also open to the idea of a smartphone application for the project. The riders were the only group to actively support the idea of a smartphone application. The

participants in this group were within the age bracket of 20-30 and from a mid-high level socio-economic background. This is a key factor in their comfortability with using an app to engage with these problems. The group argued that different platforms of communication are required for different types of reports. For example, if reporting on something urgent that requires a rapid response then they would use SMS. However, if reporting more long-term issues then a platform such as Facebook, which allows for bilateral communication, would be their method of choice.

When asked what would have prompted them to engage more, some suggestions were new and others corresponded with those of other user groups. City involvement in the project was the main point as it would increase the legitimacy of the initiative. They wanted to be sure that something would come of a project before investing time or money in it. Some participants had been actively involved in maintenance projects in the area and these had not ended well. They had found that past projects had lacked the necessary backing and coordination for long-term feasibility. This had left them sceptical of committing to new projects.

“It was an effort that was essentially completely wasted.”

However, one of the participants saw this project as a possible way to avoid this through its potential to create a connection between the public and authorities to coordinate and monitor management efforts. This point was similar to those made by property owners regarding the tendency for private actors to take matters in to their own hands without engaging authorities or the public in the process. Although there is some regulation of these actions, a horse rider observed that it is a “very reactive” approach.

The short time frame was another key issue for this group. They stated that a longer period would allow for more than one cycle of reports and voting. Tangible products in terms of council approved plans or project implementation could result from this, and the effects could be monitored before another cycle is initiated. If people invest time in something, they want some form of resulting value. A participant noted that in order to achieve this, interactions needed to be more interactive and not standardised digital responses. A dialogue or discussion regarding management would be more appealing than reporting problems without being involved in the solution-finding process. This argument supported the aim of this research.

The voting process made it apparent that this group were more aware than the property owner CoP of the hardships faced by pedestrians using the study area. Part of the reason for this is their frequent interaction with grooms who walk to their place of work in the study area. Some participants had also witnessed accidents from people trying to cross the river when it was flooded after heavy rain and, as a result, offered to transport pedestrians in their cars when the crossing was dangerous. The main issue which they identified was the need for a formalised pedestrian bridge. They stipulated that it should also accommodate horse riders as they use that crossing point frequently. The main reason for voting in this way was their awareness of the accidents that occur at the crossing.

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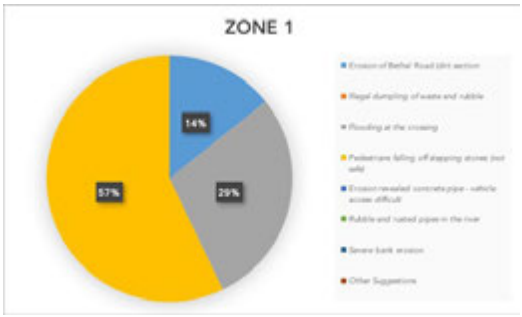


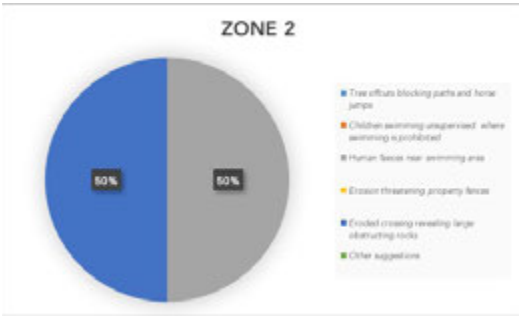


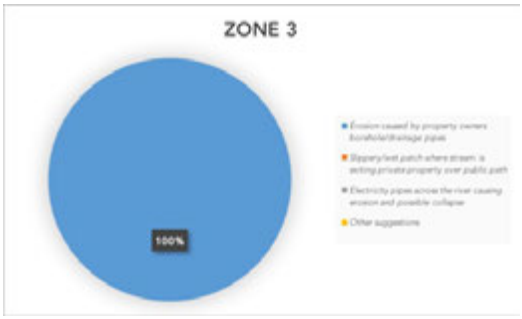


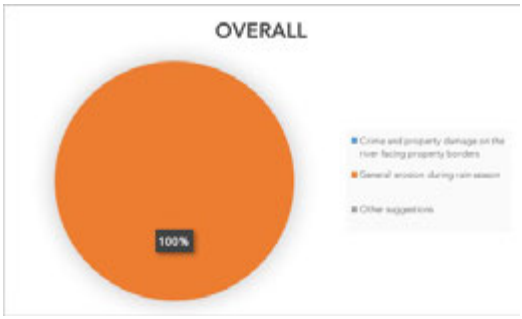


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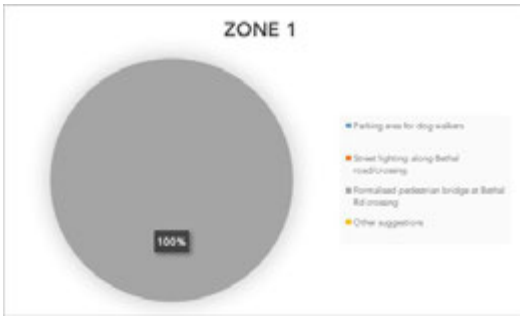
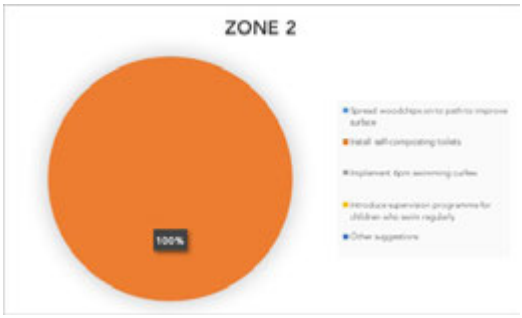
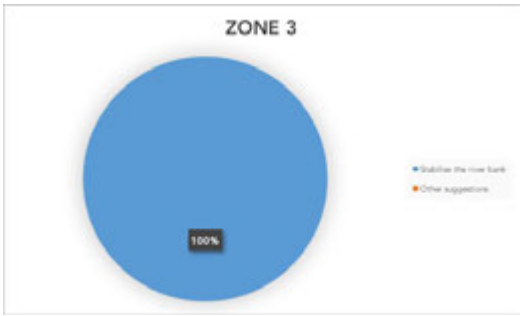


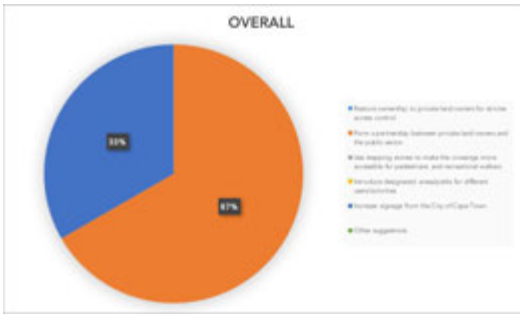




*Figure21:Pie Charts Showing the outcome of Voting in the Horse Rider Focus Group (Source: Author)*

The participants agreed that there is potential for the swimming area in zone 2 to become a valuable resource for the surrounding community. However, while riding in this area they had had negative experiences of being targeted by children throwing stones. Participants considered what should be done to realise the potential of the area. They identified maintenance, management of erosion and the introduction of social facilities such as outdoor furniture as some possible strategies. They recognised a need to break the social stigmas around certain groups of users of the space (such as the children who swim there) in order to foster more inclusive use and co-production of the space. To do this, the experiences and ideas of marginalised user groups would need to be brought to the wider forum of management of the space.

Crime and safety was another prominent issue. They had experiences of being targeted while riding and one participant who is the manager of a stable yard noted that some of her employees have been robbed while crossing the river. They proposed that the Bethel Road route could become more transport-oriented, and harsher access control could be introduced to the greenbelt area at night as happens with other public parks.

### 6.1.3. Pedestrian Commuters

There were five participants in this focus group – four men and one woman. In the future, it would be interesting to conduct a focus group consisting only of women participants in order to explore how gender may impact the user experience in the space. All of the participants in this focus group use the river crossing on a daily basis in order to commute to their place of work. Most of the attendees were working as horse grooms. Others were providing maintenance services such as gardening or housekeeping. I began this focus group differently to the others with an engagement regarding personal experiences in the space.

It was clear that using the crossing is often not a choice but a necessity. This contradicts sentiments from other users that people using the crossing to commute are lazy or that they are ignorant of the risks involved. Some of the responses regarding the most challenging aspects of the crossing were the same as those I had collected through the survey and semi-structured interviews earlier in the research. The main issues were the flooding of the crossing and criminal activity. The disconnect between the experiences of these pedestrians and their employer's perspectives was dangerous. One participant recounted an experience of being called to drain a stable at night during heavy rain. This was an extremely dangerous task and it had clearly shaken him as he commented: "I managed, just by the grace of God. But it was not safe at all." This experience was symptomatic of the deeper issue of a lack of general awareness for Non-Motorised Transport (NMT) mobility in Hout Bay. The problem would be explored in more depth during the voting process.

I wanted to determine why they persisted with the route when they had all clearly had negative and dangerous experiences in the area. The majority of participants were not South African. They reside in Imizamo Yethu and are of a low socio-economic status. They described how the decision to use the Bethal Road crossing is calculated on an almost daily basis depending on factors such as weather conditions, associated risks, time and money availability. As one participant commented:

“We don’t have a choice with using this route. A lot of times, we don’t have money to take a taxi to go around that way. This is our short-cut; we have to cross it. But when it is raining, the river is full, we can’t do anything.” Regular use combined with a sense of comradery from collectively facing the dangers of the route has resulted in a strong sense of ownership and reverence for it. When able to cross, it represents a livelihood strategy and respite from some of the challenges which they face on a daily basis.

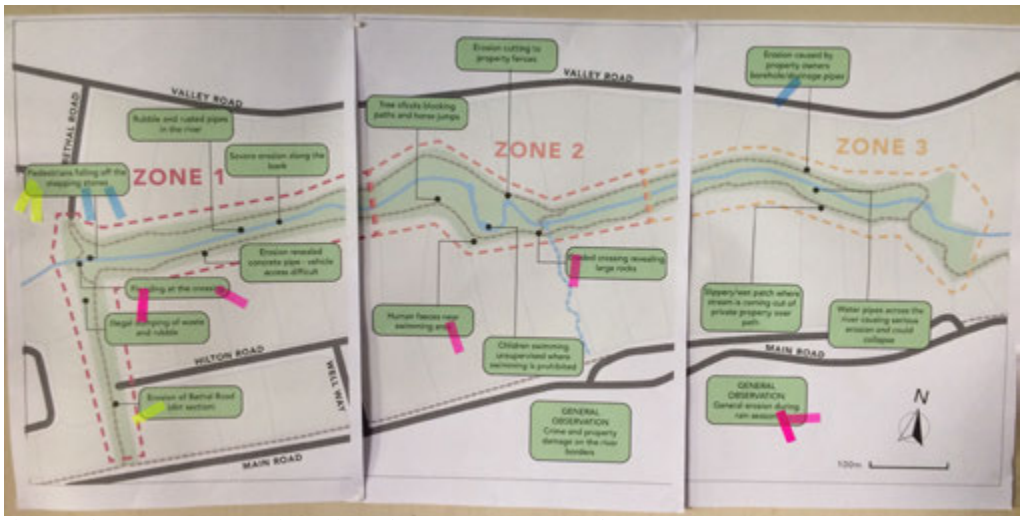
Crime is another factor adding to the safety concerns of the pedestrians. However, the participants observed that recently the threat had seemed to subside. One respondent noted that this was probably due to the curfew initiative introduced in Imizamo Yethu. It involves strict curfews and policing in the settlement managed by a group of men. This initiative has recently been criticised for the violent vigilantism which it seems to inspire. However, the participants claimed that the positive effect which it had had on crime in the township had filtered into the study area as well. They still felt vulnerable at times when the space was not being actively used: “When it’s quiet - there’s maybe two or three people - then it’s easier to be robbed. You must walk very slowly along the big rocks.”

I asked the participants if they had ever reported an incident which they had seen or experienced while crossing the river. The unanimous answer was no. This was now a common point between each of the CoPs I had conducted focus groups with. The reason for this was always similar - in this case: “We don’t know who or where we can go.”. The issue of fragmentation and ambiguity in the management of the space was becoming explicit. The group was interested in the concept of reporting issues using digital platforms. “That’s the simplest thing,” one pedestrian commented at the group’s suggestion of Facebook or SMS as the best tools for their engagement.

As was the case with other CoPs, the participants want to engage with the management of the space. The pedestrians rely on the route heavily and are invested in its maintenance and longevity. A participation process needs to be challenged when the most active users of the space are not able to contribute to its management or voice their concerns regarding it.

Even before I initiated the voting process, the participants made it clear that for them the most important intervention in the space would be a formalised bridge and street lighting. This was formalised through the voting process where the pedestrian group voted unanimously for issues and ideas regarding safety concerns. They do not use the river area except for the Bethal Road crossing because, “The most time we pass through here, we use it for the work purposes.”
They were not comfortable to vote on areas which they had not been to. Therefore, for this focus group the voting was essentially limited to the first zone. They did agree that if the safety and maintenance of the other areas improved, they would be more inclined to visit them. Any voting in the other zones was done according to what participants would prioritise based on their personal values and what they had heard other users complaining about.

During the voting process, the issue of a general lack of consideration for NMT transport in Hout Bay was raised again. The study area for this research did not include Hout Bay Main Road. However, there was a call from participants to extend it and find a way to increase the compliance of private vehicles to pedestrian-crossings and other traffic-slowing measures. They use this road as a route to the study area and there have been many accidents on it in the past. Although for this project a very specific pedestrian route was considered, this could be used as an example of how NMT modes could be better promoted in Hout Bay.




*Photograph3:Voting in Progress during the Pedestrian Focus Group (Author's own)*

After voting, I reflected with the group on what future projects in the space should consider in their design and implementation. The participants stressed the importance of taking the context of the crossing and its users into consideration. They had had ongoing disappointing experiences with the delivery of basic services in Imizamo Yethu. Due to this, they put greater stress on the maintenance and monitoring of projects than their initial implementation. Effective monitoring was needed to ensure the continuation of a project's benefits for a wide group of users. Without design which responds to contextual realities, the intentions of a project can be short-lived and lost.

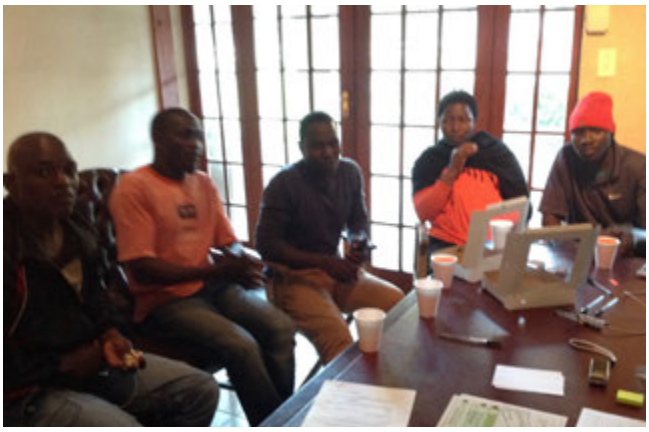
The benefit of experiential knowledge is that it can be factored into future interventions for a space. Participants had suggested design standards for proposed public dustbins, toilets, and the bridge in the area in order to protect them from degradation and misuse if implemented. The need for this was substantiated by one of the pedestrians who brought attention to a recent pedestrian path project on the border of Imizamo Yethu. A paved path with lighting at regular intervals was built. Within weeks of its introduction, the path had become a dangerous target for crime. The design of the lights had not responded effectively to the issue of crime in the area as criminals threw stones at the bulbs to ensure the cover of darkness for their illicit activities.

The pedestrians cited this as an example of the lack of engagement with people who actually use a space resulting in a flawed intervention. The path in question was established close to dense vegetation – which is one of the main factors for crime on pedestrian paths identified by the pedestrians I had spoken to. When I asked whether there had been any engagement with the

users of the original path to determine where to place the new one the response was negative: “I think they just followed the footsteps. I don’t think it was well-planned.”

There were other stories such as this which demonstrated the dangers of top-down planning. Through traditional modes of participation, it is easy for all users of a space to be categorised as part of the problem to fix instead of valuable contributors to finding a solution. This promotes a disconnect between the people experiencing problems and those finding solutions to them. Pedestrians arguably have the most vested interest in improving a space as they use it frequently and to them it is a crucial livelihood tool instead of purely recreational. As one participant stated: “If you ask the ones who work in this area they can tell you all the problems. Because this road here, it’s like our bread and butter.” Discussing design ideas for the improvement of the space turned out to be a valuable way of showing how experiences can shape and benefit the planning of an area – digital tools had been a catalyst in starting this engagement process. The participants know the potential value they can offer from their experiences and desire a platform for knowledge sharing. One participant expressed his frustration with the lack of engagement: “We need this type of meeting for our ideas like the way how we are putting our considerations forward … I’m asking myself how these decisions are made.”

This CoP demonstrated the potential value of inclusive co-production of space. My role in this forum was not as a researcher but rather as a fellow user of a space who posed questions which I could not answer alone with my limited experiences. I left this focus group with substantially more knowledge about the space and what improving it would entail than I arrived with. The pedestrian group enjoyed the meeting and expressed interest in future involvement within broader public discussions around the management of the study area. A participant commented that: “It is a very very helpful meeting because it’s like we didn’t even have a place to say our view - to complain.” I told them about the River Catchment Forum which I had attended and they all agreed that they would be happy to be able to participate in those meetings.




*Photograph4:Participants Contributing to the Discussion during the Pedestrian Focus Group (Author’s own)*

## 6.1.4. Friends of the Rivers of Hout Bay

As mentioned in the introduction, I had originally planned to conduct a focus session with the Friends of the Rivers of Hout Bay (FORHB) public interest group. However, I was told that it would be too difficult to coordinate a meeting with the members within the short time-frame. The chairperson and founder of the group was accommodating and offered to meet for an in-depth interview regarding the work of the group. She wanted to make it clear that she could not speak on behalf of the other members. The group had a strong presence at the Hout Bay River Catchment Forum meeting which I had attended earlier in the research process. I was interested to find out more about its motives and dynamics. The interviewee had been one of the first people to contact me regarding the possibility of collaborating with my research project. The interview did not follow the same format as the focus groups but the objective was still to link the CoP with reported issues. Instead of voting on physical maps, the participant used the online voting system which was available at the time of the interview.

The participant describes the FORHB as "… A group of people who are very interested and passionate about having the river rehabilitated and the wetland." Despite currently focusing on the lower stretches of the river, their long-term goal is to establish a greenbelt from the Orangekloof Mountains to the ocean – I had previously heard of this plan from a sceptical property owner during a semi-structured interview. The group consists of members from the public, however, it is not advertised and, therefore, to join requires an existing association with one of the members. This has made the group exclusive. Despite this, there were approximately 40 people on the group's emailing list. However, the interviewee noted that "you get a core group of people" who are actively involved in the group. The amount of engagement varies according to the level of interest and availability of time.

The FORHB has worked closely with officials since its initial conception. The recent formation of the River Catchment Forum was initiated by the Storm Water Department of the City of Cape Town and is an attempt to a broaden and organise public cooperation to introduce more rehabilitation projects. This was the only CoP which had an existing relationship with the authorities managing the space, and it was clear that this had helped in their ongoing projects. The chairwoman noted that the City of Cape Town's backing "formalises a lot of what we are trying to do." In past collaboration with officials, FORHB had mainly played a monitoring role reporting issues to officials before they escalated. She identified the key factor of success in this relationship to be establishing a partnership to enhance projects instead of a one-directional criticism of existing strategies and delivery. She reflected that "… if you approach with the attitude of having the same goal and wanting to help, you get a completely different reaction and they see that actually you're just trying to help get the job done."

The River Catchment Forum is still in its foundation stages. As a result, focus is stretched thin between project proposals and areas of concern. At present, the focus of FORHB and the Forum is on the lower section of the river as this is the most inhabited, publicly accessible and polluted.

This was decided from an ecological perspective. Many of the most active members of the group are from a professional engineering or environmental background. However, in addressing the problems of pollution caused by run-off from Imizamo Yethu there is a clear social dimension to the project which I thought was being neglected. The participant was aware of the study area for this project. However, it was not a focus because it is significantly less polluted and has less alien vegetation than the lower reaches. She stated that they needed to be focused in order to be effective: "… unfortunately you can't focus everywhere at the same time."

The participant was very open about the groups approach towards public engagement. It is not a focus mainly because of a lack of human resources, skills and time. There was a fear that by getting diverse and strong public opinion, opportunities could be missed to take fast action and address dynamic issues. Typically, the group relies on the knowledge and experiences of its members when considering projects: "We approach it from an ecological point of view really… some of the FORHB people are experts in their field and have walked on the river or live on it." A focus on 'expert' opinion and an ecologically motivated standpoint means that they are able to take prompt action based on what they consider to be the best for the riverine system. The 'knowledge gap' in participation is another factor which intimidated the participant and inhibited the inclusivity of projects. It seemed easier to get the opinions of people who have specialist knowledge than to involve users who may not immediately understand what is being proposed and its implications. She argued that the need to take quick action and circumnavigate participation is substantiated by the ever-increasing environmental issues. At times, she needed to take advantage of resources which were available for a short time. Another argument was that actions such as removing alien plants and planting indigenous ones are inherently good. It was clear that participation had been a point of frustration for the respondent: "I find the public participation bit really hard." This perception of participation was a recurring theme in the focus groups. I remained hopeful that this project could demonstrate the value of inclusive participation and challenge the impression of the process being too intensive in terms of time and skills. To do this, it would be important that the results of the research were easy to read and publicly available.

The participant was aware of the research project. She had contacted me early in the process via email and a phone call in order to offer information and collaboration. She was most comfortable using these forms of communication because they were the ones she used to share information with members of the FORHB. I could assume that the majority of the FORHB group would share this sentiment. In order to increase future engagement from people from the FORHB she suggested that spatialising reported issues and ideas would be a crucial step. She argued that people needed to not only reply 'yes' or 'no' to ideas but also contribute to them constructively. I was glad that she raised these points because they were some of the main objectives of the project.

The participant was interested in having access to the results of the project in order to inform future projects of FORHB. This could be an opportunity for future collaboration and combining the professional resources of the group with the crowdsourced user information from the research.

### 6.1.5. The Relationship between Communities Of Practice and Recurring Issues

The objective was to integrate the information collected through crowdsourcing with the Communities of Practice which I had identified. On the next page is a diagram which summarises the outcome of this process (Figure 22). I was able to identify some of the recurring issues which arose in my interactions with each Community of Practice. It was interesting to note that some of the Communities of Practice had more similarly-aligned perspectives on issues than others. For example, the horse riders and pedestrians who were both frequently moving through the space were closely aligned in the issues which were most important to them. In contrast, the FORHB perspective on issues was less grounded in personal experiences of the space, and rather driven by professional knowledge and ecological objectives. The property owners seemed to fluctuate between these different perspectives and recognised both social and environmental issues. This is possibly also because it was a large group and there were different individual perspectives within it.

The diagram shows that despite the clear differences between the motivations and experiences of the Communities of Practice, an overall alignment is evident in their recognition of issues in the study area. This supports the objective of co-production in the space. I used the findings of this process and added information from the focus groups to refine the digital maps for online distribution. A public vote was the final step in the process which the time allocation for the fieldwork would allow. I used this step to establish the clarity of results necessary for the information to be used in future planning initiatives.

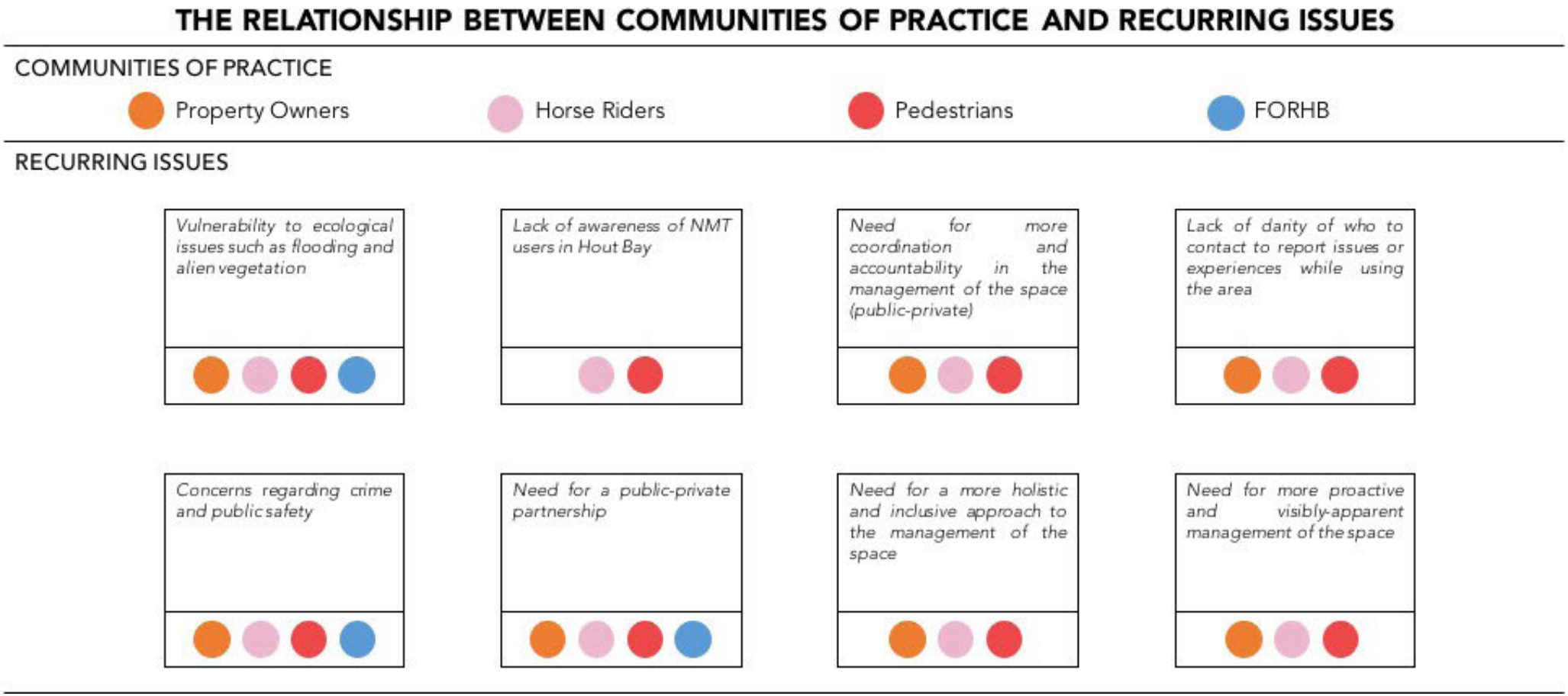



*Figure22:A Diagram depicting the Relationship between the Communities of Practice and key themes identified through crowdsourcing. (Source: Author)*

## 6.2. VOTING TO ESTABLISH A USEFUL TOOL FOR LONG-TERM PLANNING

I used Google Forms as the platform for online voting. It was easy to use and highly customisable. In order to make the voting process simple, I separated it into 'issues' and 'suggestions'. Within each of these, participants could vote for one crowdsourced option which they thought should be prioritised for future intervention. These maps are shown on the pages which follow.

I distributed the voting form through all of the digital platforms for the project. I also shared it on

### MAPS FOR VOTING: ISSUES


*Figure23:Zone 1: Issue Map for Online Voting*

**Zone 1: Issue Vote** *

- 1: Erosion of Bethal Road
- 2: Illegal dumping
- 3: Bethal Road crossing unsafe (particularly when flooded)
- 4: Slippery stepping-stones have caused injury
- 5: Car break-ins and theft
- 6: Erosion of path has revealed concrete pipe which limits access
- 7: Rusted pipes and rubble in river
- 8: Severe erosion of river bank
- Other:


*Figure24:Zone 2: Issue Map for Online Voting*

**Zone 2: Issue Vote** *

- 1: Tree offcuts blocking pedestrian path and horse riding jumps
- 2: Children swimming unsupervised where swimming is prohibited
- 3: Human faeces near swimming area
- 4: Bank erosion threatening property fence lines
- 5: Erosion has revealed large rocks and a pipe which obstruct the path
- Other:

Zone 3: Issue Map


Zone 3: Issue Vote *

- 1: Erosion caused by private property borehole/drainage pipes
- 2: Slippery/wet drainage point crossing the path
- 3: Electricity pipe structure obstructing river flow and causing erosion damage
- Other:

*Figure25:Zone 3: Issue Map for Online Voting*

Overall: Issue Vote *

- 1: Crime, property damage and safety concerns from users of the river
- 2: Severe bank erosion in the rain season
- 3: Alien/exotic plant species
- Other:

## MAPS FOR VOTING: SUGGESTIONS

Zone 1: Suggestion Map


Zone 1: Suggestion Vote *

- 1: Parking area for dog walkers
- 2: Street lighting along Bethal Road and crossing
- 3: Formalised pedestrian bridge
- 4: Public dustbins
- 5: Furrows to direct water flow and prevent erosion
- Other:

*Figure26:Zone 1:Suggestion Map for Online Voting*

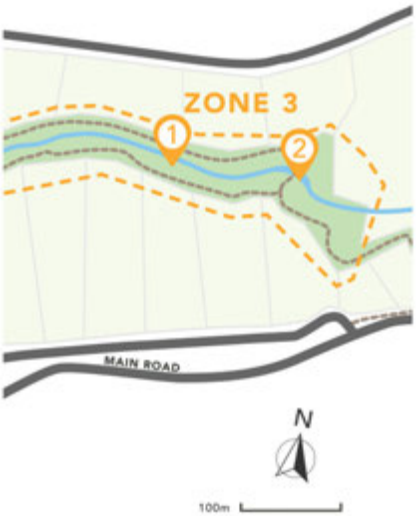
Zone 2: Suggestion Map


**Zone 2: Suggestion Vote** *

- ◯ 1: Spread wood chips to improve the path surface
- ◯ 2: Install composting toilets
- ◯ 3: Implement a 6pm swimming curfew
- ◯ 4: Supervision programme for children swimming
- ◯ 5: Manage the bank erosion
- ◯ 6: Use large rocks to make a stepping-stone pedestrian crossing
- ◯ Other: _____

*Figure27:Zone 2:Suggestion Map for Online Voting*

Zone 3: Suggestion Map




**Zone 3: Suggestion Vote** *

- ◯ 1: Stabilise the river bank
- ◯ 2: Use large rocks to make a stepping-stone pedestrian crossing
- ◯ Other: _____

*Figure28:Zone 3:Suggestion Map for Online Voting*

**Overall: Suggestion Vote** *

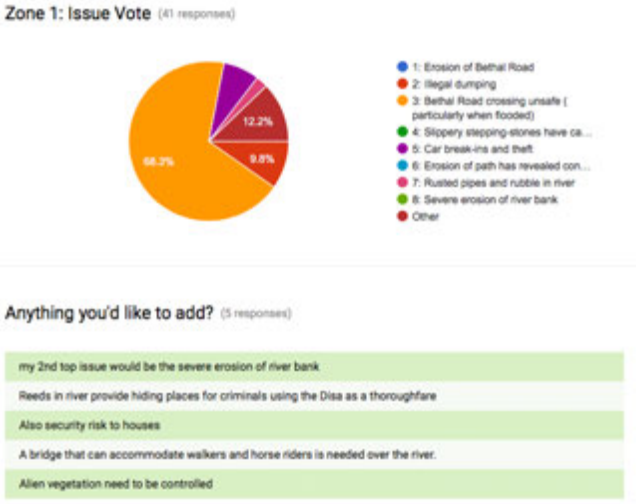
- ◯ 1: Form a public-private partnership for funding and management of the space
- ◯ 2: Restore ownership of area to private properties for stricter access control
- ◯ 3: Use stepping stones and a bridge upgrade to make the river walk a circuit again
- ◯ 4: Increase signage from the City of Cape Town to establish a management presence
- ◯ 5: Clear multiple paths for different activities e.g. riding, walking, cycling
- ◯ 6: Beautify the area and introduce public facilities such as picnic areas, public dustbins and lighting at key access points
- ◯ 7: Remove alien vegetation
- ◯ Other: _____

community Facebook pages such as HBO. In order to ensure that pedestrians had access to the voting platform, I spent three consecutive evenings at the Bethal Road crossing with an iPad so that responses could be entered digitally. I brought the iPad to the pedestrian focus group so that participants could cast their votes during that process. I received 43 completed responses to the survey. The results of this process are mapped in the pages which follow.

The voting process resulted in a clear visual representation of what a mix of users from different Communities of Practice thought should be prioritised in the study area. There were evident

## VOTING RESULTS FOR ZONE 1

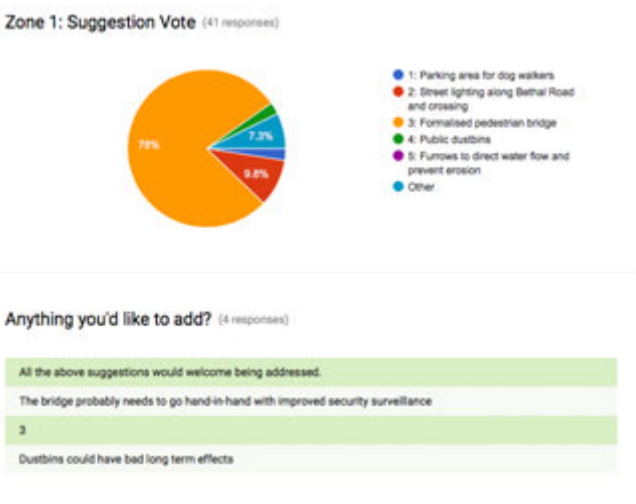
ISSUES







SUGGESTIONS







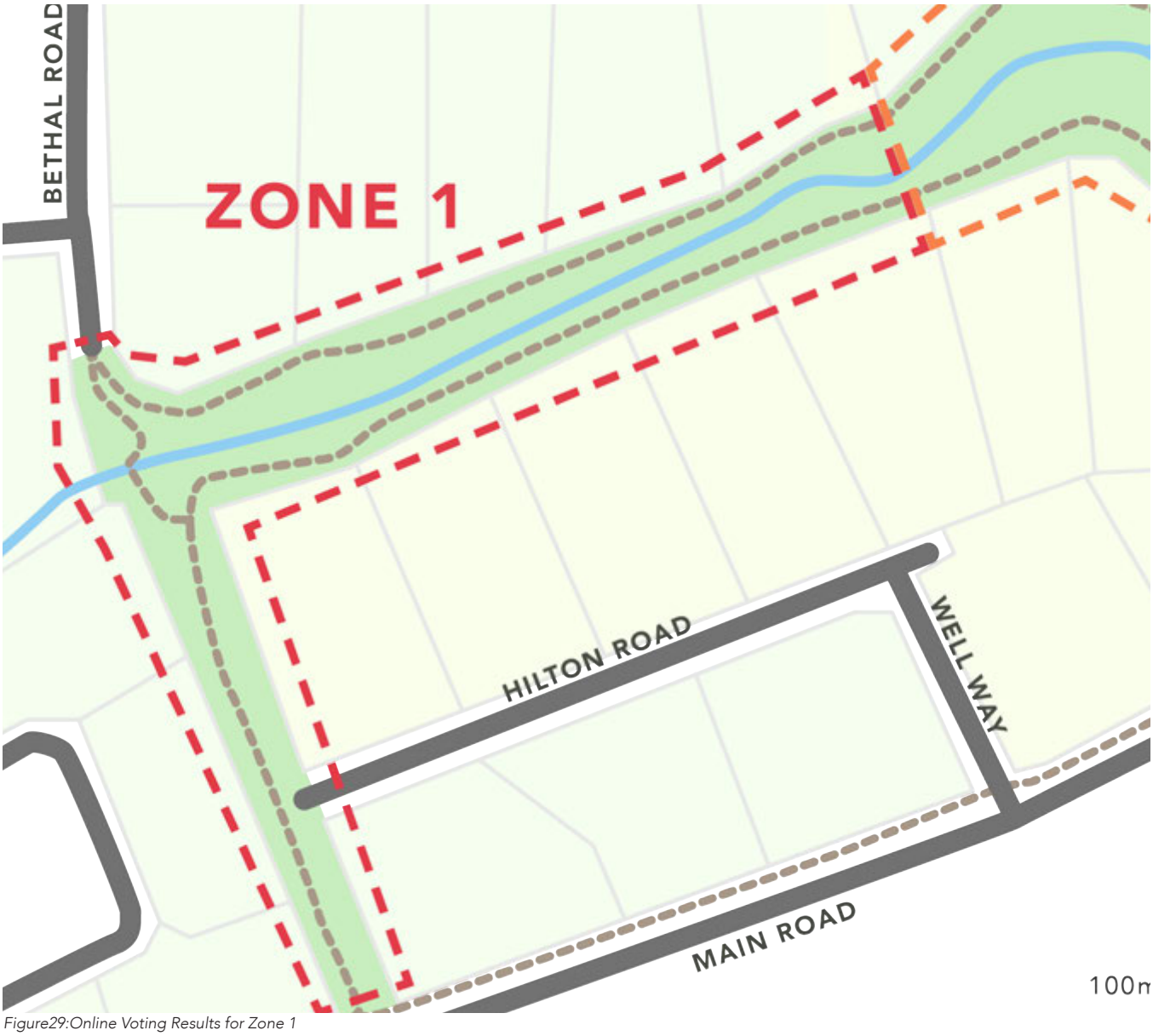



*Figure29:Online Voting Results for Zone 1*

## VOTING RESULTS FOR ZONE 2

ISSUES

SUGGESTIONS

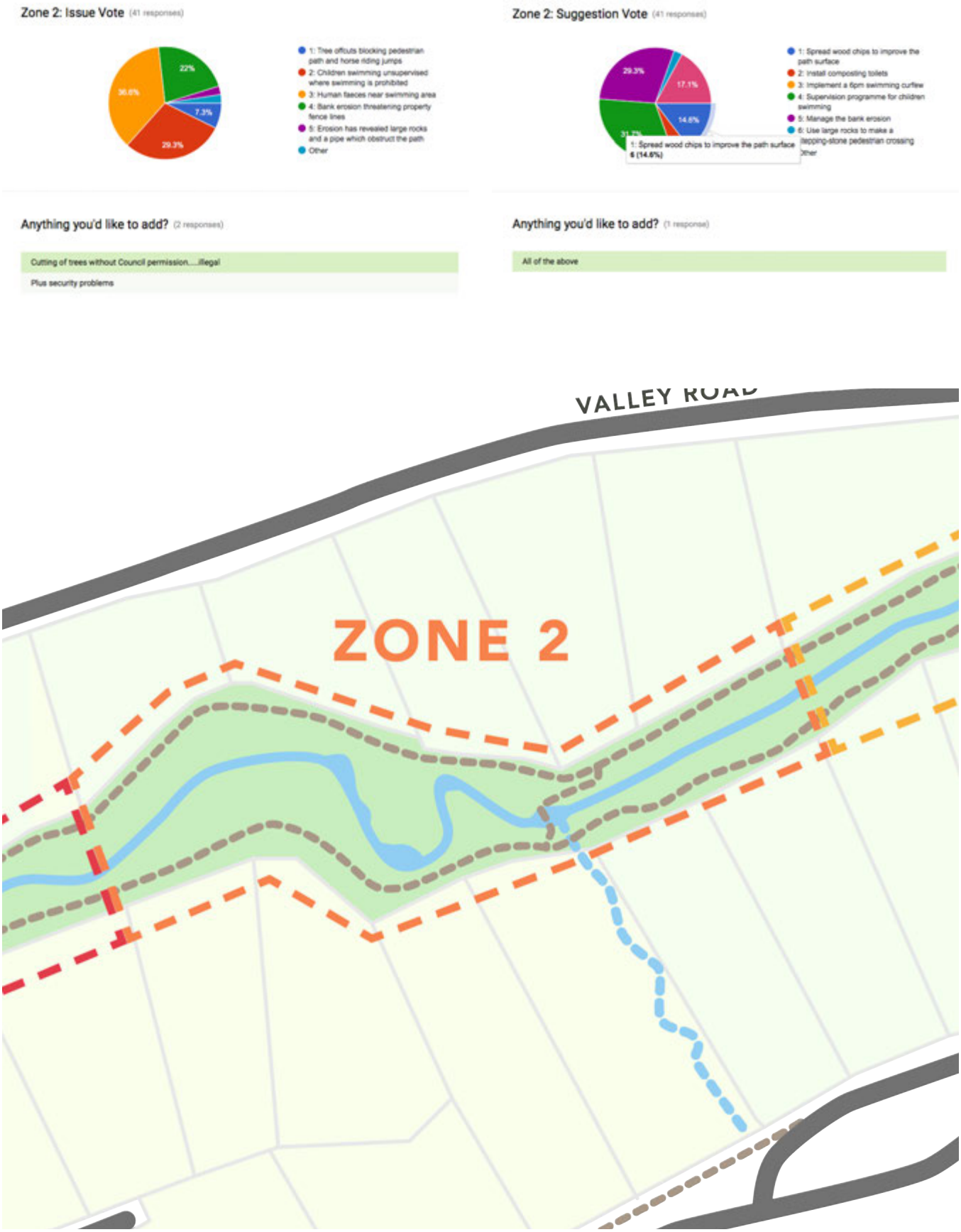
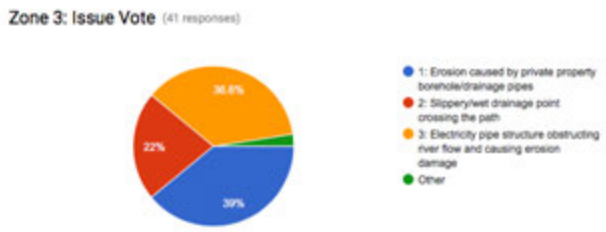



*Figure30:Online Voting Results for Zone 2*

## VOTING RESULTS FOR ZONE 3

ISSUES

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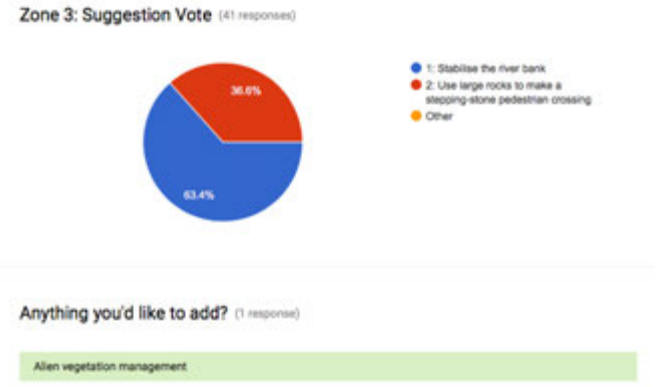
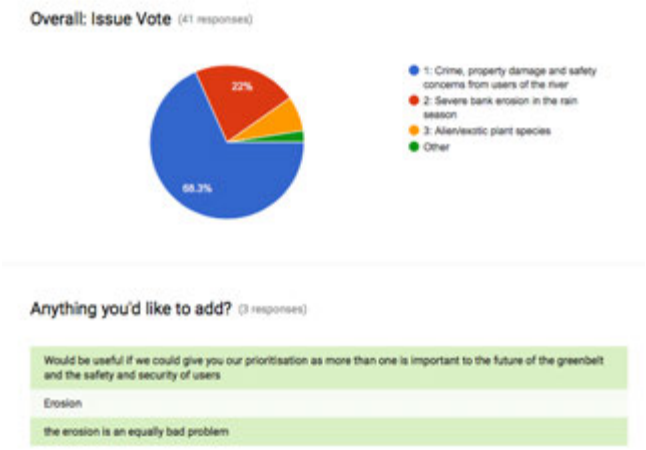




*Figure31:Online Voting Results for Zone 3*

## VOTING RESULTS FOR OVERALL AREA

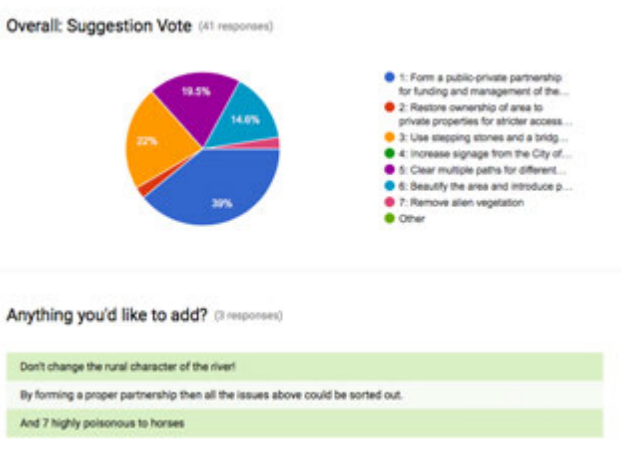
ISSUES







SUGGESTIONS







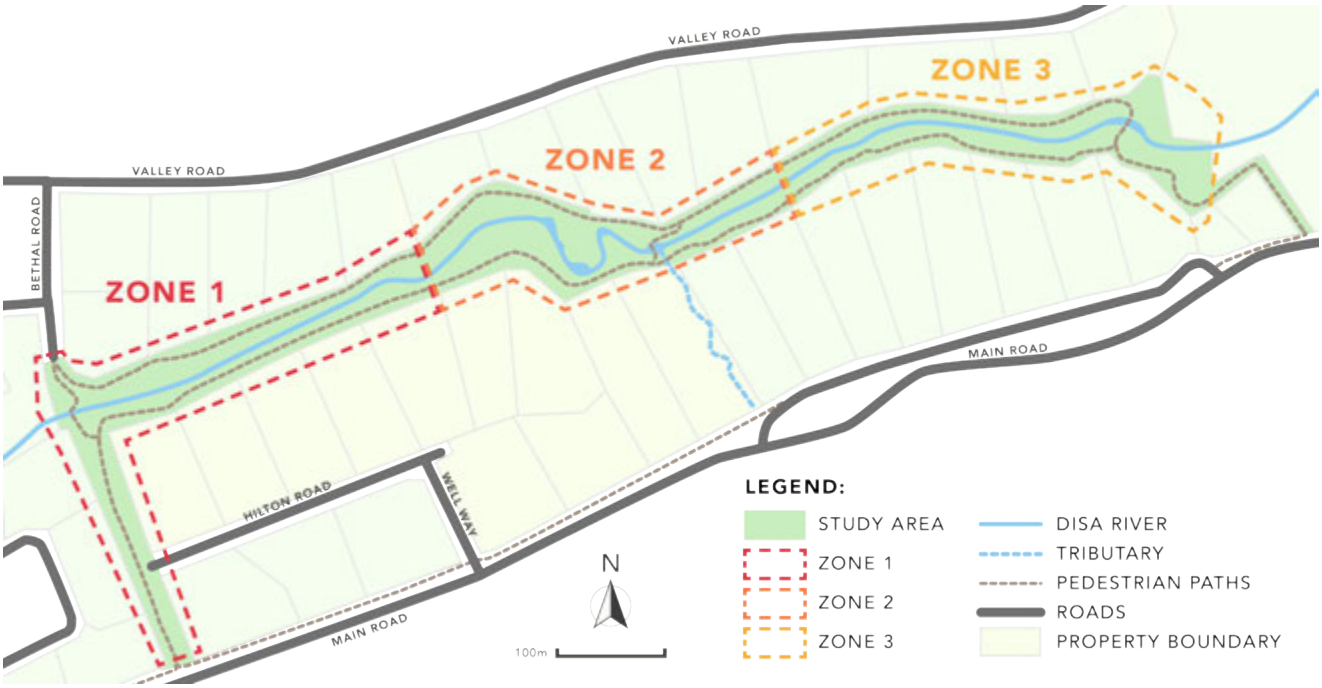



*Figure32:Online Voting Results for Overall Study Area*

trends in the results. The most noticeable one was in zone 1. Both the issue and suggestion votes in this zone demonstrated a need for a safer and more formal crossing. This showed the increased awareness of the dangerous threat the crossing posed to those who used it. The product of this process could be taken forward as an informant of future plans for the space and to promote a partnership between the officials and users. At this stage, I planned to make the information available to the public in a summarised format which could be used to substantiate future interactions between the users and management of the space.

## 6.3. MOVING TOWARDS REFLECTION & DISCUSSION

This research process was completed as comprehensively as possible within the allocated time restraints. In future projects there is potential to explore additional stages in the process and the role that technology could play in these.

The project was dynamic and iterative. I began with limited knowledge of the space and its users, with a theoretical understanding of the traditional modes of participation. At the conclusion of

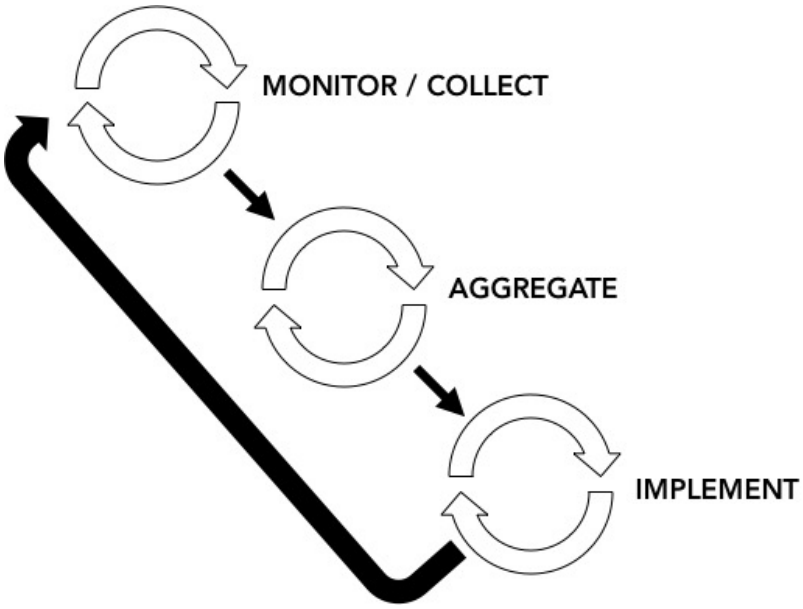



*Figure33:The Iterative Stages of Co-Production using Technology (Author's own)*

the process I have a far deeper understanding of the space and the experiences and perceptions of the people who use it. I have identified through trial and error some strategies which effectively utilise digital tools to develop a more inclusive participation process in this context. This learning was largely enabled by the technology which I used in the research. I was able to start off with a set of research questions and address these in collaboration with a variety of users of the space. In the process, diverse knowledge was not only collected but also processed to become a concise visual representation of what the users of the space experienced and wanted to address. This supported the initial argument that digital tools could be used to enhance the participation process and develop resources for the future planning of a space. In the following and final chapter, I reflect on the key themes that emerged from the research in response to the research questions and emerging issues, and make recommendations based on the outcomes of the project.

*In this chapter, I reflect on the main themes which emerged from the research in response to the research questions, methodology and outcomes. Based on this, I am able to make recommendations – particularly in relation to future research within this field. One of the themes dealt with in this chapter responds directly to the final research question: what needs to change in current planning policy, practice, and research in order to enable a bottom-up approach to participation using digital tools?*

# 7. TECHNOLOGY AS AN 'ENABLER'

One of the main themes which emerged in the literature review was the different roles which technology could play in cities depending on who was advocating or implementing it and the context to which it was being applied. This project demonstrated that this theory can be applied at a smaller scale and time-frame. Technology played multiple roles which were central to the success of the project. One of the findings of the research was that embracing the unique strengths of digital platforms is a key factor in their success and level of interaction. This was particularly evident in my use of Twitter for the project. I tried to force the platform to play the same role as Facebook but they clearly have different strengths and characteristics. The best way to identify the roles which technology could play in this project was to apply them and observe the level and type of interaction that they received. It is important not to dictate how the platforms should be used and to leave this largely in the hands of the users. In the project, this allowed platforms such as Facebook to organically assume a role for which there was a need. This can be equated to small businesses being vulnerable and responsive to market forces when they start. If participants were favouring one form of interaction, I could quickly respond to this by directing more attention to its development.

The narrative process which I recorded in chapters five and six would not have been possible without the technological tools I used. In these chapters, I made the distinction between using technology as a 'collector' and as an 'aggregator'. This is another demonstration of how the role of technology can be differentiated according to the objective for which it is being used. In the crowdsourcing phase I used digital platforms to collect information from participants. Once I had this information, my objective was to process it in collaboration with the participants in order to prioritise objectives and issues and thus develop a potential resource for future planning and co-production. I used technology to achieve this through public online voting. Through these processes, technology enabled me not only to build initial relationships with the diverse users of the study area, but also to coordinate the terms of engagement with them, in order to pursue the end of co-producing and prioritising issues within the space. The question now is how technology could potentially enable these established relationships to progress beyond the point of aggregation to the implementation and monitoring or projects. As Figure # shows, this is one of the points at which an opportunity for future research emerges. The question is, what are the unexplored steps and roles of technology in the cycle of engagement which ultimately enables the cyclical process of inclusive participation necessary for the 'City 4.0' model—of governments as collaborators, and citizens as co-creators—to become a reality? (Figure 34) (Foth, 2016)

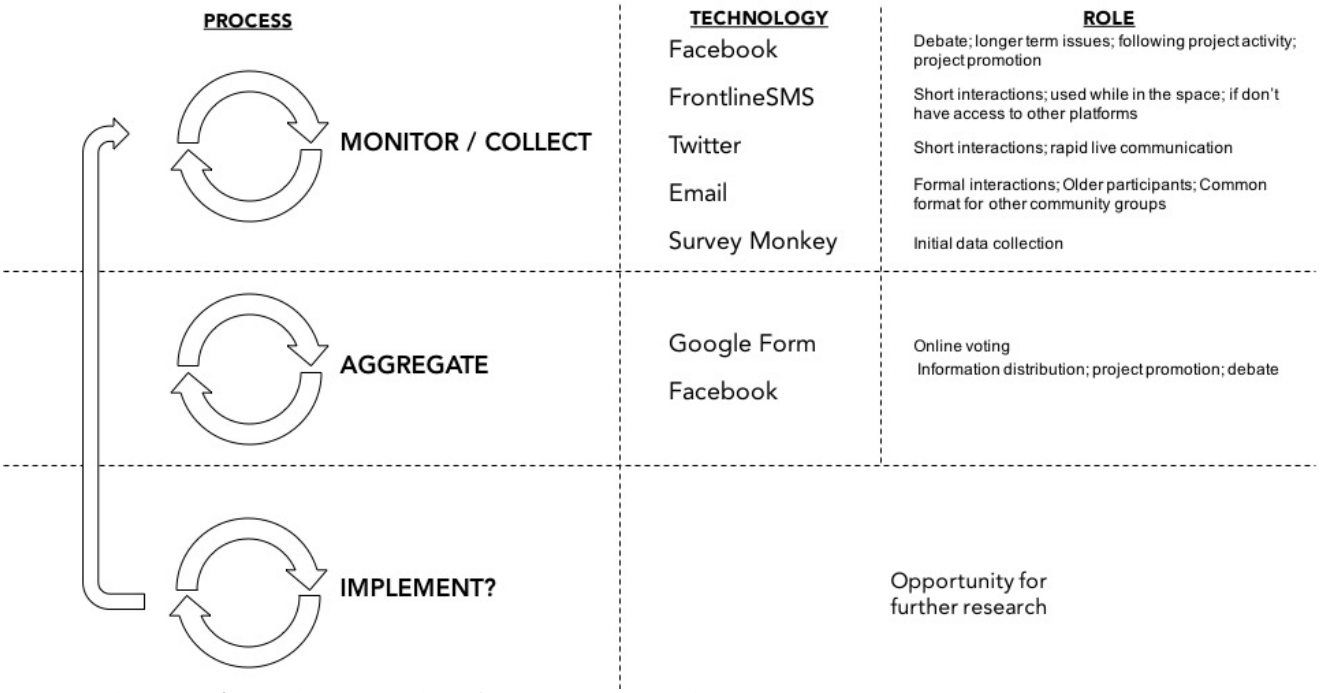



*Figure34:Further Stages of Co-Production required to realise 'City 4.0' (Source: Author's own)*

Even the most basic technology platforms which I used in this project were customizable and could be adapted to fulfil the roles which the research objectives and context demanded. This flexibility is one of the advantages of using these platforms – it was possible to interact with a diverse audience through the system with which they were most familiar. To harness this potential requires a level of trial and error and experimentation. The project needs to respond quickly to positive and negative feedback in order to promote the most successful platforms. It will only be possible to know what different forms of technology are capable of through more case study research in which technology is applied to diverse contexts.

## 7.1. PLANNING, GOVERNANCE AND TECHNOLOGY

I want to reflect on the existing relationship between planning, participation, and technology, and the potential of what this could be. Already, some of my experiences in the project (River Catchment Forum Meeting) had demonstrated that some officials were apprehensive towards the digitally-enabled inclusive participation which I was advocating. In order to get an informed perspective of this, I interviewed a consultant at the Governmental Technical Advisory Centre. This is an agency of the National Treasury established to support public finance management through professional advisory services, programme and project management transaction support. She has also been involved with projects concerning the use of digital tools in both citizen engagement and supporting decision-making.

She had a positive approach to technology becoming more integrated in processes of governance. She argued that "one should use the tools that one has available and I think that technology is an opportunity to expand reach, so personally I embrace using digital tools." I share this optimism. However, it is important that it is grounded with knowledge of the limitations – particularly within the South African context. The 'digital divide' is one of the main limitations to using digital

tools. The respondent was also aware of this issue. However, she noted that if one is aware of it, then it can be addressed in the way that projects are introduced and the platforms they use. For example, she noted that "cell phone penetration is at such a high extent in SA and so having apps or ways to engage citizens using cell phones is brilliant."

For the respondent, digital tools present an opportunity to increase the number of voices considered by parliament beyond the scope of more traditional participatory methods. They can provide a less intimidating and time-consuming alternative for interaction between the public and officials. There is a particular need for this in the South African context where "…there is a great deal of frustration in South Africa about not being heard and listened to." Many of these frustrations are linked to past inequality and current marginalisation; the interviewee saw digital tools as a way to initiate necessary conversations and provide opportunity to marginalised groups to share grievances, and participate in the management of the spaces and systems which they use and which may perpetuate their marginalisation. The role of developing the platforms for this should not be exclusively for governments but also academia and citizens.

The respondent identified some of the main positive aspects to using technology for public participation in governance:

- The level of anonymity which digital engagement offers allows participants to "say more candidly what they won't say to you face to face." The environments created for traditional participation methods can sometimes be 'austere' and intimidating. This could prevent people from sharing personal experiences or frustrations openly.

- The speed with which digital platforms can produce feedback from interactions is another positive aspect of their use in planning. It makes it a less time-consuming process both for the people submitting and processing the information. The convenience of technology could play a role in reaching a more diverse group of participants. More people would be willing to participate if it were an easier process to navigate. This corresponded with my finding from the project that no participant had previously reported issues, because they did not know where to direct them.

- By involving people from the beginning of a project through the crowdsourcing of ideas, a sense of trust may be restored or established. Particularly in the process which I had used, if a pedestrian bridge (the main outcome) were to be introduced, participants would see that their interaction was being valued and considered. This would encourage future interactions and possibly a partnership for the co-production of the space.

The respondent identified the main constraint of this form of engagement to be promoting the initial uptake of the project. The process of distribution would be paramount in the overall success of digital engagement. Another aspect of this would be applying the appropriate technologies to specific situations and contexts.

Building trust with the public and ensuring that participatory processes do not end in disappointment due to false promises was a main concern for the respondent. She noted that: "there have been participatory processes that have broken peoples trust". New approaches to participation and projects would need to acknowledge this and aim to re-establish this lost trust through accountability and transparency. A lot of the success of participation comes down to their intent and the way that this is communicated with the participants. For example, the respondent commented that "it comes down to the intent … are participation processes being done to tick a box? Or is it being done to really consider broader perspectives and issues? … if the intent to listen is there I think people will be more open and the uptake could be better."

Engagement is a two-way process and the willingness of officials to listen and engage with the public is as important as the willingness of the public to engage with a project. Partnership is a key variable in the effectiveness of these projects. The interviewee had found partnerships and co-production with the public to be amongst some of the most rewarding and effective projects that she had been involved in. For her, a process of cooperation where "you sit at a table and say I don't know the answer … and you figure it out together as a citizen and an official" was what democracy should be striving towards. She argued that where there are tools which can enable this pursuit, they should be used to develop a more effective and open system of governance. The government should be seen as a collaborator and city residents as co-creators.

It was clear from this interview that there is optimism and intent regarding the use of digital tools in planning and governance. However, in order for the potential of this to be applied and tested in the South African context, policy and legislation needs to become more flexible, responsive and relevant to modern technology. The respondent identified the example of a lack of a current cyber-crime policy as a mismatch between the rate of advancement of technology and changes within governance. She argued that this mismatch can result in vulnerabilities as well as missed opportunities: "the process is too slow and the digital world is changing so vastly and so quickly that they actually don't have a hope."

Important steps are being taken for improving the use of technology in South African governance. This is happening to a different extent in cities – with some such as Cape Town embracing available tools more than others. A local government toolkit for using mobile platforms for participation was developed in 2014 and is a positive step towards making the use of technology in processes of governance more common (SALGA, 2014). In cases where there are projects using digital tools, there seems to be an individual or small group driving the process. By developing toolkits, the use of digital tools could become an option for more officials. However, this document needs to be supplemented with platforms for sharing knowledge and lessons learnt through the individual projects. This would help the strategy continue to improve and react dynamically to the changing technological tools which are available.

## 7.2. IS HYBRIDISATION THE FUTURE?

During the research process, I encountered three sets of seemingly paradoxical concepts. Each individual of the pairs had positive and negative associations. To establish a hybrid is to find a combination in which the positive elements of the concepts can complement each other to form a new concept. In one case, an example of how this can be achieved was established in the research. For the other two, more research is required in order to determine where the middle-ground may occur.

### 7.2.1. Physical and Digital

Despite technology being recognised as a significant enabler in this research project, it should not be received as a 'catch-all'. The supplementation of digital with physical tools played a crucial part in its success. Initially, the importance of physical signage was recognised for spatializing information collected through crowdsourcing. However, as the project progressed, it became clear that physical tools would be an important factor for achieving inclusivity in the project.

As a result of this realisation, a hybridised approach was developed. I ensured that each processes of the project had a physical and digital component. This was applied to:

- Crowdsourcing: I used a physical copy of the online survey and semi-structured interviews as physical alternatives to the online versions. This resulted in a more balanced representation of user experiences and issues in the space.

- Marketing: In order to increase engagement with the project, I had to market it. Online this meant advertising the project on Facebook Pages and Twitter. Physically, this meant the distribution of flyers and the erection of signs. Word of mouth was a particularly powerful tool in spreading information regarding the project to people within the pedestrian CoP. In order to promote this medium, I gave multiple flyers to participants who requested them in semi-structured interviews so that they would have a visual aid which would help in describing the project to fellow pedestrians.

- Aggregating: The online voting platform was the main tool used to prioritise issues. Although performing a slightly different role in the project, the focus groups can be seen as one physical supplementation of this. The other was using an iPad to approach pedestrians to vote while they were using the space.

One of the main findings of the fieldwork was that communication needs to be in a format which is convenient and familiar for the participant. This finding does not only include digital tools but alternative physical 'technologies' as well. For example, word of mouth is an incredibly effective tool within Imizamo Yethu – most likely due to the significantly lower levels of internet access. It is important when considering a context for a project such as this to consider what is already present in terms of networking and problem-solving. With this knowledge, technology can be used

to hybridise and enhance existing communication strategies rather than establish completely new ones.

### 7.2.2. Top-Down and Bottom-Up

In the literature review, a need was established for a middle-ground to be found between these two approaches. Multiple dimensions of the top-down discourse were explored. One of these was the use of big data to guide decision-making. It was found that the potential of this resource to introduce positive change is largely determined by who is processing and has access to the information. Making this information available as an open-source resource is one of the potential ways in which first steps could be taken towards a hybridisation of top-down and bottom-up approaches.

One of the strengths of bottom-up approaches is their focus on a local scale of intervention which is one of the main factors which promotes inclusivity. There is potential for multiple projects of this nature to collectively decentralise decision-making and increase awareness and accountability within a larger urban context. The availability of scientific data through open-source portals could be used to enrich these projects through the addition of new digital tools. Open-source data could be used to compare the hard data of urban issues with citizen's perspectives of them. This would ultimately establish a more informed and refined final resource for future planning and co-production.

The example of 'OrganiCity' in the literature review demonstrated how making data—and the tools to process it to address specific issues—publicly available can inspire innovation and increase accountability and the decentralisation of decision-making (OrganiCity, 2016). In order to establish a meaningful hybrid, it is necessary to develop the skills in marginalised areas for these resources to be used. For example, if the capacity were developed within these communities for people to access and use open-source data regarding the provision of basic services to express their marginalisation and to hold the government accountable, then this would be a true hybrid of top-down and bottom-up approaches. It could be taken further if time and resources were allocated by the government to permit further cycles of the engagement process to be explored. For example, if tangible projects could be implemented which are informed by the bottom-up processes of public participation which used open-source data and digital tools.

This is where the idea of collaboration becomes important. Perhaps it is the responsibility of people within academia, who have the necessary skills and intent, to co-create action projects which aim to challenge and voice the experiences faced by marginalised groups and in doing so establish a conduit for the sharing of information between the government and citizens. There is a need for more case study projects with this aim in order to explore whether and how these collaborative partnerships can be facilitated and if the result represents a hybrid of the two approaches.

## 7.2.3. Traditional And New

The heading of this reflection is extremely broad. Through the project there was an emerging theme of old approaches meeting new potentials. It was found that there is an informing link between these two elements which should be embraced. There is a tendency, particularly where technology is applied, to have an 'out with the old, in with the new' attitude. However, this approach would negate a significant resource which could contribute to the success of the new approaches and resources. There are three main areas in which this became apparent.

Firstly, in terms of technology it was found that new technology does not emerge in isolation from older forms. When a new technology is implemented, it is often in response to the shortcomings of a past platform or a new need which has been established. It is not a linear process. The strengths of past technologies are carried forward in new ones. It is important to understand that each platform responded to a need at one point. It may still be in use by people due to its success in addressing this. For example, older participants and established community groups favoured email as a mode of communication due to its continued role as a platform for more formal communication. Due to my bias as a user of social media, I had underestimated the potential of email to play a substantive role in the project. It is easy to let one's own technological preferences shape predictions of their performance within a community. However, this must be avoided in order for the responsiveness to interaction necessary for the success of a project to be enabled. Essentially, the goal should be to maximise initial choice and refine the project as it is engaged with. The newest technology may not necessarily be the most successful one in a given context. A hybrid approach is required which combines new and old platforms of communication in order to maximise the diversity of participants contributing to a project.

Secondly, in terms of approach to city planning, smart cities should not be viewed in isolation from past planning approaches. The smart city does not present a new paradigm in city planning. Rather, it often relates to the way in which current tools (technology) are used in order to realise the ideals for city planning put forward in the past. This is a theme throughout the literature review. Links are made between the way that technology is applied to an urban context and past arguments in planning which would have aligned with this. For example, I draw on the works of Jane Jacobs, Kevin Lynch and Patrick Geddes to substantiate the use of technology as an enabler of decentralised decision making and realising the value of the knowledge of the people who use a space. On the opposite side of the spectrum, the African Urban Utopias were argued to be closely aligned with the past planning approaches of blueprint and master planning. It is important to ground the opportunities technology presents within these past planning approaches. This can reduce the repetition of mistakes and be used to guide and substantiate the implementation of projects. A hybridised approach should be established which incorporates the wisdom and experience of traditional approaches to city planning as well as the creative and unchartered application of new technologies.

Lastly, there are clear limitations in existing participation processes. This project demonstrated how

technology could be used to address some of these. However, the digital platforms for participation must be supplemented by reformed traditional approaches such as community meetings. The products of participation through technology can inform a more inclusive, dynamic and targeted meeting process. In reflection on the public River Catchment Forum Meeting which I attended, some of the main problems were that marginalised groups were not represented and there were too many projects being proposed for any decisions to be made. Participation through technology can be used to promote a more inclusive meeting as groups are made aware of the experiences of different CoPs and the value which they could add to the planning process. Secondly, if a process such as the one used in this project could be conducted before a public meeting took place, it could be used to structure it more effectively. For example, the resource established through the final online voting process clearly showed that the largest concentration of issues was in Zone 1. And therefore this could become the area under consideration. Secondly, evidence could be shown that the need for a formal and safe crossing point was the most urgent in this zone. Through a hybridised participation strategy, the scope of the project could potentially be broadened to incorporate and prioritise intervention in more areas of the riverine system.

## 7.3. THE EMERGING ROLE OF NETWORK ACTION RESEARCH

Network Action Research (NAR) is an emerging branch of Participation Action Research which is being driven by the ever-increasing availability of technology. In the methodology section I explored the logic and process behind this method. In this section, I want to reflect on the methodology and the contribution which it could make to urban planning knowledge. These reflections are based on how the methodology performed in the context of this research project as a way of addressing the research questions.

It was clear in my interactions with the pedestrians who use the study area that they felt marginalised by existing processes of participation and management. This was true not just within the space but also within Imizamo Yethu where they live. Top-down planning seemed to be the norm. It is problematic that the most active users of the space are not actively included in discussions, consulted regarding their experiences in it, or valued for their opinions on how it should be managed. One of the roles of NAR is to challenge these existing methods of participation and perception of the process as a 'box to tick' or as an obstruction to the initiation of projects. Projects should aim to demonstrate the value of inclusive participation and the role that technology can play in enabling this process by making it faster and easier to initiate.

Another finding of this research was the disconnection between the experiences of the pedestrians and the perceptions of other users. This seemed to be a problem which extended beyond the study area. The inaccurate perception of the pedestrian user experience was not due to a lack of empathy but rather awareness. NAR provided this opportunity for user groups to be made aware of each other's experiences within the space. Through the project, it was interesting to watch perceptions being challenged and changed. The final vote reflected this change as the clear majority of votes in zone 1 aimed to improve the walkability of the area. Sharing the crowdsourced issues also portrayed the high level of marginalisation experienced by the pedestrian users of the space. The

majority of the other Communities of Practice agreed that this lack of representation should be challenged and changed. Promoting awareness and making sense of the diversity within a space is an important role for NAR to play when applied to situations and contexts.

One of the main reasons for choosing NAR for this project was that it bridges the divide between theory and practice. This process allows theory to be tested and applied to real-world situations. It allows for practical knowledge to be acquired through experience and experimentation. The method also shifts the traditional hierarchy and roles of the researcher and participant in a project. For me, the co-production of data which this allowed was the most important component of the project. It demonstrated the value which inclusive participation could play in the planning process. Although I knew the theory behind this, it was only when I actually collected crowdsourced knowledge that it became tangible.

Partnership between academia, public and private sectors is a powerful concept. This collaboration can result in a spirit of experimentation and the development of more inclusive and innovative approaches to identifying and addressing urban issues. Academia in particular has a responsibility to utilise the knowledge and skills within it to address issues being faced in the surrounding context of the institutions. NAR could play an important role in promoting this as it encourages the application of theories and resources to real-world contexts in collaboration with the people who inhabit and use them.

The end products of NAR are contributions to three different areas of knowledge. Due to its context-specific application, the transferrable knowledge which projects using this method develop is mainly from the processes of the research. Firstly, how technology was used in the project, and secondly, the research method which enabled this role. The method of recording the fieldwork process is very important for the success of this research. The narrative method was found to be a particularly good fit as it allows for a story to be told of how the research process unfolded and the actors within it. The third type of knowledge produced relates directly to the context to which the method was applied. This product is mainly of importance to the participants in the project and the researcher. Particularly in this project, where the outcome was a resource for the future co-production of the study area.

There is a need for more case study research using NAR methods in order for the existing body of knowledge to be furthered. For example, more case studies could contribute to understanding which technologies are best for enabling the specific objectives of a project. Also, projects - especially within a developing context - could explore how this effects the use of digital tools and how they promote inclusive participation. For example, the finding that particularly in a context where a digital divide is present, digital tools must be supplemented with other physical instruments of participation. Future comparative research utilising the NAR method could contribute to the understanding of how different contexts may shape different technologies and intervention processes.

There is an underlying theme of experimentation associated with the NAR method. Due to its

focus on emerging digital tools, it is only through application that theories and knowledge can be developed regarding the opportunities and limitations of using technology to address urban issues from a grassroots level.

*The final chapter provides a short overview of the dissertation. Starting with the contribution which was intended, then exploring the method which would enable this. The key findings of the project are used to substantiate its success in addressing the research questions posed. Lastly, key areas are identified for further research in this field.*

# 8. CONCLUSION

This dissertation began with an exploration of the conflictions within the smart city discourse. It was found that the concept had become ambiguous through its use as an umbrella term for a broad range of approaches to applying technology to urban issues. However, despite this, technological innovation is recognised as one of the main ways through which urban and, in turn, international issues can be addressed. A central distinction was made between top-down and bottom-up smart city strategies. The scope of the research was narrowed to bottom-up strategies: the processes which constitute them and the role which these could potentially play in the prioritisation of urban issues, decentralisation of decision-making, and enabling of co-production. The research aimed to explore how this role is fostered in a specific context through the application of technology. This was identified as an under-researched area in the existing literature. The research questions and methodology for the project were developed with the aim of contributing to this body of knowledge.

The main research questions which guided this dissertation were:

- How do bottom-up ICT-based local projects for civic engagement start and how do they stimulate inclusive engagement of the diverse groups that use a common space?
- How can the data collected through these platforms be processed in order to be a tool for evidence-based long-term planning and the co-production of space?
- What needs to change in current planning policy and practice in order to enable this bottom-up approach to stimulate participation in order to establish a bi-directional flow of information between officials and local communities?

Subsidiary questions were developed in relation to the findings of the literature review and contextual factors of the case study chosen. In order to address these questions, a research method was required which incorporated both participative action and the use of technology. Network Action Research (NAR) was identified as the method most suitable for this purpose in combination with the case study method. The use of NAR resulted in a new potential contribution of the research: exploring how a project using NAR would unfold and how it could best be recorded. The case study chosen for the project was a public open space in Hout Bay, Cape Town. Hout Bay can be seen as a microcosm of South Africa due to the prevalence of issues of inequality and marginalisation. The study area within this context is used by a diverse group of people and was an ideal location to determine the extent to which technology could enable inclusive participation and the co-production of space.

The fieldwork process and record of it was divided according to the sequence of the research questions. The narrative method was chosen to document the process. It performed well in exploring

the complexities of the NAR method and the positionality of the researcher as a participant and co-creator in the process. It was found that technology could perform different roles to enable each of the research questions to be addressed.

Firstly, technology played the role of 'collector' of information from the diverse groups of users of the study area in order to map identified issues and proposed solutions within the space. This process contributed to a more informed understanding of how local projects which use ICT for engagement can be implemented and made inclusive. It was found that an in-depth contextual understanding of the study area must first be developed. This can inform the types of technologies used and extent to which these are supplemented by other instruments of participation. Through crowdsourcing, key issues were identified as well as the main Communities of Practice. Secondly, technology played the role of 'aggregator' in order to develop a visual prioritisation of crowdsourced issues and solutions for the study area. This showed how collected information can be processed to be a tool for the future planning of a space. Clear trends emerged through voting which demonstrated an alignment between the goals of the different CoPs. The final product of this could be used as evidence to prioritise projects. It is important that inclusive participation continues from the crowdsourcing to aggregating phase as this promotes a balanced and informed final product. Lastly, the process and results of the research were reflected upon in order to generate recommendations. Within this, the final research question was explored. An in-depth interview with an official was drawn upon in order to outline the current relationship between governance and the use of technology. It was found that some cities have been more progressive than others in this regard. Promising steps are being taken in promoting the use of ICT for engagement. E.g. The Mobile Participation Toolkit developed for local municipalities. However, there is a need for a more flexible and consistent approach if the potential of future technology is to be harnessed for effective governance. The role of introducing these projects does not rest solely with the government. As shown in this project, one of the strengths of bottom-up approaches is that they can be established by civil society, academia or ideally a partnership incorporating all three of these actors.

The fieldwork process exposed the complexity behind enabling participatory planning and the inclusive co-production of space. However, it also showed the significant role which technology could play in enabling this. Using technology, relationships could be formed and used to direct action. It was found that digital tools are incredibly flexible and have the potential to reach a diverse audience. However, technology is commonly misconceived as a catch-all solution to problems. In this context, this was not the case. A hybrid of digital and physical methods was developed in order to ensure that the digital divide evident in the study area was addressed and its restricting influence on inclusivity mitigated. This was a critical factor in the success of the fieldwork.

The findings of this research have specific implications for planning in a global south context. Bottom-up projects can be initiated through partnerships. They are of a relatively low cost and do not require specialist skills for their implementation. This means that with a relatively small amount of resources, significant changes can be made in the distributed autonomy of cities and decentralisation of decision-making. One of the products of the participative fieldwork process was a prioritisation of the issues and potential solutions within the study area. In a context where

resources and budget are restricted, this could be a potential tool to direct resources to projects which can maximise positive impact.

In the context of South Africa, the need to address socio-spatial marginalisation and inequality should be at the forefront of planning concerns. In order for transformative action to be effective, a platform must be established which enables marginalised voices to contribute to addressing the problems which they face. Technology has a significant role to play in this and in challenging the stigmas towards public participation (e.g. it obstructs action, people will not understand the plans etc.). In the literature review, the next progression in the relationship between government and citizens was identified to be 'collaborator' and 'co-creators'. The findings and process of this research project contribute to the argument that the bottom-up smart city approach can contribute significantly to achieving this goal of co-production.

Multiple areas for future research have been identified in relation to the methodology and findings of this dissertation. Firstly, more case study research projects which use NAR to investigate the bottom-up application of technology to urban issues are required. These can contribute further understanding of the different roles which technology can play. Comparative research could explore how contextual factors may affect the process. One of the major limitations to this research was the time-frame. With more time, the steps in the engagement process could move beyond crowdsourcing and aggregation to implementation and monitoring. It could also explore how the authorities within a space could be included in the process in order to establish a partnership for co-production. Additionally, which technologies could enable this and what their respective roles would be.

Secondly, the emergence of hybridisation was one of the main points of discussion. This research contributed to the understanding of how physical and digital tools for engagement can be combined. However, further research is required in order to identify where other seemingly paradoxical concepts may be integrated and result in a more effective way forward.

As the researcher, this project was incredibly stimulating and challenging. It required constant attention and flexibility to respond to the influx of engagement which it collected. The most exciting aspect of the project was being able to play the role of a co-creator and participant as well as researcher. It was a humbling experience which brought attention to the value of diverse opinion and the importance of providing marginalised users of a space the opportunity to contribute to its improvement. This collaborative approach allowed not only for solutions to be found but also for the right questions to be asked. The smart city truly is a hollow concept without smart citizens. The smartest citizens are those who use a space most actively and are exposed to the issues within it. The role of technology is to enable a society to reclaim its right to the co-production of space. It seems fitting to conclude this dissertation with the following quote:

**"Those closest to the problem should be at the forefront of the solution." - Anonymous**

# 9. REFERENCES


Agyeman, J. & Mclaren, D. 2016. Apps don't make a city smart. Available at [https://www.bostonglobe.com/ideas/2016/08/13/apps-don-make-city-smart/YrEuTHcHAFArq5piut1nrN/story.html]. Accessed August 15, 2016.

Alexander, C. 1965. A City is Not a Tree. Architectural Forum. 122(1): 58-62.

Aurigi, A. 2005. Competing urban visions and the shaping of the digital city. Knowledge, Technology and Society 18(1): 12–26.

Bakici, T., Almirall, E. & Wareham, J. 2012. A Smart City Initiative: The Case of Barcelona. Journal of the Knowledge Economy. 4: 135-148.

Battle, G. 2007. Sustainable Cities. In The Endless City. Burdett, R. & Sudjic, D., Eds. London: Phaidon. 54-69.

Batty, M. 2013. Big data, smart cities and city planning. Dialogues in Human Geography. 3(3): 274-279.

Brydon-Miller, M., Greenwood, D. & Maguire, P. 2003. Why Action Research?. Action Research. 1(1): 9-28.

Bulkeley, H., Luque, A., McFarlane, C. & Macleod, G. 2013. Enhancing Urban Autonomy: Towards a new political project for cities. Discussion Paper for Friends of the Earth's Big Ideas Change the World project on the topic: How can we get cities driving positive social, environmental and economic change?'. June, 2013.

City of Cape Town (CoCT). 2016. ECAMP Business Location Intelligence. Available at: [https://web1.capetown.gov.za/web1/ECAMP/Home/About]. Accessed Auguse 16, 2016.

Conway, S. & Steward, F. 2009. Managing and shaping innovation. New York, USA: Oxford University Press.

Corner, J. 1999. The Agency of Mapping: Speculation, Critique and Invention. In Mappings. D. Cosgrove, Ed. London: Reaktion Books. 213-252.

CSIR. 1988. Estuaries of the cape: Part II Synopses of Available Information on Individual Systems. (Report no. 29: Hout Bay (CW 27)). Stellenbosch, South Africa: CSIR Research Report 428.

Datta, A. 2016. The Smart Entrepreneurial City: Dholera and 100 other utopias in India. In Smart Urbanism: Utopian Vision or False Dawn. S. Marvin, A. Luque-Ayala & C. McFarlane, Eds. New

York: Routledge. 52-70.

Dechief, D., Longford, G., Powell, A. & Werbin, K.C. 2008. Enabling Communities in the Networked City: ICTs and Civic Participation Among Immigrants and Youth in Urban Change. In Augmented Urban Spaces. A. Aurigi & F. De Cindio, Eds. Cornwall: Ashgate Publishing. 155-170.

Duminy. J., Andreasen, J., Lerise, F., Odendaal, N., and Watson, V. 2014. Planning and the Case Study Method in Africa: The Planner in Dirty Shoes. London: Palgrave Macmillan.

Flyvberg, B. 2011. Case Study. In The Sage Handbook of Qualitative Research. N.K Denzin & Y.S. Lincoln, Eds. 4th Edition. Thousand Oaks, CA: Sage Publications. 301-316.

Flyvberg, B. 2001. Making social science matter: Why social inquiry fails and how it can succeed again. Cambridge, UK: Cambridge University Press.

For Love of Water (FLOW). 2010. South African rivers under threat [Blog, 16 May]. Available: http://forloveofwater.co.za/south-african-rivers-under-threat/ [2016, September 13].

Foth, M. 2016. City 4.0 – city governments as collaborator & city residents as co-creators. [Twitter post, August 11]. Available: https://twitter.com/sunday9pm/status/763816961784606720. [2016, November 1].

Foth, M. 2006. Network Action Research. Action Research. 4(2): 205-226.

Foth, M. & Brynskov, M. 2016. Participatory action research for civic engagement. In Civic Media: Technology, Design, Practice. E. Gordon & P. Mihailidis, Eds. Cambridge, MA: MIT Press. 563-580.

Freire, M. & Hoornweg, D.A. 2013. A data compendium for the World's 100 largest urban areas. Urban development series knowledge papers; no. 17. Washington, DC: World Bank Group. Available at: [http://documents.worldbank.org/curated/en/2013/07/18119984/building-sustainability-urbanizing-world-partnership-report-vol-2-2-final-report]

Frontline. 2016. Product: How Frontline Works. Available: http://www.frontlinesms.com/product/. [2016, August 18].

Gawith, M. 1996. Towards a Framework for Integrating Environmental and Community Concerns into the Planning and Development of Informal Settlements: a case study of Hout Bay, Western Cape, Thesis (MSc) Department of Environmental and Geographical Science, University of Cape Town.

Gaved, M. & Mulholland, P. 2008. Pioneers, Subcultures and Cooperatives: the Grassroots Augmentation of Urban Places. In Augmented Urban Spaces. A. Aurigi & F. De Cindio, Eds.

Cornwall: Ashgate Publishing. 155-170.

Hajer, M. & Dassen, T. 2014. Smart about Cities: Visualising the Challenge for 21st Century Urbanism.,Netherlands: Nai Publishers.

Hamdi, N. 2010. The Placemaker's Guide to Building Community. London, UK: Earthscan.

Hemment, D. & Townsend, A. 2013. Here Come The Smart Citizens. In FutureEverything Publications: Smart Citizens. D. Hemment & A. Townsend, Eds. Manchester, UK: FutureEverything Publications. 1-3.

Hill, D. 2013. On the Smart City; Or, a 'manifesto' for smart citizens instead. Available at [http://www.cityofsound.com/blog/2013/02/on-the-smart-city-a-call-for-smart-citizens-instead.html]. Accessed August 15, 2016.

Hollands, R.G. 2016. Beyond the Corporate Smart City?: Glimpses of other possibilities of smartness. In Smart Urbanism: Utopian Vision or False Dawn. S. Marvin, A. Luque-Ayala & C. McFarlane, Eds. New York: Routledge. 71-87.

Hollands, R.G. 2008. Will the real smart city please stand up? Intelligent, progressive or entrepreneurial?. City. 12(3): 303-320.

Jacobs, J. 1961. The Death and Life of Great American Cities. New York, USA: Vintage Books.

Keane, M. 2004. Network or perish? In Innovation in Australian arts, media and design: New challenges for the tertiary sector. R. Wissler, B. Haseman, S.A. Wallace & M. Keane, Eds. Flaxton: Post Press. 135-147.

Kitchin, R. 2014. The real-time city? Big data and smart urbanism. Geojournal. 79: 1-14.

Le Corbusier. 1922. Ville Contemporaine de 3 Millions d'Habitants. Installation, Salon d'Automne, Paris.

Le Roux, M. 2007. Hout Bay land inequality a 'microcosm' of SA. Mail *Guardian. 21 May 2007. Available: http://mg.co.za/article/2007-05-21-hout-bay-land-inequality-a-microcosm-of-sa [2016, September 12].

Luque-Ayala, A. & Marvin, S. 2015. Developing and critical understanding of smart urbanism?. Urban Studies. 52(12): 2105-2116).

Lynch, K. 1960. The image of the city. Cambridge, Massachusetts: MIT Press.

Marks R and Bezzoli, M (2000) Palaces of desire: Century City and the ambiguities of development,

Urban Forum 12 (1) 27-48

McLaren, D. & Agyeman, J. 2015. Sharing Cities: A Case for Truly Smart and Sustainable Cities. United States of America: The MIT Press.

Mitchell, H. & Odendaal, N. 2016. From the Fringes: South Africa's Smart Township Citizens. In Citizen's Right to the Digital Democracy: Urban Interfaces, Activism and Placemaking. M. Foth, M. Brynskov & T. Ojala, Eds. New York: Springer.

Odendaal, N. 2016. Getting Smart about Smart Cities in Cape Town: Beyond the rhetoric. In Smart Urbanism: Utopian Vision or False Dawn. S. Marvin, A. Luque-Ayala & C. McFarlane, Eds. New York: Routledge. 71-87.

Odendaal, N. 2006. Towards the Digital City in South Africa: Issues and Constraints. Journal of Urban Technology. 13(3): 29-48.

Oelofse, C. & Dodson, B. 1997. Community, Place and Transformation: A Perceptual Analysis of Residents' Responses to an Informal Settlement in Hout Bay, South Africa. Geoforum 28(1): 91-101.

OrganiCity. 2016. Tools. Available: http://organicity.eu/tools/. [2016, November 1].

Poole, S. 2016. What's Yours is Mine: Against the Sharing Economy by Tom Slee review – the problem with Airbnb and Uber. Available: https://www.theguardian.com/books/2016/apr/02/whats-yours-is-mine-against-the-sharing-economy-tom-slee-review. [2016, November 1].

Ratti, C. & Claudel, M. 2016. The City of Tomorrow: Sensors, Networks, Hackers, and the Future of Urban Life. United States of America: Yale University Press.

Ratti, C. & Townsend, A. 2011. The Best Way to Harness a City's Potential for Creativity and Innovation Is to Jack People into the Network and Get Out of the Way. Scientific American. 42-48.

Sandercock, L. 2003. Who knows? Exploring planning's knowledges. In Cosmopolis II: Mongrel cities of the 21st century. L. Sandercock, Ed. London: Continuum. 59-82.

Sassen, S. 2001. The Global City: New York/London/Tokyo. Princeton, NJ: Princeton University Press.

Saunders, T. & Baeck, P. 2015. Rethinking Smart Cities from the Ground Up. London: Nesta.

Scheepers, M.J. & Bloom, J.Z. 2005. Resident Perceptions of Mixed-Use Development in Hout Bay, Cape Town. SAJEMS NS 8(1): 1-17.

Shelton, T., Zook, M. & Wiig, A. 2015. The 'actually existing smart city'. Cambridge Journal of Regions, Economy and Society. 8: 13-25.

Shepard, M. & Simeti, A. 2013. What's so smart about the Smart Citizen?. In FutureEverything Publications: Smart Citizens. D. Hemment & A. Townsend, Eds. Manchester, UK: FutureEverything Publications. 13-18.

Soja, E. & Kanal, M. 2007. The Urbanization of the World. In The Endless City. Burdett, R. & Sudjic, D., Eds. London: Phaidon. 54-69.

Statistics South Africa (Stats SA). 2016. Main Places: Hout Bay. Available: http://www.statssa.gov.za/?page_id=4286&id=332. [2016, September 13].

Statistics South Africa (Stats SA). 2016. Main Places: Imizamo Yethu. Available: http://www.statssa.gov.za/?page_id=4286&id=333. [2016, September 13].

Steffen, W., Grinevald, J., Crutzen, P. & McNeill, J. 2011. The Anthropocene: conceptual and historical perspectives. Phil. Trans. R. Soc. A. 369: 842-867.

Tinkerspace. 2016. Start making something. Available: http://www.tinkerspace.se. [2016, November 1].

Townsend, A.M. 2013. Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia, United States of America: W.W Norton & Company.

United Nations (UN). 2016. Sustainable Development Goals, September 2015. Available: http://www.un.org/sustainabledevelopment/sustainable-development-goals/. [2016, November 2].

Watson, V. 2013. African urban fantasies: dreams or nightmares?. Environment and Urbanization. 26(1): 1-17.

Weiser, M. 1991. The Computer for the 21st Century: Communications, Computers and Networks. Scientific American. Special Issue: 76-81.

Welter, V. 2003. Patrick Geddes and the City of Life. Cambridge, MA: MIT Press.

Wenger, E. 1998. Communities of Practice: Learning, Meaning and Identity. Cambridge University Press.

Westby-Nunn, T. 2005. Hout Bay: An Illustrated Historical Profile. South Africa: Westby-Nunn Publishers cc.

Wiener, N. 1950. The Human Use of Human Beings: Cybernetics and Society. London, UK: Houghton Mifflin.

World Economic Forum. 2016. The Global Risks Report 2016: 11th Edition. Geneva: World Economic Forum.

Yin, K.R. 2014. Case Study Research: Design and Methods. 5th Edition. United States: Sage Publications.

# ANNEXURE A: APPROVED ETHICS FORM

# APPLICATION FORM

**Please Note:**
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form **before** collecting or analysing data.The objective of submitting this application *prior* to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the **EBE Ethics in Research Handbook**(available from the UCT EBE, Research Ethics website) prior to completing this application form: http://www.ebe.uct.ac.za/usr/ebe/research/ethics.pdf

| **APPLICANT'S DETAILS** | | |
|---|---|---|
| Name of principal researcher, student or external applicant | | David Corbett |
| Department | | Architecture, Planning & Geomatics |
| Preferred email address of applicant | | David-corbett@live.com |
| If a Student | Your Degree e.g., MSc, PhD, etc., | MSc |
| | Name of Supervisor (if supervised) | Dr. Nancy Odendaal |
| If this is a researchcontract, indicate the source of funding/sponsorship | | National Research Foundation |
| Project Title | | Exploring the Potential of Crowdsourcing Data as a tool for Evidence-based Spatial Planning |

**I hereby undertake to carry out my research in such a way that:**

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

| **SIGNED BY** | Full name | Signature | Date |
|---|---|---|---|
| **Principal Researcher/ Student/External applicant** | David Corbett | | **18 Jul 2016** |

| **APPLICATION APPROVED BY** | Full name | Signature | Date |
|---|---|---|---|
| **Supervisor** (where applicable) | Dr. Nancy Odendaal | | **18 Jul 2016** |
| **HOD (or delegated nominee)** Final authority for all applicants who have answered NO to all questions in Section1; and for all Undergraduateresearch (Including Honours). | Toma Berlanda Click here to enter text. | | Click here to enter a date. |
| **Chair : Faculty EIR Committee** For applicants other than undergraduate students who have answered YES to any of the above questions. | Click here to enter text. | | Click here to enter a date. |

# ANNEXURE B: SIGNED CONSENT FORMS

Consent Form

**UNIVERSITY OF CAPE TOWN**

**DEPARTMENT OF ARCHITECTURE, PLANNING & GEOMATICS**

1. **Invitation and Purpose**

You are invited to take part in this study about Citizen Engagement.
I am a postgraduate student from the City and Regional Planning department at the University of Cape Town. The information gained in the interview will be used for research.

2. **Procedures**

The interview should take about an hour. Participating in this study is voluntary. You do not have to answer any questions you do not feel comfortable with answering. You are free to end the interview without any consequences.

3. **Privacy and Confidentiality**

Any information you share is strictly confidential. You will remain completely anonymous throughout the research process. You have the right to request that any information you have shared be removed from the study.

With your permission, interviews will be recorded using an electronic voice recorder. Only the interviewer will have access to these recordings and they will be kept in a safe place.

After the interview the voice recordings will be transcribed (typed out). Your name will not appear in these transcriptions.

The information from the interviews will be used to write up a research report.

4. **Risks, Discomforts & Inconveniences**

This study poses a low risk of harm to you. You might be inconvenienced by having to give up an hour of your time.

5. **Signatures**

*Interviewer*: The participant has been informed of the nature and purpose of the procedures described above including any risks involved. He or she has been given time to ask any questions and these questions have been answered to the best of the interviewer's ability.

05-09-16

~~Interviewer~~'s Signature Date

*Participant*: I have been informed about this research study and understand its purpose. I agree to take part in this research as an interviewee and consent to an audio recording of the interview. I know that I am free to withdraw from this interview at any time, and that doing so will not disadvantage me in any way.

15-09-16

~~Participant~~'s Signature Date

UNIVERSITY OF CAPE TOWN

DEPARTMENT OF ARCHITECTURE, PLANNING & GEOMATICS

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Interviewer's Signature 05-09-16 Date

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Participant's Signature 19/09/2016 Date

Consent Form

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20-09-16

Participant's Signature Date

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Participant's Signature 05/09/2016 Date

Consent Form

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Pa[illegible] 26/09/2016 Date

Consent Form

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Participant's Signature 5/9/2016 Date

Consent Form

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Participant's Signature 9.9.16 Date

Consent Form

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4. **Risks, Discomforts & Inconveniences**

This study poses a low risk of harm to you. You might be inconvenienced by having to give up an hour of your time.

5. **Signatures**

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05-09-16

Interviewer's Signature Date

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9-9-16

Participant's Signature Date

Consent Form

**UNIVERSITY OF CAPE TOWN**

**DEPARTMENT OF ARCHITECTURE, PLANNING & GEOMATICS**

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Participant's Signature — Date: 05 09 2016

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Participant's Signature 6.9.2016 Date

UNIVERSITY OF CAPE TOWN

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13 Sept 2016

Participant's Signature Date

UNIVERSITY OF CAPE TOWN

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Participant's Signature 13 Sept/2016. Date

Consent Form

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