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CHALLENGING PARTICIPATORY DESIGN IN AN URBAN ENVIRONMENT STRUCTURED BY COMPLEX SOCIAL DIVISIONS

by

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DECLARATION

I, **Micah Donnoli**, declare that the contents of this dissertation/thesis represent my own unaided work, and that the dissertation/thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

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ABSTRACT

This research is based on how an understanding of place can facilitate designing Product Service Systems (PSS) in an urban environment structured by complex social divisions. Predominantly grounded in Participatory Design (PD), the study investigates how certain methodologies within the field are appropriate, and to what level that they are effective when used in a majority-world context. PD has produced successful projects when used in minority-world contexts, however, if the basis of the field – that of co-designers and the synthesised work effort from all stakeholders – is brought into an environment that has extreme social divisions, there is a definitive abstraction of design-orientated social engagement.

The project research began in Malmö, Sweden, with the first of three case studies. In this context, PSS and PD were used as a paradigm to engage businesses and people in a specific area in a project referred to as *Linjen* ('The Line'). The main purpose of the project was to stimulate the public's interest in the area and to investigate the potential for connecting local businesses in an effort to propagate constructive communication. This section serves as a baseline framework for minority-world PD projects.

The second study of the project was conducted in Cape Town, South Africa, and from the resultant implications a revised approach emerged. This reappraised angle proved far more interesting and relevant: it now aimed to take the PD methodologies of a minority-world project and explore what challenges were encountered when PD approaches were implemented across a socially complex environment. The third and final case study involved prototyping a waste collection trolley as a participatory aid for engaging stakeholders as co-designers.

The case studies are presented here to describe the dichotomy of PD practice between contexts or *place*. A recurring theme of this research area is that of 'perceived' distance and roles between co-designers, and specifically that of the researcher and the stakeholders.

This thesis concludes by presenting a lens – an amalgamation of experiences, prototypes and research outcomes – through which designers could work when involved in PD projects. The conclusion includes the following research tools: planning casual encounters, value-based interactions, design ownership and human proxy. These tools present useful and insightful ways in which designers can minimise the perceived distance between themselves and their co-designers, ultimately developing a reflective and mindful design practitioner and engaged participants.

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DEDICATION

For my parents, Paolo and Ria –

You have given me the gifts of education, belief, honesty, love and trust.

I hope I can always reflect that back into the world.

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GLOSSARY

AT	*Activity Theory: A theory used to analyse the 'activity' within a studied system, which can lead to fostering participative engagements.*
CT	*Cape Town*
CTP	*Cape Town Partnership: A local organisation that works closely with the private sector and the City of Cape Town. They run multiple socially oriented projects in the city.*
DCL	*DOO.co-Lab: An organisation based in Cape Town that focuses on aligning itself with local businesses, organisations and academic institutions; in order to provide researchers a more rapid engagement with the necessary means to run a project.*
DEDAT	*Western Cape Department of Economic Development and Tourism.*
EC	*East City of Cape Town*
Feedback Loops	*The action of engagements with stakeholders that provide immediate knowledge of specific inquiry that can then be fed directly into a reiteration of a design development.*
HCI	*Human-Computer Interaction*
Human Proxy	*The method of a researcher or designer engaging with a system of activity that is being studied. This would see the researcher enacting a part of the system with the duties that the stakeholder would hold.*
ITS	*Information Technology System: This can refer to general systems of technology commonly used*
IxD	*Interaction Design: A theory that looks at how interactions between people and objects can be improved through various participative tools*
Majority-world Context	*The reference to a social-cultural landscape that can be considered as 'third-world' or 'developing'. Typically this would consider marginalised and at-risk communities.*

Mesh Network	*A technology-enabled system that makes use of a series of 'nodes' that act as an independent wireless network.*
Minority-world Context	*A socio-economic context that can be considered as 'first-world' or 'developed'. These are typically communities that are stable.*
PD	*Participatory Design: A theory that looks at engaging users through participative methods and tools that develop stakeholders as co-designers.*
PSS	*Product Service System: A system that has a model orientated on function to moderate consumption and production.*

CHAPTER ONE

INTRODUCTION

1.1 Background to the Research Area

Participatory Design (PD) has provided an interesting and enlightening methodology to design projects, with designers looking towards their users for insightful information that attempts to fill the gaps that result in the design flaws evident in so many design projects of past. The definition of PD that will be used for the purposes of this thesis is that of an approach characterised by the users in design, and in the design process, to what can be referred to as “use-before-use” (Ehn, 2008: 92). The notion of anticipated use is emphasised here. In order for such an envisioned use, users are brought into a paradigm where they are seen as co-designers. In essence, this flattens the typical ‘top-down’ hierarchy in traditional design processes. Users are seen as the masters of their own experience, and designers acknowledge that they will never fully understand the environment or system that a specific project is focused on better than the stakeholders concerned. The relinquishing of dogmatic design processes has opened the paths to many intuitive and creative solutions and opportunities within design.

The level of personal interaction between relevant stakeholders has made PD an invaluable tool for designers as they endeavour towards successful projects. However, this holistic and all-encompassing basis can prove challenging to a researcher on a social level. The challenge is that truly engaging and developing insightful participation with others as co-designers requires a high level of personal relatability, and the delicate nature of such relationships is imbued in the interaction process. The significance of this aspect of design research is evidenced by the development of new design research approaches such as Design Ethnography (Baskerville & Myers, 2015), which recognises that a system of stakeholders – and the activity within that system – cannot approach a researcher objectively, and conversely, a researcher cannot remain a neutral element within a researched system.

Figure 1.1 (below) shows how the interpretation of design thinking has undergone many reincarnations and variations, primarily in titles and key words or phrases.

DECADE	DESIGN APPROACH	IMPACT
40's	Ergonomics/Human Factors	Physical and technical human needs
	Action Research	Social action by researchers
	Cooperative Learning	Horizontal exchange of ideas
50's	Theory of Innovative Problem Solving (TRIZ)	Cross disciplinary importance
60's	Placemaking	Cities designed for people, not cars & structures
	Design Thinking	Design as a way of thinking
70's	Universal Design	Ergonomics includes vulnerable citizens
	Small Is Beautiful	Importance of context & localized solutions
	Cooperative Design	User requirements & mutual learning
	Wicked Problems	Myth of the expert
80's	The Reflective Practitioner	Processes over Outcomes
	User Centred Design	Needs driven
90's	Indigenous Knowledge Systems (IKS)	Local level decision making and influence
	Empathic Design	Observation over market research
	Contextual Design	Understanding of users in their context
2000's	Design Thinking popularized	Design processes applied in business
	Collaborative Design	Popularization of stakeholder engagement
	Participation for Design / Design for Participation	Directions in Participatory Design

Figure 1.1: Participatory Design? (Futerman, 2014)

These variations guide researchers in trying to understand how and why people do what they do in a certain environment, and to what extent it can be realised in a more universal sense. This has resulted in further complexity, and to a certain degree – further confusion. It is at this point that Activity Theory (AT) must be considered for its ability to illustrate the contextual analysis of a network as a collection of activity systems (Miettinen & Hasu, 2002: 129).

A researcher can easily overlook or misinterpret the historical culture and internal reflections or learning of participants in networks (Miettinen & Hasu, 2002: 130). In other – more practical terms – when conducting research, a researcher would travel the path of an outsider, a status that enables a distance from participants or co-designers. This distance is a social complexity that develops an abundance of challenges when a researcher is seeking to design within an environment constructed by social complexities.

PD tools have been developed and frequently tested on minority-world contexts – those that can be considered 'First World' or 'Developed'. Examples of these tools are Future Workshops and Brainstorming, which are practiced in Western contexts but can prove to be incompatible with the socio-culture elements of 'Third World' climates (Winschiers-Theophilus et. al., 2010). This research attempts to investigate PD and AT methodologies put to use in a majority-world context ('Third World' or 'Developing'

countries). What happens when there are language barriers between you and your users? What if your stakeholders are homeless? How can PD achieve its intentions when your environment is thwarted with social complexities and imbalance? When such a personal level of collaboration is required, how can stakeholders come to trust the designer? These are some of the immediate scepticisms levelled at PD as a lens through which design researchers seek opportunities and solutions when in engaging participants.

The research presented will cover a project run in Malmö, Sweden and how PD and Placemaking exercises compare with those run in Cape Town, South Africa, in another PD project. The parallel is necessary in order to create a strong reference of projects with similar *envisioned* outcomes and uses, run in two different social environments, and deduce comparisons between them. Also included is a discussion of the challenges that were encountered and how these were overcome through the development of investigative tools and techniques concerning design research.

Design research, and specifically research that depends heavily on participation and is conducted in an environment structured by social complexities, may result in the researcher in a position of significant sensitivity. This sensitivity stems from the culture of the participants and the conditions of the environment or network that they reside within. Interaction in an unfamiliar setting is precarious in it's nature as the personal level of engagement required to develop successful projects can very easily effect the culture of the investigated system, or worse, be cause for rejection and damage future synergies with stakeholders. It is the desire of the researcher to reduce the ambiguity experienced when participation with a local community is initiated. There is a need for the participation to be designed, or for a motion of "designing for participation", and in essence, this is the imperative stepping-stone for PD that will be investigated (Sabiescu, David, van Zyl & Cantoni. 2014: 1).

1.2 Statement of Research Problem

Participatory Design has been heralded as a forward-thinking design methodology, from which many successful design projects have arisen. However, the fundamental nature of this form of research inquiry falls comprises that of participation and engagement with stakeholders as co-designers. There is a personal level of relinquishment required from both the designer and local to allow for open and productive participation, thus enabling the expression, and acquisition, of implicit information. The delicate nature of this approach means that research conducted in an

environment structured by social complexities can prove to be challenging to the researcher whose aim is to garner emic and etic perspectives.

1.3 Research Question

How can an understanding of place facilitate the designing of product service systems (PSS) in an urban environment structured by complex social divisions?

1.3.1 Research Sub-questions

- Which current design methodologies can be utilised to understand place?
- How do stakeholders define their place?
- Why do social divisions affect a researcher's engagement with co-designers?
- How can a researcher ensure a truly participative design process?

Table 1.1: Research Sub-questions, Methodologies & Objectives

Research Sub-questions	Research Method(s)	Objectives
Which current design research methodologies can be utilised to understand place?	Literature analysis Participant observer Video analysis Case study	Develop an understanding of current processes to engage stakeholders as co-designers and form a base of a typical PD project in a minority-world context.
How do stakeholders define their place?	Participant observer Informal interviews Case study	Identify key participants within a system being researched and develop an understanding of how PD operates in a majority-world context.
Why do social divisions affect a researcher's engagement with co-designers?	Literature analysis Participatory action research Technology probe Informal interviews Case study	Put into practice design research reflection and engage stakeholders as co-designers through means of product prototyping and development.
How can a researcher ensure a truly participative design process?	Literature analysis Participant observer	Develop a set of design research recommendations when conducting a PD project.

1.4 Current Status of the Research Area

In 2007 the Smithsonian's Copper-Hewitt National Design Museum hosted the first officially recognised exhibition showcasing design solutions that were centred on "Design for the other 90%" (Smithsonian, 2014). This was in response to how the majority of designers focused product development and services towards 10% of the world's customers (Cooper-Hewitt, 2010). Of the remaining 90%, nearly one billion people worldwide live in slums or informal settlements, without access to basic

services. The design profession often overlooked the social complexities of systems born out of this statistic. However, a shift in design ethic introduced a core ethos that focused on: shelter, health, water, education, energy and transport of the “other 90%”. These themes have continued to propagate invaluable steps towards solving some of the world’s most devastating problems, and have positively contributed to the livelihood of the marginalised 10%.

The collective consciousness of designers, from which this paradigm shift was born, was the public opening necessary to encourage the design field to tackle the needs of society and step away from the ‘wants’. This also meant was that designers needed to delve into completely unfamiliar systems in order to design for the people in need – a logical step, because how could it be possible to have a successful product without researching the problem system? This, however, was the start of a rich relationship in the initial pursuit of understanding the designer and the *designed for*.

This rearrangement of design activities calls for rich participative relationships with the people who are now part of the design process, as opposed to being the people designed *for*. Participatory Design (PD) is increasingly becoming a commonplace practice to foster the kind of engagements that have shifted from workplace-orientated activities to innovation in the pubic domain (Björgvonsson, Ehn, & Per-Anders, 2012). The assemblage of engagements orientated on collaborative design work has pushed for a more ‘democratic’ design practice in which designers and stakeholders have an equal share in the design process, essentiality levelling out power relationships between them (Merritt & Stolterman, 2012). Shared ‘democratic’ design processes bring to light the shortfall notions of solidarity amongst participants, as there can be challenging circumstances that are developed from the use of ‘lead-users’ and ‘design experts’ (Björgvonsson, Ehn, & Per-Anders, 2012). Community-based PD allows for further insight into this presupposition by revealing that challenges can be experienced when there are knowledge gaps between the researchers and community members (Sabiescu, David, van Zyl, & Cantoni, 2014). These differences are also sensitive to sociocultural aspects that can cause tension with the researcher’s frame of inquiry.

These tensions constitute what Björgvonsson, Ehn, & Per-Anders (2012) refer to as ‘agnostic democracy’ – one that is built from an energetic gathering of tensions that strive for the improvement of situations through debate and tolerance. The idea of uncertain participative collaboration in design processes empowers the contributors to challenge a hegemony that might exist in situations that include ‘lead users’. Agnostic or community-based PD also focuses on implementing the existing knowledge within

the community, whereby situated experiences of members form the basis of the development of participative tools and understanding from the researcher's perspective (Sabiescu, David, van Zyl, & Cantoni, 2014).

PD conducted on grounds that are prescribed to not have set outcomes, but rather derive results from 'user-driven innovation,' through interactions and generations of community knowledge through action and experience, require a considered creation of tools, and use thereof, in the sense that intra-community challenges entail an adaptive reflection on appropriate participative methods (Halse, Brandt, Clark, & Binder, 2010: 164). This process reflects the notion that there is no single formula applicable to every situation where PD is used with the expectation of successful interactions and derived results. The contemporary practice of PD calls for researchers to foster healthy understandings of implicit and explicit knowledge of the communities participating in design projects – however, inter-personal and cultural variations, and the dynamics produced from this, have proven to be an area of focus in itself (Winschiers-Theophilus, Chivuno-Kuria, Kapuire, Bidwell, & Blake, 2010). This is especially pertinent when the researcher and the community with which they are engaged have large sociocultural gaps.

When PD is investigated in an African context, community-centric engagements have been based on the negotiation of design tools, methods and processes that are specific to the region (Sabiescu, David, van Zyl, & Cantoni, 2014). Gainining an understanding of the existing levels of participation within a community also becomes increasingly important. The 2014 Participatory Design Conference (PDC) focused on 'Exploring the Potential of Participatory Design in Africa', and although there was a call for predominately technology-enabled PD projects, it illustrated how there has been attention drawn to the research and methodological challenges posed to designers using participative tools in community-driven projects (Blomberg, Hagen, & Loi, 2014).

The emergence of this interest forms the critical basis of the research presented in this thesis, which endeavours to develop a critical exploration of participative methods in an African context that has perceivably marginalised communities. This research becomes all the more relevant as it scrutinises the effectiveness of PD in environments that have historically challenging pasts. This is in accordance with Simone (2010:8), who deconstructs the advent of African cities as places of contemporary 'contestation' based on "*…different kinds of accommodation between the needs of autonomous individual action and the security of life that largely remains rooted in long-term forms*

of social belonging." Furthermore, "*These dynamics have a direct impact on what governments and civil society can do in terms of managing and changing urban life."*

1.5 Theoretical Framework

This section contains an explanation of the various theories that comprise the methodological lens that was employed to conduct the research for this study. As a result of the relevant crossover that emerged, the three primary theoretical fields were assessed parallel to one another. The symbiotic nature of these theories reveals itself further into this chapter and throughout the case study descriptions, documentation and summaries.

1.5.1 Interaction Design

Interaction design was the entry point to the various methodologies employed within this field and also provided the literature paradigm from which the project was approached. The term 'interaction design' was first coined by Bill Moggridge when he imagined the adaptation of physical design into digital design, applying the same notions of identifying user needs and desires (Lowgren, 2013). Spring boarding off of Moggridge's description, a close association between interaction and industrial design has developed. Although the technical skills required for the two fields are different, their have been increasing instances where there have been unplanned crossovers, especially in terms of technology and commercial usage thereof, which has made for valuable growth out of shared practices and experiences (Binder, Koskinen, Redström, Wensveen, & Zimmerman, 2011: 08-09).

Jonas Lowgren succinctly describes the research inquiry: "Interaction design is about shaping digital things for people's use." The keyword in this is "shaping" as it implies a more responsive nature to designing, as opposed to a dictatorial and top-down position. Although interaction design has its practice in the digital realm, the design fundamentals are applicable to design research in general. Lowgren highlights five main characteristics of design in relation to interaction design (Lowgren, 2013):

1. Design involves changing situations by shaping and deploying artefacts
2. Design is about exploring possible futures
3. Design entails framing the 'problem' in parallel with creating possible 'solutions'
4. Design involves thinking through sketching and other tangible representations

5. Design addresses instrumental, technical, aesthetical and ethical aspects throughout

These five values, although not solely specified for digital design, imbue a designer's research process with a tendency towards "good" design practice. The principles laid out by Lowgren were of critical importance in considering how the research in this study was to be conducted. By sharing and borrowing information from different design practices, Lowgren's characteristics formed the fundamental building blocks in creating the content in this body of work. Andrea Branzi laid the groundwork for this thinking in design when he spoke about the second modernity and the framework that it brought about (Binder et al, 2011, p. 10):

"During the period of forced industrialisation that lasted from 1920 to 1960, the hypothesis had been formed that design ought to be helpful in bringing about a standardisation of consumer goods and the patterns of behaviour in society. Its work lay in a quest for primary needs… Along that fascinating road design has hunted for many years the white whale of standard products, products aimed at the neutral section of the public's taste, products intended to please everyone and therefore no one… Then, in the mid 1960s, things began to move in the exact opposite direction. The great, pyramid-shaped mass markets, guided by enlightened or capricious opinion leaders, gradually disintegrated into separate niches and were subsequently reformed into new and multi-coloured majorities. Design had to skirt its attention from mass products to those intended for limited semantic groups. From objects that set out to please everyone, to objects that picked their own consumers. From languages of reason to those of emotion… Then the process of transformation slowly came to an end. The mutation was complete and it is now possible to say that a new society, with its own culture and values, has taken on a fairly stable shape."

The final "mutation" that Branzi describes is the set of conditions and the implications thereof that this thesis explores. The culture of the "new society" is what makes design processes increasingly more interesting and challenging. The collections of systems or networks form the loci in which the result is shaped and determine the process in which design is carried out. This means that the 'copy-paste' industrialised first modernity is no longer relevant to the society. The second modernity, however, poses it's own social challenges that require multifaceted approaches, and an understanding of everyone having a level of expertise that is integral in a design process (Binder et al, 2011, p. 18).

Interaction design (IxD), born from human-computer interaction (HCI) history, was the precursor to design thinking. The assimilation of information from social sciences, and not only engineering and human-science frameworks, heralded a breakthrough in direction. The breakthrough was a deeper understanding of the space in which interaction occurred and what it was comprised of. The result was a shift in HCI from designing the interface between people and machines to a paradigm that focused on designing "interspaces" that housed a complex web of interactions (Bannon, 2011). The complexity of these networks was the result of multiple factors that carried different functions or values delineating the type of communication that was carried out. This required, or – more excitingly – created, opportunities for researchers and practitioners from different disciplines to work together, in an effort to provide more useful and insightful interactions when communicating (Bannon, 2011).

1.5.2 Participatory Design

Participatory Design (PD) was developed in the 1960s to facilitate the introduction of information technology systems (ITS) in the work place. The development of PD occurred alongside the historical social movement in which design processes became constructions of community action or, more specifically, began to encourage participation from those that shared interests and values within in the project (Roberston & Simonsen, 2013: 1-2).

Examples of PD in different forms are evident throughout modern history but were previously unrecognised as having similar intentions because of the lack of an identifying label. The value in PD being an individual research discipline is that the contribution to the field has happened through design practice, or action design. What this also means is that input has come from varying departments (Roberston & Simonsen, 2013: 2). The value of collaborative design processes is found in the on-going negotiation of information that occurs between designers and stakeholders. This collective effort provides the insight needed to achieve thoughtful and successful results. However, beyond that, it teaches practitioners and researchers that the inclusion of people as co-designers is a prerequisite guide to democratic design. Furthermore, the process of growing stakeholders into co-designers allows the designer the opportunity to garner an understanding of the culture of the environment, which can act as the silver-bullet when designing the elements that shape one's livelihood (Meadows, 1999).

Furthermore, having co-designers work as users (or experiencers) alongside designers leaves little room for impartial observation methods (Binder et. al., 2011: 83). Although

a certain level of objective observation must be achieved to allow a researcher to find entry points into a system, a deeper understanding is only achieved through involvement and participation with the system and the people who form it. The increasing use of PD occasionally blurs the line between designers and co-designers, but the methods highlight how design is intended to be collaborative process in which people explore ideas together (Binder et. al., 2011: 83).

1.5.3 Supportive Theories

Activity Theory (AT) was introduced globally in the 1980s and 1990s and has its origins in German philosophy: in the writings of Marx and Engels, the Soviet Russian psychology of Vygotsky, Leont'ev, and Luria (Engeström, Mietten, & Punamaki, 1999: 20). A reflection of the previous sections on IxD and PD, the discussion of activity theory (AT) (or an activity-theoretical approach) serves to accentuate the discussion thus far. The consideration of AT as a Supportive Theory facilitates a deeper investigation into the elements that make up a system of activity. AT is a clearer iteration of the constructs of interspaces that bridges the complexity of a network of engagements in an environment. This theoretical framework thus equips the design researcher or practitioner to develop a working knowledge of how a culture is derived from a system. This culture is a key factor in imagining and creating new possibilities that are specifically relevant to the system that is being in engage with.

The shift from an industrialised or dictatorial design ethos to a democratic one means that designers have to engage in far more – and far deeper – conversations with community members in order to understand the actors who are now stakeholders in a design process. AT is used as a method to articulate the needs of users and stakeholders, and also serves to allow designers to appropriately participate with research participants (Miettinen & Hasu, 2002: 129).

Bruno Latour's Actor Network Theory (ANT) considers participants or people as "actors" in a network, all of whom have a defining influence on the co-creation and development of a product in the innovation process, paying particular attention to scientific and technologic mechanisms (Crawford, 2005: 1). Furthermore, ANT does not take a hard line between science and technology, or knowledge and artefact, but rather sees it as a science of interaction, crafted by heterogeneous factors that are made significant by relational differences. This notion is furthered by the material extension of semiotics, or non-human actors, that have a marked influence on the network activity (Crawford, 2005: 3). ANT brought to light the concept of innovation as a product of co-construction; however, in an almost impersonal paradigm that seeks to manage the

observational stances when studying a social system, it neglects to consider the culture that creates the network. Crawford (2005) describes the third methodological principle of “free association” that “advocates abandoning any distinction between natural and social phenomenon. These distinctions are the effects of networked activity, are not casual, and cannot be explained.” As has been described thus far, it is evident that the effects of networked activity are an important factor in revealing the culture of a system.

ANT, although criticised for it’s borderline authoritative analytical methods, acted as a catalyst for researchers – or designers in this case – to acquire an understanding of the importance of being aware of the influential factors on a system. In comparison, AT emphasises a deeper exploration of a network and what defines the activity, and sees the activity in a system as a singular unit of analysis. This unit is made up from practitioners with a common object and a common outcome (Miettinen & Hasu, 2002: 130). According to AT, cultural means, tools and symbols (similar to ANT material semiotics) define the activity in a system, but divisions of labour and rules developed within the network mediate it. The aim of AT, like the other methodologies discussed thus far, is to identify user needs. These needs, however, can be contradictory at times because they are derived from the historical and cultural stance of the actors in a system. It is difficult for a stakeholder to imagine a new reality when their current reality has been pre-determined and normalised. Traditionally user needs provided the starting point for a design process, however, the needs are derived from an already existing set of rules. At this point, the application of contextual analysis is useful to understand and overcome this paradox.

AT employs ethnographic methods, such as video analysis and interviews, based on activity and needs. Through these methods, key stakeholders are identified and are gathered in a seminar-like meeting in which participants are given an opportunity to elect a ‘lead’ user. Following this process, an analysis for the reason of the needs can be broken down into its components, primarily: internal tension, critical problems and system contradictions (Miettinen & Hasu, 2002: 138). The difference in this approach is that it undertakes a critical analysis of the tensions, rather than simply accepting an account of the problems. The determined need is considered in the equation as being of equal value to the means of finding or defining the object within a system. The object, in this case, can also be taken as the technology or artefact with which a network derives its activity from. This develops a need state into an explicit object orientation, the explanation for which can be broken down into three levels (Miettinen & Hasu, 2002: 147):

1. Analysis of user needs – use value – in terms of critical problem history.
2. Analysis of situated use of artefact.
3. Construction of the collective – value of collaborative communities.

From this, three main questions are asked:

1. What are the objects and motives of an activity?
2. What resources reside in the activity system to meet expectations?
3. What collaborations are engaged in and need to be engaged in to develop the product?

In addition to this, Engeström, Mietten and Punamaki (1999) outline the following dichotomy that challenges AT as a dynamically adaptive theory applicable to evolving networks of activity:

- Psychic process versus object-related activity
- Goal-directed action versus object-related activity

In summary, AT suggests that patterns of use dictate needs, or explicit objects, and encourages researchers to focus on identifying and offering activities that compliment existing user activity. This is where valuable and truly beneficial products arise, as they come from a sociological collaboration amongst and within a researched system. Similarly to PD, the product or technology is developed in parallel to the stakeholders, however an AT approach can allow researchers to assemble a more natural dialogue (Miettinen & Hasu, 2002: 148).

CHAPTER TWO

METHODOLOGY

2.1 Research Design

This subsection presents the methodologies and their components utilised in the research presented within this study. This study was written from a flexible research design perspective, predominantly in the form of exploratory case studies but also making use of ethnographic studies. The amalgamation of these sources is the result of shifting the methodological approach initially sought in the proposal of this thesis, however, the included methodologies provided a crossover in which they not only reiterate but also reinforce one another. However, this method of combining methodologies may fall short when used independently dealing with a socially sensitive design project. This combined-method approach emerged as a thematic strand throughout the research.

Since this study was not intended to have a product result, it was approached with the intention of reaching a method outcome for which a typical product or interaction design process could not be selectively explored or applied. A method-driven thesis, and especially one of this nature, had to make use of small-scale product development processes with fast feedback loops in order to acquire adequate information necessary to learn from experience and to implement that information while still in the research process. This can be referred to as action research, or research-through-design (Small, S. 1995), which was selected to ensure that the research presented is relevant and structured in such a way that seemingly complex questions are demonstrably explored and solution directions can be presented. The study brings forward three main case studies that substantively form the departure point from which the sub-questions are deliberated.

2.2 Case Study Research

The nature of this study includes many social structures, unfamiliar networks, and variables that could potentially steer the results of research. Therefore, the researcher had to ensure that the initial investigative approach was broad in scope. In this instance “broad” is not to be confused with an extensive approach as discussed by Swanborn (2010), but rather as an “intensive” exploration that provides an in-depth understanding of the social phenomenon that this thesis draws from. It was important that the investigative inquiry did not limit the research lens, but it was also important that there was a framework to apply to the research, which the main research question provided. The broadness of the research question was intended to accommodate the different

directions that the results, or action, of the inquiry might take. The importance for framing an intensive approach with a research question is that it guides the researcher, but still allows sets of data to be explored, from which sub-questions can be realised (Swanborn, 2010: 13). The case study approach also enabled the collective use of multiple research techniques, methods and theories. This is particularly important when addressing a social phenomenon, which requires a broad understanding of the context of what is being researched, as opposed to breaking the observed system into isolated units or looking at it in a static cross-section (Swanborn, 2010: 14). Although the researcher acknowledges that it would be impossible to have a complete understanding of the investigated system and its variables, it was still necessary to have knowledge or, at least, have the best intention to gain a dynamic understanding of key points that defined the structure of the phenomenon of participation in community-based contexts.

The next decision that the researcher had to take was whether the research would be guided by a case study or multiple. This study, which considers more than one project in addressing the main research question, presented an opportunity to formulate a structure of multiple case studies that address the same research question, but in different capacities. This centers the definition of the case studies on a meso-level that seeks to explore and explain the phenomenon on a social level with detailed descriptions and an intimate understanding, with eventual potential to output on a macro-level for the broader research community. This is elaborated on in the case study chapters (Swanborn, 2010: 22). As the research also required the voice of stakeholders and participants, their stories became critical in gaining an understanding of the settings and thus in answering the main research question. Given the epistemological nature of the study, the researcher found that the variables within the researched systems were better suited to qualitative methods as opposed to quantitative.

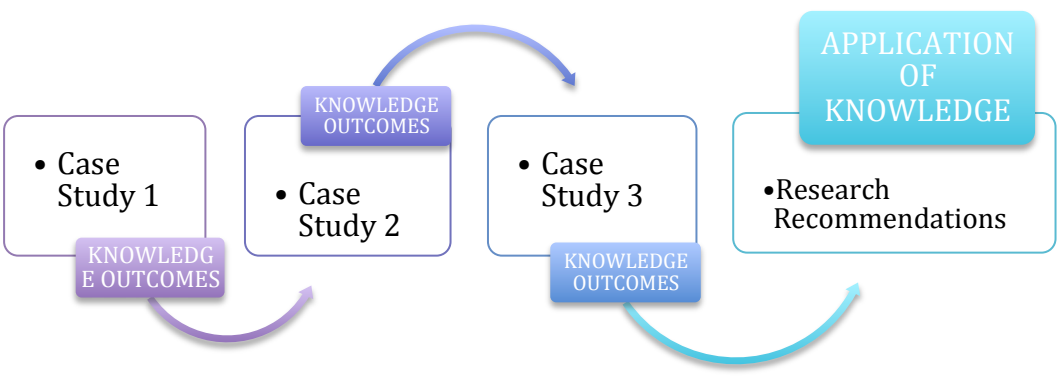

Figure 2.1: Case Study Flow

2.2.1 Methods of Inquiry

Five primary methods were used to collect data within the case studies, namely:

- Historical Documentation
- Informal Interviews
- Field Notes
- Observations
- Co-design Workshops

The researcher made use of these methods to ensure that there was a cross reference of information to certify the validity of the domain being studied. Typically the case studies were prefaced with a presentation of the participant's historical background. This background was researched with multiple sources to provide the researcher with an understanding of the social and physical development of the area concerned. The data provides the basic grounds for the investigation that might have an influence on the subjects and the system being studied.

Interviews were the next data collection method. This is an important step to engage the researcher in the field physically, and also to allow for introductions to be made with the stakeholders of the concerned projects. Multiple interviews proved to lead to refinement of inquiry and develop relationships between the researcher and subjects. This also allowed for key stakeholders to be identified. It was important that these engagements were sometimes not random, and rather pinpointed by informants, or mediators, within the domain. This allowed for more efficient communication when there was a specific set of questions needing to be answered. When the researcher was searching for information in the field, a more casual format for interviews was chosen, as it did not limit data range.

When conducting the field research, it was imperative to keep running notes and annotations of the researcher's engagements and experience, and a reflection thereof. These notes were kept in a journal form and were documented either immediately or at a later stage. It was found that certain scenarios required full attention, without the distraction of note taking, and in some instances it was simply impossible to write down notes. These notes proved to be a useful cognitive aid when data presented itself in unexpected forms or moments.

Observation was one of the key methods of data collection. It is a time-consuming exercise, however, the nature of the case studies and the theory being applied to them meant that it was necessary for the researcher to allow for long periods of time

dedicated to this. Human behaviour, physical artifacts, material resources and environmental constructs were all observed as a method of gathering data. These observational findings were viewed in relation with one another, and not in isolation

The final method employed was the hosting of co-design workshops. This method of data collection was drawn from PD research in which the practiced methods of engaging participants as co-researchers proved to be a useful tool to engage the subjects of the studies. These workshops were, however, limited by social constraints and individual capabilities, as experienced in the second case study. The benefit of this method though, is that it provided for an intense collaborative environment that generated a high frequency of participative work. The data collected from this process was highly accurate and useful when considered in relation to the subjects and the researcher.

2.2.2 Case Study Chronology

The first case study presents an exemplar of a minority-world PD project. This study was conducted in an area called Västra Hamnen in Malmö, Sweden. It will form the basis from which the first sub-question will be answered, with the objectives of allowing for an insightful understanding of PD process and the ways in which to engage and analyse design participants, and develop a co-designer relationship with them.

The next sub-question was introduced into the discussion with a case study conducted in the East City of Cape Town, South Africa. This case study follows two Swedish students conducting their own PD project in the East City. Various methods of observational data collection are presented along with participative ethnographic approaches. This was the first experiential instance, in this thesis, of PD being conducted in an environment structured by social complexities, as found in the East City. The interesting challenges that arose from the case study served to develop an understanding of how stakeholders define their place, and what that definition means. The sensitive nature of this location (a result of the social complexities) meant that various qualitative methods were needed to identify key stakeholders.

The third and final case study was also conducted in the East City, however, this exploratory study allowed the researcher to adopt a far more active and participative role involving the implementation of design reflection and research-through-design. The objectives were to better understand the relationship between a designer and a participant co-designer, and document the challenges experienced on a social level and how that affected the design process. This was undertaken through the process of

prototyping a physical product, in the form of prototype trolleys.

The final sub-question was not paired with a case study but serves as an amalgamation of results and research outcomes from the three preceding sub-questions. This collection of information forms the basis for an informative discussion, alongside literature, that attempts to develop a guide for design researchers when conducting PD projects, not only in majority-world contexts, but also in a general sense. The experiential directives serve to share with the research community the challenges encountered when a PD project was run in a majority-world context and what was learnt from this.

2.3 Ethical Considerations

From the onset of this study, the researcher was aware of the potential for individuals to be considered in the progression, documentation and publicised interpretation of the research. It was for this reason that there needed to be transparent ethical considerations when engaging the various key players pertaining to the study. These key actors included:

- Stakeholders, who were directly or indirectly involved in social systems and research design processes, including: business owners, residents, workers in the area, private designers, community members, government personal, academic researchers and academic educators. These groups of people are referred to as stakeholders, participants and co-designers. In an effort to define the structures within the research, those who were actively engaged in the research and design processes are solely referred to as ‘participants’ and ‘co-designers’, while ‘stakeholders’ refers to potential candidates who were seen as having an influence on the studied system, but who were not necessarily comprehensively engaged in the spectrum of the research;
- The researcher, or author;
- Associated research unit, which pertains to the research team that developed the projects and the overlying strategic organisation, DOO.co-lab.

2.3.1 Ethical Considerations Relating to Informants

‘Informants’, in this case, refers to the key actors outlined in (2.3). It was critical to have a strong ethical consideration when engaging these individuals and groups. The following procedures were taken to keep the study ethically sound:

- The informants were not forced or obliged to participate in the study.

- If there was an incident where the informants retracted their input and information from the study, they were allowed to do so without any prejudice.
- All data is kept confidential and relayed in a form exempt from personal information of the informants, in an effort to safeguard against any psychological harm.
- The names of the informants, groups and private organisations have been changed to ensure that there is no damage caused by the study to reputations or occupations.
- The informants were not intentionally deceived and were given full disclosure about the intent and potential outcome of the study. The study was conducted without any incentive beyond the value of the research.
- After interpreting the data, the informants were given feedback to the best level of effectiveness, in consideration of social constraints. The final outcomes were presented to the informants in an effort to minimise misconceptions and miscommunications during data collection.

2.3.2 Ethical Considerations Relating to the Researcher

Whilst the researcher was conducting research, the following were taken into account in order for the study to remain ethically sound:

- All data methods and procedures employed during the course of the study were maintained at a non-biased standard.
- Methodologies utilised were academic and apt for the context of the study.
- Data captured was accurate to the researcher's efforts and was not aligned to any preconceived intent beyond the academic result.
- The researcher had the utmost respect for all engagements with others and abided by a moral and just code of conduct in order to avoid any infringement on human dignity and rights.

2.3.3 Ethical Considerations Relating to the Research Unit

The research unit, which is considered as both the project teams and DOO.co-lab, was connected to academic and business linkages. Ethical considerations in this regard had to account for the connection to broader research communities and organisational relationships, and so the study endeavours to produce research in a useful an appropriate format that can contribute to future use.

2.4 Summary

The methodologies and theories presented in this chapter provided a useful departure point of inquiry from which field research and theory could be effectively paired to enable the researcher to follow through with the main research question and confront the problem statement. This approach was taken to ensure accordance with the scope of the interaction design, participatory design and activity theory fields.

The useful combination of the methodological tools, under the multiple case study approach, allowed the researcher the freedom to develop a research lens that accommodated for both the analysis of the case study and the findings thereof, which captured the complexities of the system being studied. The multi-faceted approach enabled the captured data sets to be both independent of each other but remain in relative co-existence, which reinforced or presented elements of the studied system that would not have become obvious using a singular methodological approach.

Ethical considerations reinforced the academic intention of the study, and enabled positive departure points – and similarly, the entry points – through which the researcher approached the involved stakeholders in the research process..

The methodologies discussed in this chapter and, importantly, the application thereof, are brought forward in the rest of this study, with the first case study focusing on an understanding of current methodologies utilised in the current PD practices.

CHAPTER THREE

CASE STUDY: WALKING THE LINE

3.1 Introduction

This chapter is based on a project run in Malmö, Sweden, which forms the first case study of the three used as the research basis of the inquiry into PD operating in the field. This project was run over three months in partnership with Malmö University, the Institute for Urban Sustainable Development (ISU), Malmö City municipality, the Cape Peninsula University of Technology (CPUT) and a then newly-formed organisation called Doo.Co-Lab (DCL) – an educational platform that has a manifesto to connect students, academic institutions, companies and other social organisations in order to give academic projects real-world traction in a short space of time, in pursuit of sustainable design-led social solutions.

The premise of the project was a collaborative pilot venture with a two-part comparative – one in Malmö and the other in Cape Town, South Africa. The project itself has two primary aims: (1) explore how digital tools can shape engagement within urban spaces; and (2) explore how existing design-lab approaches can be appropriated in an urban street-level setting constructed by social complexities. These aims were applicable to both cities. Following the argument in this thesis, the first aim of the project (regarding digital tools shaping engagement with urban spaces) will be a key focus. As what shall follow provides a clear example of a PD project run on the typical processes and methods utilized within the collaborative design field in a minority world context. This PD example also unfolded as the main point of data collection for this particular leg of the project, and thus the information is more readily available to be discussed.

The case study will be analysed by first providing the historical background of the area that the project was undertaken in, as this background presents a clearer understanding of the environment that dictated the nature of the project brief. The second section of the case study focuses on the design development of a digital network that was conceptualised through PD methods with stakeholders, and illustrates the progression from which the results were derived. The final section presents the findings of project and also summarises the PD element that this case study contributes towards the development of this thesis. Figure 3.0 illustrates the activity that was initially experienced and documented, within the framework of AT.

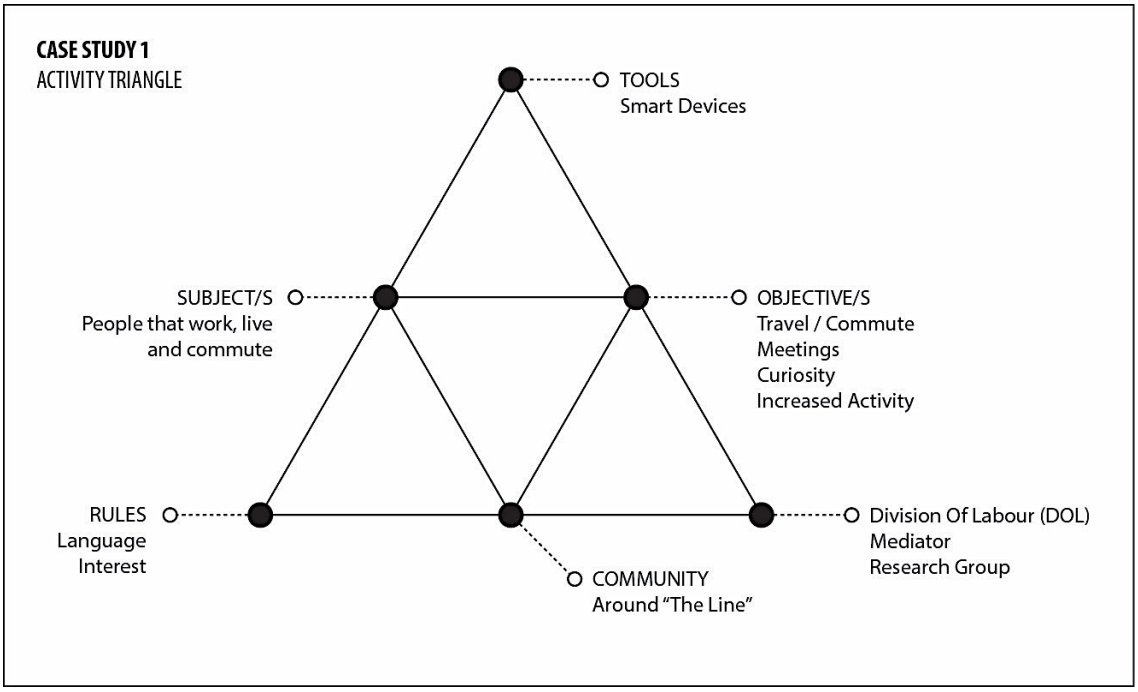

Figure 3.0: Initial Activity Sketch (Donnoli, 2013)

3.2 The Project Setting

Malmö has been heralded as an ecologically proactive city with its serious effort put into becoming a leading example of environmental sustainability (Malmö Stad, 2014). One of the strongest arrows in its ambitious quiver came as the innovative development of Västra Hamnen (Western Harbour).

Västra Hamnen was previously part of a busy harbour for which most of the inhabitants of Malmö worked, but in 1986 the shipyard, run by Kockums, closed and thousands were left jobless (Eilstrup, 2013). The city managers soon realised that the opportunity was ripe for a new chapter in their history, and worked towards developing the city as an information and communication hub. Establishing a university attracted the attention of IT companies and finally the much-debated bridge between international neighbour Copenhagen, brought this development about (Malmö Stad, 2007). From thereon, Malmö residents continued to make sustainability and environmental consciousness an ingrained part of their collective conscience.

Figure 3.1: Kockums shipyard in 1974. (City of Malmö, 2014)

In 1996 the municipality bought Västra Hamnen, and in 2001 work began in the area – the first step in Västra Hamnen becoming the hallmark of the locals' positive agenda towards energy, construction and transport (Nordic Design Review, 2014). A fitting paradox in this development is that the entire area has been developed on a landfill – essentially making Västra Hamnen a man-made extension of the mainland. What was once an industrial and hazardous space now boasts state-of-the-art green residential complexes; pneumatic refuse collection systems, a reduction in heavy traffic; Europe's second tallest building, the Turning Torso; decked coastal edges for summer recreational activities and a world-leading urban bicycle path network (Malmö Stad, 2007). Above all of this, one of the more socially important features is Stapelbäddsparken. Formed from the remains of one of the early shipyards, this facility is one of the world's leading skateboarding ramps. Highlighted as a significant activity for social engagement, the skate park allows for engagement between children and young adults from different cultural backgrounds. This stands as a testament to the City of Malmö's creative thinking towards social awareness and openness for social design implementation and development.

Figure 3.2: Western harbour today. (City of Malmö, 2014)

The geographic location of Västra Hamnen puts it on the western side of Malmö, nestled near the rest of Malmö University, the central train station and main central city area. The only drawback of the neighbourhood's location is that it sits just outside of the main commute stream: the areas between residential areas and the central train station. Even with its revolutionary tale of transformation, Västra Hamnen has a very limited amount of pedestrian traffic, outside of people who work or live in the neighbourhood. A main contributing factor to this is that the main development has been clustered near the east side of the docks, leaving many of the old industry buildings in the rest of the zone semi-occupied, and for those that have been demolished, the sites remain in extended phases of construction. The residential complexes along the coastal areas of Västra Hamnen are thus somewhat isolated by this vast and derelict divide from the centre of the city.

Although the redevelopment of Västra Hamnen is an on-going process, the municipality's emphasis on environmental, economic and social sustainability does not rely solely on the end result, but also on the journey towards it. This is why there is increased encouragement to stimulate interest and make it a desirable area, even with the adverse experiential side effects of an area under heavy construction. The planners have ambitious intentions: a first phase housing project intending to house 4,600 residents, an employment figure of 7,000 workers occupied with business developments and a final resident population of 30,000 (Nordic Design Review, 2014).

With the researcher's personal experience in Västra Hamnen, these nuances proved to be quite jarring. Given that the project's research phase took place in the Swedish Winter, a distinct sense of environmental hostility was felt when traveling through the island, from other neighbourhoods, to Malmö University. The severe and multi-directional wind, and sparse protection from buildings, made for a generally unpleasant commute. However, once the developed parts of the western harbour were reached, there was a definitive feeling of comfort, or connectedness, promoted by the presence of commercial shops, public spaces and pedestrian traffic. It is from this experience that the project found its grounding.

3.3 Malmö: *Linjen* ('The Line') Project

The sudden advent of IT development in Malmö, paired with the City's agenda for innovation, resulted in the recognition of creative solutions as a major factor when considering the wellbeing of the people living, working and commuting in Västra Hamnen. This recognition, of the need for creative solutions, was the starting point for the planners who tackled the generally lethargic response to the post-industrial area. The history of Västra Hamnen marked the beginning of a culture defined by a radical repositioning and transformation; and so shaped the story of place that was to be the cradle of engagement and interaction. It may seem to be a sweepingly poetic statement, however, this was in fact the memo that was given to the project team upon arrival in Malmö.

The team was made up of two CPUT students, two CPUT lecturers and three Malmö University lecturers. The focus of the research was on piloting an "urban design lab" that explores notions of "…how urban spaces can facilitate interaction between people, and between corporations, mediated by digital means…" (DOO.CO, 2013). The research would be grounded in a limited comparative study of two urban settings: Västra Hamnen in Malmö, and The East City in Cape Town. The interest in this pilot was generated when the DOO.co-lab organisation formed ties with Malmö, and especially when knowledge was gained of the City's attention in seeking creative avenues to generate interest in their redevelopment of the western harbour.

As previously mentioned, most of the development of the western harbour has been situated on the eastern side of this area that is closest to the central station and central city areas. For the developers and municipality, this formed a path that ran from Anna Lindhs plats via Nordenskiöldsgatan, past Sveriges Television and Media Evolution City, via Isbergs gata, over Dockplatsen, past Hallarna, alongside Skåne Dance

Theatre and finally ending at the future park and bus station. This path was later referred to as 'The Line' or *Linjen*.

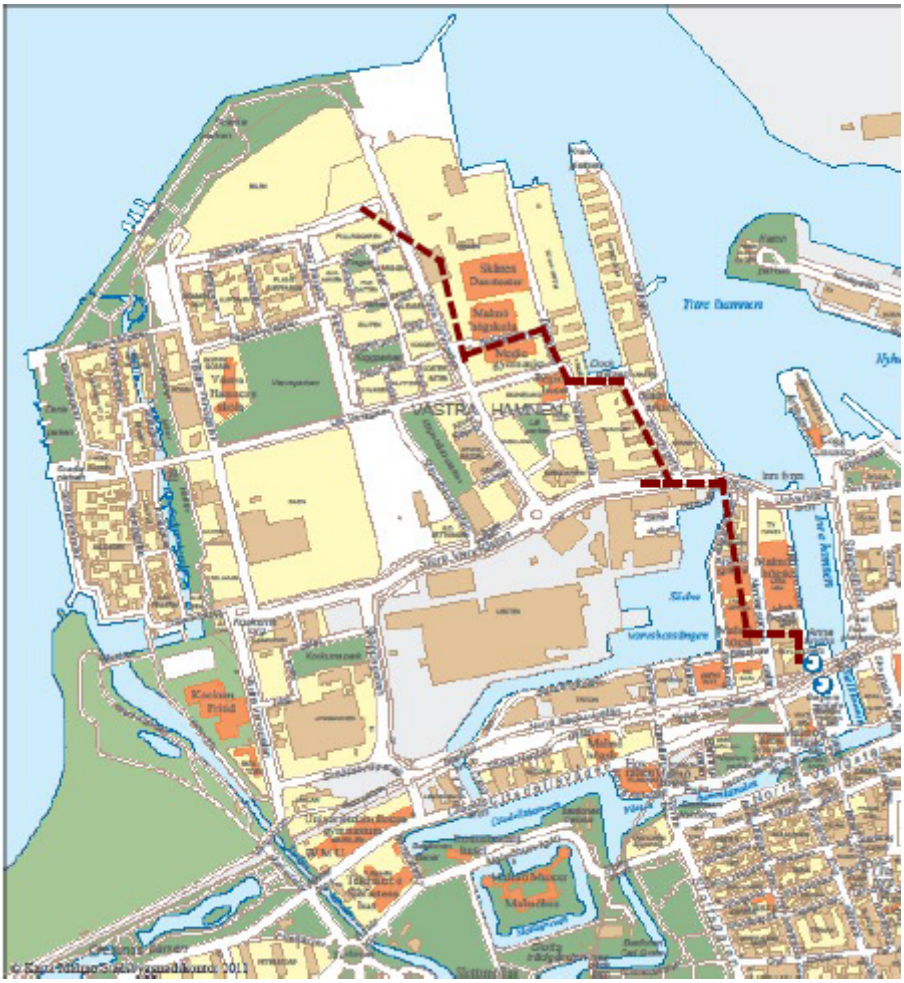

Figure 3.3: 'The Line' along Västra Hamnen. (Donnoli, 2013)

The initial intention for generating a) awareness and then b) interest in Linjen was to make people visually aware of the area, and the attention being paid to it by the City. The first step in garnering this attention was the introduction of a painted path, or line, that people could follow. The line would travel the full length of the eastern side of Västra Hamnen, taking people to historical sites and contemporary developments. Unfortunately the painted 'culture' paths did not gain as much traction as had hoped. This is where the project team's research interest came in – to apply digitally facilitated means of interaction on and around *Linjen* that aimed to increase communication, awareness and interest. Furthermore, it was the researchers' intention to develop Västra Hamnen as a desirable place to visit by gaining a deeper knowledge of the activities that took place in the area. In order for the team to acquire an understanding of the existing network in the western harbour, there had to be a first-hand experience of the environment, activities and general commute of people.

3.3.1 Mapping The Line

The first step in gaining an understanding of the environment was to walk ‘The Line’ and familiarise the team with the area in question.. Ethnographic methods of observation, participant-observation, video analysis, photo documentation and field notes were adopted in order to firstly gather qualitative information of the human behaviour in Västra Hamnen; secondly, through research analysis and first-hand experience, uncover potential opportunities that would assume an initial position, from which the team could unpack ideas and concepts; and thirdly, identify potential key stakeholders who could be interviewed and be included in a workshop at a later stage.

The team was based at the Ubåtshallen campus of Malmö University, which was situated in Västra Hamnen, towards the end of ‘The Line’. Even the though the researcher commuted to the campus from the western side of Västra Hamnen, most of the field research started from the end of ‘The Line’. The following eight photographs provide brief glimpses from Skåne Dance Theatre, all the way to the beginning of *Linjen* at Anna Lindhs plats, near the underground walkway that leads to the central train and bus station:

Figure 3.4: End of ‘The Line’. (Donnoli, 2013)

Figure 3.5: Skåne Dance Theatre and surrounding buildings. (Donnoli, 2013)

Figure 3.6: In between Ubåtshallen campus buildings. (Donnoli, 2013)

The majority of the path is paved or tarred to make non-motorised transport an attractive option. The topography is also generally flat, which makes walking or cycling particularly easy. Designated bicycle and pedestrian paths are vast and can accommodate high volumes of traffic, although such traffic was not observed during the course of the study. It must be mentioned again that weather conditions were not favourable, as the project was run during winter. Severe wind and rain proved to be obstructive to the observation phase.

Figure 3.7: Dockplatsen - the dock square. (Donnoli, 2013)

Figure 3.8: Media Evolution City. (Donnoli, 2013)

Media Evolution City is a standout contemporary feature along ‘The Line’. It houses multiple small to medium creative agencies, and with an open-plan layout inside the building, it encourages collaborative work between people from different fields. The team had a few lunch meetings here and it served well as a place to engage stakeholders who are employed in the area or in the building.

Figure 3.9: View from the bridge towards Malmö University. (Donnoli, 2013)

Figure 3.10: Cafés and shops along the pier-side of Nordenskiöldsgatan. (Donnoli, 2013)

There were a number of cafés and small commercial shops and businesses along the path. The walk along the pier was particularly enjoyable as it was fairly sheltered from the elements and there was a feeling of openness provided by the wide public space combined and the clean architecture. There were also more people commuting, by bicycle and walking, along this area.

Figure 3.11: Anna Lindhs plats - the beginning of *Linjen*. (Donnoli, 2013)

Anna Lindhs plats was particularly well-suited as a starting point to 'The Line' as it had the potential to be a platform to designate that it was the start of something. This designation, however, did not seem to be executed and thus not fully grasped, as the only striking visual element was a colourful art piece that doubled-up as children's jungle gym. Perhaps this hinted at activities or social engagements that took place in more favourable summer weather, but it did not allude much in terms of a start to an experiential culture path, and certainly was not suggestive of a world-leading ecological development. The only indicators that the team found were fairly large orange dots stuck to the ground arranged in varying distances of 2 to 4 meters apart. These dots seemed to have been worn away over time and it became difficult to differentiate the path from random markings.

The only other indicator the team found was an interactive information point placed just off the platform area. This sparked some hope in the team, but upon inspection it was clear that the device had not faired well in such close proximity to the sea. The computer interface was barely functional and the housing for the screens had warped and started to disintegrate. It offered no exclusive information about 'The Line', and it seemed to have once served mainly as general information point.

Figure 3.12: Information kiosk on Anna Lindhs plats. (Donnoli, 2013)

Aside from walking, members of the team took other forms of transport that were available in the area, namely bicycle and bus. The bus route, which ended at Ubåtshallen, basically skimmed 'The Line' and rarely followed the culture path's delineated route. Not much could be observed nor physically linked to the study, and it was found that in order for the intended intimate scale to be felt, there had to be a more personally connected form of travel in the area. Cycling was the other practical method (alongside walking) of transportation that was tested. This was an enjoyable form of transport, as the lanes were easy to navigate and it took about fifteen minutes to casually travel the full length of 'The Line'. It did, however, require a higher level of attention in order to follow the designated route accurately, as the direction of orange dotted path was ambiguous and easily confused with other unrelated graphic elements

After the team had conducted a few days of field research, it was necessary to sit down and begin compiling what had been found. Each member refined their field notes for discussion purposes and began going through the photo and video documentation that had been gathered along *Linjen*. One of the 'analogue' brainstorm tools created was a large printed Google Maps shot of Västra Hamnen. 'The Line' was clearly drawn on the map with a marker. Then, selected photographs of potential key areas along 'The Line' – shops and businesses – were printed to provide small but distinguishable images. These were then used in an interactive conversation session, in which members from the team spoke of their personal experiences gathering research and contributed relevant images as the conversation progressed. This allowed for a visually stimulating experience, and successfully avoided vague descriptions.

Figure 3.13: Thumbnail and Post-It note map. (Donnoli, 2013)

Once the discussion phase ended and all relevant images had been placed, it became apparent that there were collections of images that translated as key points of interest. These areas were then annotated with Post-It notes highlighting the name of the place, reasons for interest and any particular characteristics. The next step was to condense the map by translating it into a stylised version that displayed the information more clearly. The main purpose of this was to catalogue the work and progress. Visual aids proved to be valuable when there was a complex system that had to be mapped. It also provided ease of reference, in the sense that complex information was accessible in casual conversations – something that was convenient when there was not enough time for the researcher to dig into digital representations and archives.

The outcomes of this exercise were the team's first-hand experience of Västra Hamnen and their working understanding of travelling *Linjen*. As we approached the research as outsiders, this exercise failed to reveal the social depth of the network being investigated, however it did provide a basis from which meaningful investigation could be furthered. It also allowed for the researchers to start piecing together the information that formed the next phase of investigation, which involved engaging stakeholders in the network in a workshop or design lab.

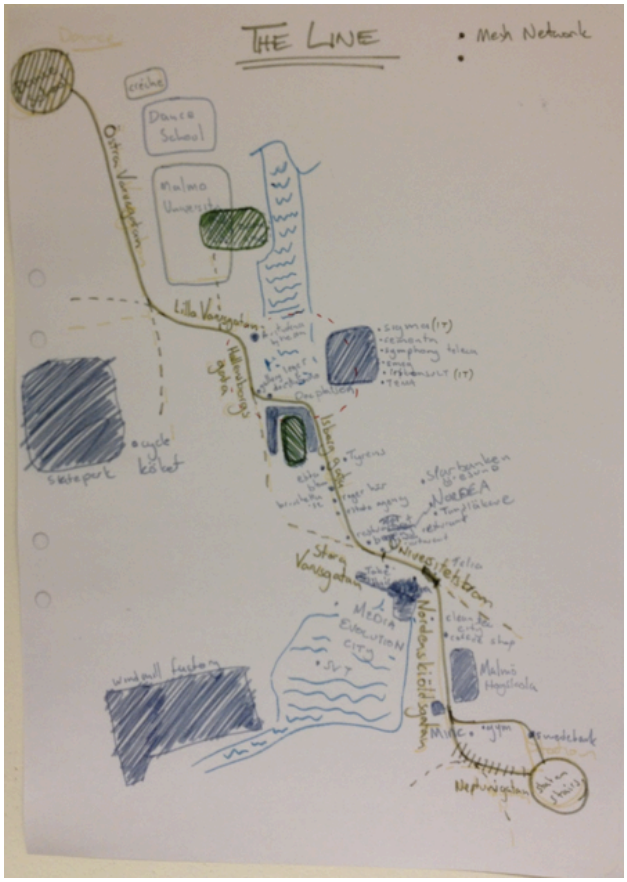

Figure 3.14: 'The Line' stylised. (Donnoli, 2013)

3.3.2 Stakeholder Workshop

The Swedish members of the team were able to engage several key stakeholders of 'The Line' through their local networks, acting – to a degree – as mediators. Having local researchers, or at least people familiar to the investigated environment, on the team made establishing connections to stakeholders a more comfortable process. These participants were selected based purely on their willingness to be a part of the workshop, their availability and their position as having an everyday interaction, or inclusion, with the activities happening in the area.

The workshop included the project team and three local stakeholders, these being: Peter Langerbreck, a senior environmental advisor and resident in one of the ecologically world-leading housing developments in Västra Hamnen; Andreas Lundberg, a business developer in Malmö with numerous projects in progress around 'The Line' and who works from an office within the area; and Helena Uesson, who is Media Evolution City's head of communications.

The intention of the workshop was to create an environment in which the stakeholders and researchers could engage with one another comfortably, describing their individual

experiences of ‘The Line’ as part of their daily routine, without the stress and expectation of their daily employ. The session was held in one of the Ubåtshallen campus rooms, and the group sat around a table in the room with refreshments served. Before commencement, all participants were made aware that it was the team’s intention to video record the entire discussion and they were asked for their consent. Once this was acknowledged and all the participants had settled, the team explained the envisioned process of how the workshop would run and the tools with which they could converse or extrapolate their experiences. It is also important to mention the entire session was conducted in English, as all participants had a firm grasp on the language.

Figure 3.15: Introduction session. (Messeter, 2013)

The workshop was divided into three main activities:

1. Each participant was to describe their digital practices, in the sense of what technology they used everyday;
2. Stakeholders described their movements in and around ‘The Line’, and also were to indicate areas of interest or enjoyment to them; and
3. The final part was an open-ended discussion about the future possibilities that they could envision within the area, pertaining to interactions and potential activities.

The tools presented to the stakeholders were intended to encourage a relaxed expression of experience and also enable them to present tacit knowledge, something that is difficult to achieve when engaged with formal semantics. This was achieved by simply using a projector, Google Maps, white-board markers and coloured adhesive papers. All of the participants were familiar with the technology and there was little explanation required as this was seen as implicit and familiar knowledge.

The first part of the session involved each stakeholder presenting the digital tools they used, and explaining the uses of them from both private and professional standpoints. There was a common crossover between the participants' use of technology: their use of smart phones, tablets and laptops was the common denominator. Some stakeholders had extra units of these products that were dedicated to the work and home parts of their lives. One of the key questions asked of them was how they received and conveyed information and where this mainly took place – in both the digital and physical senses. Suddenly a pattern started to develop. It became apparent that the stakeholders would frequently travel within the western harbour to attend meetings outside of their own offices. These meetings usually required an Internet connection or Wi-Fi to conduct their engagement and also to keep up-to-date on the happenings of their work and personal lives. The outcome of this activity could thus be laid down as a basis of technology amongst the stakeholders. Much of their activity within the western harbour relied on the technology that they used.

The next phase required the stakeholders to map their travel routes. They did this by drawing on a projected map of Västra Hamnen and some of the surrounding areas. They would normally first indicate the direction from which they travelled (their home) and then mark the location of their workplace. They then drew the typical path they would travel; all, except Langerbreck, travelled primarily by bicycle. Langerbreck lived in the western harbour, so he would commute by walking unless he had to travel to meetings outside of the main city area, in which case he would use his car. An interesting result of this basic mapping technique was that the participants were observed as frequently being reminded of certain factors along their journeys. There seemed to be an almost pleasant aide-mémoire to them of why they had taken a certain route, and why they changed it on another occasion - something that they could have not portrayed in normal conversation without the technology aid. The reasons for these route alterations were mainly to change the scenery, avoid certain weather elements and meetings scheduled at the beginning or end of their workday. Other elements marked on the map were meeting places, frequented coffee shops, entertainment places and spots they wished to avoid or disliked. After each participant

had had their turn, a photograph was taken of their personal ‘story drawing’ in order to be archived and referred to at a later stage. Each stakeholder’s journey was drawn on the same map so that they could add, clarify or explain the previous stakeholder’s ‘story drawing.’. This phase produced: a collection of routes travelled by bicycle or foot in and around ‘The Line’, and the reasons why; environmental elements that dictated certain activities, that were not apparent to the researchers; points of like and dislike, and the reasons for them; and finally a deeper understanding of the networks within ‘The Line’ and indicators of the activities that contribute to the culture of them.

Figure 3.16: Everyday life on ‘The Line’. (Messeter, 2013)

The final phase of the session was a discussion that continued to use the interactive map, and the participants were encouraged to describe personal visions of the area, based on their everyday experiences, that would accentuate their likes and diminish their dislikes. They were also stimulated, based on the input of others, to imagine areas of the map that could be future concepts to contribute to the social value of the western harbour. This saw them drawing in or modifying areas that they felt would be beneficial. These additions were annotated with coloured papers. Lundberg’s position as a developer of the area allowed him to indicate areas that were of interest to his company and informed of plans for the future. This also allowed the visions of the other stakeholders to have an element of reality. An additional component of the session that was not possible to complete, due to time restrictions, was a Google Maps Street View option, whereby participants were going to be asked to roughly sketch in ‘real life’

renditions of areas that appealed to them. While it is unfortunate that this additional research could not be undertaken, there is merit in mentioning it for future use.

The workshop concluded by introducing the participants to a closed Facebook group, which had been set up by the team, dedicated to the activities happening in and around 'The Line'. The intention was to extend the dialogue initiated in the workshop as a daily reminder when travelling around the western harbour, and also to instil a sense of influence that the stakeholders could have on the design and development process of the area.

Figure 3.17: Envisioning the future of 'The Line'. (Messeter, 2013)

This form of engagement proved to be rewarding for the team as a comfortable level of social interaction was reached. This meant that ideas and information could be easily exchanged and the format – provided for by the combination of analogue and digital tools – allowed the participants to communicate effectively. Additionally, conversing by means of drawing or 'gesturing' meant that there were experiential information triggers set off simply by the act of demonstration. The team was able to clearly observe the mood and emotion that the stakeholders felt when commuting along *Linjen*. The researcher feels that this personal level of understanding would not have been reached through field observations and interviews. The arrangement of an interactive interview is far more valuable.

The outcomes of the workshop were that of a foundation of information that could be designed from. The team realised that communication, information and transportation were key elements to the physical activity that took place in the western harbour network. From this basis, the researcher was able to begin deliberating how to translate these elements, drawing on the experience of the stakeholders and the team's first-hand observations. There was a definite layer of interconnectedness that was not apparent at first glance and the inability to convey this interconnectedness was an essential problem in the area as well. The team found themselves asking how it would be possible to make the public aware of this interconnectedness and also intrigue them so that they would want to know more about the rich history of Västra Hamnen, and also what was happening in the area. This distilled into a brief that looked at curating a localised information source and providing a visually engaging interaction with people in order to develop a sense of comfort in one's environment.

3.3.3 The Mesh Network

The Mesh Network project aimed to produce a technology-enabled network that provided a locally sensitive means to encourage activity and interaction between people and a specific place. The project was grounded in the idea that positivity can be developed from awareness of one's surroundings and accessibility to information about it. However, it was not intended to stop at simply providing information – it would also enable that information to have a physical effect on a person or place. This interaction, and access to the information, needed to be unique in order to generate a genuine curiosity within people who are 'inside' the network.

With the information garnered from the mapping exercise and design lab workshop, the team set off to take advantage of the stakeholders' expectations when it came to using Wi-Fi. This was seen as design delineation. At this point the team came across information about how to build an independent Internet – a parallel Internet. The idea was based upon research and testing into a software that can enable smartphones, Wi-Fi routers and other transmitting hardware to link together and form a network coverage that can send information without the need for a centralised Internet device (Simonite, 2013). The idea was spurred on when questions were raised about the redundancy of cellular phones when natural disasters hit populated areas, because once communication towers are damaged, there is no way to communicate via them. However, if calibrated correctly cell phones are fitted with the technology to allow for a localised communication network. This project was taken up by Serval and Commotion Wireless, both of which operated independently to produce a platform application that could enable devices to form their own network with the ability to communicate data

such as voice calls, text messages, file transfers and more content rich formats (Simonite, 2013). This method does not require any specialist knowledge and is compatible with relatively inexpensive devices. It has also proven to be helpful in communities that are unable to afford a full Internet network, or simply lack the infrastructural requirements. With the mesh network technology, linked transmitters and transceivers – in the above-mentioned products – are able to extend a Wi-Fi service from community centers into areas that were previously without Internet access (Simonite, 2013). For the team, this presented a valuable and financially viable basis from which to start the project.

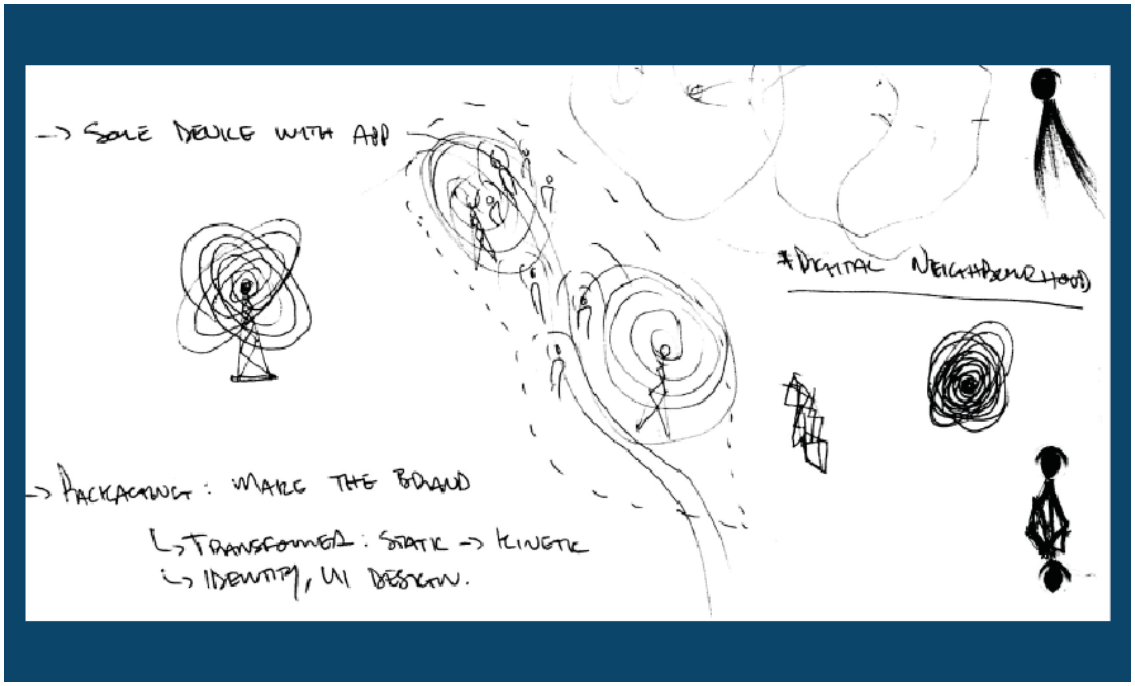

Figure 3.18: Mesh network brainstorm. (Donnoli, 2013)

The team made a design decision to opt for an independent-device based network, instead of a cell-phone based network, because of users' expected hesitation to download unknown software onto their smart devices. The current mesh network software is still very much in testing and is a fair distance from being a commercial product. There had to be a custom device to experiment with and most importantly, emulate the Wi-Fi component in cell phones. The technology used also had to be open source, easily accessible, economical and able to be used outdoors. The device also had to be independent from an electricity grid. After online research and consultation with Malmö University's mechatronic department, the team was able to spec a device, or node as it was referred to, with the following components:

- Raspberry Pi
- D-Link wireless router
- SD card 8GB

- PowerPack 10000
- Solcell 350mA 12V

Figure 3.19: Node tech components. (Donnoli, 2013)

This pack would be sufficient to produce a sustainable and independent Wi-Fi transmitter and receiver with the ability to communicate with other nodes. Multiple nodes with this technology were necessary to create a wireless network with an independent server, which could then be accessed by any user with a smart device. The nodes has to be aligned in an array along a specific path, in this case 'The Line', so that a continuous wireless network could extend over an abnormally large area. This makes the information contained within the mesh network only accessible to users that are physically present in the designated area.

A decision was made to steer the framework of the project away from imitating existing social media platforms, so the mesh network does not provide access to the Internet, as this carries expectations that would not be achievable in such a small project. It was important that users were engaged with an entirely new system so as to maintain the value of the project's vision. This also allows for a totally independent and localised online experience that avoids complications that may arise from connectivity through commercial bandwidth channels.

It was essential that the user experience be as fluid as possible. To allow for this, consideration had to be given for the type of information, the richness of the content and the presentation thereof. An example of this would be to opt for an interesting interaction – digital to physical actions or vice versa – over graphically rich content. The

mesh network had to act as a digital springboard of information, enabling users to experience their environment physically, more interactively and hopefully with an enlightened perspective, as opposed to users being permanently focused on their smart devices.

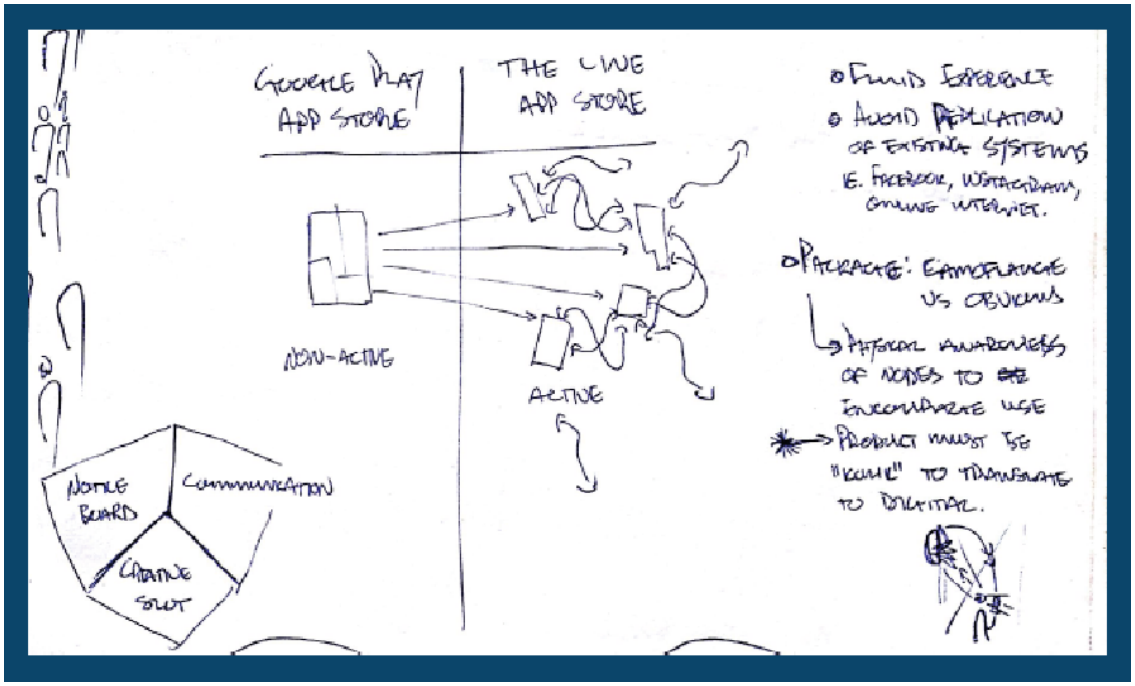

Figure 3.20: Mesh network brainstorm 2. (Donnoli, 2013)

To encourage the use of the network and, more importantly, to ensure that people were aware of it, it was necessary for there to be a clear and recognisable brand developed that would translate effectively from the GUI to the node packaging. Consideration was given to whether the nodes should be camouflaged or highly visible. It was decided that the nodes would be made visible and packaged in such a way to create interest and lead people to realise that they could be a part of a publically accessible, yet localised, digital system. The nodes had to be designed in such way to become 'iconic' and relatable to the interaction on smart devices.

The starting point for the pilot system was an application (app) to develop the user-side of the network. This app would be available to download from the Internet but only activates once users are within and connected to the mesh network. Information gathered from the workshop led the team to focus on a simple first step – a basic 'notice board' feature that would display information about events, venues and activities taking place in the area. The next step in development was to focus on communication, with the potential of a chat-type feature, and further consideration was given towards being able to accommodate a creative function that opens the network up to

experimental concepts. With the ability to transmit information wirelessly and independently, developers could expand their thinking to create mechanical installations controlled via the mesh network. A hypothetical example of this would be a lighting display that could be set along 'The Line' with the variable inputs (colour/frequency) being controlled independently by users within the area, with an effect that could be similar to the Northern Lights at night. This hints at the potential for creativity that could be achieved once a mesh network is setup and utilised beyond its basic practicality, however, the team had to stay on point with a simple feature first.

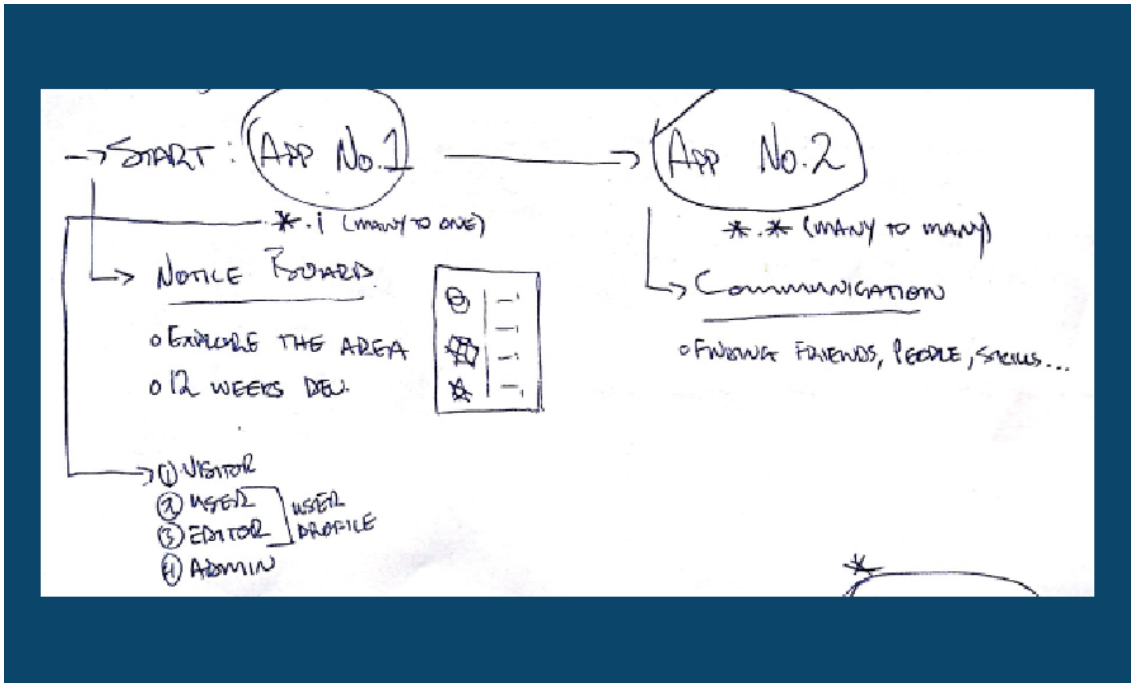

Figure 3.21: Mesh network brainstorm 3. (Donnoli, 2013)

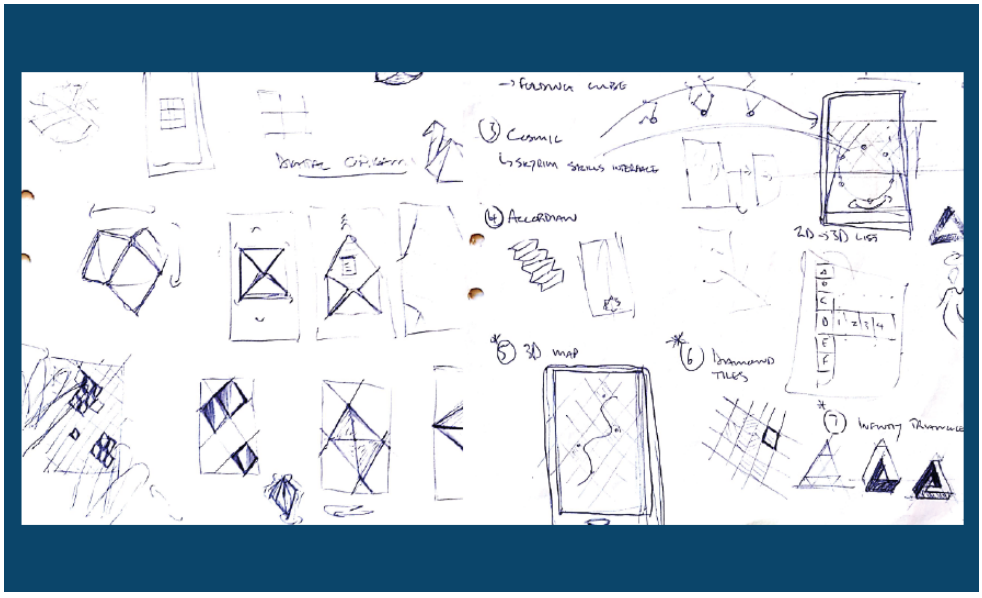

Figure 3.22: Application design iterations. (Donnoli, 2013)

The app's graphic user interface (GUI) had to be intuitive and also interesting to the user, so particular attention was paid to how the app would be navigated. It was the designer's intention to allow for an experience that would engage visually but without the need for high graphic content. The interface also had to speak about the place and present it in a fresh and interesting way.

Various iterations of the GUI were fleshed out, all of which focused on translating information into visual elements instead of being text heavy. The semiotics of the design were critical as the network was intended to engage any person (foreign or local) who happens to be in the area. The concepts were refined into:

1. Origami, which was characterised by delineating the control actions, or flow of the GUI, based on how one would be able fold paper;
2. Dot matrix, based on simple clusters of information with a very minimal aesthetic, making use of colour and geometric assemblage;
3. Cosmic, a fairly ambitious concept as it sought to develop a spherical GUI that could be zoomed in and out of, depending on the user's selection, similar to travelling through space;
4. Accordion, which worked on a stepping and foldout of information, so options would expand visually once selected, similar to the movement of an accordion; and finally
5. A layered three-dimensional map, which provided an overview of 'The Line', with hotspots indicated.

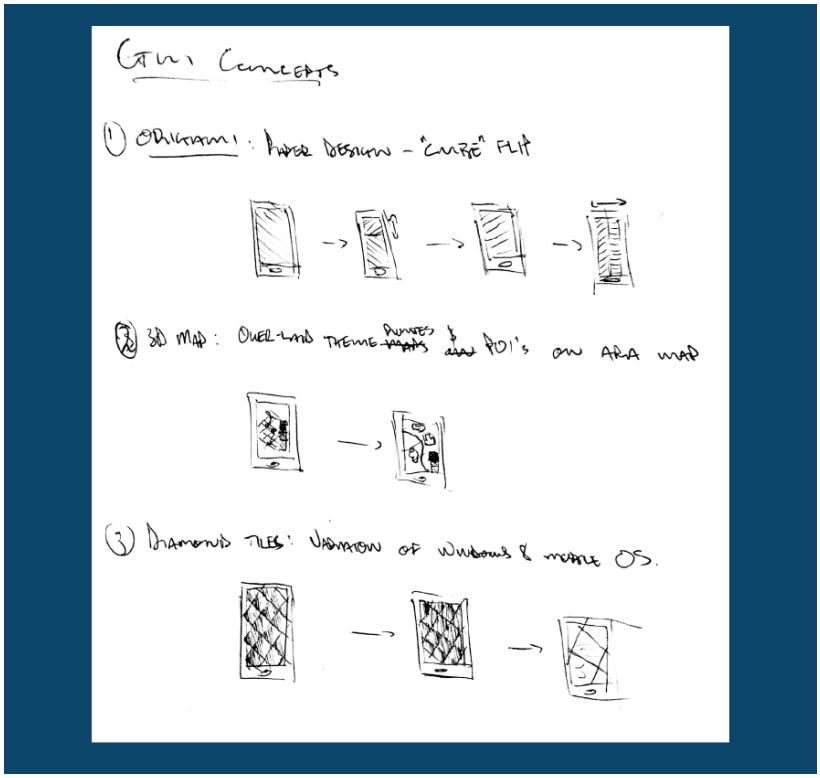

Figure 3.23: Final GUI concepts. (Donnoli, 2013)

The final three concepts that were settled on were; the ‘origami’ derivative ‘cube’, ‘3D map’ and ‘diamond tile’ (a variation of the dot matrix concept). These were the seen as the most realistic within the scope of the project. The graphic design did not rely on heavy graphics and the team was able to prototyped the chosen GUIs fairly easily.

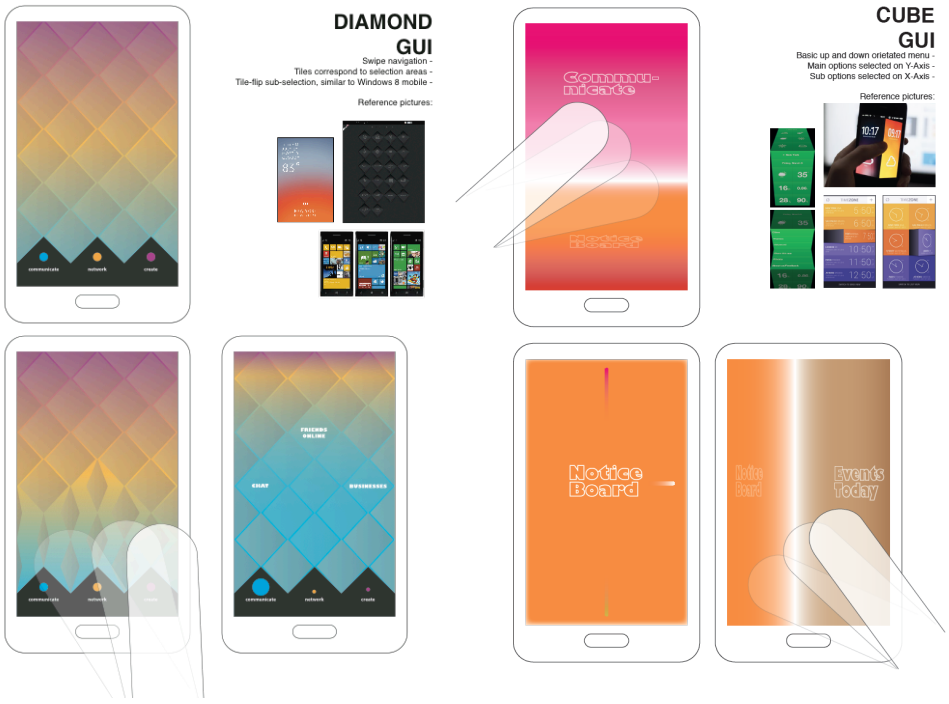

Figure 3.24: Diamond & Cube GUIs. (Donnoli, 2013)

These concepts were then presented to the original stakeholders who were taken through the various interactions using printing paper prototype versions with which they could experiment. The stakeholders gave feedback on the intuitive nature and aesthetic appeal of the GUI. The team then settled on '3D Map' as the final concept. '3D Map' was visually appealing and the information was presented in such a way that users had a sense of hierarchy and also could reach their target point faster. The three principle information categories were 'events', 'venues' and 'points of interest'. These categories stayed within the scope of the handling ability of the mesh network, and they were highlighted as key areas that could be used to generate content. The information would also be relatively familiar to users, which meant that the concept could be introduced on recognisable grounds, but also avoid comparisons to existing online platforms. At this point it is important to mention that even though the functionality of the app in the pilot phase can be mirrored with any app available from the Internet, the long-term advantage of a localised mesh network must be emphasised. There is great potential for advanced functionality.

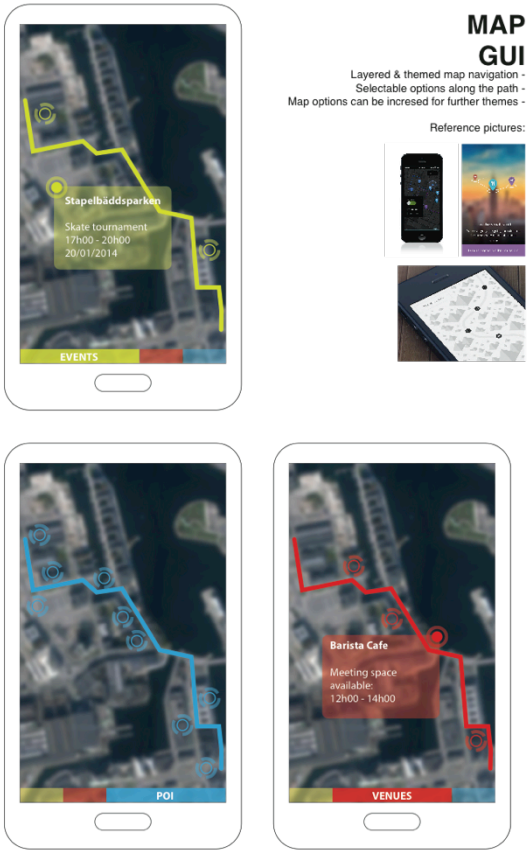

Figure 3.25: Map GUI. (Donnoli, 2013)

3.3.4 Project Results

The team managed to take the project as far as finalising the technology for the prototype and using an understanding of the needs of the users in Västra Hamnen as a basis for the ideation. Frequent communication with stakeholders about the progress of the project meant that while research was being conducted on technical elements, the team could also make constant alterations to the user-driven elements of the design. The development of the nodes, and specifically the software, proved to be somewhat troublesome. The team was able to take the mesh network software as far as proof of concept, in that two different nodes were recognising and receiving basic data from each other. The various software platforms that were used from open source websites had to be heavily analysed and adapted, and this proved to be a lengthy and frustrating affair. With all the revisions on technology and coding dead-ends, the project ran short on time to fully develop a working application and array of mesh network nodes in Malmö.

Feedback from stakeholders about the GUI of the application and the concept of a mesh network revealed that it had been well received. The most common question was about the practicality of having an entire mesh network setup in parallel with existing Internet Wi-Fi networks, and whether this would inhibit their regular communication methods. However, once the technology was explained further, with potential future-use mentioned, the stakeholders reacted positively to the idea. The researchers acknowledged that investigations had to be conducted into whether an integrated Wi-Fi feature could be developed, whereby the mesh network would not interfere with existing Wi-Fi networks. Upon review, all of the stakeholders had mobile data on their smart devices, which meant regular communication applications could be used in conjunction with the mesh network.

The mesh network development, although incomplete in Sweden, had to fulfil the second part of the overall project, which was intended to take place in Cape Town.

3.4 Case Study Conclusion

The Malmö case study proved to be a valuable exercise in understanding the basics of how to run a design project based in PD methods. The researcher entered a completely unfamiliar environment, without any substantial notions of what had to be solved. In essence, this is what made the project relevant as an exercise in designing for opportunity. The opportunity in this case came from designing with stakeholders, who became the co-designers of the project.

There were certain key elements that contributed to the design process in which the stakeholders relayed their own needs through their experience. This was made possible by the researchers understanding the stakeholder's environment from outside-observer and participant-observer standpoints. It was important for the researcher to have a first-hand account of the setting before any conclusions where drawn about what to design. The 'how-to-get-there' was more important at this point. The value of personally experiencing an environment is in not only gaining knowledge of the place, but also that it breeds a common ground for discourse when engaging potential design participants. This proved to be the case once conversations with stakeholders were sought.

Documenting the information gained from field research (by note taking) is a crucial part of the process, however, it became clear that the gathering and presentation of such information was an important exercise in itself. The mapping phase of the project included a large collection of media that reflected what should be logically applicable in conversation, but it was experienced that many of the nuances in the information could be lost to tacit knowledge. The researchers discussed their experience, with the rest of the team, of Västra Hamnen through the use of photographs and diagrams that were placed on a large map. Through this dialogue, certain overt elements were reinforced, and other finer details were accentuated. This information was then visually categorised, a process that proved helpful when engaging in either casual or formal discussions. This also provided the researchers with a constant reference for potential design features or passages of inquiry that took place beyond dedicated deliberation periods

The next critical evaluation that can be drawn from this case study is that even with a level of shared experience with stakeholders, it was important to have local mediators who would personally introduce the researcher to the community concerned. Without this, approaching potential key stakeholders would be more of delicate task, although not impossible. This shortened the distance of engagement between the researcher and participants. Once the team had been introduced to the stakeholders, an equal level of interaction could be established. The workshop was somewhat of an extension of the experience gained by the researcher in the mapping exercise, and it became evident that actively reiterating information that may be obvious to one's self could potentially reveal hidden details. This could also potentially develop a faster assemblage of information leading to fruitful ideation. With stakeholders simply drawing on the projected map, it seemed that tacit information was readily available for them to express. This meant that they could visually explain places, and the routes used to

reach them, with ease.. If compared to a discussion that did not make use of conversational tools, the mention of location might not draw out the same information as it would when shown visually. This method also demonstrated that by enabling the participants to physically convey their experience, the information was not totally dependant on spoken language. The map also let the stakeholders illustrate their stories, which enabled them to have a confident level of ownership resulting from the almost playful nature of drawing out experiences. This is a practice that translates well in the architectural field as well, in instances observed where mapping exercises are used as warm-up to further dialogues, subsequently followed by design games (Halse, Brandt, Clark, & Binder, 2010: 80). The value of this kind of process is that stakeholders are able to work without constructs and explore their own experience – processes through which information can be garnered, summarised and re-packaged into questions that continue the conceptualisation development. This essentially qualifies the stakeholders as co-designers, a critical part of the design process.

The introduction of the mesh network concept was a result of the frequent input and referral from the stakeholders. The researcher was able to observe the design dialogues by being directly involved in the interactions and simultaneously assuming an outside perspective. Parallel to researchers, participants where able to do the same. This created a synergy whereby new information was constantly being acquired and translated into manageable pieces by interpreting it into visual representations of experience. This enabled the team to run through concepts and then feed the results back into the participatory design cycle, delivering variations and refining ideas. Instead of compartmentalising the processes and attempting to present the results in a linear design sense, the research was realised in a circular and analogous fashion. This meant that ideas could be immediately explained, understood and assessed. The development of a rapid feedback loop, through co-design, was an invaluable advantage to the project.

The understanding of place in Västra Hamnen was attributed to methods and processes that followed stakeholder participation closely. What was learnt in this chapter is that place is comprised of networks and within those networks, activities that are based around and influenced by environmental, social, communicative, occupational and technology-driven factors. These elements cannot always be fully understood from an outside perspective, and requires input from stakeholders. However, a research process that continues to involve these participants as co-designers, benefits from rapid idea iteration processes. The researcher was able to develop an understanding of place by having a first-hand experience of the

environment and visually representing this information into categories. This was then translated into a workshop in which participants shared their own lived experience of the same area, through an ‘interactive’ interview format, but were put into a position that they could educate the researchers. From this, certain boundaries could be created, that where understandable to the designer and participants, which allowed for continuous collaborative interactions that led to a sound and kinetic understanding of place.

CHAPTER FOUR

CASE STUDY: PARTICIPATORY CHALLENGES

4.1 Introduction

This chapter includes an investigation into how stakeholders define their place in the East City of Cape Town, South Africa. This definition of place will be analysed in a case study that follows from the previous research conducted in Malmö, as part of 'The Line' project. Chapter Three saw the researcher following typical PD methods such as: field observations, participant-observer, mapping exercises, video analysis and, critically, a stakeholder workshop set up as a design lab. Combined, these methods allowed the researcher to have an insightful level of communication with the stakeholders, which nurtured a collaborative relationship. This engagement promoted the stakeholder to the level of co-designer. An evidential basis presented participatory methods as a beneficial process in designing, as stakeholders find themselves providing the tipping points to the design ideation (Halse, Brandt, Clark, & Binder, 2010: 81). Having experienced the value of PD operating in 'The Line' project, the next phase of the project was to apply the findings, both methodological and potentially product, to a specific area of development in Cape Town – the East City. The key aim of the second case was to investigate whether the benefits of a design lab could be achieved in an urban environment, on a street level, and see what outcomes would be developed.

This chapter is arranged by firstly providing the setting in which the case study took place. This will illustrate the historical, environmental and social aspects that contribute to the culture of the area, which in turn had a strong influence on the direction of the research. These factors were drastic enough to alter the course of the envisioned project, which was abandoned, revised and then eventually set on a new course.

Following a contextualisation of the setting, the East City project will be analysed as the second phase of 'The Line' project, and presented as the basis of the case study. This will show the intentions and methods of inquiry that were sought in the first part of the project. The project team and partners will also be introduced.

The first part of the analysis will show how 'The Line' project was intended to be tested in Cape Town and what observations were taken from this. There will also be a discussion of the failure of the mesh network, and how certain factors contributed to this. Parallel to that is an introduction to a waste management company that formed a basis of research operation. This company provided valuable grounds upon which PD methods could be tested.

The next part of the case study introduces a sub-project that was used as the primary focus for the length of this research section. This section comprises an overview of a project that was being conducted in parallel by two Swedish students in Cape Town. Their project placed the students in a similar position to that of the researcher in Sweden, in that they were researching and attempting to engage stakeholders in an environment that was unfamiliar to them. The Swedish students' project translates as a comparative work and research analysis of not only the original *Linjen* project but, more significantly, that of the research presented in this thesis thus far, with particular attention being paid to how social differences present a challenging frame for PD, when the researchers are faced with stark social differences to that of their potential co-designers. The observed progress of the student project seeks to illustrate the difficulties encountered and also actions that were taken to potentially alleviate these frictions. This leads to the next section that discusses the observational research undertaken, particularly that of the Swedish students. This is followed by an outline of their project and the development towards their final results. The students' results coupled with the outside observations of their research will be used to form the conclusive direction for the progression of this thesis. This orietnation of work is displayed in the initial AT sketch in Figure 4.0 below.

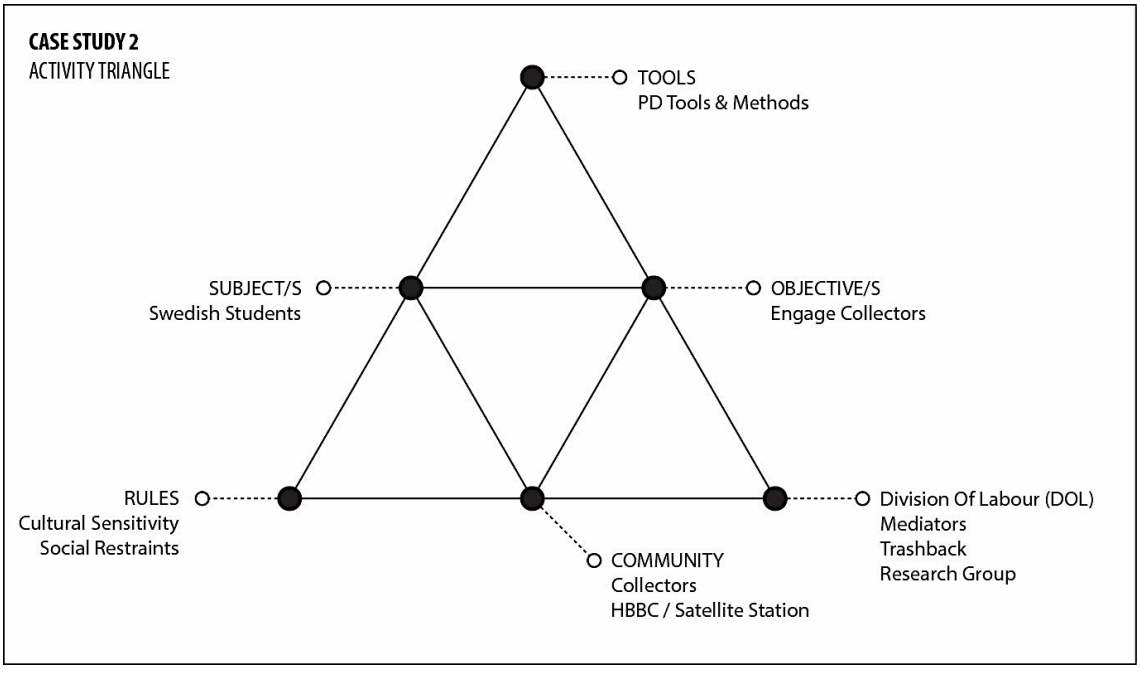

Figure 4.0: CS2 Initial Activity Sketch. (Donnoli, 2014)

4.2 Project Setting

South Africa is rich in diversity and social complexities. Its political history is entangled in the radical regime of Apartheid and decades after it's dismantling, the contemporary social landscapes are still struggling to find a form of stability and unity. These conditions are resoundingly evident in the setting for this project: District Six. It is important for the researcher to provide an image of the social landscape that, in this case, has had a strong influence on the development of communities in Cape Town.

In 1966 the Apartheid regime passed the Group Areas Declaration Act that would put into motion a near complete eradication of an over 60 000 person strong and vibrant community in the East City, or what was known as District Six (Rassool & Prosalendis, 2001: 3). District Six was deemed a white-only area, and the original inhabitants were forcibly removed and relocated out of the city to the Cape Flats. The existing structures of homes, places of business and, more importantly, sense of belonging were rapturously brought to rubble – a scheme of the then government's social engineering tactics. By 1982 the Nationalist government had razed the entire area, and all that stood to remind people of a former life were the remaining hard-fought-for churches and other select buildings (Rassool & Prosalendis, 2001: 33). This, however, ignited a reverence of the former District Six community, and a journey of remembrance and recollection ensued – starting with the District Six Museum.

Figure 4.1: District Six Pre-removal. (SAHA, 2010)

The District Six Museum was opened in 1994, after the fall of Apartheid, with an exhibition called *Streets: Retracing District Six*. The museum represented the collective effort of multiple organisations that arose between the 1970s and 1990s, to preserve the history of District Six and the memories that communities had there (Rassool & Prosalendis, 2001: vii). The opening exhibition, which ran for four years, introduced the District Six Museum and solidified its place as an institution in Cape Town – a place of story telling and education, for locals and travellers. The museum, in this sense, goes beyond simply hosting exhibitions and, as a still fully operational feature in Cape Town, the District Six Museum has grown itself into a pièce de résistance for the vibrant community that once lived in the area.

At this point one may question the importance of a museum is in the context of describing the project setting, or how it operates as a singular channel through which a historical understanding of place can be ascertained. The answer is that the District Six Museum is a 'living' artefact representing the history of a culture, of a community – a history that had only been publicly documented and appropriated by the Apartheid rule (Rassool & Prosalendis, 2001: 168). It truthfully shows what once was and also, what will be. It is a form of education that can be experienced, and shown to the younger generations of families that once lived in District Six. More importantly, it shows younger generations where they actually came from: not from a ghetto. The museum is a rich portal to understanding the social landscapes that are currently operating in District Six.

Figure 4.2: District Six Post-removal. (SAHA, 2010)

This was the vision that founder of the District Six Museum, Anwah Nagia, had when he opened the doors of the establishment: a re-education of belonging, or as Nagia put it “the reconstruction of people” (Rassool & Prosalendis, 2001: 171). This was particularly important for the youth, as generations of children grew-up in fractured communities that were far removed – almost kept out of sight - from the city hubs. The youth grew up with housing overpopulation, high unemployment, vicious peer pressure, drugs, and gang violence being everyday aspects of life (Rassool & Prosalendis, 2001: 173). The knock-on effect of relocating a once tight-knit and warm community to various government-built town projects can be described as a contemporary catastrophe. The then government’s careful planning scrutinised military aspects instead of social structures, which meant that relocation towns were placed at a ‘safe’ distance from white-only communities, with buffer zones, that could be easily controlled by military force (Bickford-Smith, van Heynigan, & Worden, 1999: 156). The irony of this scenario was that the Apartheid government’s mounting security paranoia in the 60’s and 70’s was the agitator that provoked violence, and aggression within the communities – the very thing that worried them so much. As the elders in these communities came to grips with their new living conditions, removed from their neighbours and family, the youth were left unguided and alienated by the Apartheid system, and so begun the propagation of the extreme gang culture felt today (Bickford-Smith, van Heynigan, & Worden, 1999: 188).

Resettlement townships were smattered with people from different non-white races and areas of the Western Cape. The long-standing communities that were supportive of growth and cultural camaraderie, had been broken-up and offered housing on a first-come-first-serve basis. This meant that it was difficult for families and friends to relocate to the same living areas in the Cape Flats (Bickford-Smith, van Heynigan, & Worden, 1999: 189). Instead, pre-removal communities from District Six, which were generally classified by the government as ‘coloured’, were mixed with urban refugees and black African communities from shack settlements that had been demolished (Bickford-Smith, van Heynigan, & Worden, 1999: 188). The resulting social landscape formed by compounding these fractured communities, was a primer for juvenile delinquency. The absence of familiar ‘neighbourly’ security, a steep decline in employment and increased drug and alcohol abuse allowed pre-existing gang culture to thrive, especially from feeding off the unguided youth (Department of Rural Development and Land Reform, 2013).

Once the Apartheid regime came tumbling down in the 1994 democratic elections, effectively putting Nelson Mandela’s African National Congress (ANC) in control of

South Africa, a long journey of restitution lay ahead for the splintered former District Six community. The Land Restitution Act 22 of 1994 enabled the District Six community to seek out opportunities from the new government to reclaim the land that had belonged to them before they were forcibly removed from it. This would also serve as a benchmark example of restitution in the new South Africa (Davie, 2014):

“The return to District Six can serve as a model for restitution, as a process, which has made it possible for citizens who ordinarily would not have been able to afford it to have access to prime real estate in an increasingly gentrified Cape Town. It has facilitated the process of repossession of the city by the dispossessed.”

Nearly 50 years later District Six has only been marginally developed, with some 1 060 of the original 60 000 people having been verified by the government as restitution claimants (District Six Beneficiary Trust, 2011). If one walks through the District Six area, the lack of restitution becomes painfully obvious. With a few new residential complexes, the grounds are comparatively bare to its vibrant history. The few stalwart ‘defenders; of District Six, such as Vincent Kolbe, have rallied the old community on numerous counts to keep modern day developments off the land, land that over time has become prime real estate with the continually growing metropolitan (Fisher, 2013).

Figure 4.3: Current Layout of District Six. (Google, 2015)

Land and Affairs Minister Gugile Nkwinti, who at the time was leading the process on land restitution, made a clear point that “things can never be the same” and went on to say, “… Without land you cannot practice your culture. You become alienated from

yourself" (Fisher, 2013). This statement is poignant in its accuracy, not only within its historical stance, but more importantly in the astute relevance it has in the contemporary canvas.

With the demise of Apartheid, the buckle was unfastened and the people of South Africa could once again move freely in their country. The ambitious restoration goals of the new government highlighted the limitations of attempting to return effected people to the way of life from which they came. Unfortunately, in light of Nkwinti's words, the land from which to practice culture had changed, and the alarming result of this is the high number of displaced people, many of whom returned home seeking a livelihood but were met instead with homelessness and unemployment. The Cape Town City Bowl, or Central Business District (CBD), boasts booming business, but this remains far from reach for many seeking opportunity and restoration. On the street level, the CBD has the highest number of street people out of all the sampled sub councils (City of Cape Town, 2014). Obvious indicators point to a more lucrative life living on the street when surrounded by more affluent people, but since the early trickling of displaced individuals looking for wellbeing, Cape Town can be seen as perpetuating its own street culture. In essence, the land is now the street, and people are practicing a culture of survival by all means possible. This culture brings with it an inclusive community, albeit a socially problematic one – which could be interpreted as a means of avoiding alienation.

4.2.1 Current Context

In late 2014, the City of Cape Town initiated the first part of a survey to better understand the growing street community in the city. This was the first investigation of its kind, and there is no prior official data on people living on the street in Cape Town. The survey was conducted with 2 670 street people over the age of 18. Of the appraised group, these were the statistics on people's presence on the street (City of Cape Town, 2014):

- 15% - live on the street out of choice
- 26% - cite lack of housing
- 18% - the loss of family
- 15% - substance abuse
- 15% - unemployment and economic factors

One can plainly see the parallel between these statistics and the problems highlighted in the relocation townships during Apartheid. Given the City's prior lack of knowledge,

many social interventions were running without accurate background knowledge of the social setting. This makes for a recipe of reaction, more than prevention. In a more recent and exhaustive study that was carried out from 2014 into 2015, more than 7 000 people were counted as being homeless in Cape Town, of which nearly 5 000 were living on the street (Bernardo, 2015).

There is a need for a greater understanding of the culture that is homelessness, or street living, in Cape Town. There have been indications of a slow progression of interest in developing systems that are geared towards reintegrating or uplifting street people. There are numerous NGOs and other organisations present in Cape Town, and each have a slightly different approach, or focus, to tackle the social complexities of street culture. It has proven to be difficult for an intervention to happen in a timely manner: someone new to living on the street has approximately three to six months before social work becomes ineffective in restoring stability in the street person's life (Cape Town Partnership, 2015a). As more pieces are added to the picture, the place and the culture that it reveals becomes a stark facet of the social assemblage of Cape Town. Just as traditional cultures have entrenched themselves with religion and history in the city, so too has a street culture formed from social displacement. And with any culture, in order to understand it, one must garner knowledge on the networks that make the community.

4.3 East City Project

Despite its social complexities and problems, Cape Town is also a city brimming with opportunity. Alongside the abundance of large corporate companies, there is a young and passionate stream of youth. This, along with Cape Town being selected as a World Design Capital in 2014, and its unique history, was the context in which the second part of the original *Linjen* project would be undertaken. Essentially, the task of this project was to firstly replicate the approach and methodology that was utilised in Malmö, and secondly, apply the technology or, more specifically, the mesh network, that was developed during 'The Line' project. The brief was simple, and the team assembled about one month after the completion of the first part of the project in Sweden. This team was made up of two students and the original two lecturers from Malmö University; the joint-professor of Malmö University and CPUT, and the author.

The team, as part of the DOO.Co-Lab (DCL) project, was introduced to Cape Town Partnership (CTP) that served as the main contact on the ground for this stretch of the research. CTP had set up an office from which the team could work in the central city area. The first task was for the team to familiarise themselves with each other and the

vision of the research, especially the Swedish counterparts who had not been involved in 'The Line'. The team was also introduced to Evan Lotter (name has been changed) who later would become an integral part of the research process. Lotter was accompanied by other individuals who also worked for CTP in various capacities. The primary reason for the team to work with CTP was the opportunity it provided to focus on a certain area of the city that had been earmarked as problematic by the City of Cape Town, but also had factors that could potentially be a good fit for rolling out the mesh network. This area a part of District Six called East City.

CTP forms a large umbrella under which a multitude of projects fall. Working in close relation with the City of Cape Town, they have the agenda to make positive change and growth in Cape Town in small and large ways, and take on various initiatives that focus on social complexities, incubating entrepreneurships and the general advance of Cape Town as a modern African city (Cape Town Partnership, 2015b). The organisation's projects form part of a ten-year strategy for the central city of Cape Town that is running from 2008 to 2018. CTP's approach to creative and social research made them an ideal partner to work with on the East City project.

The team presented 'the Line' project and the mesh network to Lotter and CTP, so that they could have a clear understanding of the existing research. From this point the collective team could flesh-out any potential augmentation or customisation of the existing product (more so, the technology). Another critical element of this was to give CTP, especially Lotter, a directive that could lead the team to give the project a rapid traction for its field research and testing, which was a primary business objective under the vision for DCL. The first step in this was for the team to engage the East City (EC), on a street level.

4.3.1 Understanding The East City

The team had its headquarters based on boarder of the East City and the Cape Town CBD. This was an ideal location as field research could be conducted within walking distance. This also allowed the researchers to have a more intimate experience of the field. As previously mentioned, the East City (EC) forms part of District Six, or what was originally considered District Six.

Figure 4.4: A Scene From the East City. (Donnoli, 2014)

The EC, officially known as Cape Town Central Business District's East City Precinct, was highlighted as an area of importance, by the local municipality, for the development of District Six and Cape Town as a city. It maintains cultural and economic importance, and with its growing creative community the City of Cape Town and CTP put forward a proposal to develop it as an urban environment for design, and innovation (City of Cape Town, 2013). The proposal would solidify the final draft of the Urban Design Framework for The Fringe, which was the label for the entire project, in reference to its geographic location. Roeland and Darling Streets, and Buitenkant and Canterbury Streets, running in respective parallels with each other, neatly framed the area. This essentially formed a square which CTP poured its efforts into. The vision was to bring the area to its full potential by paying attention to the following elements (City of Cape Town, 2013):

- Working with the existing character of the area
- Working with established urban patterns
- Re-establishing urban continuity
- Establishing a more permeable street network
- Delivering a pedestrian environment
- Integrating public transport with public space
- Extending the city's public space network
- Facilitating a culture of street activity

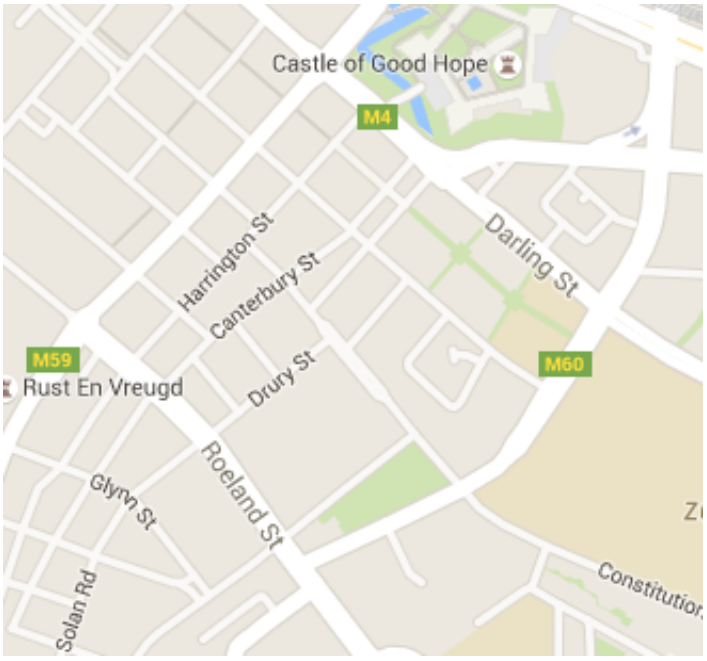

Figure 4.5: Focus Area. (Google, 2015)

In 2008 CTP's Creative Cape Town programme conducted a mapping exercise of the city's creative sector and found a large contingent of creative businesses and organisations clustered in the EC. Further to this, the central city as a whole accounted for 80% of Cape Town's creative economy (Purdham, 2013). The EC already had long-standing businesses in its precinct, and this increased investigation of the asset framework revealed a fruitful opportunity to stimulate economic growth in an effort to combat inequality, poverty and unemployment. This path led to the development of The Fringe in 2009. At the time, Cape Town was bidding to be the next World Design Capital, and with its eventual success, The Fringe became an essential area in the winning bid programme.

The Western Cape Department of Economic Development and Tourism (DEDAT) was the first provincial arm of the government to not only identify, but also put its weight behind drafting a design strategy geared as an economic tool to increase innovation and global competitiveness (Cape Craft & Design Institute, 2013). In a summary of the Western Cape Design Strategy, the strategic underpinnings of the objectives were based on three primary pillars: support, promote and develop (Cape Craft & Design Institute, 2013). With this, design interventions were sought to leverage existing structures from which entrepreneurial activities could be accelerated. One of the existing structures, albeit still in development, was The Fringe. With The Fringe already having received organisational support, the mandated design strategy called to initiate the next pillar – promote. This process endeavoured to raise the profile of design in

The Fringe as an economic asset. This meant that The Fringe was included into a promotion and building programme for innovation (Cape Craft & Design Institute, 2013). This turned into a branding exercise for a forecasted vision of the area that would see an assemblage of existing enterprises packaged as a new district – an oversight that stopped The Fringe in its tracks. As the proposition of turning the EC into a design district came to light, so too did the historical significance of the area. The Fringe was operating in District Six, and many of the District Six stalwarts raised a flag on the project for ignoring the cultural heritage of the past and existing communities (Purdham, 2013). Criticism was mainly levelled at the exclusivity of people and collectives within the EC that were playing a major part in the development of the area. The envisioned strategy was sound, but there was an expression that the project was not including broader interests. This caused the focus to shift from marketing and branding to a more inclusive strategy that engaged people who have a vested interest in the future development of District Six and also incorporating the existing mechanisms – specifically that of restitution. This was an example of the voracity with which the District Six community protects their heritage. This was seriously acknowledged by CTP, and after considered reflection, The Fringe became the East City Collective (ECC). This new incarnation The Fringe was intended to operate on a much more socially participatory and inclusive level.

The Western Cape Design Strategy was an important step for the evolution of design in the South African economy, and after the misapprehension of The Fringe, the strategic realignment of the project took on a far more valuable stance. The CTP became increasingly aware that the EC was home to many people beyond the creative community, and it was necessary – in order for good design inquisition to be true to itself – to seek greater participation from all relevant stakeholders: people living on the street, businesses, young designers, residents and so on (Purdham, 2013). Certain projects were carried over from the initial incarnation The Fringe, but these fell inline with the renewed focus on the EC. CTP's researcher, at the time that this research was being conducted, Evan Blake ran one particularly relevant project. Blake, at the time, was completing his social science masters degree, which was tightly knitted with urban ethnography. He had been conducting extensive social research in the EC, and was looking into experimental interventions that were based on street-level interactions with marginalised people living in the area. There was also an emphasis on mapping social geographies, in order to gain a better understanding of the perspective from street groups and, furthermore, an emphasis on changing the way that these groups are perceived by others outside of this community (Blake, 2014). Another programme, which was the primary connection with the research team, was called the

Neighbourhood Communication Project (NCP). This was centred on Harrington Street, within the EC, and sought to investigate how to bring strangers in the area together in a meaningful manner. Consideration of the cultural, social and political diversity of the streets was a critical factor for the basis of the research (Purdham, 2013).

Blake and Lotter's keen sense of the social landscape in the EC made for an advantageous partnership with the research team. Having a keener a sense of the EC's growth as a modern creative quadrant, the team was taken on a walkthrough of the area and some of its peripheral streets. The purpose of this exercise was to give the team a realistic understanding and reference of the conversations regarding the EC's background. Lotter led of the tour, and he provided the team with relevant information on each of areas covered on foot. When the tour arrived at the main area of interest, Lotter introduced the people that were living on the street. He explained the reason for the team's presence and was careful to express the personal interest that the team had in the area.

It became clear that previous social outreach programmes had tarnished the image of such research groups. In conversations, Lotter mentioned how projects had swooped in on the area and failed to implement or enact project ideas. Many of these projects failed because of inaccurate assumptions – a reoccurring issue (Blake, 2014). In an interview with Blake, there was mention of 'street people' being an ill-conceived category. He went on to express distaste for this label, expressing that it generalised without a personal understanding of individuals and collective interest (Blake, 2014). This could be interpreted as a dehumanisation of the issues experienced by people living on the street, with the general public simply packaging it in a manageable way. An immediate example of this was when one of the Swedish students captured a photograph of a person on the street who made a living from making furniture from wooden pallets. The man immediately became aggressive when he realised that someone was taking his photograph. What the student considered an innocent act of field documentation the furniture maker considered an act of indecency. Lotter was quick to settle the unintentional misconduct, however, the man's sensitivity illustrated that field research in the area was going require greater forethought.

The tour continued to the heart of the EC, which was centred on Harrington Street and ran the length of the area. As the team entered the vicinity of Harrington Street, the concentration of street people increased markedly. Many, if not all, of the people were well acquainted with Lotter and Blake. There was a genuine openness and curiosity in the team's presence, and the support of Lotter and Blake made it easier for the team to

engage in introductory conversations . This also piloted the process of conversations centred on the personal issues that the street people experienced. The geographic mapping tour was somewhat interrupted as both Lotter and Blake became separately engaged in conversations that required an experienced level of attention. Unfortunately the team was left to engage other members of the street group on a sympathetic level, and this lead to lengthily and one-sided discourse that emphasised their immediate problems. Although this was an overwhelming first encounter with potential stakeholders, there was a certain element in the discussions that kept coming up: the infringement of security forces on the street groups.

Once the initial conversations were over, and Lotter was able to reconvene with the team, he explained the structures that the city had put in place to increase public safety – namely the Central City Improvement District, commonly known as CCID. The CCID is a private-public partnership involving an array of property owners in the CBD that provides supplementary services to the City of Cape Town municipality. CCID is involved with urban management, social development, communications, safety and security. CPT and CCID have close relations, however, Lotter brought it to the team's attention that there were internal conflicts within the safety and security arm of the CCID. The most significant clash of interest is the way in which street people are treated, in their opinion, by the CCID. Loitering is considered a punishable offence in the city; however, the definition of 'loitering' becomes quite vague and is, more often than not, used to the detriment of marginalised groups of people (Southern Africa Litigation Centre, 2012). Considered 'peace officers', the security personal working for the CCID are given power by the City to enforce the by-laws relating to streets, public places and the prevention of nuisances; under which loitering falls (City of Cape Town, 2007). When the team learnt of this by-law and the complications it induces when dealing with street people, the first question was why there was a relatively high concentration of street people in the EC. The answer is that the CCID maintains the CBD up until Harrington Street, but their jurisdiction did not extend to the side Harrington Street that the team was standing on. According to the group of street people, however, this boundary was ill defined and blurry.

The team also observed a large open field that was partly converted into a grocery store parking lot. Small businesses, restaurants, night clubs, student accommodation, residential apartments and various other buildings mostly surround the area. One of the important locations that Lotter pointed out was a small garage operating as a recyclable waste drop-off point next to a social outreach centre called the Service

Dining Room. This drop-off garage was connected to a recycling company called Trashback that allowed street people to sell recyclables.

Trashback was a business that Lotter had highlighted for their positive work in engaging the street community in the EC. Their headquarters are also about two blocks away from the small drop-off garage. In the lead up to commencement of the project, there was mention of potential partnership between Trashback and Doo.Co-Lab. The team identified a natural synergy here, with the mutual interest in the EC and also with the intention to replicate 'The Line' project. CTP's urban ethnography and NCP work were strong tracks on which to rollout of the mesh network, as there was access to information and people who could help facilitate the process. From this point, the team found the basic building blocks to stabilise and then drive the research.

The tour concluded at Trashback's drop-off site, and the team returned to the office to brainstorm their observations and experiences. The walkabout revealed certain key elements:

- The importance of a 'guide' as a mediator.
- Cultural barriers: researcher-researcher and researcher-stakeholder.
- Unforeseen social structures and their instability.
- The 'outsider' effect of research on marginalised groups.
- Pre-existing research reconcilement necessitated by inadequate previous projects.
- The compact geographic location of the EC.
- Existing projects that linked businesses in the in the research area.
- Trashback as an active participant in engaging street communities.

In expressing these key observations, Lotter as a first-hand mediator of information pertaining to the setting, and also leading as a 'trusted' link between the researchers and potential stakeholders in the EC, proved to be invaluable in helping the project gain traction. The team also felt that Trashback was a strong stakeholder to include in the design process, as they were already working with a network of street people living in the EC. They also had a commodity that linked them with the surrounding business – waste.

4.3.2 Project Revision

In light of the findings of 'The Line' , the project pursued a similar methodology in terms of mapping out the research area, identifying stakeholders and including them in

participatory design process. With the overwhelming amount of variables to consider in the EC, the team decided to focus on the presence of street people and their relation to their place. There was an opportunity to work with existing projects that were relevant to the researcher's work. On a more socially important level, the team expressed that there would be a far higher contribution to the vision of the EC if the project was steered to benefit the marginalised group.

At this time the team felt that the implementation of the mesh network would lead to a dictatorial design process so it was, it was confined to a technology tool rather than a brief-defining element. The question was posed, "How do people who share a city connect across their differences to make something of shared value together?" With this in mind, the team, with their collaborative CTP alliance, had to draw a link between 'The Line' project and the EC project. The delineation remained the same, in that there remained a focus on connecting stakeholders in the area and raising the level of communication in an effort to foster a healthier place. The most significant difference was the stakeholders who were relevant to a PD process, namely the street community.

At this point, the team identified the key stakeholders of the project to be the street people, Trashback, and the surrounding businesses in the EC that had an involvement with the recycling company or were engaged in one or more of the existing CTP projects. The area of focus would include the Trashback headquarters, their satellite drop-off station, Harrington Street, and the open field in front the Fruit & Veg City.

Figure 4.6: Trashback Operational Area. (Negash & Björklund, 2014)

Trashback was only in its first year of operation when the team started the project, although the company had already initiated its operations outside of the EC in 2011. Their pursuit was to create income opportunities for those who needed it most, and to clean up the environment at the same time (Trashback, 2011). In a conversation with Trashback's managing director, Kathryn Warner, she explained how the business model for Trashback was much broader than the operation running in the EC. The headquarters and satellite station were a pilot project operating under the name Harrington Buy Back Centre (HBBC). Their project focused on a localised recyclable waste collection service that used existing assets in the area. The prime asset in this case was the street people who resided or frequented the area. A large portion of this community was already involved with waste reclamation exercises that provided them with some remuneration. In setting up HBBC, Trashback emphasised that engagement with these informal collectors would alleviate the major cost of recyclable waste collection and transportation. They would also be able to cast their reclamation net far further if they were to harness an existing network of informal collectors. HBBC's positioning made it ideally located for the informal collectors to drop off goods and receive payment. Warner emphasised that one of the biggest challenges they faced by involving informal collectors was the negative perception that other local businesses held of them. The other task was the generally uncharted territory of having a business model with a major component (waste collection) reliant on an informal network. There are numerous human conditions that have an affect on people who live on the street, the most obvious being substance abuse, emotional trauma, mental instability, ill health, poor education levels and lack of basic living amenities (Eddy, 2014). Trashback continuously consider and cater for these factors in their engagement with the street community

Considering this information, the team realised that the initial project comparative between Malmö and Cape Town required a methodological shift. It was clear that running a stakeholder workshop that mirrored 'The Line' project would be near impossible. The social sensitivity of the project setting in relation to the project stakeholders was too acute, and posed a challenge to the implementation of a traditional PD approach. It was necessary for the process of research design to account for participation outside of a design lab – it required an urban design lab of sorts. There was also the challenge of including street people in the design process as stakeholders and, eventually, as co-designers. The Swedish students, in accordance with their academic requirements, had to orientate themselves and their work to adapt to the setting and the stakeholders. This provided a unique opportunity for the author to observe the live implementation of a PD project, in a perceived majority world context,

by students who were completely foreign to the setting, and required deliverables within a set period of three months. It was at this point that the author's research trajectory shifted from comparing 'The Line' project outcomes with the final outcome of the EC project to observing and seeking to understand PD in operation across an environment structured by complex social divisions.

The following components of this chapter seek to illustrate the path that the Swedish students, Rufael Negash and Love Bjorklund, took to complete their research and develop a product within the original project framework. Their project will be overviewed with particular attention paid by the author to the necessary steps they took to overcome participatory challenges. It must be noted that the team, as a whole, consistently provided collective input towards the Swedish students' and the author's research. While the shift of focus meant that the team was operating in an extended capacity, Lotter and the lecturers from both universities continued to guide the process.

4.3.3 Observing Research

Following the shift in focus, the author accompanied Negash and Bjorklund (N&B) on most of their field research outings and brainstorm sessions. In essence, there was a considerable crossover in research interest. N&B titled their project 'Connecting people across complex social divisions through ICT in a hyper-local context'. ICT in this case refers to information and communications technology(ies). While technology was central to their paper, it was not framed as a solution in the context of the research, so the students approached their research envisioning the eventual use of a technology probe or tool. The stakeholders were seen as the primary solution in achieving communication over complex social divisions.

In the initial stages of research, the author discussed with N&B his intentions to observe their progress with a focus on their conduct, field observations, physical engagements and research documentation. The author by no means deceived N&B, and regular informal meetings took place to analyse the students' and the author's results. In accordance with the ethical framework set out earlier in this thesis, please refer to appendices A and B for the students' formal consent forms. Just as N&B endeavoured to channel Sanders's (2002) "Say, Do & Make model" in their research on their stakeholders, so too did the author intend to apply Sander's model to the students. It was important to listen to the students' feedback on how they engaged the street people as stakeholders – this was recorded as observed knowledge – with the eventual objective to gain tacit and latent knowledge (Sanders, 2002). It was critical to

retrieve experiential knowledge from the students, as they were the stakeholders in the PD process.

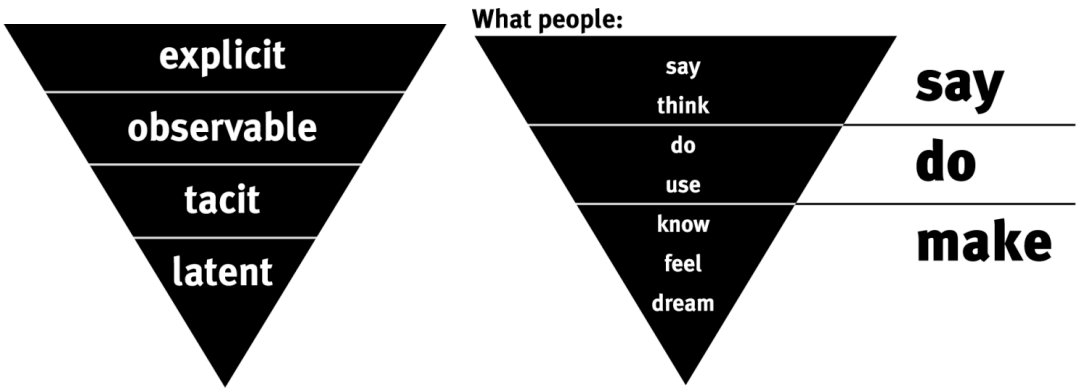

Figure 4.7: Sanders Say, Do & Make Models. (Sanders, 2002)

4.3.3.1 Field Observations

The students commenced their field research by simply being present in the focus area. They were initially uncertain of where or how they could implement ICT as a design intervention; however, their first step was to develop an understanding of their stakeholders and, with the prior knowledge presented early in this paper, their attention was focused on street people.

The decision was made to place themselves near the HBBC satellite station, in order to gain observable knowledge. Their activity proved to be unsubtle – the street community immediately noticed their presence, and they were approached on numerous occasions for a variety of reasons. These interactions ranged from asking what they were doing, to asking for cigarettes and money. An interesting observation was how the students' outward appearance influenced the types of conversation initiated with them. On an exterior level, and the author emphasises that these descriptions are included purely to give the reader a sense of the situation, Bjorklund was a white male with fair skin and light hair and Negash was a fair-skinned black male, with a considerable head of hair. The street people in the area spoke Afrikaans, Zulu or isiXhosa as their mother tongue. Generally, most of the people spoke a degree of English, but this was spoken with an accent that proved difficult to for the students to understand. Bjorklund was engaged in Afrikaans several times, which is evidence that he was not viewed as a foreigner to South Africa, but rather as a white male in South Africa. Negash was also confused with a local and had a few people start conversations in isiXhosa or switch to isiXhosa from English in mid-conversation. This confused the students and subtracted them from their research objectives, and they soon found themselves the object of inquiry. Their immediate social classification

severely tainted their approach for the kind of information they sought, and this required a pause in research to regroup their thoughts.

After consulting with the rest of the team, N&B decided that they needed to be consistently present in the field in order for the street community to become accustomed to their presence. It also became apparent that they needed to rather focus their efforts on forming bonds with a select group of individuals, instead of only trying to gain knowledge from them. This required a considerable amount of time and patience. Included in this focus group of select individuals were the people working at the HBBC drop-off site. This proved to be a sound decision as the link with HBBC provided a common ground for valuable observations and interactions.

The research continued at the satellite station, where the researchers were able to start conversations with the HBBC employees and gain an understanding of their relationship with the informal collectors. At this point, the author was co-conducting the research with N&B from a participant-observer position. The author is a local to the research area and has a more experienced understanding of the various cultures in Cape Town and South Africa. As a participatory relationship developed with the students, and from a more practical position, the author was able to assist them in overcoming language barriers.

Figure 4.8: HBBC Satellite Station. (Donnoli, 2014)

Language proved to be a reoccurring problem in the field, not only for the project research, but also as an operational difficulty for HBBC. A prime example of this

occurred on a day that the students and author were present at the drop-off site. A Malawian man named George (name changed) was operating the site. During the day, one person normally managed the drop-off station, with the HBBC manager going between the HBBC headquarters and satellite site. Trashback has developed a computer application to capture personal information of the waste collector that is then compiled into a profile, along with a running record of the quantity and type of material dropped-off by that specific collector. After the material is weighed, the programme automatically calculates the pay out. All HBBC employees are trained to operate the system, and are given service guidelines on dealing with collectors. Despite this, the researchers felt that there were potential computer literacy problems, as in the case of George.

In the afternoon of that particular day, a pair of collectors visited the site. At first, it was not obvious that there were two of them, as one collector arrived first with cardboard and then said his friend was coming with more. The waste was weighed and the collector did not check the scale but instead went back to collect the rest of the material. This could have been because he trusted George, or that he did not want to remain static, or because he wanted to deliver the goods as fast possible and move onto the next material collection area. After the first collector left, the second in the pair delivered the next batch of materials (cardboard). George seemed to be unaware that this second collector was working with the first. Once their partnership was established, George asked after the first man in the pair, for whom he wanted to write a receipt. The second of the pair then said that they were together and that the waste should be written up under one name. This information seemed to be lost somewhere in translation and it took George a while to understand the request. The collector was growing visibly anxious and impatient. George then began weighing the materials, and asked the collector to read the weight. The collector then disregarded the request, saying, “I don’t understand those things there”. It could not be determined whether this was related to him being illiterate or not. The collector was an Afrikaans-speaking man and in a manner of urgency he told George to “*maak gou*” (‘hurry up’) because he needed to move on to other places. This was said in Afrikaans, and as George is Malawian, the meaning of the phrase was completely lost. The only factor that George seemed to have picked up was the collector’s tone of voice. George seemed to have misinterpreted the emotion used in the language, and responded to the collector by saying, “You are the client, and I must respect you. I’m not fighting with you. Relax.” It became evident that the collector was unfamiliar with the client-service concept and this further aggravated the situation. The collector grew frustrated to the point where he walked off before George could finish writing the receipt. This meant that the pair would

not be able to receive payment. The researchers were unsure whether the collector left because of a lack of understanding about the receipt system, or whether he was so frustrated that he would rather leave his material and forego payment. About five minutes later, the first of the pair came back to collect the receipt and dropped off the last of the cardboard.

This illustrated one of the primary apprehensions that the students had about attempting field research in a conventional PD manner. From their time spent in the field, the students also observed the fluctuating mental state of many of the collectors. More often than not, the people who dropped material in the afternoon were intoxicated, which put a general restriction to the amount of time N&B could spend in the field – this was not helped by the station's close proximity to a liquor store. The tendency for collectors to be inebriated by the afternoon made it incredibly difficult to conduct research, a shortcoming observable from the students' inability to gather usable information from their stakeholders through participatory means. Further to this, the students observed that few to none of the street group possessed a mobile phone or any other form of telecommunication tool. This resulted in a very 'manual' form of communication, which meant the students had to spend long periods of time, essentially waiting, in hopes of finding opportunities for their project; and were unable to expedite the process through direct communication with individuals. This also resulted in the exclusion of the informal collectors as direct users in their implementation of ICT.

In conversation with the students, they expressed how their first impression of street people was "that homeless people are lazy, and all they do is hang around, beg for money and drink alcohol" (Negash & Björklund, 2014). This quickly changed once a deeper personal understanding of the street people was gained. They then observed a community of people who operated in a distinguished network. The street people were constantly seeking opportunities, mainly to acquire money; but there was a definite regularity within the group that engaged with the HBBC operation. Within this movement, the students found a leverage point in the system to engage their street stakeholders (Meadows, 1999).

4.3.3.2 Observational Implementation

After the students explored how they could interact with socially different groups, they found that if they were to focus on the street people and their interaction with HBBC, they could find their footing in participatory knowledge generation.

The main challenges that the author observed, in regards to connecting with the collectors, were that the students were foreign and unfamiliar with cultural aspects of the research area; the constant language barriers and miscommunication; the lack of valuable communication from the informal collectors; the vulnerability of the street people, and the social sensitivity implicit in that; mental instability of the stakeholders; the lack of understanding of design terminology; the lack of ICT presence; and the fact that N&B were perceived as outsiders to the system being researched.

After much deliberation, the students (with the help of the rest of team) made a decision to insert themselves into the system, specifically that of HBBC's. They initiated what was termed a 'human proxy'. Essentially, this was an alternative methodological term for Participant-Observer, but has been used to emphasise the process of playing an existing part in a system, as opposed to an additional feature. At no burden to HBBC, N&B became assistant operators at the satellite station. Through this method, the students were able to grow their understanding of the stakeholders. The network in which the informal collectors operated became clearer, and N&B also started developing relationships of some of the regulars who frequented the HBBC operation. N&B's presence as workers completely altered the way in which stakeholders engaged them – they were now discussing what waste was being deposited, where they were retrieving it from and, critically, the students were developing a common ground. The students were participating in the process that was part of the collectors' routine, and in so doing, the collectors no longer had to take time out of their routine to discuss topics that were outside of a relevant frame of activity. The initial dialogues with the street people were anchored in general wellbeing and social problems and their answers were perfunctory. Participatory communication centred on the commonality of a shared interest that opened the door to tacit knowledge (Sanders, 2002). Another valuable factor that arose was that the students were developing trust between themselves and the collectors. An interesting scenario that was taking shape, seemingly unbeknown to the students, was an exchange. N&B's act of being involved in the interest of collectors earned them conversations – a currency of favour.

Figure 4.9: Swedish Students Interacting with HBBC Employee. (Donnoli, 2014)

4.3.4 Project Results

When the students found their ‘silver bullet’, they were in a far more informed position. Their participation in the network allowed them to be included in the activity and presented an invaluable source of information. This enabled them to have an anthropological and ethnographic understanding of the complex social factors of the environment; and by concentrating their efforts on a specific part of the system, they were able to keep their heads above the current of historical problems. They were absolved from attempting to solve all the issues that they were bombarded with in the beginning.

With their experience of the recyclable waste collection process, N&B were could now observe a fuller spectrum of stakeholders: HBBC, the informal collectors using the HBBC operation, and the surrounding businesses (waster producers) that were producing most of the waste collected in the 2.5 kilometre collection radius of HBBC. In an effort to escalate the cooperation of all stakeholders, the students sought to use ICT to increase the efficiency of the system and, to a certain degree, help formalise the collectors. Several discussions revealed the importance of introducing the collector to the waste producer in order to facilitate a favourable degree of trust between the two parties. Considerations had to be made of the general appearance, hygiene, sobriety and the observed mental state of a collector. The perception of collectors held by waste producers is generally negative and they would not normally seek to engage with them. It was important for N&B to observe a collector who was perceived as capable of

understanding the information, was a regular at HBBC and would carry out the task effectively. The students considered the use of the mesh network, however, this proved to be futile. The mesh network was deemed unusable, as there were critical flaws in its software programming on top of being financially impractical (Holmberg, 2014). This was an unfortunate but necessary departure. N&B rather played it safe, and made use of the existing mobile network as the information carrier.

Their proposed product was a mobile application that allowed waste producers to notify HBBC or, more specifically, the operator at the satellite station, that recyclable waste that was ready for collection. This information would then be relayed to a collector deemed suitable for the duty. The students went through multiple iterations to settle on final the design elements for the prototype. The conceptualisation process was guided by repeated testing that included the collector and waste producer. As the students were essentially acting as HBBC in the stakeholder triangle, they felt it unnecessary and risky to step outside of the testing process (and become observers) because to do so would risk missing valuable information.

In conclusion of their prototype, the students highlighted that extra features were built into the app system to cater for the perception of the collector. An invoicing method was implemented that produced a basic printout of the location of the waste producer and included an order number. This number was shared with the waste producer. A simple feature, this gave the collectors confidence when presenting themselves at the waste producer, as they were given identification in the process. This small act dramatically reduced the perceived power distance between the two parties, in that there was a shared interest built on participation (Oyugu, Nocera, Dunckley, & Day, 2008).

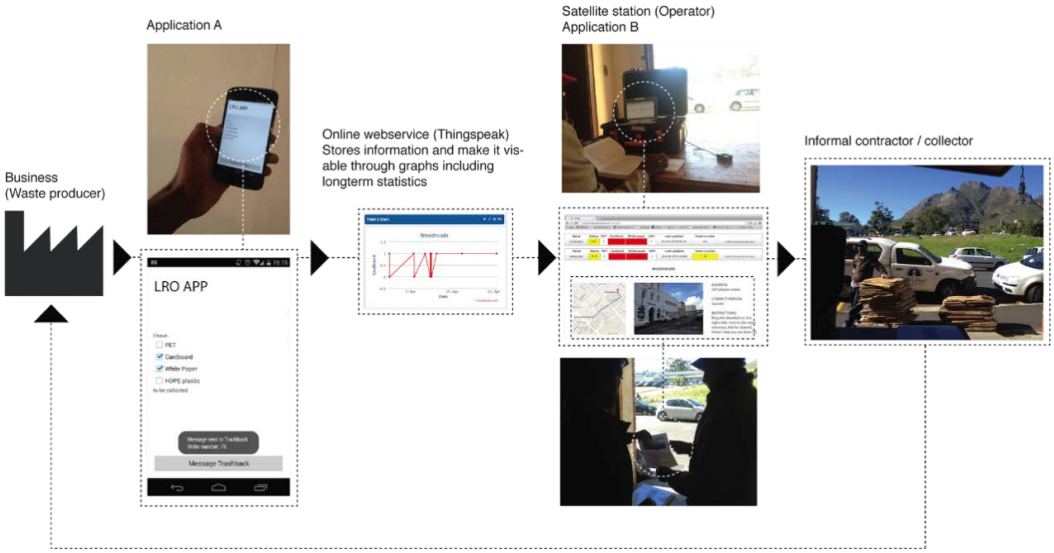

Figure 4.10: N&B's Concept Iteration and Development. (Negash & Björklund, 2014)

4.4 Case Study Conclusion

This case study sought to illustrate the execution of a project utilising PD methods in an environment structured by social complexities. The progress of information travelled from a historical understanding of the research area, which was a more delineated area of focus that carried its own complexities. This research presented a cultural understanding of the limitations and challenges encountered in this case study. The reader was then shown how the author redirected research attention to focus on a live PD project implemented in the given environment. This decision to redirect was made in order to establish an alternative angle of the how public spaces could be used to support interaction between people and businesses through interactive means. In somewhat of an epiphany, or 'triple-loop learning transformation', the researcher became aware of one's presence in a system being researched, and how this has an ability to change the state of a system that could educe unexpected outcomes (Reason & Bradbury, 2001: 250). Chapter three presented a case study that described a first-person perspective of the progression of a PD project in development, and in chapter four this scenario was observed from both external and internal perspectives.

Critical value was gained from observing the steps the students undertook to arrive at their solution, and the outcomes of research tools that were utilised. The value of such research is overviewed in Table (4.1).

Table 4.1: Research Deliverables

Problem Area	Solution	Outcome
Unable to access system	Awareness of presence	Find leverage points
Unable to communicate with stakeholder	Play a part in the system	Human Proxy
Unable to gain tacit knowledge	Understand what the stakeholder values	Change of identity within a system
Uncertain designer-stakeholder reflection	Understand the perception of the stakeholder towards the researcher	Acknowledgement of stakeholder's perception

These formed a critical lens through which PD processes, and the like, were challenged by a majority world context. This essentially meant that the researchers in the field were faced with a group of stakeholders who were not implicitly oriented with interaction methodologies, as is to be expected in minority world contexts. Further to this, the informal hierarchy of the environment, albeit highly participative, meant that there was implicit knowledge that the researchers had difficulty acquiring as outsiders (Offenhuber & Lee, 2012). The knowledge that the perceived informal network was

made up of multiple participatory activities meant that there had to be a focus on inclusion in the activity. This was the key for the team to access the information necessary to foster an inclusive design process.

At the outset of this chapter the question of how stakeholders define their place in the East City was asked. This set the researcher on a journey to understand the existing stakeholders within the delineated area. Through experienced and informed mediators, the researcher was able to identify and begin developing relationships with the appropriate stakeholders. Upon early observation, specifically of the Swedish students, of the engagement with street people as stakeholders, and the way in which the personal capacity of the researchers was influenced, it became apparent to the author that the researchers played a role in defining their place in the EC. This idea – the presence of an external element that is attempting to intervene in an on-going system of activity – has an immediate effect on the information that is retrieved. In hopes of extrapolating information to harness a participative researcher-stakeholder relationship, the result of a 'forced-entry' meant that there would be a high risk in a developing a 'dynamic complexity' that could leave the studied system in a worse state than before (Reason & Bradbury, 2001: 247). The researcher found that the complexity of the situation made the students stakeholders. As such, the case study identified the stakeholders as: the students, the informal collectors and the waste management operation.

The difficulty of the setting was its complex cultural history and resultant present condition. This meant that there were many factors in action that made a finding project focus difficult. Centring on a project grounded in PD, that included the relevant stakeholders, the author took advantage of the opportunity to step out of the initial project mission and field analysis specific to it. The research would therefore not be affected in the same way as the students who were directly dealing with a system structured by social and environmental complexities. The author had to maintain a close working relationship with the students, and in many cases collaborated with them on their research steps, so that knowledge could be shared and problems overcome. The solutions thus developed a rapport that was gilded in explicit, observable and tacit knowledge (Sanders, 2002).

In light of this case study, to answer the sub-problem question, the researcher realised that the role that one plays in a place enables them to define this place. The students included themselves in the system being researched, so one could say that the 'human proxy' was the tool, or artefact, that they used to immerse themselves in participative

actions within the researched system (Baskerville & Myers, 2015). Instead of playing the role of researcher, they were participants who added value to the existing system in question. This value gave them the necessary means to conduct an investigative inquiry without being negatively disruptive. The informal collectors' perception of them was that of a shared sense of interest and inclusion in a network of activity. To this end, the singling-out of an activity within a broader network allowed for a perceptive point of view. This proved to be mutually beneficial, as the collectors understood the needs of the students in relation to the system. In conclusion, the stakeholders of the EC define their place by the activity that they are involved in. This activity can range from research, waste collection, data collection, opportunity seeking and business development; however, there has to be a common language spoken, and this is how one adds value to an activity.

CHAPTER FIVE

DESIGNING WITH CO-DESIGNERS

5.1 Introduction

This chapter concludes the investigative component of this thesis. The following chapter presents the final case study that reflects the value of applying the learnt results of the previous case studies to an experiment in which the author develops a co-design relationship with stakeholders and an understanding of social divisions within this relationship. The tools developed from the previous case studies are utilised and the results thereof summarised. The case study entails the design and development of a recyclable waste transporter that was realised in the form of a trolley. The research process involved the waste management company Trashback, introduced in the previous chapter, a primary waste collector; and the researcher as a participant. This engagement and the mediated interactions were initially sketched in Figure 5.0.

The conclusive outcomes of this case study will lead to the proceeding section that describes the progression of the case studies and the impacts of importing and exporting products and processes of PD, and how this was implemented in the various studies. This section also serves as an opportunity to retrospectively illustrate the methodological case study approach, how these case studies fed into the theory, and how knowledge was transferred to each and fed back into the researcher's learning loop.

The final section of this chapter merges the entire experience and case study results into an arsenal of tools that aim to contribute to the research community and to individual researchers. This set of tools endeavors to answer the research questions presented in this thesis, and decisively answer the key question of this research which asks how an understanding of place can facilitate designing PSS in an urban environment structured by complex social divisions.

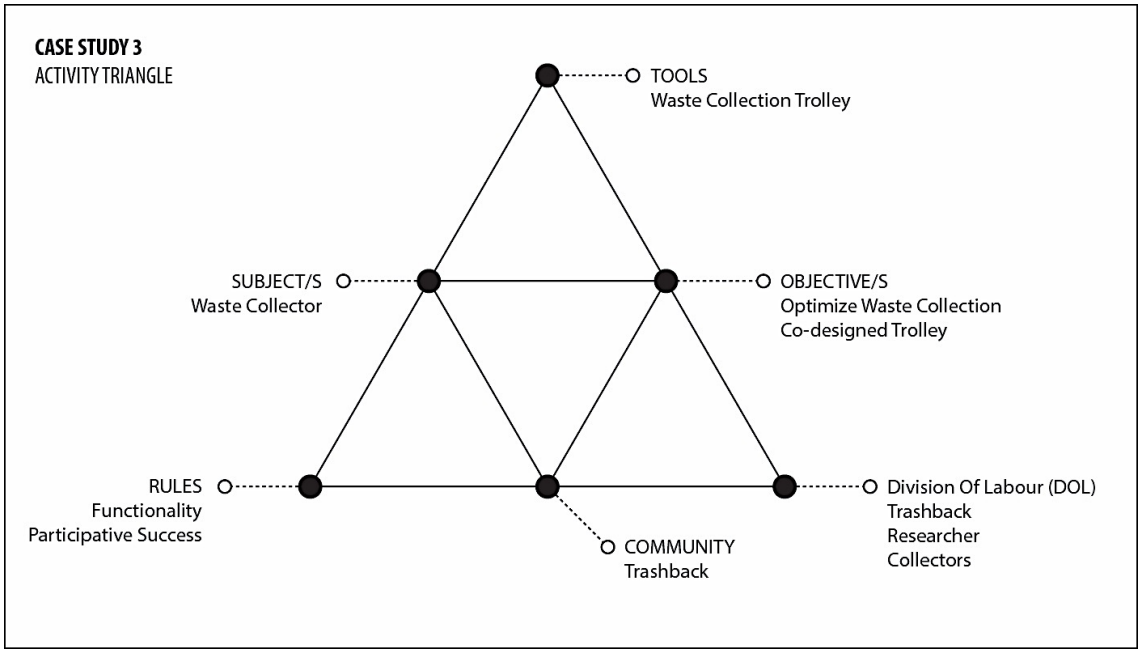

Figure 5.0: CS3 Initial Activity Sketch

5.2 Case Study: Bridging The Gap

In this case study, the author presents a project that has a more refined focus than the previous case study concerning the East City project, in order to analyse and answer the questions of how and why social divisions can affect a researcher's engagement with co-designers. It is evident in the previous study that the Swedish students had difficulty in engaging their potential stakeholders because of socio-cultural differences. This was later translated into a scale of value, or language, that needed to be understood in order for effective communication to occur, in the context of their project objectives. This provided an understanding of how stakeholders define their place, but within the PD process it is understood that the researcher or designer needs to play a role, and be aware of it, when engaging stakeholders or participants (Reason & Bradbury, 2001:251). The previous case study showed the difficulty of running a PD project in an environment structured by social complexities, and the following case study works within the same parameters. However, this project presents a more intimate look at the relationship between designer and participant. This is necessary to test the effectiveness of the tools and findings from the previous cases, namely:

- Developing a language of commonality, &
- Inserting oneself as a proxy and garnering an understanding of the value in an observed system.

The case study is not as extensive as the previous ones, as the project was conducted over a shorter period of time (six weeks) and the objectives of the brief were satisfied rapidly. It will follow the same orientation; with a project setting that was supported by

field research, stakeholder engagement, concept ideation and results. This is concluded with the project's results that develop the case study conclusion in the context of this thesis.

5.2.1 Project Setting

While the author was conducting research on the previous case, there was an inevitable acquisition of knowledge that spanned outside of the objectives at hand. During field observations in the EC and, more specifically, in the Harrington Street area, the author was able to closely observe the movements of people involved in the network of activities concerning Trashback. With a characterisation of how stakeholders define their place and how this action can lead to social divisions that can make a PD processes difficult, the author needed to further the understanding of how and why these divisions affect the designer-stakeholder relationship. Coupling this with the continuous reflective action-learning loop, the researcher delineated the research area from Trashback's sorting facility – HBBC – to the drop-off satellite station and the immediate surroundings of Harrington Street. This was a slightly smaller area of focus than the previous research area. Essentially, the focus range was formed around the main traffic route of waste collectors either dropping off goods for remuneration at both facilities, or waste being transported from the satellite station to the main HBBC site. This area was selected as it presented a short route with regular activity. The limited area also made it manageable for the researcher to find opportunity to further the investigation and seek participative inquiry.

5.2.2 Trolley Project

The EC project worked in the researcher's favour in the context of this project as there was an already existing relationship with Trashback and it's subsidiary operation, HBBC. This relationship allowed for conversations that developed an understanding of a need for the organisation to have improved manual transport mechanics that the collectors, more closely associated with the company, could use. The need was brought forward by Trashback and was not an initial departure point for the author, however, this provided for a perfect opportunity to align the case study research in a participative and personal manner. After further consulting with Trashback's director and operations manager, a brief was officially set to develop a transport vehicle and there was a clear relay of interest regarding the project's value contribution to this thesis. Once the expectations of each party were clear, the framework for an industrial design project took to shape – mainly due to the requirement of a product outcome. At this juncture, it must be noted that the author has a background in industrial design, and this was a major factor in Trashback's product proposition.

The main components necessary to develop this product, on a research level, were to gain a deeper understanding of the needs of the users, and who these people were. The stakeholders needed to be identified and included in the design process. Further to this, the use of the hypothetical product needed to be outlined. These were initial key steps to the actual physical design of the product. The author was careful to avoid any preconceived result in order to not taint the interaction with participants. In essence, the key objective for the researcher was to have a successful PD project – one that has its outcomes generated by participative relationships between co-designers and researchers - before any product development deliverables. This is not to say that the transport project was neglected, if anything it benefitted from this agenda.

5.2.2.1 Stakeholder Identification

The first two stakeholders were already identified from the onset of this project: Trashback and the researcher. It was important to view the researcher as a participant, as there were two areas of interest: the first being the design of a product, and the second being the objective of extracting information for this thesis. Beyond initiating the project, Trashback also has a list of requirements that contributed to their needs as stakeholders in this collaborative project. These requirements will be discussed in the Concept Development section below.

The next stakeholders were the potential users of the product, and anyone else that might have an active role in the progression of the investigation (see figure below). In order for this to be confirmed, the researcher returned to the field to conduct observations of the activity within the focus zone. Certain collectors who provided a regular service to Trashback were identified as key stakeholders. These collectors had essentially earned the trust of Trashback based on the reliability they displayed in working with HBBC and handling limited components of the operation. This group of people also presented themselves to be sound of mind in the context of their duties. The researcher earmarked them as the user-testing group.

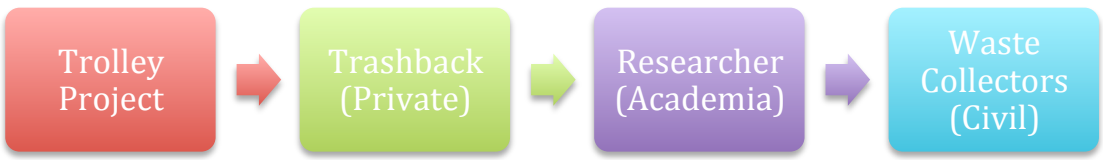

Figure 5.1: Stakeholder Illustration

The author progressed to become more involved in the activities of Trashback's operational duties in the following capacities:

- Helping move waste bags
- Learning the waste data capturing programme
- Helping repair existing trolleys
- Consulting on administrative issues

Through these activities, relationships developed with people who were associated with the HBBC operation in various roles. Even though all of these connections were not initially considered for the stakeholder engagement process, the emergent addition of stakeholders proved to be a valuable exercise in understanding the network of people involved in the area of investigation. This allowed for an understanding of the culture of the individuals who are involved in informal waste collection. Through these conversations, the researcher was able to grasp the issues that are encountered when this group goes out into the field to collect recyclable waste.

These issues are not unfamiliar to the author, as an early interview with an informal collector (a collector who is unemployed) reinforced the daily obstacles that collectors face on practical and social levels. The main areas of concern were highlighted as:

- Negative perception by public – deemed a nuisance, criminal and undesirable.
- No insignia or uniform to formalise collection activity.
- Physical stress transporting heavy loads.
- Competition from other collectors and formal recycling companies.
- Lack of understanding of waste quality specifications.
- Danger of being hit by cars on the road while transporting loads.
- Lack of adequate and reliable trolleys.
- Trolleys being stolen.
- Difficulty of developing relationships with surrounding businesses.
- Slowness of transferring stored waste from the satellite station to the main headquarters.

An immediate issue presented itself when conducting these informal interviews, and that was the waste collectors' situated vulnerability. The social constructs of the urban environment, namely the perceptions held by the businesses in the area, designated the collectors as homeless, alcoholics and drug addicts. Although these problems may apply to some of the people on the street, such categorisations fail to delve deeper into

the individuality of people and their personal history that brought them to the state that they were in. Blake (2014) speaks on the issue of how social intervention programmes mainly deal with the result of the journey that puts people on the street, and these programmes usually fail to understand how to handle the emotional damage that led them to where they are. An example he uses is a woman, well known by the street community in the EC, who had extremely aggressive tendencies that landed her in jail. Prior to this incident, Blake talks about how he developed a relationship with her and how, through careful conversational steps, he managed to gain her trust. This allowed for open and honest conversation; Blake learned of the sexual, emotional and physical abuse she endured while growing up. She fell pregnant after being raped, and child services took her baby away. Because of this, her family threw her out of their home. She said that she drank alcohol to deal with the traumas, and her violent disposition was result of this. The alcohol-induced aggression she displayed stood in stark contrast to the subdued, almost shy, impression she gave Blake when being interviewed in the early morning, before she had had her first drink.

This story provides invaluable insight, as it clearly illustrates how an outsider of the street community can grossly misunderstand the social situation of people living on the street. This leads to what Blake refers to as “artificial labels” (Blake, 2014) – labels that serve a purpose to simplify social constructs. The danger of such “artificial labels” is that they result in generalised solutions, implemented to handle complex social situations, such as: handouts, blankets, food, security and police enforcement. What can be garnered from this in relation to the study is that the street community suffers from a lack of identity within the greater EC community that does not live on the street. Informal collectors working in the area are in fact positively contributing to the recycling system, and serve as a competitive service to the industry in relation to formal constituents and companies (Fieuw, 2012).

The HBBC operation had various tiers of people engagement. These ranged from fully employed, to semi-employed, to regular helpers, to people simply dropping off waste for money on an irregular basis. Aside from engaging most of the familiar faces within the operation, the researcher developed a closer relationship with one of the people who regularly helped at the operation site, and was considered their ‘handyman’. For ethical reasons, his name has been changed to Frank for the purpose of this report.

Frank has experience in collecting recyclable waste and is quite familiar with the daily commute of the process. At the time of this research, he was not regularly collecting waste and instead found an income from the odd jobs he was doing for Trashback. He

still helped with the transport of waste from the satellite station to the main site. He lived in a house subsidised by the City of Cape Town, located right next to the HBBC headquarters. This meant that he was regularly present in the area of operation, and so the researcher had frequent social encounters with him. When Frank was younger he was employed as a construction worker and had a decent working knowledge of building materials and processes – he had made one or two makeshift trolleys out of wood that the HBBC staff were utilising. He was also an active member of the marginalised community in the area, and was familiar with most of the street people living in the focus area. Frank's experience, in both collecting and building, his regular engagement in the local street community, and his active participation in the running of HBBC made him a key stakeholder in the process of designing a manual transport vehicle. From this point, the key stakeholder group was identified as:

- The business owner and product financer – Trashback
- Professional industrial designer – the researcher
- The users – regular HBBC collectors
- The consultant – Frank

5.2.2.2 Route Mapping

Observing the activity of the HBBC waste collectors revealed that the majority of them spend their days transporting loads of waste to the satellite station or from the site to the headquarters. Some of the collectors dropped waste off at the main HBBC site, but the station had received complaints from surrounding businesses about the undesirable presence of homeless people traversing the area with their collections.

The HBBC's operational area covered a radius of 2.5 kilometres, which included most of the Cape Town CBD and surrounding residential areas. This coverage was too extensive to accurately analyse within the restraints of the project, and the researcher found that there was sufficient movement in the near vicinity of the HBBC sites. The satellite station and the headquarters lay only about 160 metres apart, however, Roeland Street, one of the main roads that feeds traffic in and out of the city, bisects this route. Collectors would shuttle waste from the satellite station on Canterbury Street, across and down Roeland Street and then would take a left onto Harrington Street. From there they would travel 60 meters down to arrive at the headquarters. This journey would occur frequently throughout the day, but the major offloads would take place in the afternoon or when the remote station was near capacity.

At the time of this research, Trashback had existing relationships with certain businesses in the area. These associations were usually based on Trashback providing a service to the businesses by removing their recyclable waste, but would pass that information onto the trusted collectors who would be remunerated for the value of the collection.

The observed routes travelled by the collectors generally took under half an hour to complete, and the collectors mostly made use of a transport aid in the form of rudimentary trolleys. These trolleys were either fashioned from scrap wooden pallets or stolen metal shopping carts. In all their states, these trolleys dramatically helped the collectors transport their loads, and through conversations it emerged that these trolleys were frequently stolen if left unattended for too long. This inferred the product's high street value within the informal collectors network.

Figure 5.2: Rudimentary Wooden Trolley. (Donnoli, 2014)

5.2.2.3 Concept Development

Through field observations, informal interviews and first-hand experience working within the HBBC operation and the focus area, a clear direction emerged for the development of the product: the need to design a dedicated HBBC trolley. This intention was presented to each stakeholder group, and there was resounding support for the idea. The development of the trolley was a manageable means to collaboratively engage the stakeholders in pursuit of the overarching objective of this case study – understanding how and why social divisions affect the co-designer to designer relationship. The technology was familiar to all parties involved, as was the

use of such technology. Thus a definitive commonality between the stakeholders emerged. The researcher was aware that this could prove problematic in light of what Schön (1987) pointed out as the “coach and student” model. There existed a common understanding of what was necessary to realise the product, but the process required a further understanding of how each party framed their expectations. There needed to be a “frame reflection” in order for a unidirectional design process to occur (Schön, 1987). The first step to this end was to outline the expectations of each stakeholder group. These were gleaned through conversations and informal interviews, and were as follows:

The Financer (Trashback) –

- Durable
- Load weight of at least 300kg
- Financially feasible
- Space for branding
- Aesthetically pleasing
- Scalable into a range
- Marketability to other businesses

The User –

- Easy to manoeuvre
- Ability to ramp up and down curbs
- Clear packing space that can fit large flat-packed cardboard boxes
- Flat bottom
- Ability to be pushed and pulled from front and back
- Wheels with good impact absorption
- Potential for a canopy for protection against rain

The Researcher –

- Viability within time constraints
- Batch production manufacturing processes
- Product development as a ‘conversation piece’
- Engagement with stakeholders as co-designers
- Deeper understanding of the designer and co-designer relationship

With experience from the previous case study, the researcher felt that it would prove to be futile, and possibly even damaging for the design process, to host a traditional co-

design workshop. Given the social constraints experienced by the users, the researcher realised that the co-design relationship had to be developed for use in the field. Frank was earmarked as the chief representative of the user group, mainly because of his orientation around the HBBC operation. The researcher thus engaged Frank in multiple short brainstorm sessions in the field. These kept brief and scheduled around Frank's schedule.

As with the earlier example of Blake's engagement with the street woman, and how a more emotionally sensitive approach can lead to gaining implicit information, the researcher endeavoured to show that same sensibility when engaging Frank. This was achieved by allowing there to be an equal share in conversation, even though the researcher had more experience in product design and development. Frank, having used various trollies, was the mediator of the knowledge when it came to the use of the product. He was considered to be the experiential expert. Even though the physical form had not yet been designed, the researcher and the collectors shared stories – when in the field – about the encounters. Many of these stories contributed toward the expectations and requirements of the final product. As Frank had previously built wooden trolleys for HBBC, he conveyed the difficulties he experienced with their use. The main problems were:

- Poor quality wood
- Inappropriate nails and screws
- Wheels or castors that weren't suitable to rough surfaces
- Heaviness
- Derelict appearance

With this information, the researcher encouraged Frank to take the lead on the design and to envision the ideal trolley. It must be noted that at this stage Frank was not considering the perspective of the financer, or Trashback. This designation allowed him take ownership of the design, and the researcher was guided by his (Frank's) design thinking.

It was decided that to counter the problems experienced with the existing wooden trolleys, it was necessary to change the material from which the trolley was built. The wooden trolleys were made and used because of their low cost, however, the expectations of the financer meant that there was financial means to explore more expensive options. An interesting factor that played a key role in the design process with Frank was that he had a marked sense of urgency in his work. The researcher

could not identify the root of this urgency, but it became obvious that Frank's attitude swung from being brash when too much time was spent sketching and talking, to passive when outside of product discussions. This inconsistency changed once mock models were constructed. For the prototype, a simple plank and piece of cardboard would do. The ease of construction, or rapid prototyping, of the design was a much faster way to resolve technicalities and communicate problems. This process was similar to the co-design workshop introduced in chapter three, when stakeholders were able to visually develop their travel routes and contribute tacit knowledge to the design process. Participatory action that included a physical component seemed to have an equal value in these two circumstances, regardless of the sophistication of the technology. It also reduced the energy spent on clearly communicating oneself with words and iterations. This led the researcher to step back from the situation and consider the forms of communication being used:

- Spoken,
- Written (sketched)
- Demonstrated.

Figure 5.3: Location of Sketching Session With Frank. (Donnoli, 2014)

Frank's first language was Afrikaans, but all conversations were held in English (a limitation of the researcher). When the researcher was drawing out a design, Frank would wait to discuss that drawing instead of adding or sketch out his own render. When he did draw, he apologised that his drawing standard was not good. Although

the researcher did not place a value on the accuracy of the spoken language used or the drawing standard, these seemed to be intimidating factors to Frank. This, in turn, had an affect on the quality of the communication.

The researcher had to alter the method of engagement to allow for more responsive engagement that matched the output of the user. This meant that there needed to be a working prototype that could be observed and tested. In order to satisfy Trashback's expectations, and also to keep within the time constraint, the researcher decided to seek out existing metal trolleys that could be customised to suit the design requirements.

Figure 5.4: Standard Industry Trolley. (Donnoli, 2014)

Various options were considered until there was a model that fitted the majority of the design needs. The chosen trolley featured a central axis with two large wheels and two sets of smaller wheels on each side. The benefit of this was that the trolley had an acute turning radius and could manoeuvre over the rough terrain characteristic of the context of inquiry. The sides of the trolley were open, which meant that there would need to be sides fitted with branded material, which would also serve the purpose of hiding the waste.

When the basic trolley was presented to Frank and the rest of the users, the researcher explained the needs of Trashback; this made for an easy flow of dialogue that involved the users explaining their ideas. The key point that they expressed was the necessity

for the sides to be removed effortlessly for efficient loading and unloading of waste at collection and drop off sites. The researcher observed that the users were excited about the prospect of using a new steel trolley. These products were normally inaccessible to them. Further engagement with Frank revealed a notable lack of energy or motivation when it came to furthering the design idea of the trolley. It seemed that an industry manufactured product had satisfied the immediate needs of the users, however, this provided the researcher a space to test the implementation of the PD theory of designing for participation (Sabiescu, David, van Zyl, & Cantoni, 2014: 1). Problems can be difficult to identify before the researcher has sight of a solution, and so an effective technique of 'generative-prototyping' can lead to solutions that are formed from what the inquiries are based on and how the stakeholders are engaged (Halse, Brandt, Clark, & Binder, 2010: 26-27).

After some consideration and independent iterations of the trolley prototype, the researcher decided to plan for the future use of the trolley – focusing specifically on the side panels. These required branding with HBBC's corporate identification, and the users required the sides to unfasten, which meant that there would be a high amount of user interaction with the mechanism that held the sides in place.

In order for the co-designer relationship to continue into the next phase of product development, a design fault was implemented. Essentially, this was an experiment to actuate participation with the stakeholders that was used to help model future exploration (Houde & Hill, 1997). This was discussed with Trashback, and an understanding was reached in light of the value of this, in the context of the research. The side panel was made up of PVC canvas, with printed branding. A pocket was sewn into it for a pole to slide inside, which formed the top of the panel that locked into brackets on opposite ends. These brackets were key to the future participation as the orientation of them made it so that if there were pressure applied from a heavy load within the trolley, it would buckle and pop out of place. For lighter loads and casual use, the brackets worked fine. A simple reorientation of the brackets to face upwards would enable them to be fully functional on all use levels.

Figure 5.5: Bracket Coupling & Side Panel Pole. (Donnoli, 2014)

Figure 5.6: First HBBC Trolley Prototype. (Donnoli, 2014)

The researcher left the prototype to be used within the operation for a couple days and then returned to receive feedback. As expected, the brackets had failed and the users had come up with makeshift ways to rectify the situation. Although the solutions were not ideal, the most important part of the exercise was that the users, and Frank, were now voicing their concerns with the design and were suggesting ways to improve the next iteration – a step that previously had not been topical. The researcher then

fabricated new brackets and installed them on the prototype. The users essentially took ownership of the design process, and after seeing their input shape and refine the product, a notable level of confidence in their engagement with researcher was observed. This led to further suggestions for the next prototype, which were:

- Better wheels
- Wider load area

Unfortunately, the prototype did not fare well with regular use and rapidly started to degrade. The researcher, and Trashback, realised that the next prototype needed to be far more robust. The following points were discussed with the co-designers:

- Solid side panels to keep branding intact
- Panels that can be folded down
- Four larger wheels with greater durability
- Storage area for personal items
- A drinks holder
- Ability to transport bulk bags (approximately a cubic meter in volume)
- Easy to keep clean and wash

Figure 5.7: Deteriorated First Prototype. (Donnoli, 2014)

The final prototype developed in this project was sent to industry to be custom manufactured, the result of which produced a trolley that was built from folded sheet steel. The design made it so that it was fully enclosed on the sides, maximising

branding area. Further consideration led the push bar to be fabricated from tube steel to serve ergonomic benefits. One of the sets of wheels was static and the other had the ability to swivel. This allowed for good manoeuvrability on the street. The large wheels made it easy for the collectors to climb the curbs and had a total load capacity of 500 kilograms. The design also included a personal storage area, something the users had requested to be included as a feature.

Figure 5.8: Custom Trolley Prototype. (Donnoli, 2014)

Figure 5.9: Features of New Trolley Prototype. (Donnoli, 2014)

5.2.2.4 Project Results

The delivery of the final prototype concluded the project for the researcher. The researcher was present for the initial trial runs of the new trolley and, as suspected, there were further opportunities to refine the design. The final prototype did, however,

meet the requirements and expectations of Trashback and the users. Trashback now had a product in their assemblage that could be branded, and they owned the design, which meant they could market it as a product outside of the waste collection industry. It also improved the efficiency of waste movement from the satellite station to the main site. This was an important advantage for the company, as they could streamline their local ground operation

The trolley enabled the collectors to present themselves to businesses with a sophisticated transport platform for recyclable waste, which empowered their sense of belonging and reflected how they were earning a decent living. One of the collectors, while giving feedback to the researcher, proudly called the trolley his “Ferrari”. It was hugely satisfying for the researcher to see this display of pride. The fact that the collectors played a part in design process meant that they had a greater sense of responsibility and ownership towards the trolley.

Frank, being a critical part in the development of the trolley, took ownership of maintaining all of the trolley’s mechanical issues. When the researcher engaged him after a period of time in which the trolley had been used, he was already suggesting further refinements of the design.

5.2.3 Case Study Conclusion

From the onset of this case study, the researcher endeavoured to study the relationship between a design researcher and the co-designer – a critical component of a participative process – and ask why social differences have an effect on this engagement. From the previous chapter, it was understood that stakeholders define their place through the activity that they are involved in, which in turn develops the culture of a network. This activity is steeped in socio-cultural complexities, many of which cannot be fully comprehended. When a PD project takes root in a complex socio-economic environment, the designer needs to find a common language that can be used to positively interact with the stakeholders. This language, as was observed in the EC project, can be made up from the occupations of groups in the studied area. Once the basis of a language is laid down, the researcher is able to gain further insight into the mechanics of a community.

In this case study, the researcher found that the value of identifying a language of commonality played an important part in developing a relationship with the stakeholders. In the case of Frank, where it was discovered that he applied himself more effectively in situations that involved demonstrations and physical expressions,

the researcher was able to accommodate this factor to grow the level of trust. The social differences between the researcher and Frank were spoken language and the ability to draw. Spoken language and the ability to draw can be seen as fundamental pillars of a PD process; however, it cannot be taken for granted that stakeholders will be able to communicate in these ways.

The evolution of the users into co-designers does not qualify the individuals to gain implicit knowledge within the design field. It was necessary to reduce participation to the basic level of developing an artefact to act as the channel of communication. The social divisions experienced in this case study illustrated the value that individuals offer in a participative process, in that personal experience holds tacit knowledge that can be applied to the project at hand. This develops a relationship that requires reflective conversation, which solidifies the construction of a determinate situation (Schön, 1987: 42). Social differences, in relation to individuals in a PD process, add value to the research; as they force the researcher to perceive future possibilities. Without this, the designer would be ineffective in conducting research.

5.3 Bridging The Gaps

This thesis has presented three consecutive case studies. These were approached on a meso-level that focused on delineated areas comprising groups of perceived stakeholders, which effectively orientated the thesis on N>1 studies focused on investigating the phenomenon of participation in a design process (Swanborn, 2010: 15). This meant that the research was conducted through multiple case studies that fed into an overall theme that developed across them. Thus, the research inquiry was thematic in an effort to answer the main research question of how an understanding of place can facilitate designing PSS in an urban environment structured by complex social divisions.

The first case study, which presented ‘The Line’ project, served as a control example of PD taking action in a minority world context. The purpose of this case study was to develop an understanding of the current tools in PD utilised to engage stakeholders. The first step taken was to understand a stakeholder’s environment from an outside-observer to a participant-observer. This enabled the researcher to develop a common ground from which discourse could emerge. It must be noted that the stakeholders being of a similar social level to the researcher made this communication easier. The next method utilised was the researcher’s documentation of the explored focus area with photographs and notes. This media was assembled in a concise format that proved to be useful when engaging stakeholders in conversation, as it could be used

as a visual aid. It also helped in directing the participants' attention to the task at hand, and not focusing on how the information is relayed from their personal capacity. The case study also illustrated how it was critical for a team to be in constant communication with one another, and not just occupied with their engagement with the stakeholders. The researchers were as much a part of the investigative inquiry as the stakeholders. This combined involvement is fortified by the continuous feedback loops utilised, whereby an idea presented to the stakeholders was then in turn analysed and returned for further testing; and continued in this cycle until satisfaction. The next factor that proved to be valuable was the identification of a mediator. The mediator facilitated the researchers' prompt identification of and engagement with stakeholders, which was invaluable considering the fact that the author is operating foreign territory. The use of a co-design workshop proved to be a turning point PD method. The workshop provided a controlled environment that included participation from all stakeholders. The mapping exercise, which was based on projecting a map of the focus area, enabled the co-designers to act out their knowledge. Through this, the participants were able to extract tacit knowledge and pass it on to the researchers. This effectively put the stakeholders in charge of their own experience, and they were not forced to expel their information in an uncomfortable way.

The experience of the first case study equipped the researcher with an implicit understanding of the PD tools available to use in the field, how to use them, and the extent to which they were useful. The case study approach allowed for condensed focus that had an output of tools that were then applied in the second case study. Although the second case study was briefed as a continuation from the former, the critical elements were the tools that were brought forward from 'The Line'. A major factor that was of invaluable importance in the EC project was a thorough understanding of the socio-political history of the area, which continues to have an overwhelming influence of the culture of place. Mediators played an important role in this project as well, in that the research group was introduced to the street community in the 'correct' manner. The necessity for 'correct' ways of approaching and engaging is indicative of the social sensitivity implicit in the delineated area, which had been damaged by past research endeavours. The mediators were able to outline the basic social structures that the researchers needed to be aware of. This taught the researcher more about the importance of one's own awareness in a system – an awareness that led the researcher to appreciate their potential influence on people who hold preconceived perceptions of your intentions and reason for being present in their place. This was the major obstacle encountered in the EC project, as it effectively required the methods used in the previous case, namely the traditional co-design

workshop and continuous feedback loops. This meant that the researchers were not able to gain implicit knowledge to feed into the research, however, the implementation of a “human proxy” developed possibly the most valuable method in this project. This provided a way to shift the designer into the user’s space – and not the other way around – which made the users comfortable and effectively acknowledged them as experts and the researchers as learners. Their understanding that the activity could be isolated into units of occupation enabled the researchers to positively engage stakeholders in a manner that was grounded in commonality. This commonality engendered more intimate relationships with the stakeholders, in the sense of having unified interest. These encounters were then propagated to have a broader understanding within the context of the community. The complexity structured by social divisions became an apparent challenge when seeking to draw out participative communication. However, such complexity allowed for a deeper understanding of how PD can be applied to a completely different context in comparison to the previous exercise, effectively shifting it out of the comfort zone of the designer and into the comfort zone of the user. The final method developed in this case study was applying shared interest in engagements, however, this interest had to come from inserting oneself in the system. This process of insertion was reminiscent of applying reflective learning during participation, and made use of applying the knowledge gained through past interactions (Reason & Bradbury, 2001: 246).

The third and final case study had a clear focus on engaging participants in the EC. The key difference in the case was how an artefact, or product, proved to be the main conversation piece and entry point into a system of activity. Houde and Hill (1997: 12) propose prototypes as a useful way to resolve unseen dimensions of the design process and develop a synergy for integration into a set context. This was an intervention that proved to be both productive as an end product and artefact for communication. As an outsider, the researcher was able to effectively engage stakeholders by conversing in a common ‘design’ language that was partly formed by the researchers’ understanding the historical and current influences of the participants. Further to this, the understanding of the stakeholders’ activities – through observations and participation within their system – allowed for a more efficient method of gaining traction for the project. This produced the opportunity to test more PD tools, the purposes of which were for participation and reflective conversation. Developing close participative relationships essentially extended the life of the participatory process with the stakeholders and allowed for positive growth within the studied system. Reflective conversation challenged and also reminded the researcher of the social divisions between participants and illustrated why these have effects on participative action, that

there will always be a difference in understanding and knowledge, and in a PD project this imparts knowledge that is not predictable. This case study reflected the amalgamative summary of utilising participative tools, which then enabled the researcher to determine which tools to use. This essentially means that the context determined the tools used.

5.4 Participatory Action In The Field

The previous section summarised the case studies and illustrated the transfer of the accumulated tools and knowledge. Some of these tools were used in the same way and others were not used again in their original capacity. In this section, the author will respond to the question of how a researcher can ensure a truly participative design process, or at least attempt to ensure such a process. The case studies uncovered invaluable information supported by theories and methods, utilised through practice, which complimented the projects presented in this thesis. The following steps will be presented as a guide and also summarise the final findings for the entire progression of this thesis:

1. **Activity Identification:** All of the projects presented in this thesis were dependant on the understanding of the system being studied. Within this system there is an activity made from an infrastructure of interactions (Miettinen & Hasu, 2002: 129). It is necessary for the researcher or designer to ask *how* to design instead of *what* to design (Koskinen, Binder, & Hellstrom, 2005: 12). With an open perception, the researcher developed their ability to adapt to a variety of encounters and adjustments of design directions. Further to this, particular attention needs to be paid to the patterns observable in the system, as these can dictate needs and also provide opportunities on how to compliment existing activities.

2. **Mediation:** The first two case studies made use of a mediator in the PD process. A mediator will usually have an experienced and deep understanding of the system being studied, and also the social structures embedded within the system. This role accelerates the rate at which a study gains traction. It is advised to always engage a mediator to familiarise the researcher with the focus area, but not necessarily to include him/her as stakeholder. The primary purpose is for the researcher to be introduced to potential stakeholders in order for an initial level of trust to be established. This streamlines the initial research phase when attempting to engage a socially delicate system.

3. **Casual Encounter Planning:** Linked to point (1), this is a tool that was developed over the entire research phase. The author discovered that it was difficult to engage potential stakeholders without disrupting their regular activity. In order to utilise this method, it is necessary to make careful observations of the patterns within a system. An example of this would be when the author was conducting field observations in the third case study to understand the movement, or value, in a system. What was observed was that the users spent most of their time pushing and pulling trolleys filled with waste. This was a laborious activity, and the collectors eventually tired and needed a break to drink water; however, they did not leave their trolleys unattended. This break gave the researcher the opportunity to engage the collector in a conversation about their trolley, as this was of obvious value to them. Planning a casual encounter takes advantage of the materials of a situation (Schön, 1987: 158). Similarly, ANT reinforces this activity by identifying the relational science of non-human actors and their influence on the network of activity (Crawford, 2005:1). These non-human elements become conversation pieces that form channels that a researcher can use to engage stakeholders effectively.

4. **Human Proxy**: This method proved to be invaluable to the Swedish students in their project, in the second case study, where they were struggling to develop co-design relationships. A proxy, in the technological sense, is a server that acts as a transitional point in relaying information (Microsoft, 2015). This is exactly what a human proxy is in the world of field research. Essentially, one would enact the role and carry out the duty of a participant in a system, or join it within a similar chain of command. The benefit of this method is that it includes the researcher in the stakeholder's activity, and in so doing provides regular interactions that can lead to participative action.

5. **Self-awareness:** The projects conducted in this thesis all necessitated that the interactions between researcher and stakeholders were not held in mutual exclusivity. It is essential for co-operative inquiry to supersede traditional observational research methods in order for shared experiences to guide field research (Reason & Bradbury, 2001: 179). It is also important for the researcher to be consciously aware of their presence in a system being studied, as this awareness will not come naturally to the researcher. Self-awareness stands as a good practice, especially in the eyes of Schön (1987), as it considers the reflection-in-action which enables the researcher to understand the holistic nature of interaction with stakeholders. In addition to this, it is

important for the researcher to be aware of their human behaviour. An often-neglected aspect, because of its simplistic notion, is one's behavioural actions and gestures that can be used to tacitly express information; especially in an environment with social sensitivity (Morris, 1987: 11).

6. **Design For Participation:** In the project carried out in the third case study, the author introduced in the trolley prototype a design element that was intended to fail with continued use. This purposeful shortcoming of the prototype then initiated a future participative engagement. The form of this participation is not certain, and this enables the researcher to anticipate the method's result of 'design-after-design' (Ehn, 2008). What this means is that a product is designed in such way that it considers the future use of it, and frames possible solutions to it; in parallel to the current use (Lowgren, 2013). In the same project, the artefact (trolley) served as communicative channel to engage stakeholders further. This essentially shaped situations to fit participation in the design process (Lowgren, 2013).

7. **Language Commonality:** This is more of an expressive tool that can be used in relation to the above tools. It was experienced that developing a language based on early interactions with stakeholders served as a useful way to maintain good communicative standards. This language is not referred to in the traditional sense, but more as a vocabulary of terminologies that the stakeholder values, which is developed by patterning the actions within a system. Essentially, the researcher observes the actions within an activity and questions why these are taking place; and from there can understand the building blocks of the action, the linkage of which can be used as the language. Reason and Bradbury (2001) understand this idea by defining it as "behavioural complexity" which speaks of diversity that is assimilated from mental models, values, aims and political interests.

8. **Action Thinking:** The co-designer, or stakeholder, workshop conducted in the first case study was an efficient and interesting way to engage participants and enabled tacit knowledge to be expressed effectively. The action of using an artefact or other means of animated expression allows the participants to focus their energy on illustrating the information rather than presenting themselves formally. The playful nature of action thinking develops confidence in the participants (Halse, Brandt, Clark, & Binder, 2010: 80).

This set of recommendations forms the complete combined outcomes of the chapters presented in this thesis. Chapter seven includes further analysis of the conclusions, derived from meeting the initial objectives laid out at the beginning of this paper.

CHAPTER SEVEN

CONCLUSION

7.1 Introduction

This concluding chapter presents an overview of this thesis. It is divided into sections that: revisit the research objectives and how these were met; how the thesis has contributed to knowledge in the design research field; and a discussion on the limitations of the research, implications for further research based on the findings and finally, a summary of the outcomes.

7.2 Revisiting Research Objectives

The objective of the research was to investigate how PD and participatory methods of inquiry, in the design research field, are affected by social complexities. This was framed by the main research question that asked how an understanding of place could facilitate designing PSS in an urban environment structured by complex social divisions. The further objectives were as follows:

- To develop an understanding of current processes used to engage stakeholders as co-designers, and develop a foundation for PD projects being run in a minority-world context.
- Identify key participants within the system in question and develop an understanding of how PD operates in a majority-world context.
- Put into practice design research reflection and engage stakeholders as co-designers through means of prototyping and product development.
- Develop a set of design research recommendations when conducting a PD project.

The fulfilments of the research objectives are outlined in the next section. These are paired with the sub-questions are answered to illustrate how the objectives were met.

7.3 Research Conclusions

This thesis was primarily made up from the analysis of case studies. This multiple case study approach was chosen because the main research question asked "*how*" and needed to not only be explored but also explained. The phenomenon of PD being practiced in minority and majority-world contexts meant that there needed to be a research strategy that could span over a period time, places and people: as was the case with this thesis (Yin, 2003: 6). The case studies provided the majority of the information necessary to achieve the objectives of the research.

The first objective was paired with the question of which current design research methodologies are utilised to understand place. This was set as a control study of a PD project being run in a minority-world context. Initially, this was intended to form part of the project comparative between Malmö and Cape Town, however, this did not form the foundation of the objective resolution as the comparative component was realigned to focus on a different project: observing the Swedish students conduct their research project. The Malmö case study proved to be an effective method to gain an adequate amount of information and experience to explore the methodologies that are used to understand place. An understanding of place was achieved through participative methods, such as: participant-observer, route mapping, a co-design workshop and the mapping exercise that took place in the workshop. These methods taught the researcher the value of having a close engagement with participants, in order to develop them into co-designers. Traditional case study research methods were also complimentary to the participative methods: having a historical understanding of place meant that conversations with participants began with a base-level understanding of their environment; observational field notes collected in a journal formed an on going database of experiences which could be referenced during engagements; and video analysis of the co-design workshop and route mapping exercises allowed the researcher to further understand relayed information from the co-designers, and also served as a visual aid to conversations. The combination of these methods enabled the researcher to have rich communicative relationships that developed a dynamic working arrangement with participants, which in turn led them to take ownership of their experience. This allowed them to confidently educate the research group, and effectively elevated them from potential users to designer-users. This thoroughly satisfied the objective of understanding how PD tools are used to engage stakeholders as co-designers. The following socio-economic factors served the function of qualifying the study as a minority-world context PD project:

- Stakeholders were fluent in English (equal to that of the researchers);
- All had a working knowledge of technology;
- Possessed smart devices;
- They were of sound mind during engagements;
- High-level communication relays were successful and continuous;
- They were able to participate in a design lab, or co-design workshop;
- Their economic state seemed to be stable;
- The environment being studied was safe and easily accessible;
- There were not any environmental constraints that limited research activities; and

- The researcher's presence did not have an obvious impact on the activities within the researched system.

The next objective of the study was to identify key participants within a system being researched, and develop an understanding of how a PD project and participative research activities operate in a majority-world context. The EC project formed the grounds for the case study focus, which considered implementing the mesh network into the EC's public space. The problems of this project shifted the focus from the mesh network to, instead, investigating the Swedish students – who are from a minority-world – conducting their PD project in a majority-world context. Essentially, the methods used to investigate place were applied to this study, as they had proven to be successful in the fulfilment of the previous project. This study looked at how stakeholders define their place, in this case within the EC urban environment. The case study methodology once again allowed the researcher to have a clear understanding of the benefits of the tools developed and used in previous case study. The differences between these two case studies contributed to the method tools that led to achieving the research objectives relevant to this section. Participant-observer methods, informal interviews and the case study were the traditional research methods used. The combination of the methods gave the researcher confidence to engage stakeholders in a similar manner to the previous study; however, socio-cultural factors disrupted the effectiveness of these tools. These factors were attributed to the study being conducted in a majority-world context, experienced in the second and third case studies; and were experienced as the following:

- The users socio-economic status was vulnerable;
- Stakeholders were psychologically and physiologically unstable;
- Basic amenities were not accessible to stakeholders;
- Alcoholism and drug use by stakeholders was obvious;
- The history of the researched environment was strongly influential on the culture of place;
- Lack of understanding for research processes;
- Social sensitivity to the researchers within the environment;
- Presence of the researchers influenced participants' engagement; and
- Language barriers.

Although these factors initially hampered the PD tools, they brought to light how the researcher overlooked the importance of developing an appropriate way to initiate engagement with stakeholders. In the first study, the implicit understanding of the stakeholders towards the researchers of why they were being engaged was rapidly

established. In the second and third studies, it was difficult to convey this information immediately and, furthermore, to communicate why it was necessary to include them in the design process. The initial difficulties of the study guided the researchers to apply methods that lead to participation. The second case study led to the understanding that the actions of the activity within the system were key to gaining access to the stakeholders, especially the waste collectors. Similarly, the actions of the students highlighted the problem of being present in a system and not adding value. This decreased their ability to communicate without disrupting the integrity of their intentions to help the stakeholders in their study. The eventual implementation of the human proxy method meant they were included in the system of activity. From this point, they were able to engage their stakeholders effectively in a series of communication exercises. This led to the researcher understanding that a stakeholder's activity within a system defines their place. Once there is function that is fulfilled relative to the activity, one is in a position to add value and from there, a commonality or language can be developed with participants.

Knowledge outcomes from these two cases contributed to design-research reflection and engaged stakeholders as co-designers through the means of product prototyping and development. This objective sought to implement the findings of the second case study with a greater focus on the relationship developed between a designer and co-designer. This case study method was used as a means to frame this engagement and also to document the tools produced from the previous projects. This method was also used as an experiment to further understand why social divisions affect a researcher's interaction with a co-designer. From the second case study, it was understood that the stakeholder's socio-economic circumstances play a defining role in the way communication could be initiated. The use of a product, and the development thereof, was a productive way for the researcher to experience a participative relationship. Informal interviews were conducted via the use of a technology probe (the trolley prototypes), which allowed the researcher to develop a level of trust and understanding with the stakeholders. This trust and understanding came about by having a common interest in creating and prototyping a useful product that would help the stakeholders with their duties. In pursuit of answering the question of why social divisions affect participation with stakeholders, the researcher had to understand the role that stakeholders played in in the system. The presence of a designer in the development of the product was a potential overriding influence on decision-making during the conceptual development. In order to avoid such an effect, the researcher needed to be aware of this effect and ensure that it was not implied through interactions with participants. In achieving this awareness, the researcher was required to reflect on past

engagements and implement them in future engagements. This requirement was broken down into two sources of learning: reflective learning and emergent learning (Reason & Bradbury, 2001: 246). Emergent learning fed into the method of designing for participation, whereby the researcher intentionally constructed a product that would fail in order for stakeholders to discover and adapt a solution to the problem. This generated in the stakeholders a sense of ownership over the product and gave them confidence in *their* idea developed by *us.* This new sense of ownership illustrated how the understanding of a social status and, inherently, the societal division it creates, can be beneficial and productive in propagating participative work that satisfies both individual and collective goals.

The final objective was to develop a set of guidelines and recommendations that allow for a truly participative design process. Although it is understood that the ideal of guaranteeing a completely participative process is ambitious; this objective served to clearly present the methods and tools that were used to developed high levels of participation within context of the projects presented in this paper.

7.4 Contributions to Knowledge

The value of participative inquiry and the use of tools and methods aligned to PD research were invaluable in concluding projects with successful outcomes. With participative design processes being commonplace in minority-world design contexts, it was the hope of the author to personally seek and experience how these methods would fare in the setting of a majority-world. Further to this, theories used to gain insightful understanding of human interactions and stakeholder-designer relationships were tested with participative methods.

The research problem highlighted how, when researchers are engaged with methods that require a high level of participation from stakeholders, there is also high level of involvement from the designer. It has become clear that trust is a key element to develop a healthy relationship with a stakeholder. This paper has also shown how to gain an understanding of a researched system, the stakeholders within it and the activity and the actions of it. It is essential that the researchers involve themselves in the activity so that their presence is normalised in the system and does not negatively effect the quality of engagement with the stakeholders. The researchers' involvement in the system also allows for an understanding of the behavioural complexity of the individuals in the studied system. This requires an intimate immersion of the researcher, so much so that the researcher needs to be aware that they are not an objective component to the research formula. As much as the research is focused on

participants, there is an equal reflection of design activity towards the researcher. This reflection was shown through the creation of adaptive participatory tools that were developed through feedback loops between the knowledge gained by the case studies.

The value of this thesis is that it brings forward three projects run with participative methodologies and theories. Two of these projects were undertaken in urban environments constructed by deep social complexities and social divisions; and the third case presented a control PD project where participation was achieved easily. The live-documented nature of the case studies allows for the personal engagements and problems to be honestly represented. This provided insight that will be useful to the broader research community when conducting future PD projects. A further outcome of the presentation and critical analysis of these projects is that the research community may gain a better understanding of the attention that needs to be paid when engaging stakeholders who may present challenging personal engagements.

7.5 Limitations of Research

The research was conducted over a defined period of time, and further to this, being academic projects linked to institutions, the case studies were confined to their prescribed timelines. This meant that the research and objectives had to take into consideration the depth of the research in relation to the time period in which to conduct the research. It is for this reason that the projects were presented through meso-level case studies, which enabled the researcher to use a set of tools and methods that could be applied to a delineated focus group, and document the outcomes (Swanborn, 2010:7). These outcomes were applied to the sequential set of case studies to satisfy the main research problem. The sequence of these studies was kept to a limited number as it was not possible to conduct further research.

The first two case studies presented projects that involved a group of researchers. Even though there was a common interest in researching the areas of focus, it was at times difficult to align research objectives. This meant there was a dynamic shift of importance when it came to discussions, in hopes of productive reflection. This hampered the progress of research in certain instances.

As these projects were conducted in real-time, it was inevitable that there were going to be unforeseen implications or obstacles, such as users, use and delays, that would influence the research progression.

In the second case study, although it formed part of the research as a challenge to

participative methods, the stakeholders' abuse of alcohol proved to be a challenging limitation as it meant that the researcher had very small windows of opportunity to engage stakeholders when they were of sound mind. The researcher's inexperience and lack of qualification in dealing with this experience sometimes meant that he was uncertain of the quality of information being received. This resulted in many hours of interaction having to be excluded from the formal research component of this thesis.

The social sensitivity and cultural difference experienced in the EC project towards the Swedish students conducting research on the street community proved to negatively affect the pace of the research. This was because the stakeholders had to be approached in a way that had to anticipate negative responses. This left the researchers having to relook and be aware of their presence in the environment that they were observing. Cautionary steps were taken, with the help of mediators, to make sure that the stakeholders were not negatively affected.

7.6 Implications for Further Research

As the majority of this body of work draws from case studies, there could be further refinement and development following Yin's (2003: 162) outline:

- Expand the significance of the study;
- Further research to add to the 'completeness';
- Grow the consideration of the study;
- Implement further evidence to findings; and
- Composition of the study can be more engaging.

Bearing in mind these points of development, the social nature of research means that there will always be room to refine the use of the participative tools presented. Further use of these tools in future projects could provide a better understanding of the effectiveness. Similarly, new participative tools may develop from different orientations of the tools.

The combinations of different participative methods enabled the researcher to develop the ability to engage stakeholders as co-designers under challenging social divisions. It is in this development that the researcher believes that the research community can further their understanding of engagements in similar circumstances.

Even though the tool kit developed in chapter six was used as a list of recommendations for PD projects being conducted in environments structured by

social complexities, there is no reason why these tools are not suitable for other PD-related projects. The use of minority and majority-world contexts was intended to create a comparative lens for the research. This was not to say that Cape Town and Malmö fall exclusively into those two categories; there can be a majority-world context within a minority-world context, and vice versa. There is ample room to explore whether these contexts are more suitable with different tools and how participative inquiry is affected in its outcome.

In presenting this research, the researcher hopes that there will be further exploration of PD in socially complex scenarios, as projects are predominately focused on the product outcome of participative engagements. This thesis has highlighted how this process can be drastically hampered by the designer's personal knowledge shortcomings in the world of social science. The researcher's awareness of behavioural conduct is imperative when developing a relationship with stakeholders. Further research into this area, relative to the design community, will be hugely beneficial for PD projects.

7.7 Summary

This thesis endeavoured to answer the question of how an understanding of place can facilitate the designing of PSS in an urban environment structured by complex social divisions. In doing so, the research included understanding which methodologies and tools are compliant with developing co-design relationships; how these tools are applied to gain an understanding of how stakeholders define their place; why these methods are challenged by social divisions; and how a participative inquiry can remain fortified by the 'tool-kit' provided at the end of the research.

The progression of the research was enabled by the use of case studies. These studies provided a concentrated focus on projects that made use of Participatory Design, Activity Theory and Interaction Design. This meant that the results were categorised within those studies, and the researcher had a clear understanding of the use, effect and result. The combination of these theories, case studies and Research Design methodologies provided complimentary alignment that enabled the researcher to carry out the projects.

With the design community increasingly needing to design in collaboration with stakeholders as co-designers, there has to be a greater exploration of participatory methods. These tools empower the researcher to be more effective in field studies. Similarly, they empower the co-designers to take ownership of their experience. These

tools are a fundamental way in which the designer and co-designer can impart tacit knowledge to one another. When this knowledge sharing takes place, there is an mutually beneficial dynamic that forms to potentially grow latent knowledge. These are the principles and tools that could prove to be vital components for designers tackling complex problems. This research has shown that design processes based on participation empower the researched and elevate them to the position of influential co-designers. If the general language of commonality can be that of collective participation, self-awareness, reflection, materialised thought and dynamic understanding, then design is capable of contributing greatly to reducing socio-economic disparities.

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APPENDIX A: RUFAEL NEGASH ETHICAL CONSENT FORM

Ethical Consent Form 03 June 2016

Mtech Design Thesis:

Challenging Participatory Design in an urban environment structured by complex social divisions.

Author:

Micah Donnoli (CPUT Student No.: 206005326)

This form serves to formalise consensual participation of
(Full Name) Rufael Negash
in the research carried out for the progression of this thesis.

I (Full Name) Rufael Negash
hereby acknowledge that Micah Donnoli made his research intentions known prior to any methodological processes that were undertaken to compile the body of research pertaining to his Mtech thesis. I was by no means forced or deceived into participating in this study. I give my full consent to use my name for narrative purposes and recognise that my participation in the study will be purely academic. I have read all sections of the written paper and I have no problems with the way that I have been represented in the thesis.

Signed at (place) Malmö, Sweden on this 17 day of (month) 06

Full Name: Rufael Negash

Signature: Rufael Negash

APPENDIX B: LOVE BJÖRKLUND ETHICAL CONSENT FORM

Ethical Consent Form 03 June 2016

Mtech Design Thesis:

Challenging Participatory Design in an urban environment structured by complex social divisions.

Author:

Micah Donnoli (CPUT Student No.: 206005326)

This form serves to formalise consensual participation of

(Full Name) Love Björklund

in the research carried out for the progression of this thesis.

I (Full Name) Love Björklund

hereby acknowledge that Micah Donnoli made his research intentions known prior to any methodological processes that were undertaken to compile the body of research pertaining to his Mtech thesis. I was by no means forced or deceived into participating in this study. I give my full consent to use my name for narrative purposes and recognise that my participation in the study will be purely academic. I have read all sections of the written paper and I have no problems with the way that I have been represented in the thesis.

Signed at (place) Malmö, Sweden on this 22 day of (month) JUNE

Full Name: Love Björklund

Signature: