INFORMATION AND COMMUNICATION TECHNOLOGIES AND THE URBAN TRANSFORMATION OF SOUTH AFRICAN INFORMAL SETTLEMENT COMMUNITIES

Urban Master of Philosophy Thesis
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PLAGIARISM DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature: Date: December 2014

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Abstract. The paper explores the Information and Communication Technology (ICT) practices of the Social Justice Coalition (SJC), a grassroots community based organisation working with informal settlement communities in Khayelitsha, a largely informal neighbourhood on the south-eastern fringes of Cape Town, South Africa. The study focuses on SJC's advocacy work in the delivery of 'decent sanitation' to informal settlement residents. This has been an explosive political issue for a number of years now. Many communities within Khayalitsha rely on communal toilets for sanitation, and the maintenance thereof has left much to be desired. Within the larger theme of digital activism, three main research areas were identified and explored: the appropriation of ICTs by the SJC's field staff, the use of their Web 2.0 based social networking sites (SNS) in their advocacy work and digital mapping of portable communal toilets in the RR Section of Khayelitsha. The research interrogates the use of ICT as a strategic tool for knowledge-based community empowerment, with the aim of understanding how these emerging uses of technology could assist urban transformation work within this sprawling area. The research emphasizes the roles of various actors, the roles played by different technologies and the relations between technology and people. The emphasis on agency reveals that technology is not enough to augment empowerment processes. Technology-organisational relations are enmeshed within an institutional frame, where the enrollment of technology as actor, requires a repositioning of network relations, in order for it to fulfill its potential as an empowerment tool.

1. Introduction

Pellegrini wrote:

> Technology should be considered ‘appropriate’ when its introduction into a community creates a self-reinforcing process internal to the same community, which supports the growth of the local activities and the development of indigenous capabilities as decided by the community itself (1980, 1).

1.1 Background to the study

South African infrastructural challenges in township and informal settlement communities are inherently complex and political. Under Apartheid, urban planners actively engineered to create discreet townships serviced by the “planned grids of urban life that were regular, clean, visible and open to surveillance…” (Minkley, 1998: 210). The result was a lack of adequate basic services in black townships which ignited social unrest in the turbulent 1980s and this phenomenon still continues to be pervasive in the news today, twenty years after the official end of racial segregation (since the first democratic elections in 1994). Today, urban renewal and transformation remains at core of the South African government’s plans for recalibrate the economic growth and urban regeneration of these communities, as set out in its new National Development Plan (NDP) for 2030.

But the chasm between grassroots aspirations and government intentions continues to be a stubborn feature of life in areas such as Khayalitsha, in Cape Town, however. Whilst the country is considered a primary African economic hub, three South African cities top the list of the most unequal in the world; the UN-HABITAT’s 2010/2011 State of the World’s Cities report cites Buffalo City (East London), Johannesburg and Ekurhuleni (East Rand) as extremely unequal with Gini coefficient values of 0.71; Cape Town’s value is slightly less at 0.67 (UN Habitat, 2011). The institutional frame intended to enable delivery entails sophisticated bureaucratic machinery informed by a pro-rights constitution. Devolution of developmental autonomy to local government and the concomitant embrace of strategic modes of planning through the municipal integrated development planning process is intended to create the space for collaborative solutions under a fragile democracy. Urban planning legislation and policy walk a precarious tightrope spanning process and substance. Service delivery, social upliftment and infrastructure upgrade are to be delivered through intensive consultative processes (embodied in local government legislation and the South African Constitution). There are two goals integral to this process: empowerment through process and spatial reconfiguration of some of the most fragmented cities in the world.

Today however, cities are rapidly evolving into urban networks of interconnected nodes, driven in a large part by the speed, adaptability and the ubiquitous nature of modern Information and Communication Technologies (ICTs). These new ICTs invade every fabric of our cities dramatically changing the way we work, live and

play in this new urban reality. Mitchell explains, “wireless connections and portable access devices create continues fields of presence that may extend throughout buildings, outdoors, and into public space as well as private,” (2003, 144). Today, modern cities are now irreversibly linked and supported by ICT-enabled flows of people, materials, information, capital, services, and media. Yet, this pervasive reality is for many citizens of the global South a distant experience. These technological innovations fail to offer them the benefits of exploiting theses new digital social networks in a shared and equitable manner, where they too are able to participate in the ideals of modern city making and planning. Authors like Korpela (et al, 2005), shares this view, and believes Africa stand to gain the most from the promise of ICTs, as Sub-Saharan Africa faces the greatest infrastructural challenges in achieving the gains through ICT led development but is the least studied region in ICTs Mabarika (et al, 2005). They conclude that the potential for ICTs to transform and empower people is more clearly needed in Africa.

Traditionally, architects, urban planners or local government policymakers have influenced our understanding of cities but increasingly today’s research points to an evolving revolution of *‘digital activism’*, smart phone technologies and low cost digital social networks that are shifting the balance in citizens favour. According to authors Pendakur & Harris, ICTs now constitute a dominant role in transforming the city of the 21st century (2002, 68). ICTs therefore are changing the urban environment and facilitating a new kind of urban digital network, where the way we live and interact in urban areas can become a collaborative process dramatically revolutionising the urban context (Castells, 2012, 128). A growing amount of academic research illustrates how technology has become an integrated and necessary part of urban life, and how today’s urban dwellers are using an array of digital technologies to keep the urban environment civilized, habitable, and sustainable (Odendaal, 2010; Kim, Claus, Rand, and Xiao, 2009; Aurigi, & De Cindio, 2008; Castells, 2004).

But less significant is the research that focuses on how ICTs are being used in informal settlement communities and particularly by South African community organisations working in these fragmented and segregated urban spaces. How are they able to apply modern ICTs in tackling the deep and pervasive infrastructural challenges plaguing informal settlement communities and in particular how it forms part of their urban transformation agenda. This area of research is particularly important when focusing on a South African civil society organization like the Social Justice Coalition (SJC) campaigning for ‘*decent sanitation’* in informal settlements in a township known as Khayelitsha, outside Cape Town. The research therefore focuses primarily on how the SJC are able to take there traditionally grass-roots based community activism into the *‘Information Age’*. Especially how they are planning to build and use a systematic knowledge sharing system like their digital mapping programme, with the aim to make it a participatory sustainable urban development tool for informal settlement residents. This research direction is strengthened by a growing body of evidence, suggesting that ICTs can be an empowering tool when

used appropriately as part of an overall developmental strategy (World Bank Group, 2003, 2004).

1.1.1. The Research Problem

Within this context, this research considers the digital activism environment of a social movement in Cape Town, like the Social Justice Coalition (SJC). The organisation uses different methods and digital tools some embedded in their infrastructure which includes digital applications and the use of popular social networking sites, to hold the local municipality, the City of Cape Town accountable in delivering proper sanitation services to the residents of Khayalitsha. One of the SJC's main service delivery priorities is on *'decent sanitation'* provision. A large majority of informal settlement residents rely on communal toilets for everyday use and their deteriorating maintenance and unhygienic conditions has been an ongoing contentious issue.

Therefore, the research explores the extent to which ICT can enable community members to exercise their constitutional right of access to basic services. In addition to understand how digital activism on the ground is used as a relevant tool within three distinctive contextual elements worth highlighting here: a rights-based Constitution that advocates access to information and freedom of expression, decentralized local government with a firm developmental mandate, and finally, a messy and unresolved telecommunications policy environment that has had profound impacts on digital access.

Active ICT usage is an important enabler for communities to become active citizens that will allow them to fully exercise their democratic rights as citizens within a society. Present day research has offered little attention to the needs and requirements of participatory development through ICT by community organisations like the SJC, as they attempt to use ICT as a strategic digital tool for knowledge-based empowerment, detailing how these emerging uses of technology in informal settlement communities can assist in empowering marginalised residents. The need to correct this omission is critical if we want to address and understand how a grassroots organisation such as the SJC are able to apply modern ICTs and implement digital networks to respond to the challenges of rapid informal settlement growth, housing backlogs, urban sprawl, poor sanitation provision and decades of insufficient infrastructural development in this South African township. How are they able to

utilize ICT as a medium to foster citizen-led digital activism? But to fully understand and evaluate the SJC's various ICT implementation efforts, Actor Network Theory (ANT) provided a ideal framework, to identify the relevant ICT actors, actants, processes and network alignments. ANT is useful as a theoretical lens to frame the underlying mechanics of the SJC's ICT implementation tactics and strategies but also as a normative tool to uncover the relations between technology and people. Because building effective partnerships in re-conceptualising informal settlements needs communities and city planners to find a common vision for community upliftment. Therefore, the goal of the research is to examine the implications of modern digital technologies on newly urbanized peripheral city dwellers and assessing the ICT interventions by SJC in informal settlement communities in Khayelitisha: What are the contextual factors the research has identified when evaluating any case of digital activism? What is the value of digital activism and ICT technology in informal settlement communities? How can new digital technologies engender urban transformation in townships? What policies or local government programmes might now be appropriate in light of contemporary ICT developments? Subsequently the SJC acts as a key case study for explaining digital technology's influence on social movements in Sub-Saharan Africa.

Khayelitsha is a mix of formal RDP housing and informal settlement communities comprising of 15% to 20% of Cape Town's population of 3.9 million citizens (Census, 2011). The peripheral parts of Khayelitsha can be classified as the peri-urban and a logical settlement area for new, mostly poor migrants. Much of the informal settlements in this part of the city lacks basic sanitation and other municipal services such water, electrification and refuge collection, and is marked by very high levels of routine cases of violent crimes (Peterse, 2014, 9). The SJC explains their role as such: The SJC's main focus area is Khayelitsha home to approximately 700 000 people, most of whom live in shacks made of wood and metal sheeting. With 11 active branches and over 40 partner organisations, the SJC promotes active citizenship through education, policy and research, and community organising to ensure government is accountable, open and responsive. The SJC is currently engaged in two primary campaigns – The Clean and Safe Sanitation Campaign and the Justice and Safety for All Campaign. (www.sjc.org.za)

1.1.2. Research Question

Poor informal settlement urban environments are complex, with multifaceted and interrelated developmental challenges. Therefore, finding ways to balance and engage a multi-actor and multidisciplinary approach for urban transformation requires a new urban narrative. This research approach aims to explore how the SJC is using ICTs as empowering tool in their grass-root operations in mobilizing and organising people around their urban transformation agenda work on the outskirts of a major metropolitan city like Cape Town. The research will assess the effects of ICT usage on the movement's ability to actively engender the urban transformation needed around improved sanitation provision for the informal settlement residents of Khayelitsha. A research gap exists, in understanding how ICTs can be utilized by

community movements, in empowering marginalized South African informal settlement communities in their own efforts to become effective participants in transforming their own urban reality. In particular, this case study research is concerned with how the SJC are developing effective ICT strategies that could assist them in this new digital information era.

This study follows previous research work done by Wasserman (2006) on the use of ICTs by social movements and this interpretive research case study into the SJC's ICT practices, especially Web 2.0 Internet based social networking sites (SNS) and digital mapping technology software platforms, provides the ideal investigation into their ability to deliver ideal partnerships between city planners, the SJC and informal dwellers. It is an endeavor to understand the socio-technical context of the SJC's campaign efforts and addressing their urban transformation agenda within this informal settlement community in South Africa.

The primary research question that the case study address is; **How can the use of ICTs in informal settlement communities contribute to community empowerment?** More specifically, could everyday ICT practices by the SJC contribute to informal settlements residents' receiving improved sanitation? But ultimately, the research question revolved around – could we make the world a better place through the use of ICTs? This idea of a 'better place' finds significance in Sen's position on development, that states, "development can be seen as a process of expanding the real freedoms that people enjoy," (1999, 20). In the South African context, the roll out of the developmental model for the uses of ICTs as a poverty alleviation tool have been flawed and has suffered numerous setbacks. Blignaut, points out that it's not just 'access' to ICT technologies alone that will guarantee the bridging of the digital divide in South Africa but the effective 'usage' of such technology that will determine it making a meaningful impact on marginalized communities (2009, 143). This demonstrates that, if ICTs were to have a significant impact on human development, the real test is to see if ICTs could play a transformative role in informal settlement communities of the global South. This further illustrates the need to emphases on how ICT implementation as a multifaceted and multidisciplinary digital tool, could then take informal settlement communities into the information age. This is the research area that will be examined, how the emergence of new ICTs impacted on the theoretical and practical assumptions as to the role of technology in socio-economic development (Morales-Gomez & Melesse, 1998; Marcelle, 2002).

This case study will therefore point to the SJC's use of mobile and ubiquitous digital media, online communication technologies and mobile devices in their grass-root digital activism programmes. In this research approach modern/new ICTs were considered as Internet based social networking sites (SNS), computers, mobile phone devices and their various applications, as the means of connecting to the Internet through mobile portable handsets, computers, Internet cafes and data mapping software as ICT infrastructure. These new digital tools creates opportunities to scale

up developmental challenges to make it possible for ICT to lead the way to defining new ways of building effective partnerships various urban renewal actors.

1.1.3. Research Design

This was also an empirical research case study focused on the collection and analysis of relevant data limited to three categories of SJC ICT activities;

(1) Its field or community advocates' online digital communication practices on sanitation delivery in Khayelitsha;

(2) The SJC office staff's online campaign content management around 'decent sanitation' provision and its online information sharing networks;

(3) The data mapping of portable communal toilets in the RR Section of Khayelitsha.

By using these three cases of the SJC, the research examined the critical, socio-technical, organisational and infrastructural issues relating to their urban transformation agenda work, their enrollment of ICT platforms around *'decent sanitation'* delivery and the institutionalization of ICTs in township community development. The case study method, was 'a logical model of proof that allowed the researcher to draw inferences concerning causal relations among the variables under investigation,' according to Yin (1994, 5). Another way of thinking about a research design was that it acted as a blue print for research, dealing with at least four problems: what questions to study, what data are relevant, what data to collect, and how to analyse the results (F.Borum 1991, Philliber, Schwab & Samsloss, 1980). Therefore, the case study research method was appropriate to answer 'how' and 'why' questions.

The proposed research framework remained constant; can modern ICTs assist with the empowerment of informal settlement communities through the work done by the SJC, when applied in these actor-networks? How were Internet based social networking sites (SNS) influencing the activism work of the SJC in Khayelitsha? Are modern ICTs able to play a significant role in advancing municipal service delivery to disadvantaged urban communities?

Throughout this research, Actor-Network Theory (ANT) was applied as an analytical devise to extract the key relationships, motivations, interests and context that bound all the actants around sanitation delivery in Khayelitsha. The significance of applying ANT as a theoretical device made it a practical and a valuable analytical tool in understanding the networks of connections between human agents, technologies and objects. Such connections were contingent on the exertion of power in relation to aligned goals within the network (Law, 1999, 12). ANT offered a unique framework to analyze and follow the actors be, they human or non-human to see how they attempted to impose their worlds upon one another, and to describe the dynamics and internal structures of the actor worlds (Law, 1999, 12). It was also used to understand the transformative qualities of new ICTs being used by the SJC in addressing the deep developmental challenges of informal settlement areas of Khayelitsha.

1.1.4. Chapter Outline

The dissertation is presented in five parts. Chapter 2 focuses specifically on the literature review analyses how ICT has been viewed as a sustainable developmental tool, providing an historical perspective of developmental and techno-social relations on social movements in various other cities. It explains the ever-increasing trajectory of ICTs and their rapid integration into our urban environments. But it also introduces the research questions, providing reasons why this research area focusing on informal settlements and why organisations working in this arena needs closer scrutiny by presenting the gaps in current ICT research on social digital activism. It creates a theoretical framework that will allow the case study to be examined in the role ICTs play in social movements.
In chapter 3 the research focuses on providing an overview of the relationship between SJC and its ICT practices. Here the focuses on three sets of SJC data gathered in the field, namely: the digital footprint of SJC field staff on '*decent sanitation'* campaigns; the SJC's digital content management and distribution on social networking sites and its digital mapping project of RR Section on Khayelitsha.
These three categories are important because it creates the best data sets which can be used to evaluate how the SJC's digital implementation operates and subsequently to assess the contribution is makes to serving its mandate on keeping the City of Cape Town and other stakeholders accountable. It also contains the methodologically approach where the significance of Actor Network Theory (ANT) as a research frame is explored and the fieldwork and data gathering process. This chapter provides examples of where and how ICT intervention took shape within the SJC digital activism work in the community.

Chapter 4 examines the SJC's research findings, while referring back to the main research questions which enables us to understand how digital activism through its campaign activities assists their urban transformation agenda and critically discusses the shortcomings in how the SJC operates as an organisation.

The conclusion in Chapter 5 reiterates the study's research questions and then seeks to answer these questions in light of the outcomes being presented in Chapter 4. Some of the major challenges the SJC faces in supporting an digital campaign strategy. It focuses on the participatory and collaborative opportunities for the designing proposals to obtain sanitation solutions for informal settlement communities. It also outlines the processes required to bring about a digital urbanism reality within this unique urban context.

2. Literature Review

This section reviews the literature on ICTs and its role within social movements, prominently featuring how similar organisations derive their use from place-based ICT practices. It broadly focuses on how the intersection of new digital media practices and the challenges of urban upliftment and transformation can find usefulness in how social movements use modern ICTs like the Internet, mobile phone application and digital technologies. This therefore focuses more on how ICTs are being used by social movements and in what context local communities are gaining real benefits from applying technology systems in their urban transformation work. Ultimately the literature review aims to demonstrate that a body of work exists in how ICTs play a role in social movements but to locate the research questions within an unexplored context of organisations working in informal settlements. It provides a context to dissect the study underhand so as to inform current thinking on the subject matter. The focus is to understand what lessons have been learnt and where the gaps are in the field of ICT study.

2.1 ICTs and Sustainable Urban Development

In 2003, participants in the largest international effort to direct the use and development of ICTs, the World Summit on the Information Society (WSIS), declared a common, global desire and commitment to building a people-centred, inclusive and development-orientated society, one where everyone can create, access, utilize and share information and knowledge, enabling sustainable development and improving the quality of people's lives (WSIS Declaration, 2003: 24). The definition for sustainable development is taken from the National Environmental Management Act (No. 107 of 1998), which is, "the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations."

The drive to promote sustainable urban development through ICTs presented opportunities for urban planners and city policy makers to consult with key stakeholders to support their urban development processes. One urban thinker, William Mitchell described the emergence of 'digital neighbourhoods' as an attractive alternative to the traditional urban and suburban pattern of the recent past (2003: 59). Another urbanist Picon wrote about the rise of digital culture as being inseparable from the spectacular progress made between man and machine, and in general between the physical and the electronic world (2010: 165). ICTs are now capable of linking more and more people through the global information and communications infrastructure found around the world. This is facilitating a new kind of digital social reality: of communications, human interaction, collaboration, and connectedness.
Hamelink shared an optimistic view about the possibilities for citizen participation through ICTs, which allowed millions of people from around the world to participate in local community-based issues that focused on global problems (2008: 223). Another prominent author, Cranshaw, talked about the development of a promising

research area of *'urban computing'* that was beginning to take shape and address this challenge (2012: 56). He suggested that, with the mass- proliferation of smart-phones and the increased availability of low cost sensors, rich sources of large-scale data revealing how people and traffic flows through a city, could now be easily available, (2012: 56).

However, this reality might be true for advanced Northern cities of the globe but the challenge of accessing and using digital infrastructure networks to address urban developmental challenges for citizens of the global South still needed further exploration. The pace of digital technological adoption was occurring at different rates across the globe, with developing countries always lagging behind the developed ones. The uses of ICTs and digital media by marginalised citizens in cities of the global South are particularly acute as accessing and sustaining a digital experience that builds participatory development nodes for more effective local information and improved services. The reality of ubiquitous ICT access experienced in developed countries where the acceleration of the ICT revolution has changed their conception of cities to a state where citizens are integrated into this new urban digital environment is a far removed from the technological alienation found in African cities. Some argue that such technology may serve to further entrench inequality within society (Etzo & Collender, 2010; Manji, 2008). Therefore, the penetration of new media technologies that have the ability to demonstrate the way modern urban dwellers to engage with city planners and developers needs to be carefully evaluated.
Wasserman makes the point *'technological determinism'* in African countries will lead to and enhance democratic participation (2006). The role out of ICTs in Africa must contend with other socio-economic, literacy levels and infrastructural constraints, particularly with regards to periphery citizens. What therefore needs further examination is how ICTs emerge within informal settlement communities before the promise of urban renewal and civic participation can be realised.

2.1.1 Web 2.0 and Activism

Today's urban environments continue to increase people's access to information and communication, creating new innovation digital networks. These new media platforms, which Tim O'Reilly dubbed Web 2.0, are products of these new innovation networks, (2005, 6). The World Wide Web has developed this new information architecture, called Web 2.0, where social movements and citizens are now connected by global information and communications infrastructure that facilitates rich digital innovation of human interaction and mobility. As the emerging new digital channel for collaboration among people, and for the design and management of cities, Web 2.0 has lead to dramatic transformations in urban life. "Web 2.0 emphasizes user participation," (Cha et el, 2009, 310). Some view the potential of these technologies to provide a platform for social movements to bring about social change. As social movements can now find visionary and practical approaches regarding technology applications, and create urban services where communities can come to grips with the potential of a networked urban infrastructure, (Bansal, 2009, 162).

The potential of the online social network as a tool for promoting knowledge transfer, competitive intelligence, skilling and re-skilling, and other aspects of innovation practice are ever growing. Web 2.0 services have gained popularity, transforming previously passive web users were becoming active content creators and organisers (Ozok & Zaphiris, 2009, 226). Now stakeholders who traditionally had low power and influence could become very effective by using the Internet as a cost-effective tool that provides interaction, networking power and information distribution that is scalable. The penetration of mobile phones on the African continent has transformed citizens abilities to communicate and stay connected to Web 2.0 making it a mass phenomenon with more individuals participating and exchanging their own content (Eikelmann, et el 2007, 89).

Web 2.0 now influences how people communicate. Within Web 2.0, information becomes more fluid rather than stay static (Gibson, 2007, 34). Similarly, it affects how the community accesses and shares information with others and establishes information as an important source of power (Heeks, 1999:226). Therefore, in activism circles, political activists could now use these applications by combining existing Web 2.0 platforms to create websites and social networking sites (SNS), where people could actively participate in activism by gaining access to speeches or legislation (Isaias et el, 2009, 118). Web 2.0 is evolving into an active civic participation tool, by scaling to a growing participant user base. Additionally, these platforms could be used in educating, mobilizing and sharing information between participants as the new premier interaction forms (Thompson, 2008, 23).

Now the Internet can act as the tool to raise users skills levels and share knowledge-based information among communities. The rise of Web.2.0 technology and the increasing popularity of user-level tools and services such as YouTube, Facebook, Twitter, and Instagram, alongside other non-commercial alternatives such the citizen blogs, and alternative media spaces, have created greater collaboration and self-publishing. MacDorment (2005) viewed the potential for these tools and services to contribute to human rights advocacy work as having increased considerably as new ICT have become cheaper and more accessible to people living marginalized communities. Web 2.0 technologies have allowed people and organisations to communicate, organise and mobilise quickly in ways that were not previously feasible. In recent years, the deployment of Web 2.0 mobile phone applications as tools in political mobilization and activism in some countries has gained attention from the mainstream media. The most celebrated of activist successes in mobile phone mobilization were the toppling of various corrupt regimes in the uprising of the Arab Spring (Castells, 2011). But technology alone does not lead to social change, communities and social movements must determine the appropriate use of such technologies. How will these modern technological platforms be used to allow citizens to become engaged and active civic participators?

2.1.2 Online Community Networking

Researchers Aurigi and De Cindo (2008: 90) explained that our enriched media environment, ubiquitous computing, mobile and wireless communication technologies are changing the ways people communicate with each other. The rise of mass media can revitalise static community networking into building stronger democratic participation. The authors draws particular attention to the digitally-mediated city as representing another interesting context, where the digital community networks cannot be separated from the changes that affect the way we plan, design and above all experience our cities, using all kinds of electronic devices; computers, cell phones, mobile applications and Global Positioning Systems (GPS). According to Pendakur and Harris the promise of the 21st century will transform the very structural underpinnings of society (2008: 28). The evolving nature of ICTs merging with the urban context has gone from having a marginal influence to becoming a central medium in the last decade. As a result, the relationship between space, society and technology has changed the status of urban environments. It is conceivable that deployment of certain ICTs coupled with other technologies would allow social movements to participate in the planning and management of municipal services, and act as a mechanism to report on faulty infrastructure.

However, a major implication for South Africa cities was that it could further entrench an already divided and unequal society if the structural mechanism around ICT infrastructure was not fully addressed. While sustainable urban development has become a South African government priority and ICT has been identified as a key catalyst in meeting this challenge, the provision of ICT infrastructure have not be extended in the same manner other basic municipal services, such as water, electricity and refuse collection. But cities of the global South are made up of different types of urban dwellers, with tech-savvy users of the city able to continue to benefit from this new urban reality. Leaving certain deprived socio-economic groups and periphery citizens, digitally starved and left out as the result of this digital divide. ICT enabled social movements can further extend their grass-root networks into larger geographically-based online community networks.

Some researchers have begun to draw our attention to the landscapes created by mobile phones (Kopomaa 2000; Townsend 2000; Sussex Technology Group 2000). Mobile and wireless media have specialized infrastructure, and as these technologies emerge in the city, they augment the existing urban infrastructures. Mobile and Wi-Fi technology as a means of organising access to digital data has gained popularity in several countries and it holds immense potential for bringing Internet access to poor communities. Mobile devices are ‘personal, portable and pedestrian’ (Ito et al, 2005:178). Hence, wireless technologies, especially the mobile phone, are perceived as essential instruments of contemporary life (Ling, 2004: 89). As a result, the proliferation of community networks that exists on wireless Internet or Wi-Fi nodes in urban environments could create a dense communication infrastructure, which re-draws existing and historical patterns of ICT investment and resource distribution in South Africa.

The major implication of Internet access directly contributes both to the increase and instant connectedness of online networked communities. This enables social interaction between online social movements and their users, dramatically expanding the information and communication footprint of citizens within communities. But collaboration can take on many forms. Preece describes, the networked community as almost any group of people who uses the Internet to communicate with each other, (2005, 199). According to Kindsmuller the online community can be defined as, "…a voluntary group of users who participate actively in a certain computer-mediated service," (2009, 214). The distribution of online content either through a website or social networking site, which in turn is consumed by a number of users has the potential to form a community of circumstance or interest, (Marathe, 2007, 23). As a result, ICTs pervasiveness and the emergence of online communities were having a dramatic impact on how users are now able to share a common interest and become active content producers within their online community. The consequence of sharing a common interest online could lead to creating a de-facto online community.

2.1.3. Social Networking Sites and Network Building

Every day, thousands of people sign up and create new accounts on social networking sites (SNSs), although many have short life spans and fall out of use (Obrist et el, 2008, 168). boyd and Ellison (2007) defined SNS as online services where individuals could create a public or semi-public profile, build a social network comprising of other users with whom they share some a common link, and navigate through those users' profiles and networks. SNSs are generally considered user-generated platforms, where digital content were created and distributed by the users. According to a 2009 survey by DigiActive, social network sites (SNS) were the most common entrance to online activism, despite the fact that SNS were not created with activism in mind (Brodock et al., 2009, 121). Heim and Brandtzaeg suggested that, "what makes an SNS successful in terms of both end-user loyalty and highly motivated users was still unknown," (2008, 143). But scholars have identified interesting models in how digital communication tools have facilitated the birth of social movements. Some authors have taken a keen interest in examining how successful activist movements have taken online activism into mobilizing offline activism (Castells 2001; Cleaver 1998; Diani 2000). Understanding how activists think about SNS as a tool could shed light on how, when, and why certain tactics were employed (Rolfe 2005, 87). These and other authors have raised these critical questions about why people participate or do not participate in online communities. But the research has shown that the more successful a particular activism tool or tactic was, the more likely it was adopted, adapted, and diffused among activist groups (Tilly 1978, 2005; Tarrow 1998; McAdam et al. 2001), thus potentially expanding the 'electronic repertoire of contention', as Costanza-Chock (2003) referred to the activist's digital toolbox. Some viewed the motivational factors to be with shared interests, experiences and social relationships of online communities. Yet this has become a critical question when viewed through the ANT lens to understand how people, organisations and institutions use these technologies to understand social interaction and the mediated effects of

technology on processes or organisations. This is as a result of more and more SNS being used around the globe to organize protests, create campaigns, and raise money for causes.

User motivation was another important aspect in understanding the enablement of network building on SNS. Wellman et. el. define user or participant communities as, “networks of interpersonal ties that provide sociability, support, information, a sense of belonging, and social identity,” (2002, 124). Collaborative relationships on SNS platforms work on a mechanism of connectedness, through sociability, mutual interest and the regular exchange of information that underlies the network architecture. Vargas says, “the technology now has made it a lot easier for everyday people to participate, “(2008, 68). What was unique about engaging on SNS was the speed with which the response could occur and the large reach of the response, (Fogg, 2008). This interaction becomes an essential element to create the condition for digital community building and for the medium to flourish and gain popularity. This understanding becomes essential when wants to understand whether SNS are useful at triggering a new kind of urban civic-mindedness that starts online and moves offline or vise versa. Again, the recent revolutions in the Arab world and the global *Occupy Movements* highlighted the importance of exploring how SNS might be mobilizing, facilitating, or even driving protest movements around world.

Importantly, however, we need to be able to contextualise the global influence of SNS in the developing regions of the world, to include the related issues of cultural, economic, social and technological country contexts. For example, in a study done on understanding differing levels of Internet access (Diani 2000; Bonfadelli 2002) and use (Garrett & Edwards 2007; Stein 2009) in the United States and Latin America, had to factor into their analysis of how activists were employing digital tools (Costanza- Chock 2003) in each of these regional contexts. Emphasizing the need for further studies to examine SNS in Sub-Saharan Africa, as social movement literature tends to privilege a North American or Euro-centric perspective. This becomes of a critical nature when examining technological adoption strategies as the potential of SNS in activism use grows in the Sub-Saharan region.

Many scholars view the potential ICTs as having the ability to collapse the boundaries created by class, time, space, and geography, which now allows information to flow cheaply to many people at once (Ribeiro 1998; Castells 2001; Juris 2005). This has proved significant, in the mid-1990s, when the Zapatista National Liberation Army in southern Mexico prevented an attack by the Mexican army, in a large part, as a result of its waged Internet war, prompting people from around the world to email the Mexican government in protest (Ribeiro 1998). Therefore, it remains important to explore the democratizing potential of the Internet when reflecting on the fact that not everyone, especially in a stratified region like global South, has access to ICTs, or the skills levels or inclination to use that technology for empowerment (Diani 2000; Bonfadelli 2002). However, the number of people with Internet access at home has increased from 1.4 billion in 2009 to almost 1.6 billion in 2010, with 65 per cent of

these in developed countries and only 13.5 per cent in developing countries (UN, 2010 Statistics).

Facebook as the most accessible SNS platform was created in 2004, and is currently regarded as the most popular SNS with over 1 billion users (Facebook, 2013). As a result of the global reach of the SNS platforms, it could theoretically address an eternal challenge for social movements in reaching and mobilizing online users who could be motivated by activism messages into becoming more active through these digital resources. Research shows that the likelihood for mobilization increases the wider the social networks of activists and potential participants (Noakes & Johnston 2005). But Heim, and Brandtzaeg in their study on SNS concluded that the main motivation behind engaging in SNSs was to make, maintain and foster social relationships (2009). They concluded that, "the most important reason was to get in contact with new people (31%). The second most valued reason was to keep in touch with friends (21%), and the third was general socializing (14%)(Heim & Brandtzaeg, 2009, 316).

2.1.4. Augmenting Cities and Urban Informatics

Mobile and wireless technology have specialized infrastructures, and as these networks emerge in the city, they could overlay and forms part of the existing urban landscape. In addition, cities get '*augmented*' by ICTs and urban digital networks can materialize as conspicuous road-side digital information board warning motorists of traffic infringements in prime urban location, or remain partially hidden in the mobile phones within people's pockets or simply exist as a non-physical, but highly local and potentially very meaningful, geo-referenced database of spatial tags, (Aurigi & De Cindo, 2008: 176). Looking at the deployment of large displays in public spaces, Allen argues that, "both the building upon which and urban screen is placed, and the space in which the building is located can be considered as a form of multimodal text" (2008:87). McCullough, starts from ancient inscription and their epigraphy, and brings us to thinking how urban 'markup', the ability to 'layer' the city with digital inscription, tagging places and buildings in a participatory, interactive way can be a way to support new cultural productions which exist within 'a new domain' (which) emerges between the authority of broadcast and the defiance of graffiti' (2008:134).

The urban environment becomes extended and multiplied, and the city gets literally augmented by digital technologies, as more becomes possible within the urban context. Lee's (2008) study on the spatiality of the mobile phone in South Korea noted that existing in a public or private space could also depend on being connected to it through a switched-on phone, rather than being physically present. Connection and disconnection – and desire to be connected or disconnected – became important aspects of our ability to inhabit spaces, and of the quality of this condition. Augmented space, Lee (2008) argued, was not just 'intelligent' and 'efficient' but 'emotional' too, and this introduced a qualitative, very personal variable in the relationship between us and digitally-enhanced space, which can make connection assume the positive connotation of belonging to a place and to a network associated to

it, or the negative one of being controlled and subdued to the network itself, seen in its wide sense of digital infrastructure as well as that of the people who share a connection.

The proliferation of wireless Internet nodes in urban environments has designed a dense communication infrastructure, which in turn redraws existing spatial thresholds and boundaries in our cities. As Wi-Fi nodes are essentially black boxes and consequently extended the accessibility well beyond defined or traditional boarders, conflating the private and public space into a new digital reality. Mackenzie, highlighted the importance of wireless Internet in being able to explicitly re-frame the cultural relevance of infrastructure, inverting the traditional paradigm of technical structure as a site from which relations to the exterior world could interact (2005, 3). Thus, the physical infrastructure, which traditionally has been perceived as the dominant form in a city, now was being challenged and remapped through the ubiquitous nature of communication networks.

In this context, *Urban Informatics* is attempting to re-invent itself by using participatory planning supported by new information tools, models and online training. Thus, community planning is being seen in many cites around the world as the ideal response to the challenges in growth of megacities as well as urban sprawl. Foth (2011), a leading thinker of the emerging field of urban informatics, provides creative insights in how digital realms are infiltrating communities, cities and space from Finland to the United States, Australia, South Korea, and Bangladesh. From this perspective, the city is spatially constituted as a hybrid that merges digital and physical worlds into a new urban form whose technological and material edges are seemingly invisible without close analysis (Foth, 2011).

2.1.5. Social Movements in Information Age

Throughout history, social movements have been and continue to be, the levers of social change (Touraine, 1978: 132). While the power of digital revolution has had significant impact on social movements in other parts of Africa (Castells, 2012: 15), the need to understand the challenges facing South African social movements, in their attempt to harness these new technologies to promote urban transformation and sustainability in impoverished communities requires further exploration. Some influential scholars view the advantages of Internet's role on social movements as two-fold: the Internet provides alternative media to disseminate information effectively; it can facilitate traditional offline activism by expanding a organisation's existing communication through online or email campaigns, virtual petitions and even virtual sit-ins to activists' existing toolbox (Castells, 2001; Juris, 2005), or present alternative version of events to those depicted in traditional media such as newspapers or television news (Wise, 1997, 141).

Other research suggests that social movements and activists often create their own media in order to counter the hegemonic messages, misinformation, and negative portrayals of activism typical in the mainstream press (Downing 2001; Rodriguez

2001). Castells maintains that the Internet networks provided an independent space for movements to form, able to break all geographical and social boundaries (2004, 183). Although the precise role of the digital networks in the Arab Spring revolutions are still being debated in various academic circles, Castells goes on to explain that technology like the Internet and mobile phones networks could be used as organizational forms for political autonomy (2012, 11). ICT's impact has created the conditions for more political freedom, which could lead to new social movement and increased calls for institutions of democracy. Howard finds that ICTs strengthens democracy and increases civic involvement and autonomy of civil society and in the context of the Arab Spring challenges dictatorships (2011:108). The influence of ICT has also been shaped by the fusion of globalization, increased online connectivity and knowledge networks. Howard and Hussain found that the extensive use of digital networks by the youth predominately had a significant impact on the intensity and power of demonstrations during the Arab Spring (2012:49). They go on to point out that Facebook and Twitter did not cause the revolutions, but that the careful and strategic use of digital media to network regional publics and international support had empowered activists in new ways. Within this context, the focus on how South African social movements are able to use online activism as a medium to raise the issues and challenges of communities or their concerns and how they are able to engage with network building online becomes an important enterprise. Social movements continue to use the new ICT revolution to enhance participation, create access to information, deliver alternative content stream and exchange information in digital forms, substantially narrowing digital gap common in developing countries. However, by investigating what limitations these new ICT adoptions will have or how it will further hamstring limited online activism in poor communities in South becomes an important endeavour. But other factors to consider in this context, is the sluggish transformation of the ICT policy landscape in South Africa and the African continent as a whole. These issues impact ICTs effectiveness as an advocacy tool for social movements to disadvantaged segments of society.

The acquisition of ICT technologies by civil society and increased digital activist communities are becoming essential for creating public accountability and a participatory form of government. They constitute a political power block and create a platform for real public engagement. Others believe that non-state actors rely on horizontal networks of communication and mass media to shape debate in the public sphere, influence opinions, and foster social change. Subsequently, social media technologies have allowed for participation in a new type of public sphere that is divorced from the mainstream media. "A functioning public sphere can now be understood as a constellation of communicative spaces in society that permit the circulation of information, ideas, debates— ideally in an unfettered manner," (Dahlgren, 2005, 148). With the result that digital technologies can now direct communication between citizens and to those in political power.

In Harbermas's definition of a 'public sphere', the Internet in the 21st century has become the definitive example of this classical notion (2007, 54). Where the ability to engage in debate and in the democratic process is enhanced with the arrival of the

Internet and now social media, linking both the government and citizens in a 'diffused network', where citizens can access government information, form lobby groups around social issues, comment on government policy and eventually in the case of the Arab Spring organise protests to overthrow oppressive regimes. The Internet has provided a new paradigm in which the relationship between citizens and politics can be revitalized (Croteau & Hoynes, 2003). Habermas explained the 'public sphere', as an accessible domain where public opinion could be formed to constitute a public without the influence or constraint from outside forces (2007). Bucy explained Habermas's 'public sphere' as a space where people who live in a democratic society could come together freely, to engage in rational debate, outside of the institutional frameworks, to discuss matters of the state and criticize the way state power is organized (2011, 165). A cyber optimist like Norris, saw the Internet as having "the potential to allow you to become knowledgeable about public affairs, and more articulate in expressing their views via email...and more active in mobilising around community affairs" (Norris, 2001: 97). Civil society and digital activist communities therefore are playing a strategic role online in negotiating, articulating and expressing the interests of various groups thus sustaining our democratic processes.

The Internet now allows social movements to bypass traditional gatekeepers and offer an alternative viewpoint, potentially empowering activists by giving them a voice. McLeod & Hertog understand this as an evolving dynamic in explaining how traditional media will negatively cover social movements, potentially de-legitimating the movement and hurting its mobilization efforts (1999, 25). Smith et al. (2001) contended that online alternative media 'allow for a more decentralized channeling of information about public demonstrations than was possible through the mass media outlets' (2001,418). One of the great advantages of the Internet is that it gives 'movements and activists the power of mass communication' (Postmes & Brunsting 2002, 294). Accelerating the provision of alternative information streams and providing a way to circumvent restrictions imposed by mainstream media. Other studies, reinforces the notion that technology has the power to challenge the old media structures to counter the notion of the 'public sphere' (Fraser 1993). There has been already an enormous amount of writing from scholars about the Internet transforming society towards a future *'information society'*. Bennett makes the point about the Internet, allowing individuals to join 'political communities' that they otherwise would not in everyday life (2004, 127). Another facet of alternative media is its potential for mobilization and prompting collective action (Wise, 1997). Postmes and Brunsting (2002) concluded in their study that when it comes to collective action, the Internet was 'opening up new avenues' and 'reinforcing existing forms'.

Further investigation is needed to understanding if these innovations will raise awareness of the goals of social movements and communities in poor urban environments in developing countries. As a study done by the United Nations Foundation (2005), highlights key benefits of mobile technology for all NGO's include; time-savings (95%), the ability to quickly mobilise or organise individuals (91%), reaching audiences that were previously difficult or impossible to reach (74%), the ability to transmit data more quickly and accurately (67%), and then ability

to gather data more quickly and accurately (59%). Catsells, Fernandez-Ardevol, Qiu, Sey (2007) puts forward the idea that the growth of mobile-phone subscription in developing countries may be the answer to closing the 'digital divide' and promoting development. This evolving paradigm shift will enable more Internet connection around Africa and give activists new channels for communication and participation. This will be the chance for grassroots activism to take more advantage of these tools and the rich data sources already available on the Internet.

2.1.6. Bridging the Digital Divide in South Africa

The digital divide refers to the differences among those with access to information technologies and those without, (Norris, 2004, 34). It is increasingly recognized that the digital divide is not just a matter of unavailability of ICTs, but also the social, political, institutional and cultural contexts that shape people's lack of access to ICTs, or their ability to use them effectively, (Waschauer, 2003, 187). This phenomenon is particularly acute in developing countries, such as South Africa, where large numbers of the population do not have ready access to ICTs, nor the educational background or sufficient skills to engage with the technology. But ICT infrastructure is also an additional underlying cause, which includes basic ICT facilities, services, and installations needed to support access within a community. Davis et al (1989), Toussea-Oulai and Ura (1991), and Mwesige (2003), have all emphasized that poor basic infrastructures are barriers to ICT adoption in developing countries. Proper ICT adoption requires basic infrastructure like electricity, trained technical population, communication networks and strong government and policy frameworks.

According to the World Bank, a modern, reliable, and expanding telecommunications infrastructure is assumed to contribute to the promotion of a variety of economic activities (2001). The South African government's approach to ICT roll out has followed the international trend by increasing information and communication infrastructure and services as a combative measure to reduce the access gap of poor citizens and its use as a stimulant for economic growth in the country. Reducing income disparities, high unemployment rates, inequality and poverty has been one of the greatest challenges of a post-apartheid South Africa. While significant advances has been made when it comes to access to ICT technologies, with South Africa's telecommunication system described as the best on the African continent, Internet services reached less than 3 million users in urban centres (Maldonado et al, 2006). The declining prices of adopting ICT infrastructure, plus the South African governmental ICT infrastructural programmes which included Thusong centres, have led to significantly more people entering the information society, (USAASA, 2009). This was confirmed in a recent report released on the finding of Internet Access in South Africa 2012 by *World Wide Worx* concluded that, the South African Internet user base had grown from 6.8-million in 2010 to 8.5-million at the end of 2011 - no less than 25% growth (2012). This in part was due to 7.9-million South Africans accessing the Internet via their mobile devices. Of these, 2.48-million access the Internet only on their cellphones, and do not have access on computers but the remaining 6.02-million users access the Internet on computers, laptops, and tablet

computers. Despite these numbers, some historical inequalities persist and render broader access to these technologies null nevoid. Disadvantaged communities continue to be excluded from the ICT process, whether by educational restrictions or poverty constraints that place them beyond the government's efforts in digital inclusion. But mobile phones were changing these statistics and have become widespread among all social classes. Its growth have alleviated the infrastructural costs of ICTs, as many South Africans living in urban and rural communities were able to explore, share, and access digital information through mobile and computer Internet connectivity.

However, Moodley (2006), questions the South African government's approach to ICT roll out, as unfeasible, suggesting differential access to ICTs are linked to other social divides such as income, education, age, gender, ethnicity, and lack of proper infrastructure as major deterrents to the government's ICT for development discourse. He goes onto suggest that social inequalities play a major role in how the digital divide was manifested in South Africa. However, government policy acknowledges the existence of historically disadvantaged communities and encourages the adoption of telecommunication services by these groups, (Maldonado et al, 2006, 143). During the 'World Summit on the Information Society' (2005), it was concluded that more than two-thirds of the world's population do not have access to computers, the Internet and other sophisticated new communication technologies. According to Young (2002), who described the 'digital divide' as a form of technological inequality separating the 'haves' from the 'have nots' will not be resolved if development does not go hand and hand with improving equity in the standards of living of poor people.

Latchem & Walker (2001) then argued that tele-centres have proven to be the method with the greatest potential to narrow the 'digital divide' in remote, rural and other disadvantaged communities. A critic of this model Singh (2010) examined the political economy of ICTs in South Africa and highlighted, bureaucratic incompetence, contradictions and incoherence in government policy, government unable to regulate pricing and the uneven landscape of the ICT sector as shortcomings in the implementation of a comprehensive strategy. In addition, other more pressing government priorities such as healthcare, education, rural and economic development and basic service delivery remain more challenging priorities for the South African socio-political context. In addition, limited access to the Internet also has a racial configuration, that classifies the digital divide even further, as the domain of a 'privileged minority', to engage in political debates and discussions. As a result, in a country still emerging from an apartheid past, it is evident that, "for many wealthier South Africans, particularly whites, the media landscape now has all the characteristics of post-modernity," (Glenn & Mattes, 2011,31).

In the absence of large scale infrastructure, mobile telephony has been seen to be playing an increasing role in bridging the digital divide, which according to Goldstuck Report (2012), 2.8 million new Internet users accessing the Internet via their mobile devices. In countries like India, researchers Cechini & Scott (2003) have found that ICTs could have an influential and positive effect on giving poor farmers and small

entrepreneurs in rural India access to new markets that has reduced poverty and improved economic activity through new media technology. On the African continent, Internet and social media usage, still has low penetration, making digital access and participation, still a skewed towards elite groups within the African context. Literacy levels and English being the dominant language of the Internet are other contributing factors in preserving the digital divide domain in the hands of 'the haves' makes the democratic nature of the Internet and social media still an unfolding reality in South African and the continent. Without structural government and private sector support the ‘digital divide’ will continue to manifest itself along socio-economic dividing lines, reinforcing the already existing social inequalities. However, government policy and mobile technology changes plus infrastructure development have proven to be the method with the greatest potential to narrow the ‘digital divide’ in Africa.

The second challenge was the effective use of ICTs. According to Fillip essential skills and knowledge were required to make effective use of ICTs for development purposes (2002, 153). He continues with his argument that the digital divide (i.e. the gap between information haves and have-nots) continues to exacerbate existing inequalities within countries. He believes it was essential to address the divide with special attention so that the groups that are most likely to be on the wrong side of the divide and are already in a disadvantaged position can be given equal opportunities in the development process.

The poor are the principal victims of the impact of the technology divide. Coventry’s (2003) research suggests that despite dramatic technological advances, approximately one-third of humanity is deprived of basic technologies. He argues that the technological advancement should offer the poor real technology choice with affordable, appropriate, and accessible options. But his argument does not reflect the debate that is needed in marginal communities of the Global South, which are restricted to new technologies, but also include all technologies of use to marginal communities. Bridging the digital divide has become a social, technical, educational, and moral challenge, particularly bringing affordable ICT access and content to the un-reached and ensuring that they have the capacity and skills to participate equally (UNESCO, 2002:28).

2.1.7. ICTs in the Global South

The role of the Internet in activism becomes important to explain whether SNS are actually creating a collective identity, ‘an imagined community’ (Anderson 1991, 36) that can inspire a sense of commitment to a cause. Diani wrote that the ease of online activism coupled with relatively little associated costs could result in more participation from a distance, thus strengthening the support base by converting ‘dispersed communities of sympathizers into virtual communities with a slightly higher degree of interaction’ (2000, 193). Garrett referred to ‘micro-contribution’ strategies enabled by ICTs: ‘organizations can more effectively pool small-scale acts of support’ (2006, 206). Additionally, once someone has participated in a movement, no matter how small the contribution, it is likely that individual will feel more

committed to the cause and more a part of that community, thus potentially leading to a ‘greater sense of obligation’ and the likelihood of further engagement with the cause (Garrett 2006, pp. 206–207).

However, while ICTs can create weak ties, and strengthen existing social relations, many researchers believe it is doubtful these digital media tools could promote new, strong community ties that are necessary for sustained collective action (Powel, 2006, Cho, 2006, Wong & Clement 2006). Powel and Cho’s ethnographic studies of participants in online communities revealed a certain level of trust and collective identification is needed from face-to-face interaction to convince people to participate in protests or other ‘potentially high-risk activities’ (2006, 163). Some academics, however, have demonstrated the potential of the Internet for building trust and constructing collective identities online, which can be turned into mobilization and participation offline (Nip 2004; Hara 2008; Wojcieszak 2009). Wojcieszak’s (2009) demonstrated in research based on online neo-Nazi and radical environmentalist groups that as participation in online forums increased, so did participation in offline political activities. While many online users initially become involve for instrumental reasons, the question whether the Internet and SNS could create online communities, raises another the question of whether online collective identities are impacting offline participation. According to Rolfe (2005) and Van Laer and Van Aelst (2009) movements or sites of civic participation on the Internet and SNS’s might be fundamentally increasing the level of activism and social capital created in new forms of resistance. Downing (2003) also questioned whether the Internet perhaps represents something inherently different about activism.

ICTs have a critical role to play in development efforts around urban transformation. Authors Graham and Marvin (1997) point towards new ways of thinking about cities and urban space that are more appropriate to tackling the increasingly mediated nature of urban life. They go on to suggest that as various actors become increasingly reliant on mediated interactions in a city, as ICTs fundamentally change the traditional aspects of cities such as physical markets, production of labour, the exchange of money and the need for face-to-face communication (1997: 126). Gaved and Mulholland (2008), talk about how ICTs augment and strengthen the sense of place felt by city dwellers. The authors believe ICTs will recombine the urban world in new ways, which brings the physical and social aspects of cities into continuous and constant interaction with mediated urban space. It is interesting how these writers talk about how ICTs are allowing fluxes in the physical space of cities and how it provides new systems through which urban life can be reorganized and remade.

But critical questions remain such as to how civil society agencies are using these technologies to further their urban agendas and creating interactive platforms for urban transformation. Researcher Hakikur Rahman (2006) focused on organizations working in South African NGO sector in their attempt to harness new technologies to promote their causes as well as their sustainability. The author explains that, even sectors that are not conventionally associated with high-tech solutions, such as the

NGO sector, have integrated technology into the routine of their business. However, the benefits of applying ICTs in urban transformation efforts is not widely understood or researched. Authors like Achugbue and Akporido (2011), focused there research on community development and questions the importance of communication technologies in alleviating the social ills of society. The relevance is important as 1 billion of the world's urban population now live in informal settlements or slums on the outskirts of the world's major cities (Davies, 2006). The author suggests that very often such communities face a daily battle for survival against developers, government authorities and criminal gangs. In cities of the Global South, the mobilization of the urban poor is often the result of even more desperate motives than those identified by Castells (1999). In the South, 'agrarian transformation, industrialization and urbanization' have been major instigators of this huge rise in the population of cities and the increased competition for jobs, housing and resources (Vellinga 1988:243). However the response to the pressures imposed on a historically exploited and under-developed urban South has varied considerably depending on the practical opportunities for mobilization, but many countries are preparing and implementing national ICT policies that emphasize the ubiquity of connectivity as well as new applications in areas such as e-governance and e-business (World Bank, 2006).

In South Africa, municipal service-delivery protests are often organized responses to local government delivery failures that manifest in depressed urban communities. But these manifestations can also be seen as result of a failure to integrate digital networks on the side of marginalized citizens to voice their discontent with the powers that be, and to mobilise around protests by inducing 'flash mobilisation' (Rheingold, 2002:48). There has been a tendency to bracket urban movements with local, municipally orientated protests and community activism, which are closer to the character of organized interests than the broad, value-led, socially transformative collective movements more typically associated with 'new social movements (Hamel, Mayer and Lustiger-Thaler, 2000:167). Collective political action in cities takes a variety of forms and it is organizationally structured according to the nature of the goals and objectives that groups set themselves, by the opportunities and constraints provided by state actors and the resources and obstacles within civil society, and in particular by the nature of the political field in which parties, interest groups and movements have to operate within the urban/regional context (Parker, 2006). Whatever the form that political action assumes in cities communities remain key interlocutors and agents of urban change. Therefore, embracing and integrating ICTs as a tool presents enormous challenges in the process of transforming the South African NGO sector as a whole. The challenges present themselves at two level: firstly, at the level of raising awareness and, secondly, at the level of implementation (Hakikur Rahman, 2006:17).

2.1.8. Mobile Phone Enabled Community Participation

The need for town planners and government policy-makers to envisage the possibilities of technological interventions to enhance cities and communities in

conjunction with grass-root movements to appropriate communication technologies have become essential possibilities that could foster community participation in cities. This is as a result of digital networks providing a powerful framework for building hybrid communities, as groups of people can interact together collectively using on-line methods of communication. According to a United Nations report (United Nations, 2005) ICTs, including telephony, computing and broadcasting can contribute to sustainable human development and poverty eradication through making social communication easier and more affordable to people. This shows that ICT in the context of citizens appropriating ICTs may also play a critical role in speeding up the flows of information and knowledge between government, citizens and non-governmental organisations. Mitchell argues that the Internet, "subverts, displaces, and radically redefines our received conception of gathering place, community, and urban life," (1995:87). When it comes to supporting traditional techniques of social movements, whether protests or online petitions, the Internet, unlike any other medium, allows for fast, easy and cheap transnational action not limited by time, space or distance (Castells, 2001; Juris, 2005; Ribeiro, 1998). But creating these 'digital communities' requires an institutional context within which it can flourish.

Social movements using ICTs as an activism tool are emerging in contested urban environments. However, the continuous challenge with social movements has been how to attract enough highly motivated individuals to initiate a mobilization, and encourage more participants and resources online. But with SNS, online participants are a click of the mouse away from being recruited around the world. According to Facebook, users and their social networks have an average of 130 friends in their own network (Facebook, 2009) this provides an easily and instantaneously accessible critical mass online. However, if it's reasonably easy to click 'like' on a particular group or 'forward this message', it is worth considering whether members or activists of online social movements truly are dedicated to the cause, or just jumping on the digital bandwagon**.** Van de Donk et al. (2004) argued that the Internet would complement, but not replace, existing social movement tactics. It is widely argued that simple online activism could undercut a movement's value, creating a half-hearted, meaningless activism, or 'slacktivism' (Morozov, 2009a; Van de Donk et al., 2004). Morozov (2007, 2009b) acknowledged that the Internet as a portal can facilitate mobilization, networking and community empowerment, and that the online activist community and protesters might be drawn by SNS platforms like Facebook, but cautioned against technological determinism that glosses over the importance of offline participation.

Similarly, others have questioned whether the electronic public space could have a significant impact on the levels of trust needed among online members to support sustained collective action (Diani, 2000). Much has been said about the effects of trust and formation of hybrid communities, where members are not deeply dedicated, so while a movement's support might grow quickly initially, that support is likely to soon fall off (Diani, 2000; Van Laer and Van Aelst, 2009). Some researchers have found that virtual hybrid communities also require 'real' face-to-face interaction, as it is doubtful that online ties alone are strong enough to successfully mobilize or sustain

a social movement, as real relationships are considered more valuable and effective than impersonal electronic communication (Diani, 2000; Ribeiro, 1998).

A feature of South Africa's ICT landscape is the rapid growth of the mobile telephony market, (Abrahams & Newton-Reid, 2011: 2014). This evolving technological landscape is allowing individuals to become part of the information society. Another author, Mitchell notes that, "the newly dense and abundant interlinkage provided by growing numbers of smart places embedded in the expanding digital telecommunications infrastructure is already changing the spatial distribution of economic and social activities – and hence the life and forms of our cities – by enabling dispersed, decentralized transactions among people and organizations, and by facilitating new, flexible, and efficient systems of production, storage and distribution,"(1999, 157). The mobile phone is one example that is having a very significant effect on the everyday lives urban citizens. Mobile phones play a significant role in enabling South Africans to connect to the Internet (Orkin, 2012). Its growth has alleviated the infrastructural costs of ICTs, as many South Africans living in urban and rural communities are able to explore, share, and access digital information through mobile connectivity. The introduction of mobile phones in Africa transformed people's ability to communicate (Aurigi & De Cindo, 2008). In the last decade the mobile phone has become the fastest technology adopted in human history, (Kleinman, 2007). Using mobile phones as a publishing and broadcasting tool is gaining momentum. The mobile phone combines other mediums where potentially every user can be a recipient and publisher of news including text, audio and video. According to a report from Internews Europe (2009), since 2008 mobile phones access has, in many countries of the global South, surpassed the access to television. There is the potential for a bottom-up approach through citizens' media. Citizens' media has flourished on the Internet in recent years and mobile phones will become the future transmitter of media. Mobile citizens' media will establish new communication channels and links with other already existing forms of citizens' media.

Mobile phones can also be used to produce content, which can later be delivered to traditional media. Jarice Hanson and Bryan Baldwin (2007) make several interesting points in how literally any citizen to become a broadcaster. There research focused on the use of Podcasting as a broadcasting tool. But in other instances the mobile phone can also act as a broadcasting tool, which can potentially boost participation by also creating local content in different languages. This opportunity to network through the Internet is opening up other possibilities for language transformation, as access becomes mobile (Kasesniemi, 2003). Language is often seen as an entry barrier into broadening the appeal of the digital network. But now mobile phones can potentially be used to get more people involved in writing about, documenting and sharing their own urban stories. Mobile phones have already been applied as a key instrument for sending messages across borders in crisis situations. Often they are the only tools for activists in repressive regimes. One case is Egypt, where mobile phones are key to documenting human rights violations and to connecting instantly with human rights groups in emergency situations. Some countries already offer high bandwidth such as

3G, which could allow media activists to report live through video-equipped mobile phones to the Internet and potentially to a global audience. African bloggers from across the continent are at the forefront of this evolution and increasingly use their mobile phones for broadcasting, as happened during the 2007 elections in Kenya and the 2008 ones in Ghana.

2.1.9. Digital Urbanism

It is believed that communication technologies constantly shape cities. Since the introduction of the telephone, we have learnt to communicate over distance. The emergence and uptake of new media and networked information and communication technologies have added a range of digital spaces where urban citizens can create digital/virtual environments, to meet, maintain relationships and interact. Earlier reaction to this new digital reality expressed it as a move towards 'individualism' and the disappearance of traditional forms of civic engagement and community values and suggested that it would result in the decline of social capital of society (Putnam, 2000). However, the opposite has happened, where online participation in public spaces has facilitated new forms of connections in work, education, civic participation and a stronger social fabric. The Internet and mobile devices are now common ways for urban citizens to connect with each other in the virtual space or gatherings taking place in other parts of the a city (Foth&Sanders, 2008).

Digital urbanism in the South African and African context can be understood as a 'patchy landscape' when it comes to citizens having access to ICT (Odendaal, 2008). Odendaal explains further, that the ICT infrastructure in the South African situation is frought with legislation and barriers to access because Telkom, the country's, official telecommunications provider, hold a complete monopoly over ICT infrastructure networks. However, this is changing, as many municipalities are embracing broadband provision as seen in ICT and free wireless (Wi-Fi nodes) roll outs in cities like Stellenbosch, Pretoria, Durban and Cape Town. The diffusion of the Internet and the emergence of the 'virtualised activity systems' (Fistola, 2001) are modifying how citizens are using modern cities (Fistola, 2008). Castells confirms that now there is no society without technology and technology is a dimension of our modern society, (2002). New ICTs are becoming essential elements of all modern urban functions. Digital flows of information, commerce and communication are transferred along networks that can expand and be shared globally.

Government and local municipalities have a key role to play in supporting the role out ICT infrastructure and the potential of e-governance in unlocking institutional collaboration in managing the ease of access to information around services. But despite the many ICT infrastructure plans mooted by government, it has not significantly increased government or citizen connectivity and usage. The prevailing critique is the promise of 'universal access' to networks and information. Fountain (2003), suggests that many local governments lack the capacity to develop sophisticated portals. Adding that some research has indicated that citizens prefer to

interact with their local governments. Further research questions around how citizens and interest groups use ICT to influence those who govern needs to be explored.

Rapid urbanisation is generally accepted as areas where metropolitan citizens tend to be more cosmopolitan (Hannerz, 1990). This has a direct influence on their level of education, culture and productivity. Proenza has noted that the use of ICTs has grown rapidly only in the most urban areas of Africa (2001). Other researchers like Shakeel (et al) learnt that telecentres, Internet cafes, and ICT infrastructure are primarily located in urban areas.

2.1.10. South African Digital Cities

In South Africa the importance of ICTs in meeting our developmental challenges has been the mantra of ANC government since 1994 (Boldt 1997, Wicander, 2003, Snyman & Snyman, 2003). The authors all suggest that the information revolution is not about technology but it's about equipping people with the digital tools that will make them enables of sustainable human development in their communities. Peter Golding (2007) discusses recent developments in ICTs in the context of sociological theory. He questions whether the changes brought by ICTs are really as fundamental as many proclaim, pointing to the persistent if variable role of globalisation on the world economy, as well as the faulty reasoning behind the idea that the information society is the basis for a shift from a goods-producing to a service economy. Another critic of the information society, Dwayne Winseck (2008) challenges the Habermasian view of perfect information, the idea that more information reduces uncertainty and the expectation that new ICTs can support an economy that is a truly free worldwide market. Winseck argues that with more information in society, there is actually more uncertainty, which governments and business make considerable efforts to control, thereby shaping the information society, sometimes in negative ways. Like Golding, Winseck suggests that there is a large gap between the economic benefits promised by the communication revolution and the existing evidence. This theme is also questioned by Ramaswani Harindranath who explores, the social, political and economic repercussions of the information society for those in the margin, especially in the developing South, who are not participants in or members of the information society (2006).

This new development is particularly important in the context of authors like, Negroponte (2005) who in his book, 'Being Digital,' conceives of cities as being inseparable from the knowledge of the people, who are going to inhabit them. Negroponte also argues that it is at the urban level that issues such as the relation between physical and virtual reality take their full scope. Odendaal, have written extensively on the impact of ICTs in cities, and sees the emergence of ICT as both a challenge and an opportunity. It is a challenge because, 'despite the ability of society to adopt and appropriate technology, access has been
and still is, uneven,' (2010, 57).

Similarly, ICT occupies a central position in the discourse of socio-economic change, such as on the post-industrial society (Bell, 1973), information society (Webster, 1995) and globalisation (Giddens, 1990). It is for this reason that ICT occupy the important space in our discourse as they do. Today, ICTs are now a standard operating tool in any information society (Jacobs & Herselman, 2006: 263). Therefore, "as part of its strategy to promote economic growth, the South African government has implemented a plan to promote the adoption of ICT, especially Internet technology (South Africa, 2005: 176)."

Government policies in South Africa (ICT Charter) were established to ensure that all citizens have the opportunity to access and effectively use ICT in order to enable them to participate fully in educational, social and economic activities and democratic processes (Cullen, 2002). According to a recent study done by Mark Orkin (2012) the majority of people in South Africa want to participate in the information society. Yet, despite the relentless pace of technological innovation, the modern South African city seems unable to extract the perceived potential of smart, digital urbanism. However, researchers Lucienne Abrahams and Lutske Newton-Reid (2011) suggest that in South Africa, many cities style themselves as 'digital cities' or as cities where communication and transaction are conducted using electronic devices and networks. They focused on cities in the Gauteng province, and their study revealed that these cities have an outward focus, presenting themselves to the world as global hubs of connectivity for business and culture. In addition, these cities also have an inward focus, towards ensuring that citizens have access to advanced communication and convenient access to services, often using electronic resources.

When it comes to understanding and managing today's 'digital cities', especially in the public sphere at the municipal level, many studies show that proactive planning initiatives related to ICTs tend to appeal to the ill-grounded utopianism of technological deterministic approaches (Graham & Dominy, 2002). Their research questions, if local authorities of these cities use ICTs in the furtherance of their urban agendas and if the actions of current government ICT policies affect the roles of urban planners and planning departments in the development of 'digital cities'. They continue, arguing that municipal governments can play a critical role in ensuring access to basic voice and data connectivity, if they view ICT infrastructure just as important as other bulk infrastructure like water, waste removal, sanitation and electricity. In South Africa, the recognition that a telecommunication policy has implications for social and economic development was identified in early aspirations towards the creation of an information society, (Odendaal, 2010). ICTs, therefore in the post-apartheid South Africa have predominately been viewed as a developmental tool, able to lift people out of poverty.

However, many South Africans experience different forms of poverty, including infrastructure, services and information poverty, (Abrahams & Newton-Reid, 2011:216). Therefore, the South African government established policies (ICT Charter, 1996) with the express aim to ensure that all citizens had the opportunity to access and effectively use ICT in order to enable them to participate fully in the

educational, social and economic activities and democratic processes (Cullen, 2002). Through its ICT Charter, the South African government, aimed to bridge the 'digital divide' with the rollout of ICT telecentres. Buckley's (2000), definition of the 'digital divide' includes information poverty, which indicates the absence of computers or a lack of access to communication technologies. Similarly, researchers Marshall, Taylor and Yu, (2003) commented that, large amounts of information pass through the Internet but the penetration is still far away from the vast majority of the people living in the developing world. Orkin (2012:3) in his study revealed findings of not one 'digital divide' but many digital divisions. He identified divisions in how people connect, how often they connect, in what they do online and in who is and is not connected at all. The study in addition, found that around 10% of Internet users were not aware they were using it (Orkin, 2012:4).

Compared with the best international standards, South Africa's ICT infrastructure is abysmal (Orkin, 2012). Orkin's research paints a picture of a diverse community of Internet users who are working around this status quo - most of them patching together their Internet access, very aware of its value but limited in their ability to access all the benefits it can bring. A strong critic of the South African government's ICT strategy is Moodley (2006) writing extensively on the relationship between ICT infrastructure rollout and poverty reduction, by raising critical questions around government's ICT implementation strategy and its ability to alleviate poverty. Moodley explains that government's ICT strategy for communities cannot attain any meaningful impact if the strategies don't address other social problems plaguing those communities.

2.1.11. Informal Settlements

In a country like South Africa, cities were designed for to favour a particular minority race group and for those who needed to maintain the urban settlement patterns of the white privilege, away from the majority of the black population of the country, during the Group Areas under apartheid. These urban settlement trends were mirrored in all the major metropolitan cities across South Africa, and for this reason our cities' informal settlement communities expanded on the periphery of our cities. According to The National Upgrading Support Programme, informal settlements can be explained as housing that has been created in an urban or peri-urban location without official government approval. A typical characteristic of informal settlements are that they contain a few dwellings or thousands of them, and are generally defined by inadequate infrastructure, poor access to basic services, unsuitable environments, uncontrolled and unhealthy population densities, inadequate dwellings, poor access to health and education facilities and lack of effective administration by the municipality," (2014, 28). Informal settlement communities are not peculiar to South Africa they are increasingly the norm in Africa and in many other developing countries where the need for urban housing for the poor cannot be matched with delivery of any kind of formal housing.

Today, most of the urbanisation takes place in informal settlements or slums. For example, South Africa today has almost the same number of people living in informal settlements as it did in 1994, (ANC Manifesto, 2011). This is in spite of the fact that government has provided nearly 3 million houses during the period. This then means that people who migrate to the cities find city life alienating in all forms, as
they cannot find suitable formal accommodation in the cities closer to places of employment and they cannot actually find formal jobs. People thus resort to informal activities on the physical and economic periphery of the city. Earlier authors such as Collier (1976) and Peattie (1979), talked about informal settlements as features of cities throughout the developing world. Thus through the process of in-migration, fewer percentages of new arrivals are actually able to transition to city life and access formal housing. Even people who hold formal jobs battle to live in our cities - the poor tend to live on marginal land, in unplanned areas that are consequently poorly serviced; distances are huge and transport costs expensive. The experiences of dislocation and alienation are very real in the lives of the urban poor.

By contextualising the South African experience of housing again, we have to consider that fifteen percent of households in South Africa have access to mortgage finance (Census 2011). Around 60% of households qualify for state provided housing, leaving a group representing approximately 25% who qualify for neither. In South Africa, the absolute numbers of people categorised as poor, are now considerably larger in urban, rather than in rural areas. While rural areas may be home to relatively significant populations of poor people - given the limited employment opportunities and access to public services, cities are increasingly home or sojourn to higher numbers of poor people.
These observations suggest that our cities were designed for the imagined, affluent populations we believe should live in them. To address the proliferation of informal settlements, we will have to consider the Municipal Systems Act, which entrenches the right of citizens to be consulted on development plans. This is in recognition of the fact that citizens have agency, they can direct change in their lives and their living environments. The experience of how this legislation has been used to drive change and affirm the centrality of citizens of our cities and local government authorities is mixed.

A bottom-up planning process has many advantages, but the process needs to be given authenticity by a better use of information symmetries. When used with the generally available mapping techniques available in our Geographic Information System, both planning techniques and information accessibility take a huge leap forward.
It draws on the strengths of different sectors - state, business, NGO's, trade unions, and social entrepreneurs. City leaders, researchers and policymakers should create opportunities for experimentation with different models of delivering services, developing and maintaining infrastructure, creating jobs.

Similarly, the fact that the impact of unsustainable use of natural resources and environmental neglect will be mostly felt in cities should propel us to invest in finding solutions.

3. Methodology of Research

A systematic approach to the research questions were followed which focused on the SJC's community-led use of the ICTs and whether its use enhanced their effectiveness in bringing about the urban transformation needed in the deprived informal settlements of Khayelitsha, a township outside Cape Town. The research focused on three unique data sets of the SJC that included, the SJC's activists online footprint in conducting urban upliftment programmes, the SJC's social networking content indicators and new media platforms used and its digital mapping programme of RR Section in an informal settlement are in Khayelitsha. These data sets were then collected and filtered through the application of the Actor-Network Theory (ANT) to understand the organisation's ability in building an integrated and robust online communications infrastructure within the communities it operated. ANT is used because as an empirical investigation tool, it allows the research to determine the interactions and connections between technology and the actors in understanding the way they function and determine each other. It provided a scope to monitor and uncover the communicative ecologies and social networks found between organisation and communities. It allowed the research to employ innovative research methodology to probe the interactions and communication patterns of the SJC. Also to understand how new media and ICT systems supported some of their campaign initiatives. No other research method could provide this dynamic insight that could create place all these interconnected networks into one designable place.

3.1 Conceptual Framework: Actor-Network Theory (ANT)

It is often argued that Actor-Network Theory (ANT) is a ruthless application of semiotics (Law& Hassard, 1999, Lee, 1999; Callon, 1991, 1999; Latour, 1987), coming from the translated French term 'acteur reseau'. It states that entities gain their form and acquire their properties as a result of their relations with other entities (Law& Hassard, 1999). This resultant effect provides a dynamic lens from which to argue about the relations between technology and humans through a series of heterogeneous elements, also referred to as 'black boxes' that are 'shaped and assimilated into a network' (Law, 1987, 113). ANT is also a key framework that describes the 'power relations' in research findings, since interlinked networks in this theory can shed significance on how entities form agency or form stabilized networks. A prominent proponent of ANT, John Law suggests, "that actor-network theory may be understood as a semiotics of materiality," (1999,4). Where the 'actor-network' embodies an inherent tension, that manifests itself between the centred 'actors' on the one hand and the decentred 'network' on the other (Law, 1999). As a result, ANT has gained recognition as an important constructivist view to focus our attention on the actors and to follow the influence they impose on one another, and to analyse and explain the processes or relations whereby variables such as economic, social and technology are brought into play to address societal challenges. ANT literally instructs us "to map out the set of relations (the network) that influence, shape, or determine an action. But each of these elements, is in turn part of another actor-

network." (Monteiro, 2000, 76). But according to academic Nimmo (2011), who stresses, that ANT should not be regarded as more than essentially a 'theoretical approach', but should also be used as an exploratory methodology to unpack the relations between technology and methodological practices of its use in urban settings by organisations and persons to uncover, 'how relations assemble or don't' (Law, 2007, 2). Other proponents of ANT have stressed, that ANT was never supposed to be a theory, but a loose intellectual "toolkit" or "sensibility" (Law, 2004), a methodology that could assist researchers to unlock interrelated, complex and multiple layered networks in uncovering categorical relations between people, technology and urban settings.

For an author like Latour, ANT was simply another way of being faithful to the insights of ethnomethodology; where we have to learn from the 'actors' not only what they do but also how and why they do it, (1999, 19). Star writes, "the analytic freedom accorded by Latour and Callon's work has opened up a whole new way of analyzing technology" (1991, 43). As this methodological approach establishes a framework to follow the actors through real-time evaluations, seeing how the actor-network unfolds and transforms from the perspective of one of its actors (Wise, 1997, 73). According to Callon, "actors are not passive, but they vary in the extent to which they influence or resist the influence of other entities (1993, 32). Successful networks occur when actor interests are aligned and bound through translation shared within the actor-network. Technology, then, is not reduced to creation or assembly but concerns the manipulation of relations between social actors, i.e. the human and non-human. Another author Rhodes suggests that this phenomenon makes ANT scalable "in that one actor of an actor-network may be expanded into a complete new actor-network, or that a whole actor-network may be collapsed into a single actor," (Rhodes, 2009, 4). As a result then what is described as, 'destabilized networks' occur when the power relations within the actor-network are disrupted by the introduction of new technology, shift in common interests, policy changes or having to adapt to new operational methods of working in an organisation.

This makes the study of ICTs and new media technologies, especially digital media and digital mapping technologies, in which this case study is set, vital if we want to understand the evolving technological nature of how informal settlement urban communities respond to this new digital urban reality. As these new digital media networks are closely aligned with their potential affinity, especially in relation to computer-mediated communication, (Bingham, 1999; Bolter and Grusin, 2000: 50, 62, 67, 77-78; MacGregor Wise, 1997). The fieldwork therefore examined how the SJC operating in Khayelitsha uses Web2.0's digital media platforms, to share information and organise the informal settlement communities around safety, healthy, and dignified sanitation in places where service delivery is poor or often non-existent by the local municipal authority in some instances. In addition, the case study focused on the ICT enabled digital mapping system that the SJC were attempting to employ in a part of Khayelitsha known as RR section. In addition, the research endeavours to find if these ICT technologies are appropriate digital mechanisms to reach an ever-growing informal settlement population and outside stakeholders, which remains a

constant challenge to the SJC. Therefore, in this context, the analyses of communication and information technologies are especially important sites of examining the appropriation of technology i.e. (the digital devices used) and content (i.e. the transmitted message) and ICT infrastructure needed for producing digital maps.

3.1.1 Actor, Actant

The actors or actants within an actor-network can refer to either human or non- human entities. It is often argued that ANT fails to offer a satisfactory theory of the actor, which is allegedly, endowed either with limitless power, or deprived of any room to manoeuvre at all, (Callon, 1999). Actors are therefore not passive, but they vary in the extent to which they influence or resist the influence of other entities (Callon, 1993). The differences is brought about by power relations and the construction of the networks where different actants have different levels of agency, as an entity in an actor world only exists in context and in juxtaposition to other actants (Rhodes, 2009). The most important is that ANT is based on no stable theory of the actor; rather it assumes the radical indeterminacy of the actor. They are a product of a more or less stable relationship between various effects that together form an actor-network (Fountain, 1999). Actor-network theory (ANT) is therefore recognised as an influential contextualist and interpretative lens from which to analyse the relationship between actors within a network using an interpretivist epistemology. This research approach lends itself to a non-determinist methodology, whereby neither human actions nor technologies are assumed to exert direct 'influence or resist the influence of other entities within the network' (Callon, 1993, 32). Rather, the interactions and changing relationships between actors are seen as result from the interplay of competing infrastructures, conflicting objectives, the preferences of different social groups, and chance" (Markus & Robey, 1988, 44).

3.1.2 Actor Network

Actor-networks can refer to a heterogeneous network of actants, where set of relations or descriptions of relations can include objects, technology, and human actors. Latour's networks are composed of heterogeneous assemblages of diverse objects acting and reacting to one another (1993, 127). What matters to the analysis is not the self-consciousness of the actor but rather, its relations with other actors through what Latour (1993) describes the process of delegation within the network. As Latour writes in *Reassembling the Social*, the term, "network does not designate a thing out there that would have roughly the shape of interconnected points, much like a telephone, a freeway, or a sewage 'network'… It qualifies [rather] its objectivity, that is, the ability of each actor to make other actors do unexpected things." (129*)* It is also unique in that it places social interests and interpretive frameworks, what Latour (1991) and Callon (1991) refer to as the 'actor-network' perspective of technology in which the actors, whether it's a person, organisations or objects and technology are mutually determining. Connecting people, institutions, technology, and rendering visible, the multiple interrelated relations in how complex networks are designed. It is

through their conceptualisations of the actors within such networks that the actor-network perspective truly moves beyond modern perspectives on the social study of technology (Wise 1997). Academic Odendaal shares Murdoch (1997) views that, "defines ANT as comprising strands that study science and scientific knowledge, technological development and general theory (as part of Science and Technology Studies)" (2014, 32).

3.1.3 Successful Networks

This takes place when participant actants, and the mechanism that perpetuate the norms of actants combine to align their interests through the collective action of a sufficient body of allies in which the network is maintained (Rhodes, 2009). So that they are willing to participate in particular ways of thinking and acting that maintains the network (Latour, 2005). The result then is, an actor-network that builds networks of alliances between human and non- human actors.

3.1.4 Sociology of Translation

Translation is one of the most important concepts associated with ANT, which describes how an actor or actors within a network can be defined in the manner or their ability to trace the relations of connections between two entities. As Callon (1980) acknowledges, the term 'translation' is taken from the work of Michel Serres, where Callon describes it in the following manner:
'Considered from a very general point of view, this notion [translation] postulates the existence of a single field of significations, concerns and interests, the expression of a shared desire to arrive at the same result… Translation involves creating convergences and homologies by relating things that were previously different.' (1980, 211)

Therefore, it 'means that an entity A can determine the properties of entity B and there is no distinction made if B is human or non-human, a collective or individual (Macome, 2002). From the perspectives of Latour (1999) the use of the term 'translation' describes the way in which an actor is affected by another actor and how it responds in relation to that action. Networks are thus unfolding translations of relations that are carried from one actor to another. Callon (1999) describes that these unusual connections can often discovered by shooting 'test signals' through ANT canon. It's also as a result of the relation of resistance to the dominant network, which Star (1991), describes as the struggle between networks that seek to stabilize and standardize and those who wish to resist to be included into the network. The sociology of translation therefore, is constructed in what Latour (1991) describes as the alternative to technological determinism implying that ANT is opportunistic by nature in its way of explaining how new innovation translates, spatially and temporally, from its origins to many other places within the network. The translation of the interests of diverse actors, along with their enrollment into stable networks, requires continual chains of translation (Rhodes, 2009).

Translation occurs when new elements are brought in between actors and changes the relationship between actors, imbuing it with qualities from another actor, therefore imprinting their collective interests, structure, desires, strategies, reflexes and afterthoughts (Callon, 1991). Translation involves showing how actors' non- aligned interests may become aligned. These are demoted and treated as the effect of translation (Law, 1993, 147)**.** Thus when new innovation is introduced into an organisation, it creates a new dynamic and therefore imposes the circuit of social integration.

Callon (1986) characterises four moments of the sociology of translation through the following concepts:

- The **problematisation** is the first phase, where explicit control is taken by the primary actor which problematises an issue. The macro-actor defines the problems and identities of the other actors in a way that aligns it with interests. In this manner, it reaches an obligatory passage point (OPP) and makes itself indispensable. Here the process of network building occurs, where certain actors have to align themselves to the new innovation introduced into the network. Actors are now being aligned to solving the problem by forming alliances and are guided by the macro-actor to reach this equilibrium.

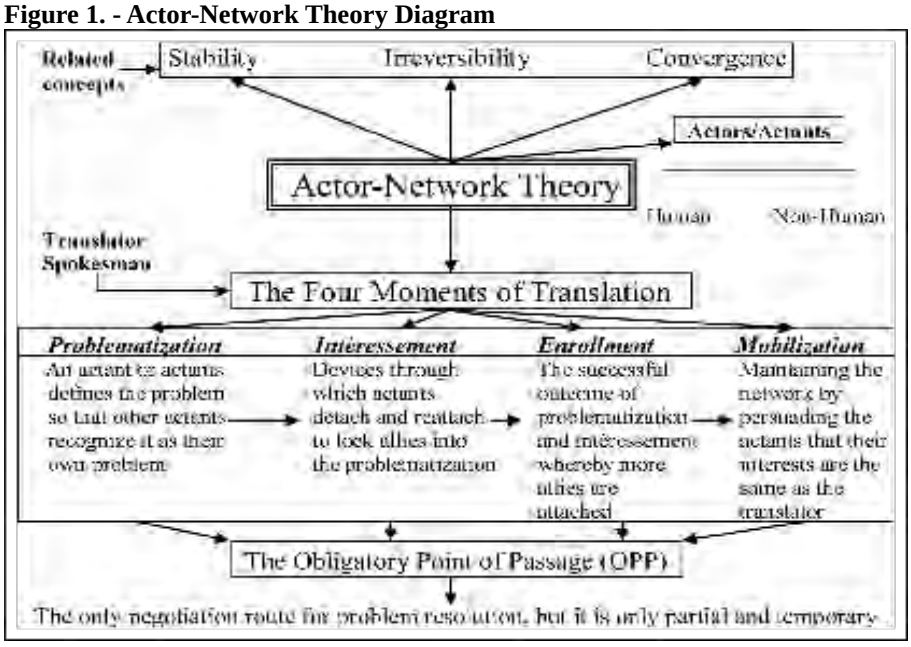
- The second phase of translation is **interessement,** the process where actors organise around a particular problem to strengthen their determination toward moving through the OPP. This is a critical threshold, where actors will align to lock in the other actants into a common determination of their roles within the organisational system. In this process the macro-actor convinces other actors to accept or imposes their identity on other actors to stabilise their defined purpose through its problematisation' (Callon 1986: 207). This means that one actor through different devices can be detached from elsewhere and then be attached to form part of this network. The main actor makes them self indispensable to the other actors and indispensable to providing the solution for the current problem. It also involves isolating other actors through compromises and persuasion to lock allies into the proposed outcome.

- **Enrolment** is the third phase of translation, where a successful outcome of the problematisation and intéressement processes is reached**.** Enrolment is the process of enrolling other actors by the macro-actor through convincing the other actors to align themselves. This is done by establishing themselves as the focal point and of central importance in organisations life. As a result, the macro-actor shape the main ideology that needs to achieved. Successful networks are achieved when aligned with common interests that are brought in line by a sufficient body of actors in the organisation. These actors then are in agreement with the dominant form of thinking and acting in order to maintain a successful network

- The fourth phase is **mobilisation** of allies, where the macro-actor maintains and ensures all the relevant actors fulfil their obligations within the network. The importance in this step is establishing the legitimacy of the spokesperson.

Ultimately, the point of network building is the pursuit for reaching stability within the actor-network, which is made possible to the extent that changes set in motion during the negotiation phases become irreversible (Law and Callon, 1997). A translation becomes irreversible when it is impossible to return to a previous state within the network. Controversies occur in translation as betrayal, where actors don't conform to the agreements previously reached which leads to **dissidence**.

Figure 1. - Actor-Network Theory Diagram



3.1.5. The role of Actor-Network Theory in Information Systems (IS)

Information systems researchers are also increasingly making use of actor-network theory**.** The one aspect of ANT that makes it particularly attractive for the field of information systems research is that actor-network theory doesn't distinguish between human and non-human entities at an ontological level. Walsham (1997) maintains that ANT treats the social and technical as inseparable and argues that people and technology should be treated in the same manner. In addition, ANT and IS research, according to Walsham (1997) allows certain computer systems within a network to become irreversible as certain technologies are present across time and space. This highlights Monteiro and Hanseth (1996) view that suggests ANT is an effective way of describing how minute, technical design solutions are interwoven with organisational issues; a fact also supported by 'ANT can be used to illuminate the results from the field research,' Walsham (1997:477). ANT basically describes how actor networks are formed. Within these networks, all actors with common interests can include human and non-human.

Some IS research have managed to deliver, 'a rich, integrative view of IS implementation does justice to the complex realities of social life in an organisation' (Myers, 1994:198). These highlights, Harvey and Myers argument that

‘general knowledge is often neither relevant nor meaningful, in which case we are better off understanding specific contexts’ (1995:23). What it further confirms it that ‘a rigorous approach to the analysis of the institutional contexts of IS practices, with the notion of context being one of the social construction of meaning frameworks’ (Harvey and Myers 1995:21). In an organizational system, all entities are examined to determine their true value and any part can be regarded as relevant. In this way the full context of organisational behaviour is captured in its evolving reality which is increasingly being employed in IS research (Walsham, 1993). Taken together, the research offers new and intriguing ways of understanding the organizational life in this highly contested urban space of Khayelitsha and the intensely inter-related networks of technology platforms and urban social agencies.

3.1.6 Research and SJC Background

The SJC is primarily an urban transformation agency working in informal settlement communities of Khayelitsha. The research methodology engaged in an extensive exploration of ANT in order to gain a practical understanding of the SJC’s uses of ICTs. It was an exploration of the SJC’s ICT culture and drew things together (Latour, 1990) and analysed and interpreted the issues that were central to their urban transformation agenda around sanitation delivery and to their use of ICT in general. The research began with an empirical observation attempting to make sense of the tensions and relations within the actor-networks. Here ANT acted loosely as a toolkit for questioning, uncovering, and telling a number of narratives that gave insight into the relationship between informal settlements and ICT. It critically looked at whether ICTs could beneficially shape the urban transformation agenda of informal settlement communities, and whether ICTs were appropriate to this locale, and any significant impact on the developmental approach in use.

By using ANT to examine the complexity of the relations that arose from the urban transformation agenda of the SJC and their use of ICT in disadvantaged township communities in Khayelitsha, it allowed the research to track or ‘follow the actor’ relationships. ANT made the differences between the ‘micro and macro actors’ more apparent by exposing the power relations and the constructions of networks that could elude traditional analysis in a quantitative reading of ICT. What was important to this approach was not the ‘natural state’ of the actor but rather its relations with other actors through what Latour (1993) called the process of delegation.

The research examined the power relations that enabled the adoption of ICT innovation through the existence of networks of participant communities and how ICT infrastructure efficiently mechanizes connectedness, access and the exchange of information. As network architecture is important in the digital world of socially networked communities, where online campaigns by grass-root movements and communication becomes essential. The technology now had made it easier for everyday people to access ICT through increased use of computers, telecentres, NGOs networks and cell phones applications. The objective of this study was to understand the choice, use, diffusion and adoption of ICT practices in the SJC organisationally

and the end-users, which included informal settlement communities' and other stakeholders' response and motivation through their ICT use. In this process it was about understanding how the SJC uses modern ICTs, specifically Social Networking Sites (SNS) and digital mapping technology, analyzing how they themselves determined their own motivation for gravitating to these SNS platforms through online campaign messaging and data collection on sanitation issues in Khayelitsha. In addition to tracking the benefits, advantages or disadvantages of informal settlement residents being able to participate, the research aimed to determine the clear and defined benefits from these ICT innovations.

As creating digital/online communities not only deliver ICT access to particular targeted groups, but also provide a variety of ICT developmental support for capacity building and information sharing. The horizontal distribution networks of information sharing are precisely the innovation that powers social networking sites (SNS). SNSs are by their nature information sharing and idea generating digital tools. They are also scalable through their dual architecture of member community and information sharing. Sahay and Walsham (2005) define scaling as the approach through which a product or process is taken from one setting and expanded in size and scope within that same setting and/or also incorporated in other settings. Thus, an understanding of the SJCs scalability and its true distributional value as a technology platform needed further investigation. However, the scaling of digital platforms is much more complex as no setting is ever similar, as the heterogeneous network constituted of technology, people, processes and institutional context all determine their own value in the field. As little is known about how activists – whether they are in the United States or Latin America – employ SNS for social change, this exploratory study seeks to contribute to burgeoning research just beginning to explain how SNS might be transforming activism (Rolfe 2005; Wojcieszak 2009).

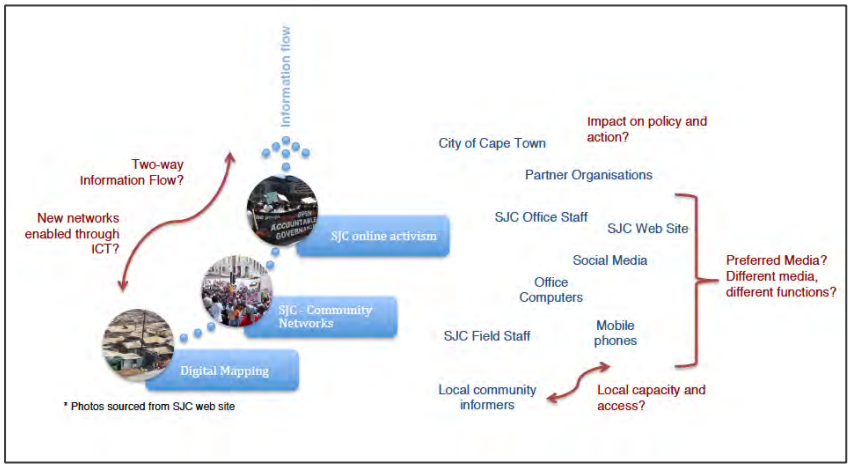
3.2 Research Methodology

This research employed a descriptive empirical case study method based on cross−sectional data collected between May and June 2014, underpinned by 'following the actor' principle of ANT to test the hypothesis under study. Here the case study research was the main method to investigate, "a unit of human activity embedded in the real world," (Gillham, 2000,1). Yin maintains that, "The case study allows an investigation to retain the holistic and meaningful characteristics of real-life events such as individual life cycles, organisational and managerial processes, neighbourhood change, international relations and the maturation of industries,"(1994:13). Thus, the case study approach became useful in examining the circumstances and contextual conditions within the ICT processes of the SJC, allowing their significance to unfold. In addition, the case study research method, places specific parameters for collecting and analyzing research data, guided by distinctly framed theoretical assumptions and by collecting data from multiple sources which ensures its integrity and reliability.

Therefore, the case study lends itself to introduce sub-methods of research; interviews, observations, document and record analysis. This is known as the *multi-method approach* allowing the researcher to collect evidence from multiple sources in the process. In addition, the framing of good questions is regarded as another important part of the case study research process. For Gillham (2000), 'good' research questions enable any researcher to achieve their aims with questions that are capable of being answered within the research setting. For in the case study research method, all evidence is of some value to the researcher. This is what Yin considers the 'chain of evidence,' where explicit links between the questions asked, the data collected, and conclusions drawn, are all essential elements in the research process. Another important method of case study evidence gathering is the interview. Yin contends that interviews are essential sources of case study information (1989). The most common, case study interviews are open-ended, allowing respondents to talk about the facts, in addition to offering their opinions on unfolding events. Focused interviews (Merton et al, 1990) allows for open-ended questions but for short periods of time, up to an hour for example. Overall, interviews are essential sources of case study evidence because most case studies are about human relations. By applying these principles in collecting evidence, important insights can be gained from any situation.

Another step within the research process is the semi-structured interview or in-depth interview, in which the researcher has a number of questions that they put before respondents. The advantage of these types of questions is that they don't always follow a specific order and is considered the most popular form of interviewing. This stems from a certain degree of flexibility in the lines of questioning, allowing the research to follow up on responses in pursuit of unexpected lines of study. Another, relatively popular, version of this is the so-called 'oral history' interview, in which open-ended questions are put to respondents, who are actively encouraged to talk about their own biographies and to 'recount aspects of their lives and/or the lives of their contemporaries' (Blaikie, 2000, 234). Some researchers believe this technique can be useful as a starting point in a research process, as unstructured sessions can lead to areas under investigation, including informal discussion, previously not considered.

Figure 2: SJC Actors and Questions



The research evidence gathered from multiple sources becomes the primary concern of the researcher. Gillham suggests there are 6 main types of evidence; documents, records, interviews, detached observation, participant observation and physical artifacts (2000). Yin contends, “for case studies, the most important use of documents is to corroborate and augment evidence from other sources,” (1994). For some case studies, records are important in that they could become the focus of extensive retrieval or analysis. However, the interview can be considered the primary device in retrieving information. Gillham provides a definition for ‘observation’ as consisting of 3 elements; watching what people do, listening to what they say and sometimes asking them clarifying questions (2000). Detached observation mean watching from the ‘outside’ and participant ‘being involved’. In presenting the research evidence following a logical narrative in a case study report becomes important in as the case study researcher is seeking to recreate the context and sequence of evidence in a way that enables the reader to see and understand the contextual meaning.

However, the case study research method has often been criticised for lacking reliably conceptualised, investigative, and designed observations. This can be ascribed to the complexity of the rich research data often gathered and determining its reliability is often open to diverse explanations, and possible ‘researcher bias’ (Conford and Smithson, 1996). But despite the criticism directed at the step-by-step data analysis of case study data (Miles and Huberman, 1994), other researchers like Pettigrew (1985) still maintains that case studies are enormously useful in acquiring and determining which data is necessary that will lead to generalisations in terms of propositions. Similarly, Yin (1994) argues that case studies are used for analytical generalisations, where the researcher’s aim is to generalise a particular set of results to some broader theoretical propositions.

3.2.1 Research Context

3.2.1.1 The 3 Cases

The main focus of the case study research was to extract the relevant ICT information from the SJC practitioners, in this case of its, (1) fieldwork staff and (2) office bound activists and (3) of its ICT practices, by means of research questionnaires and in−depth interviews, and by observing and monitoring the message data gathered of online SJC communication portals and studying its digital mapping programme on portable public toilets in the RR section of Khayelitsha. The data collection techniques by means of questionnaires, in-depth interviews and direct observations allowed the research to directly collect data about the people, their organization and their ICT activities. Questionnaires were used to collect data on the SJC fieldwork staff’s ICT activities that were not readily available either in documented form or that wasn’t apparent based on initial observations. The data collection included their attitudes, opinions, of past and present experiences or anticipated behaviour.

The questionnaires administered to the SJC fieldwork staff (community advocates) were set as part of a face-to-face focus group styled sessions in a controlled workshop environment. It was designed to collect information on the community advocates' ICT practices and to track the process of digital activism within the SJC and how ICT played any part in conducting their fieldwork around sanitation provision and education in Khayelitsha. The accuracy of the data collected in this method depended on the forthrightness of the respondents and their willingness to participate in the research. The first part of the questionnaire provided background information on the work of community advocates in the field, then the second part was to trace how they were using ICTs as part of their fieldwork, and the third part was track if they were using ICTs more now than in the past. This line of questioning allowed the case study to follow the actors and to understanding how digital civic activism unfolded in the field. It was interesting to note that the seven SJC field workers were black young people, two were female and the five were males, averaging between 21 and 25 years of age.

When addressing the 5 SJC office activist staff, in-depth interviews were a direct method used in accessing their interpretations, perceptions, understanding and approaches in applying ICT protocols in SJC online campaign activities. Semi-structured open-ended questions were the preferred method used to generate comprehensive, long and complex answers. Four respondents were male, 3 of which were white senior members and 1 male black staff member, and one black female office staffer. Respondents were asked to answer questions based on their personal fact and experiences rather about opinions or attitudes in SJC operational use of ICTs in their online campaign activities. The in-depth interview allowed the research to gain the most tangible insight into the SJCs ICT practices to ascertain how the online network architecture developed into the temporal spark to understand how agency was formed.

The SJC's data mapping of portable toilets in RR section of Khayelitsha provided the potential application of aerial mapping technology platform to create an organic information symmetry base to serve as a powerful tool in monitoring sanitation delivery and potentially creating autonomy in local community knowledge gathering. Previous SJC efforts in assessing the state sanitation delivery within the field were limited to sampling from a specific number of community residents in order to investigate service delivery failures but this ICT platform could potentially share or include larger communities. Leading in the long-term to lower acquisition costs and less time consuming collection methods, while potentially empowering informal settlement users through improved transparency and provide wider access to sanitation services.

3.2.2 Research Data Sampling

The objective of data collection sample was to understand different interpretation of use of technology by actors and their motives to enrol in the SNS platforms. Within the case study method this section deals with the research sampling and data

collection processes undertaken during the examining of the uses of online advocacy, mobile phone digital applications and data mapping around sanitation service delivery on active campaigns in sections of informal settlements in the Khayelitsha area.

The data sets gathered here for the research represented three types;

(1) The 138 SJC online messages posted on their digital media platforms May-June 2014, the two-month monitoring of SJC social networking sites. The data collection process involved, creating a profile of the SJC's information campaign strategies in delivering digital messages and how they applied ICT applications in addressing municipal service delivery shortcomings. ANT was used in the analysis of the fieldwork, unearthing technological and human actor networks and processes in determining the transformative potential of this form of digital networking at community scales.

(2) Formal and semi-structured open-ended interviews and questionnaires in addition to open in-depth discussions were done, with seven SJC fieldwork community advocates and five office bound SJC staff, to identify the personal incentives behind the usage of SNS in mobilizing and education sanitation campaigns. The field investigations and formal interviews were conducted over a two-week period.

(3) Data mapping of the sanitations services, portable toilets and locations based software were recorded.

The key ICT actors through the research process were identified at the interpretation of different ICT actors active in SJC organization, five SJC office staff and seven SJC community advocate workers were interviewed to form an overview of the organization and its campaign activities. The interviews were digitally recorded, summarized, coded and categorized keeping actor-network theory as a guiding framework. In May 2014, semi-structured in-depth interviews were conducted related to online and social media campaign messages at organisational levels to understand the communication and information distribution on sanitation provision, monitoring, education and creating awareness in informal settlement communities in sections of Khayelitsha. A data list was drawn up based on SJC online advocacy messaging, offline advocacy messaging, online advocacy tools, offline advocacy tools, online advocacy resources, offline advocacy resources, and frequency of online/offline advocacy campaign messaging, mobile communication platforms, and ICT technology platforms in the informal settlement communities. An attempt was made to include all the different categories of interlinking ICT networks and SJC advocacy campaign messaging in order to understand interrelated linkages of the importance of SJC campaigns and how technology as an instrument was used in the analysis through the lens of ANT.

4. Research Findings and Analysis

4.1. Research Data Collection

STUDY 1

7 Community Advocates

The above actors were chosen because, at the time of the study, they were the frontline or on the ground SJC fieldwork staff, active in the field in collecting sanitation information from informal settlement residents and the distributors of critical SJC campaign education and City of Cape Town policies around sanitation delivery. The community advocates, of the SJC provided assistance to informal settlement residents because of persistent problems that affected service delivery in informal settlements around basic sanitation. In addition, to service delivery shortcomings and complaints about the municipality's janitorial services, they became the only access point for effective reporting on sanitation issues in the community. There was at the time of the research 7 SJC staff employed as community advocates working in the community in Khayelitsha. The sample group contained a variety of variables such as age, gender, employment status, Internet access, education and civic skills. There were fives males and two females, ranging between the ages 20 – 26 years of age. The research instrument selected was a questionnaire that formed the basis for semi-structured, open-ended interviews with the selected respondents. The interviews were conducted in English and were recorded as individual responses to questions asked by the researcher. The average time of the interview was 3 hours. Consequently, they provided a typical picture of what challenges they encountered in accessing digital or social networking sites (SNS) of the SJC in their attempt at using it as an educational, monitoring and mobilization campaign tool. SJC community advocates were requested to answer open-ended questions, like e.g. "What benefits were there in using social networking sites in your SJC field work? This and other questions were designed to solicit a full, meaningful understanding of their own personal experiences of how they use SNS or any digital or mobile platforms in their work. Here the main goal was to reveal the motivations and usage levels of ICTs and practices within the group.

The main role of a community advocate was to educate informal settlement communities on their rights on two SJC campaigns in Khayelitsha namely, sanitation & the criminal justice (safer communities projects) by organising workshops, demonstrations, marches, political education and general engagement across the informal settlement community. They were divided in two main groups either one group responsible for sanitation or the community safety campaign. Typically, community advocates will go around to informal settlement residents, going door to door and engage with them face-to-face through mobilizing efforts on sanitation issues and to empower shack dwellers on sanitation policies. They would share material like, newsletters that came out quarterly, conduct sanitation group workshops

and mainly focus on education and interacting with community in a face-to-face and door-to-door manner. Monthly site inspections or audits would include conducting interviews with community residents through the use of a paper questionnaire and record address details and everyday challenges experienced around water, tap access and how many portable public toilets were available in their domain. Respondents however, shared that safety, security and sanitation were related issues as residents found that at night because of where portable communal toilets were located on the outskirts of an informal settlement, they are often were victims of rape or were accosted at night by criminals.

Only 4 out of the 7 community advocates used their mobile phones to access the Internet, SNS platforms and their personal emails, as there were only two working desktop computers in the SJC office for fieldwork staff to use. Only four respondents had the type of smart phones that could give them access to their emails, SNS platforms, take pictures and record video. In this manner, the mobile phone has slowly transformed into a personal computer, according to Bansal (2009). Mobile phones allow community advocates to make short video recordings, and take photos on sanitation issues experienced by local residents. The 4 respondents with access to the mobile Internet said that it made their job easier to have access to meeting schedules in addition to accessing their calendar of events instead of having going to the SJC office for regular updates. However, the frequent usage of their mobile phone Internet was limited due to Internet cost, loss of phones, theft and safety concerns within the community. But because of the structural issues on the ground and their belief that mainstream media focus didn't highlight the sanitation challenges of informal settlement residents, they had to utilise the digital media available to them to increase awareness and publicity on these community challenges.

Photo: Flush Toilet RR Section

The two main online digital platforms used by the SJC to distribute information were *Facebook* (facebook.com/pages/ Social-Justice-Coalition) and *Twitter* @sjcoalition. Another mobile phone application *WhatsApp* was used as an internal communication mechanism to alert SJC staff to events and activities related to the operational

business of the organisation. However, during the time of the research, no SJC fieldwork staff members/community advocates had direct access or were allowed to post sanitation related campaign information or message updates on the official SJC social media platforms. In this context, the main actants had varied influences in the use of new technology elements within the organisation and how it was utilised based on SJC members individual technical skills levels and trust relations within SJC's online delivery of on-the-ground information.

In the month prior to the research study, non-of community advocates had posted any information on the SJC website or on any of its digital platforms. But they did monthly site reports on sanitation that would form part of a compiled online SJC report that gets distributed onto the SJC social media platforms and website. The fieldworkers explained that they had considered using technology more effectively as way of digitally documenting, recording and conducting awareness within the community but limited Internet access and costs prevented them from capitalising on its participatory potential with local residents. They then often used their personal SNS accounts to post information or send out posts 'tagging' in the SJC's official SNS platforms. But based on the community advocate observations and interactions with the community, Internet penetration in informal settlements were very low, and residents were skeptical of digital recordings and placing responses on record. They preferred to be phoned or talked to face to face on SJC campaigns.

According the respondents, residents in the township didn't have regular use the Internet for activism purposes but rather for entertainment and to follow the Oscar Pistorious trial. Most of the time Internet users will use social networking sites for 'entertainment, gossiping and staying in touch with friends'. According SJC field workers, only a small amount of people used SNS for social activists reasons in their communities. The Internet and its use were unfamiliar to most informal settlement residents and so there was a sense of mistrust within this communication medium. But SJC community advocates believe it depends on what generational group within the community you wanted to target, as young people would frequently access the Internet and social media sites like *Facebook* at local Internet cafes. Further, SJC staff had their own *WhatsApp* groups through which they communicated staff and SJC information, around internal meetings and events schedules plus any urgent notices for staff only. *WhatsApp* allowed the creation of segmented groups within the organisations where information could be shared internally to succumb vent traditional email propensity.

There were only one or two people in the SJC office that was responsible for sending out information on SJC social media platforms *Facebook* and *Twitte*r but this was done on an ad-hoc basis. SJC community advocates believed that if they had better smart phones they could possibly be more effective on the ground in engaging people and being able to record information digitally on portable communal toilets service delivery failures. But safety on the ground was another concern in using ICT technology or smart phones as they were always at risk of being targeted by criminal elements within the informal settlements they were working. All SJC community

advocates said that it was dangerous to take pictures of service delivery problems, sanitation and safety campaigns, but possibly with additional resources they could start recording information digitally.

The results from the questionnaires were illustrated to explain their online activities and online activity networks, which would increase the understanding and provide an overview of SJC community advocate fieldwork activities.

Table 1. Online Access Per Week

SJC Community Advocates	Category	Facebook Access Per Week	Twitter Access Per Week	Internet Access Per Week
Desk Top Internet Access	5 Male 2 Female	1hr 2hrs	0hrs 0hrs	1hrs 1hrs
Mobile Internet Access	5 Male 2 Female	3hrs 4hrs	2hrs 2hrs	1hrs 1hrs

STUDY 2

5 SJC Office Staff and Online Campaign Communication

The second study included five SJC office participants (4 male, 1 female) and examined the SJCs online content campaigns as a form of online activism, the information flows underlying such campaigns, examining the total number of messages accessible on the platforms, average message content and the frequency plus the reach of SJC content on the online platforms. In addition, the research developed data sets in which the SJC participants chose to constitute an online community through language, content categories and external community feedback. By examining the data sets divided into:

(1) Informative Messaging – Content that conveyed digital material that could stand on its own.
(2) Interactive Messaging – Content that required a response from other digital participants.
(3) Civic Messaging – Content that came from online community participants.

These are discussed in relation to the effectiveness of such indicators, sanitation campaign actions, their ability to bridge the digital divide and the role of online campaigning within the SJC organization.

SJC Facebook:

At the time of the research the SJC Facebook page ‘likes’ stood at 2 163. From detached observation of the SJC’s online campaign messaging on Facebook, content was sent out in an ad-hoc manner and contained an average of 3/4 posts per week during the time of the research. From the two-month observation period 90% of all

sanitation related information, stories and content on Facebook were SJC sanitation campaign articles or activism stories that were exported or lifted from other news sources such as the *Mail & Guardian* newspaper website, another was an online publication called *Groundup News*, sister organisations such as the *Equal Education* and the SJC official website. The Facebook posts were all in English. Facebook as an online platform can be accessed on a desktop computer, mobile devices and mobile phones. This social networking site is a free social media application that is available for download from the Internet.

At a rudimentary level, the SJC sent out longer messaging overall on sanitation campaigning, which was accompanied with pictures on sanitation, related issues concerning the Khayelitsha community. This digital communication channel allowed the SJC to quickly share content that could be made available to all users immediately. Facebook allows for immediate feedback by being able to 'reply' to content posts or users are able to posts content on the SJC Facebook 'wall'. According to Ferebee and Davis, what makes Facebook an important communication medium is its open source nature that allowed rapid communication, rapid change, and rapid development (2009).

Users who formed part of the SJC Facebook community could 'share' and 'like' the message feeds. Ferebee and Davis call these 'interaction points' on Facebook (2009). This allows the whole online community to participate, as message posts and news feeds would automatically reach all connected users from the Facebook group. Posts 'likes' during the research period were on average 1-3 'likes' per posts/ content message, out of a SJC Facebook user population of 2 163 connected community users. Facebook is unique as a platform as content producers have access to the online response data generated on story posts and the amount of users who have interacted on the page. The user community experience is enhanced based on the automation and architecture of the digital communication platform. The observation showed that the message posts 'likes' were extremely low at 1 and 3 per story posts. The response rate might be low but these Web 2.0 platforms facilitate people in collaborating and sharing ideas and contents (Bansal, 2009).

Respondents explained that SJC online campaign distribution were not considered a SJC priority and was dealt with in its communication and activism strategy as an, 'after-thought' and not considered a strategic tool in its grass-root work. Further responses explained that SJC office staff understood the value of online Facebook campaigning but because of a lack of media training, content was place on an ad-hoc basis. Respondents went on to explain, that only one SJC office staff member was responsible for online content distribution on the SJC official platforms. Out of the 5 respondents only 2 had used their personal Facebook accounts for SJC campaign work.

Table 2. SJC Facebook Content and Interactions Averages Per Week

Table 3. SJC Facebook Content and Interactions Averages Per Week

Dimension	Average	Descriptive	Informative	Interactive	Civic Message
Story Output - Posts Per Week	3-4 Posts Per Week	Policing, Sanitation and Safety	Access to SJC Local Info and City Information	No Calls To Action is related in the Posts	Viewers Gained A Better Understandin g of the Issues
Story Content 'Like' per Posts	0-3 'Likes' Per Week	Lack of User Engagement	Little or No Feedback User Community	No Calls To Action is related in the Posts	Viewers Gained A Better Understandin g of the Issues
Participants Replies Per Story	0-2 User Replies to Stories		Little or No Feedback User Community	No Calls To Action is related in the Posts	Viewers Gained A Better Understandin g of the Issues
Participants Comments Per Story	0-2 User Replies to Stories		Comments in support of SJC Actions	No Calls To Action is related in the Posts	Viewers Gained A Better Understandin g of the Issues

Dimension	Average	Descriptive	Informative	Interactive	Civic Message
Other Online Content Sources	4 Posts from other Content Streams	News, Media Articles and Other NGO Support	Policing, Sanitation and Safety Messages	No Calls To Action is related in the Posts	Viewers Gained A Better Understanding of the Issues

The subjects of the Facebook content messages ordinarily contained problems with portable toilets provision, janitorial contract staff not performing cleaning operations, neglect of portable toilets, poor community policing and community safety related stories. The Facebook posts were one directional styled content. It wasn't a call to action but more informational. Respondents reported that the SJC Facebook audience, were mainly other community activist, organisations, media organisations and journalists and a small percentage of informal settlement residents.

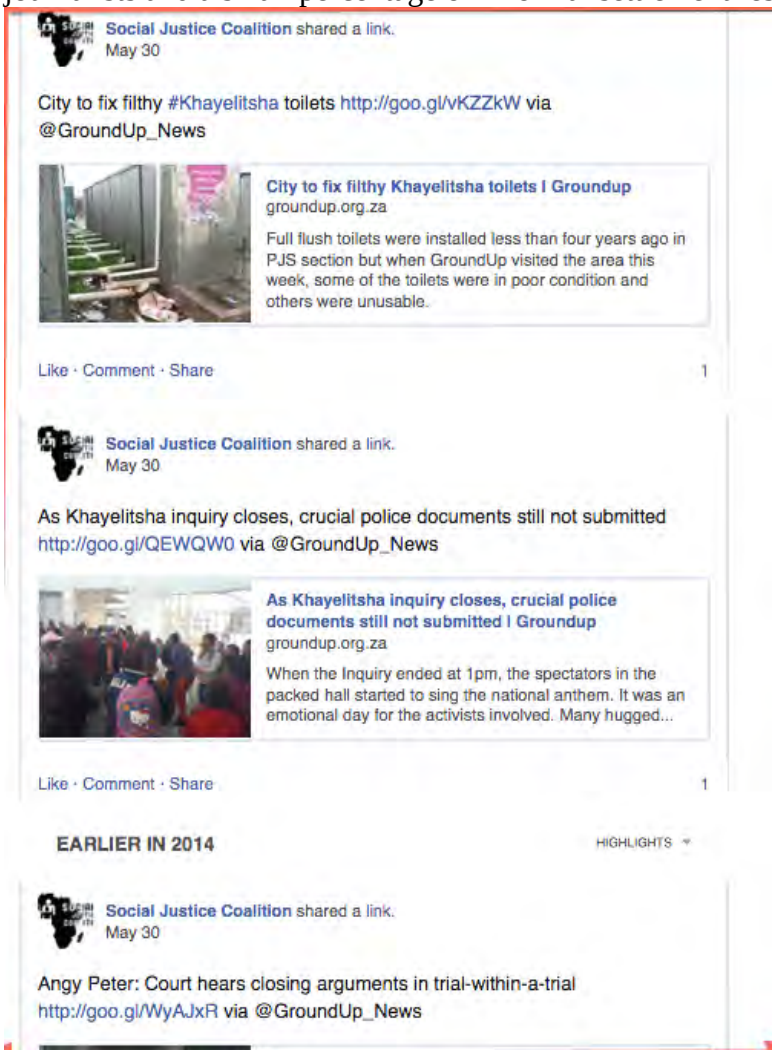


Figure 3. SJC Facebook Feed

SJC Twitter:

At the time of the research the SJC Twitter followers stood at 1 938 and the Twitter users they followed were 121. The SJC averaged about 13 Twitter messages per week. This hypermedia system is an interactive communication tool where users can benefit from the accessing knowledge, information and collaboration (Bansel, 2009). Posts on sanitation and the Khayelitsha Police Commission of Inquiry dominated the tweets on the SJC Twitter platform during the research period. The Khayelistha Police Commission of Inquiry was a public hearing process unfolding at the time, focusing on the conditions of poor policing in Khayelitsha. The Twitter platform of the SJC was mainly conducted in English. Twitter as an online platform can be accessed on a desktop computer, mobile devices and phones. This social networking site is a free social media application that is available for download from the Internet.

The SJC Twitter community reach was based on the 'followers' interacting or 're-tweeting' posts onto other users within there own digital networks. It was mainly used to keep online users, other NGOs and sister organisations, up to date on weekly campaign activities. Re-tweets average on one 're-tweet' per every 6 SJC tweets. Posts typically included text and occasionally had pictures attached. This mediated system allowed the SJC to promote and elicit support from online individuals, organisations and communities by making visible their activities taking place in the organization. Twitter users could 'reply' to tweets and the research could not determine how often users replied to tweets as this access was only open to the administrator of the SJC Twitter platform. But the SJC confirmed it was regular but not exceptionally high on Twitter.

One SJC respondent explained that occasionally "Twitter Wars" or content exchanges would take place between certain SJC staff and the personal Twitter accounts of key political figures within the local or provincial governments responsible for safety or sanitation.

Table 4: SJC Twitter Content and Interaction Average Per Week

Dimension	Total	Description	Interaction	Civic Message
Content Posts Per Week	13	Policing, Sanitation, Housing & Safety	Robust Online Interaction from the User Base	Viewers Gained A Better Understanding of the Issues
Content Retweets Per SJC Story Posts	2-3	Policing, Sanitation, Housing & Safety	Robust Online Interaction from the User Base	Viewers Gained A Better Understanding of the Issues
SJC Retweeting other Sourced Content	8-10	Policing, Sanitation, Housing & Safety	Robust Online Interaction from the User Base	Viewers Gained A Better Understanding of the Issues

Dimension	Total	Description	Interaction	Civic Message
Online User Replies Per Content Post	Unknown	Information was not available	Information was not available	Information was not available

Figure 4: SJC Twitter Content and Interactions Averages Per Week

SJC SMS and WhatsApp:

Bulk SMS was another way through which communication messages were dispersed to community residents based on existing SJC databases. This happened about once a month influenced on SJC activities, but was not considered a main source of community communication based on cost constraints and other social factors. SJC branches in Khayelitsha had their own WhatsApp groups a mobile communication platform to inform members of specific events taking place in the township around SJC activations, campaigns and community feedback sessions. Here the frequency increased but communication dissemination was concentrated from branch level to community recipients. But the WhatsApp mobile platform was mainly used as an internal SJC communication platform.

WhatsApp is unique in that it is also considered a low-cost communication tool and is accessible on almost any smartphone device. This makes the communication medium instant and relatively inexpensive to communicate internally in the organization.

STUDY 3

Data mapping of portable toilets in RR Section in Khayelitsha and Information Networks

Data Collection

The SJC were in the process of rolling out a digital location based mapping system that would map public portable toilet locations in RR Section of Khayelitsha. This would allow them to create an interactive website and phone-based reporting system that could improve efficiency in toilet maintenance in this part of Khayelitsha. The SJC began the GPS mapping process in May 2014 and have completed three sections of the township through regular plotting trips. Based on SJC figures and estimates, RR Section was largely an informal settlement area consisting of about 300 families (1200 people in total*) located in small shack like dwellings. Access to portable public toilets were considered extremely poor as some shack dwellings were defined to be isolated from accessing water taps and some of these toilet facilities. The purpose of the mapping project was to improve efficiency of toilet maintenance and to be able to recommend improvements based on location and user feedback to the municipality. Using the GPS data, the Ndifuna Ukwazi (NU) and Social Justice Coalition (SJC) teams plotted portable toilets on a map that would be visible on the website the SJC was creating. The map would indicate the location and usability of each toilet. Until recently there was no formal organised digital system in place to address informal settlement resident complaints, and to plot the actual location of faulty or poorly maintained portable public toilet facilities in communities. Therefore, this digital mapping process was developed to link and locate residents to portable toilet facilities in a digital network through an aerial map offering a virtual representation of this informal settlement community. Respondents highlighted that when developing and rolling out this digital mapping project, that there were many challenges within the SJC, such as the skills levels needed, lack of physical infrastructure, lack of technological capabilities, and lack of finance to fully fund the operations.

Photo: Aerial Map of RR Section

In order to overcome these problems they identified and formed relationships with other actors within and outside the community. They started seeking partnerships with human and technical actors. They formed a partnership with Ndifuna Ukwazi (NU) a sister NGO, to supply them with the digital mapping technology and website capabilities to run the system. Typically grass-root organisations like the SJC would seek to work together with other organisation to strengthen their communities. This would encourage informal settlement residents to develop cohesion and acceptance among their members and a structure that would encourage participation. By creating the visual element to various data points, the SJC believed it would make it easier for residents and the organisation to engage with problem areas. An additional feature was the inclusion of submitted photos of problem portable toilets on the website formed part of the digital service. This would go hand in hand with a real-time cell phone-based reporting system to keep the map updated. In addition to the technical actors, it was important to facilitate the digital interactive project as a platform to facilitate empowerment of communities to have control over their infrastructure. This was facilitated by digitally marking each portable public toilet with a digital code or sticker placed on the toilet, in order for residents to send a Short Message Service (SMS) or Unstructured Supplementary Service Data (USSD) message to report problems with specific toilets. Unlike SMS messages, USSD messages create a real-time connection during a USSD session. The connection would remain open, allowing a two-way exchange of a sequence of data. This makes USSD more responsive than services that use SMS. The SJC then could measure and incorporate this digital data into determining access to portable public toilets and water taps and how many residents had access to those taps and portable toilets per family in one location. The digital mapping service also differentiated on the kinds of portable toilets that was available to residents; (1) portable, (2) chemical and (3) flush toilets. According to respondents, the interactive digital service would allow a resident to call or text a message into the system to report a portable toilet problem then the SJC team could report this information to the municipality. The resident would then informed of the municipality's response while the SJC team would check back with the resident to ensure that the problem was resolved.

The SJC realised the potential of this virtual mapping system to provide a historical data map and by making an important contribution to community generated information, as it was based on improving the service delivery mechanism. The research revealed that most of these portable toilets were located on the edge of the RR Section informal settlement as inaccessible roads and high-density shack dwellings made it difficult for sanitation service providers to deliver portable close to some residential structures. The mapping system would make the need for SJC field/ community advocates to conduct monthly audits obsolete, as resident feedback and input would be in real-time and continues. The maintenance of service delivery would now rest with local residents as they could report problem portable toilets and input complaints directly into the digital system. But the data collection process was still being done manually as the system was not fully operational. The monitoring and data collection process was still in an analogue stage as face-to-face interactions with residents on the ground to record digital numbers and profiling complainants, were

still being done with SJC field work staff. The SJC have envisaged this portable toilet monitoring system becoming fully digitally integrated but the technology platforms and an organisational partnership plus funding needed to operationalise this system still needs more attention. It is envisaged that these location based monitoring system will have and increase on the bottom up approach to community participation central to SJC engagement objectives.

During research period there were 112 Msengu toilets (portable toilets) identified and located in RR Section, according to SJC community advocates translates into one toilet per every 3 families in this location. The feedback received from informal settlement residents by SJC community advocates was that it started to influence how service level agreements were being maintained between the contractor and the City of Cape Town. For example the manager of the *Iyelehethu* project which supervisors the janitorial cleaning have not been paid in some instances based on user feedback and monthly audits. The SJC used these monthly audit reports on sanitation services as information to inform policy and help the City of Cape Town adapt planning and roll out strategies more effectively in sanitation provision for the informal settlement residents of Khayelitsha. The collaborative map would allow SJC monitors to identify patterns of where toilets are not being properly maintained and help them recognize where issues were more prevalent.

Photo: Water point in informal settlement

Photo: Sanitation survey audits

Photo: Conditions of communal portable flush toilets in informal settlements

4.2. Research Analysis

The employment of the translation approach of ANT to explore the impact of ICTs on the capacity of community organisations like the SJC, provides a focal lens that sharpens the focus on how increased ICT use affects the network building, cohesion and over-all impact of operationalising these measures in a contested urban environment. This analytical approach allows the data, actors and actor networks to become comparable on a variety of interlinking factors, but which vary in their distinction as technological in nature and the interests of the human actors.

4.2.1 The Community Advocates viewed through the ANT lens: translation phases

Case Study 1 Analysis

ICTs and Web 2.0 applications have been argued to increase empowerment and the participatory nature of civic engagement given the network architecture afforded by ICTs and specifically SNS. Increased ICT deployment and use are believed by many to have the potential of addressing a wide range of social issues such as unemployment, lack of political participation and limited access to skills development (Maldonado et al, 2006, 138). This has made it particularly pertinent for SJC community advocates, who were more likely to be ICT savvy based on their youth and because they were close to the community issues on the ground.

4.2.2. Problematisation

The key actors in the collection of sanitation information from informal settlement residents were mainly: the SJC community advocates, informal settlement residents, mobile phone technology used, the SJC office staff, the SJC online digital platforms and Internet access and infrastructure. It is clear from the outset that the community advocates were operating in a challenging environment with elements that influenced the process of network building. Community advocates as the macro-actor in this instance wanted to employ mobile phone digital application and SNSs as viable avenues to collect, store and disseminate informal settlement sanitation information. The macro-actor subsequently saw an opportunity to increase awareness, digital documentary proof and build stronger participative nodes within the community. They additionally, believed the mediated digital platforms could reduce the information gap and the turn around time needed in collecting and disseminating important sanitation information. But this was delayed, as they had to forward relevant field information or photos and video content they collected to the appropriate SJC office staff member. As the opportunity costs associated with Internet access prevented them from having frequent connectivity and respondents explained that SJC office politics didn't indicate how they could use the Internet and SJC digital profiles for filing community stories. It seemed that the SJC did not have the internal resources available to produce or translate there own online content from their offline sanitation campaigns.

According to community advocates, they understood the advantages in using ICTs, which allowed community organisations and activists' new opportunities to enhance civic participation and community empowerment in improving municipal service delivery. As ICTs provide a means for increased access to information and potential for knowledge sharing and learning (Katz and Rice, 2002; Kennard, 2001; Oden and Rock, 2004; Oden and Strover, 2002; Tufekcioglu, 2003). But they mentioned this depended on whether community participation or empowerment could be introduced and maintained within an actor-network based on their own experiences. The lack of alignment between community advocates' with the organisational office SJC actors, and their online goals and interests may be working in opposition, or operating in competing directions, due to different social, technological skills levels, economic, and the SJC ad-hoc ICT strategy. Mediating factors include the status of message sender, the information processing capabilities of individuals in the organisation and their skills levels and access to alternative or new media in the SJC. In addition, the existing challenges such as, lack of physical broadband infrastructure, electrical power access, illiteracy, violence, top down development, unemployment, project funding, and lack mobile phone resource may inhibit progress and the alliance building needed in community development in the SJC. However, the research interviews revealed that informal settlement residents regarded face to face and the use radio as the preferred means of communication, as it was more powerful and familiar medium than unfamiliar digital technology.

4.2.3. Interessement

In addition, the community as actor and the beneficiary of sanitation development can be expressed as lacking the following elements for network alignment: informal settlement have low Internet access, lower literacy rates, poor infrastructure, high poverty levels and technology phobias**.** Respondents mentioned that participation in this context becomes an elusive concept as the breakdown in a culture of participation emerges, as an increasing number of informal settlements and community field workers were disconnected from the Internet. As participation is always connected to the action of the communities, groups or individuals related to the development, improvement or change of an existing situation (Moser, 1989:81 et sep., Kellerman, 1988, 30 et seq.). This can lead to ‘dissidence’, where the consensus and the alliances that is needed, can be contested at any moment and the translation can be reversed or broken down. Here the non-alignment of critical SJC internal human and technology resources were an obvious oversight in network building and alignment.

However, driven by the community advocates individual desires, or compelling SNS applications, and the design of particular mobile technologies, the offer for emergent forms of engagement with communities, objects, and environments were growing. But community participation efforts were often undertaken in a top-down fashion, while there are few examples of “participatory experiences from self-reliant grassroots organisations” (Burbidge, 1988, 188). Another author, Wisner advocates a new style of development, where the poor take control of their own development, usually through grassroots organisations (1988, 14). The notion of actor alignment is of pivotal importance in the debate on participatory development or community empowerment.

4.2.4. Enrolment

The enrolment of communities to participate or to become involved in their own development has had notable flaws. Lungu (1987), in a Zambian case study on the practice of participation, found that poor communities were generally reluctant to participate in government-sponsored projects. Authorities have not enlisted one explanation he offers is that the planning contribution of ordinary citizens. Participation in the SJC context still relied in the main on face-to-face communication and the opportunity to take communities or groups into digital revolution cannot not be fully realised. This was due to community advocates having had limited self-sustainability and technical capacity, and they lacked the broad programming context to build the sense of a digital community by electronic communications technology. Ultimately, their inability to scale up the technological applications was due to their lack of clear linkages with SJC office staff, lack of regular Internet access, lack of adequate SNS communication skills levels and lack of organisational support. But community advocates also have an important task within the actor-network facilitating the link between nodes of actor relations. The indirect break down to establish community networks with the aid of electronic technology that could have

lead to fostering self actualising community networks through dense, multiplex, and systematic webs of relationships remained elusive**.**

However, there were three main elements that stood out in the analysis of SJC community advocates wanting to adopt the use of electronic communication: (1) the gravitation towards digital communication arising from a mainstream media system that is generally insulated from effectively highlighting and influencing informal settlement issues on the ground; (2) the distinct absence of community participation in community development is another factor in wanting to address extend community involvement; (3) there was evidence of an osmosis of individual actors and even groups of community advocates from local campaign activities. Digital communication featured as a primary mode to exchange internal organisational information with frequent e-mails from office but this was not a substitute for face-to-face contact. As a result of this new digital communication reality, community advocates have identified an objective in using electronic communications as a means to document, record and report on sanitation challenges within informal settlements. The focal actor, the community advocate in this instance has problematised an issue and attempts to involve community actors to establish electronic communication as an obligatory passage point between the other actors and the network. They have determined digital communication as a contact point to connect all the actors those involved in the network. At the same time, with the growing use of their mobile phones, community advocates were transforming informal settlements from deprived physical spaces into a virtual context where senses such as sight, touch, and sound were input points into the actor network. There was a clear desire to experiment with new combinations of methods in capturing and analysing data from residents, technologies, and environments.

4.2.5. Mobilisation

Digital communication tools and SNS applications were changing community advocates understandings and offering them new opportunities to rethink how social technologies might be reframed and embedded with an ideology of encouraging socially conscious urban citizenry and civic participatory activities**.** They realised that the digital mediated communication's influence in their urban environment was unassailable, but delivering the impact they envisaged of its participatory and collaborative strengths in transforming communication within their communities remained challenging**.** The traditional links or networks that brought community advocates and information settlement residents together could now be attached to the digital web transforming their primarily face- to-face interaction. In a sense, this new technology and its social and participatory benefits have reached a point of irreversibility if we consider the proliferation of these digital platforms in the modern urban cities. The question still remained whether digitally mediated communication could quickly find or develop into viable platform for community advocates and shack communities in building these digital networks. The use of the Internet and related SNS applications remained mainly for entertainment-expressive activity, and currently displayed low levels of commitment for it to be used as a participatory tool.

4.2.6. Dissidence

Central to the goal of the SJC is to strengthen informal settlement communities' living conditions and this requires increased civic participation among community members if they are going to achieve their goals. But the results show that the social influence of information technology, that supports the notion that the Internet does not necessarily lead to a more, broader social engagement in this context is likely to be true. The findings suggest that SJC online participants are organisations, individuals and member branches that already share a similar political outlook on township community interests. The goal in allowing a diverse audience to receive this information still remain a challenge in broadcast capability of the Internet in allowing information to be shared equitably. "In a way, Internet connectedness becomes akin to a civic skill," according to Weare (et.al) (2005). This indicates the pervasiveness of the digital divide still within informal settlement communities around South African that makes civic participation in informal settlement upgrading a challenge for periphery city dwellers. Internet access is directly correlated with socio-economic status, ethnicity and age, (Jung, Qiu, and Kim 2001, Loges and Jung 2001).

The consensus and alliances needed to build networks was contested. There was a lack of alignment between ICT actors, and interests were diverging, in opposition, or operating in competing directions due to different social, human, physical, economical, and political factors (Thapa & Sæbø, 2011). The SJC community advocates attempted to post events and stories that were happening within the community online but they didn't have access or the necessary authority or the training to place content on the SJC digital platforms. But access to the Internet and understanding how to use it effectively are some of main challenges faced by SJC community advocates as an advocacy tool. The costs and limited resources are also additional challenges. In addition, the communities they were operating within were reluctant to fully appreciate the impact and value that these technologies brought with its introduction as new modes of communication and information sharing.

4.2.7. Mobile Phones as User-friendly and common participatory digital tools

Although significant progress has been made in mobile Internet connectivity in South Africa with roll out of 3G, much remains to be done to bring the 'Information Society' to township and informal settlement residents and organisations working in the urban developmental and transformation sectors. It has become now more apparent that the information age has given rise and reinforced new forms of inequality and exclusion of citizens living on the margins of our society. Therefore building digitally networks in disadvantaged communities are complex and lengthy processes, which needs the appropriate technical skills and levels of innovation to be applied if it is going to succeed. This only confirms leads to the rising gap between groups of people who are connected and disconnected from ICTs. This has been referred to as the digital divide (Zeitlyn et al, 1998). For the community advocates, ICT is an unfamiliar tool for doing advocacy work and participatory networking in the

field context. But increased connectivity created through online user forums could enhance community participation on sanitation policy provision, which could make surveys or site information collection visits more efficient and positively impact on the intention for people to participate. The data gathered from participants can include visual, audio and spatial networked information that can be visualised and displayed to improve participation.

Web 2.0 applications such as video and photo-sharing sites as well as SJC social networking platforms offer a more, user-friendly, collaborative, instant, and therefore more participatory Internet experience for more community people and outside stakeholders than what was previously possible.
But the case study research confirmed that SJC community advocates' online participation through ICT platforms were severely constrained based on specific inhibitors limiting their effectiveness in the field. This can be attributed to their current lack of empowerment from effectively using ICTs due to their lack of online skills, lack of Internet access, connectivity costs and a lack of participatory online channels for field workers

4.2.8. Discussion

SJC community advocates have good trust networks within the community they serve and informal settlement dwellers obtain reliable advice from their information sources. These relations are based on the information flow that results in a network of information exchanges. Through digital information network like social networking sites or mobile technology platforms like WhatsApp, content and online communication portals could be optimised on these mediated social networks. Consequently the automation of information routing could become a dynamic and collaborative process. SJC community advocates, informal settlement dwellers and the SJC technology platforms could be treated as elements of a social network or "sets of nodes" forming networks (Vignollet et al, 2007). How users were connected could be a key indicator of the efficiency and complexity of mediated social network. But virtual ties alone, without 'real' face-to-face interaction, are doubtful to be strong enough to successfully mobilize or sustain a social movement, as real relationships are considered more valuable and effective than impersonal electronic communication (Diani, 2000; Ribeiro, 1998).

The analysis of the relations between users could indicate the degree of 'transitivity,' which could be interpreted, as important indicators of stability (Vignollet et al, 2007). Further, ICT characteristics like connectivity and its one to many configuration could potentially have positive effects on increased community participation. It is argued that enhanced citizen participation can lead to formulation of policies that are more realistically grounded in citizens' preferences and improved public support for these policies (Aristotle 1987, Irvin and Stansbury, 2004). But authors like DiMaggio, Hagittai, Neuman and Robinson (2001) notes, that there was little systematic study of how community-level voluntary associations use the Internet and whether the Internet affects their structure and enhances their effectiveness. Weare (2002) stresses that the

gap in the literature was unfortunate as the communication capabilities of the Internet should be particularly useful to community organisations.

Because when we consider the community as a node within the communication network, their importance as a node stems only from their ability to contribute to the "network goals" (Castells, 2004). As Monge and Contractor explain, "communication networks are the patterns of contact that are created by flows of messages among communicators through time and space," (2003, 39). Therefore the high reliance on face-to-face interaction in completing the sanitation audits by SJC community advocates disrupts the network process flows. "Flows are streams of information between nodes circulating through channels of connection between nodes,"(Castells 2004, 3). But this can also be attributed to informal settlement community's general distrust of digital mediated media, lack of regular Internet access, affordability of Web2.O enabled smart phones, low technical skills levels and other socio-economic barriers. The description of the 'digital divide' according to Cullen (2003), explains it as the gap of knowledge between communities with access ICT as apposed to those with no, or limited access. In order for this communication network to deliver real performance, ICTs would remain important in organising and sharing knowledge (Berawi, 2004).

Therefore, strengthening SJC's information/digital infrastructure and developing basic digital communication channels internally would alleviate the difficulty in building a case or taking on the ground activations in the digital sphere. The main goal would be to highlight the various ways of strengthening the SJC's internal digital communication infrastructure. It should include a campaign analysis of SJC on the ground activations and how to make them better known to local government decision makers, local authority planners and other forum participants who are urban transformation experts. Here the focus should be on developing digital communication channels that could create greater engagement and connectivity, creating an enabling environment to speed up service delivery bottlenecks and infrastructural development, in a real-time and integrated digital communication environment.

In addition, ICTs have a greater potential for improved engagement on sanitation challenges if it involves the township community on these digital platforms. SJC needs an open and accessible digital channel for township citizens to express their views. A strong emphasis should be on the appropriation by social practice, which seems to be based on SJC community advocate feedback heavily concentrated among teenagers. The SJC should consider new forms of community, bringing young people together on-line around shared values and interests, that can create ties of campaign support that already exist in on the ground service delivery protests and to extend this to on-line interactions

But the socio-economic status of citizens will explain their level of online participation in terms of the social circumstances that shape their attitude to ICTs. Cited as the most widely employed online participation theory (Seyd et al, 2001) the

model considers various resources, motivations and civic skills as antecedents of online participation. So how can digitally mediated communication facilitate community empowerment? First, the maintenance and management of dispersed face-to-face networks can be dramatically increased. It can facilitate a larger assessment pool of community actors creating ever-growing networks of allied participants**.** Digital platforms like SNS can transform displaced communities into digital networks, where notices can be placed, and allow community actors to stay in touch beyond face-to-face meetings and exchange text and data. Certain mobile phone digital applications will allow community advocates to form closed and direct virtual networks with their constituents to facilitate mediating service delivery failures in a more effective manner. The virtual community could also become an authentic community experience for poor informal settlement residents if the basis was grounded in the everyday physical world experience of community actors. Community activists associations that seek to strengthen their communities require cohesion among their constituents or members and infrastructure that encourages participation.

4.3. The SJC Office Staff and SJC Online Activities viewed through the ANT lens: translation phases

Case Study 2 Analysis

By using the ANT perspective in this section, the analysis wants draw attention to the sociology of translation in case study 2. The focus is on how ‘the actor-networks’ grew, changed and stabilised during the process of adoption and use of ICT-based SNS initiatives, examined in particular in organisational and outside stakeholder contexts. Each case study is analysed on the basis of the four elements of translation: problematisation, interessement, enrolment and mobilisation.

4.3.1. Problematisation

The identification of the actants were as follows: the SJC office staff, the SJC SNSs, the outside stakeholders, the news sources, the Internet, content messages and SNS users. Social media, and mobile technologies have become integral part of the SJC’s organising and work practices. In addition to influencing and increasing the way they engaged with citizens, outside stakeholders and communities, the SJC understood the medium as a valuable participatory tool. A large number of theorists have linked the development of large-scale organisations and other social structures to developments in information technology (Bell, 1974; Beniger, 1986; Castells, 2000). According to Weare (et al), the broadcast capability of the Internet may allow information to be shared throughout a group efficiently, and thus reassure members that they are on an equal footing where information access in concerned, (2005). But this means online communication participation that was available to informal settlement residents was limited and was influenced in how they overcome the digital barriers. Subsequently, the SJC office staff through their online engagement identified outside stakeholders,

like the City of Cape Town, sister NGO organisation such as Equal Education and Ground-Up news and news sources such as the Mail and Guardian plus SNS users on SJC digital platforms as relevant actors to foster their urban agendas.

4.3.2. Interessement

As the main actor in the network, the SJC was aligning its outside stakeholders with specific content streams on its SNS platforms to send out information with the intention of addressing its informal settlement agenda. The Internet and SNS platforms were the Obligatory Passage Point (OPP) where all content and stakeholder alignment would converge. In addition, the SNS communication facilitated the development of cultural and socio-spatial pockets for engagement and alignment. This is a dimension of community empowerment where the community, SNS users, outside stakeholders and interested digital parties could choose to maintain relations with the SJC. Computer-mediated communication facilitated the proliferation of interest group activities. SNS were moderately successful as a vehicle for mobilising people based on similar interest and to influence public opinion by sharing accounts of communities in sanitation challenges based on articles and covered incidents. Interest groups formed part of the actor-network. They were categories of interest groups linked by sharing of a single concern, rather than a network that bound groups across many arenas of activities.

4.3.3. Enrolment

The SJC as the focal actor wanted through the process of enrolment by their actions and communication to define and coordinate the roles of other actors within the actor-network. The actions in this context, was the SNS communication platforms, where these digital mediums were employed to broaden and keep the SJC network bound together. Here the SJC's computer-mediated communication enabled interested parties to communicate on the issues raised in various campaigns and events taking place in the informal settlements. This computer-mediated communication was also supplemented with face- to-face contact on the ground in campaign activities. It does appear from SNS 'likes' and followers that the SJC had managed to attract through the enrolment process mediated support on its platforms. By using the technology to facilitate dispersion, the SJC was facilitating it to reach a broader community. The computer-mediated communication facilitated the organisation to extend its relevance in time and space. As SJC staff preferred using there personal Twitter accounts to engage in dialogue with certain political figures. However, the research on the micro-level impacts of information technology provided support for the claim that the effects of the SNS platforms did not necessarily lead to more engagement with informal settlement residents. Other research into the role of communication and community building has shown that the communication infrastructure in the communities in which people live influences their ability to use available technology effectively for purposes of enhancing their quality of community life (Ball-Rokeach, Kim and Matei, 2001).

4.3.4. Mobilisation

SJC online sanitation campaign did influence opportunities for diverse community interest groups outside Khayelitsha to participate on a range of SJC campaign related activities, events and notices. In the case of both the SJC and other interest groups, the research revealed that new technologies enhanced network building, suggesting that it could aid community development. This can be described as the kind of social organisation brought by electronic communications as "the rise of the network society" (Castells 1996). Therefore, by designing and using new engagement communications technologies it furthered interventions that offered a valuable way of strengthen local SJC networks. The use of the social media and some mobile technologies did provide the SJC with some capabilities in building awareness and generating communication with other stakeholders that might not otherwise have occurred.

4.3.5. Dissidence

Inevitably the SJC were confronted with other actor-networks in which township communities such as Khayelitsha, where the immediate and pervasive lack of access to online technologies remains a major challenge in building a truly participative online community and culture. The challenges were depicted by the lack of digital tools, community interfaces, digital methods, and online practices in the use of social and mobile technology that enable participation and engagement. But given the context of informal settlement communities, among other things, a variety of options for face-to-face engagement to complement SNS communication is another enrollment process. But the more relevant question is to what extent the actor-networks are maintained across the digital boundaries of such SNS applications, especially if it was able to organise the community to further their personal circumstances.

4.3.6. Frequency of posts

By examining the frequency of SJC posts, it could be determined the consistency developed through online traffic flow and message delivery by the SJC. It varied according to how often the SJC posted comments and stories online. Frequency on Facebook averaged around three stories per week and was classified as low-frequency posters based one post every second day**.** The percentage on Twitter increased to 13 posts per week and was considered as a medium frequency of online content distribution. However, more medium frequency posts than low frequency posts supported the movement or offered encouragement to end users. As the Twitter posts offered more engagement and frequency in content and message delivery which users could follow up on based on specific action resulting from content frames.

But this seems to put the SJC online content and message at a disadvantaged as little confidence existed in individuals taking charge of SJC content distribution. This could be due to a lack of media experience, content distribution techniques or it not forming

part and parcel of SJC operations in any of its campaign. Content distribution on digital platforms are done as an after-thought and not considered as a strategic tool in its execution from the observations. This is based on observations of content coming predominantly from secondary news sources.

4.3.7. Informational Online-Links

The kinds of information the SJC posted on their Facebook, 88 percent of comments contained positive feedback and signs of enrollment, of which 69 percent linked to textual information, such as newspapers or blogs. Of the textual SJC links, 75 percent linked to online main- stream news articles, such as from the *Mail and Guardian* or the Ground-up online newspaper. Approximately 15 percent linked to non-mainstream/alternative news articles. Approximately 80 percent of links were to still photos, like photos of campaign events or notices uploaded to Facebook photo albums. About 10 percent of links went to videos, such as from YouTube. Just 2 percent contained audio links, such as to a report on a radio station's websites or Sound Cloud sites.

4.3.8. Discussion

What computer-mediated communication adds was a greater capacity to increase public interaction of the kind that community participation in development**.** SNS networks transcend the spatial community, thus, they link people with similar interests, by forging links among people sharply different from one another. Twitter and Facebook as social media platforms can be described as computer mediated communication among large groups of individuals. These groups of people might not meet face to face to exchange content, ideas and experiences. These digital interactions in which people don't have to know each other are making new kinds of communities possible.

According to SJC office staff, information and content distribution online were prompted by offline action by supporting campaign protests and calling on outside stakeholder to participate and spread the word. The research showed that some content were framed to motivate others to get involved in the SJC offline campaigns and participate in offline activities, whether attending protests or petitioning the City of Cape Town. As most Facebook and Twitter users' comments were sanitation-related but the SJC's sub-frame of a call to action, illustrated that the online component had limited focus on generating offline participation. The SJC used Facebook and Twitter as a forum for talking about social justice, highlighting sanitation problems and criticising local government on service delivery issues. But there attempted to engage online users through uploading SJC sanitation reports, organised protests and uploaded photos on sanitation failures in parts of informal settlements proved to have little impact on reaching a truly mass base or an emerging informal settlement community.

Analysing the SJC Facebook and Twitter content also provided some insight into how they wanted to exploit the interactive elements of these mediums with sharing of photo content and long-formatted news style pieces. The SJC posts included links to videos, photos and texts, from predominantly non-mainstream news sources that provided alternative coverage of sanitation challenges in the community. Also, Facebook's option for users to 'like' or respond to a comment helped generate debate and create a sense of community and collective identity, furthering the likelihood of users participating offline. The online contents, attracted some 'likes' and attention from digital users and participants, which contributed to some online participation. But content frames, language usage and long formatted copy made it challenging for local community users to appreciate the relevance of the SJC work. Increasing participation from the local community participant stakeholders, which potentially could've created greater trust and increased building a consensus in these technology mediums, could've strengthened online interactions. As the interactive nature and online features of SNS could influence and bolster the collective identity that served to push the online content and messaging, offline into informal settlement communities, where it potentially could have more feedback from residents wanting to posts their stories and challenges online.

Thus, the researched revealed that the SJC's SNS capability could enhance the participatory nature and empowerment of communities that were influenced from political activism in township**.** This was done through organising outside stakeholders online, where the Internet served as a tool to facilitate mobilisation, education and alternative content distribution. The collective approach to aligning outside stakeholder and the consistent thematic frames, plus the inclusion of relevant links, ensured some interactivity among users via Facebook and Twitter. Digital features such as the ability to 'like' a post or comment by responding on the SJC Facebook 'wall' comment, increased community and public awareness and would have contributed to offline message and support building in the community and other sector partners.

There are three major groups of actors involved in the SJC online Facebook campaign actions; the SJC office staff, intermediary sources supplying online content on sanitation issues and the SJC online users that took part in online activism campaigns. Each performs a distinct action online in activating campaign messaging. Although there actions are determined to be coordinated to serve the SJC's online activism agenda, the differences between action and responses had implications in measuring its effectiveness. Online content were one directional in nature and seldom had a call to action response leading to low or no direct involvement from user responses in SJC online campaign actions. Initial staff responses determined that the SJC didn't have a particular target audience in mind as part of its online distribution model. It may for example have been more effective if content was styled for a particular audience to increase awareness and campaign solidarity amongst users. Subsequently, the information sources that initiate the online information flow, underlies the inaction with online users.

There was recognition around SJC staff in the value of offline campaign content distribution on digital platforms but because of a lack of media training around most SJC staff content is placed on an ad-hoc basis. SJC in conjunction with 'GroundUp Media' post content of campaign related issues online on its Facebook and Twitter platforms. But it seems SJC don't have the internal capacity to produce the content from their internal campaigns. But Mixit a mobile communication platform is main channel to get community talking and SJC staff is starting to use it as a more to link information to the community. They see Mixit as an immediate and sustainable form of two-way conversation. This communication platform still needs to be rolled out effectively as at present it is used on an ad hoc basis until internal media and communication training is complete of all SJC office staff.

Monitoring online community feedback was difficult at fixing an exact location of the online participant remained a challenge for this research methodology. Online participant feedback messages were evaluated on the basis of feedback related to a specific sanitation communication or complaints of services. Most online participant feedback centred around SJC reporting on campaign activities and events around sanitation. The frequency of feedback varied and averaged out to about two/three responses on Facebook per SJC message or campaign content uploaded. SJC content can be characterised as kind of task orientated or reporting style related to sanitation campaign messaging. The online participant response feedback would reveal a network of contacts/participants characterised in a common understanding of the social and urban developmental challenges faced by township communities. Twitter as a social media network demonstrated the best example of a shared view on the political orientation of recipients. Group social cohesion among online participants on the SJC Twitter platform yielded networks of respondents or stakeholder groups that shared similar political ideologies.

It is important to note that the SJC operate in an environment in which digital communication is not strongly promoted within the organisation daily activities. This led to greater centralisation of communication within the organisation, as only two senior office members became the conduits through which messages would pass. This can be attributed to a number of factors such as insufficient media skills of general office personnel, the centrality of communication infrastructure in the organisation, and the external environment in which the SJC operates which has low Internet penetration. People differ in terms of their ability and inclination to use the Internet (Jung, Qiu and Kim, 2001; Loges and Jung 2001; Wood and Smith, 2001).

According to SJC office staff because of low Internet penetration in informal settlements, it is more advisable to conduct SJC campaigns issues on the phone or talk face to face with people. Community residents are more amenable when you share information face to face and use radio slots as a means of communication as the Internet still remains an unfamiliar and uncertain communication terrain. The findings supported that the utility of employing a technological determinism perspectives did influence the use and impacts of technology on the organisation. In addition, the findings indicated that the social networking sites could foster the idea of a digital

community but only if people in the network had similar levels of Internet connectedness. In this way, Internet connectedness became akin to civic skills and participation (Weare et al, 2005). The digital divide problem, meaning people with less access to the Internet could not necessarily join the network, and could not participate in the virtual information-sharing platform. Adding the SNS as a toolkit to the SJC does not have any predictable results. Awareness of the potential benefits and disadvantages can assist the SJC to better optimise their technology platforms.

4.4. SJC Digital Mapping of RR Section

Case Study 3 Analysis

4.4.1. Problematisation

The focal lens of ANT provided an appropriate framework to understand the relation within the actor-network. The Social Justice Coalition (SJC) and a team of Ndifuna Ukwazi (NU) partnered up to map public portable toilet locations in the RR Section of Khayelitsha. They devised an interactive website and phone-based reporting system to improve efficiency in portable toilet maintenance. The actants in this case study were the SJC and NU members armed with clipboards, digital cameras, and handheld GPS devices, the RR Section residents, the City of Cape Town, the mapping technology platform and mobile phone devices. This mapping project's aim was to bring an alignment of various actants together in a community based ICT initiatives that involved the establishment of place-based technologies to provide a 'virtual' representation of that community. In this instance digital mapping of RR section provided the potential to make important contributions to the urban transformation agenda of the SJC.

4.4.2. Interessement

SJC and NU took place-making ICT enabled communication technologies into RR Section and transformed the physical into the virtual realm, where digitally mediated communication could now become an effective building platform for collaborative community regeneration. This is what Castells refers to as, "a network society whose social structure is made of networks powered by microelectronics-based information and communication technologies," (2004, 3). However, the technical expertise required together with the ICT supported social networks critical for the success of a ground-up capability to transmit and exchange messages requires all the actants to be aligned for it to accelerate the proliferation of hybrids. The SJC's purpose through the mapping project was to improve efficiency of portable toilet maintenance as another important actant, the City of Cape Town complained that it was difficult for them to locate the exact toilet in need of repair among informal settlements. The SJC therefore needed to develop an accurate mapping system that would identify the number portable toilets more precisely.

4.4.3. Enrolment

By combining ethnographic and observational data gathered at the ground level to analysing the flows of digital inputs in this networked informal urban spaces, the SJC could develop new ways of using GPS, social networks, logged complaints and the mapping technology to denote to arrangement of social and institutional norms among actors within the actor-network. The community and SJC staff participating in the design of this technology could use resident feedback and the digital monitoring process as a way to shape the planning of service delivery. The aim of the project was to develop the mapping service as a civic network delivering public information platform. The technological frame provided actors with conceptual resources to interpret and mine the data. It could help coordinate actors by communicating their expectations and adopt other mechanism to affect the desired outcomes. By analysing the technological details of the mapping project, is it possible to develop better and more focused plans for research and interventions into informal settlements.

4.4.4. Mobilisation

The SJC identified all the portable toilets that were managed by the City of Cape Town and their contractors in RR Section**.** Residents were encouraged to use the GPS locations of the toilets to send complaints via SMS or USSSD mobile phone networks that would indicate the location of the problem toilet. This allowed the SJC to be able to visualise and accurately the City to faulty portable toilets. The cell phone-based reporting system would keep the digital map updated on the progress and response of all actors. The collaborative map will allow all the main actors to identify patterns of where toilets were not being properly maintained and build up a data map of where issues were coming from.

4.4.5. Dissidence

The project inevitably could not be extended to other parts of Khayelitsha as limited actant resources only allowed for the roll out the small pilot area of RR Section. In addition, the SJC's technological infrastructure would be comprised to effectively deliver this system based on two elements: the network infrastructure to deliver the service and participant access to the network. Here network infrastructure refers to the sophisticated mapping software and the mobile phone technology required to transmit the information in real-time. In some instances residents however did not have enough disposable income to log complaints or report problems via their mobile phones. Resident digital access was a major draw back as it required constant links or being plug into the mapping system for it to become a viable and effective monitoring platform.

4.4.6. Discussion

Public participation as well as creating the conditions for sustainable service delivery underscores the importance of this ICT platform, in it being able to monitor and hold

effective governance to account was clearly crucial. The data collection and monitoring of service delivery from this place-based mapping system enabled a clearer and more effective distribution of resources and decision-making from all the relevant main actors. As an urban digital interface linking communities and different stakeholder actors it has become critical infrastructure needed in application of modern ICTs regardless of distance and densities. The SJC says they were analysing the feedback from this project and are considering the potential usefulness of the information to make it more visible and accessible to all the different parties involved. The improvement that could be made in tracking the layout and service delivery levels that could be maintained can be a valuable community engagement tool. The ICT mapping systems' architecture allowed the securing of valuable mapping data that the SJC could use as an empowering mechanism to deliver service managed and implemented by the community. Although ICTs are the main enabling force in creating these virtual worlds, other aspects are also at work such as, social forces, political environments, government telecommunication policies and cultural paradigms. According to Zigurs (e.tel), "these forces continue to create the necessary conditions for the eventual growth of the virtual society" (2001, 11). He goes on to say that the idea of digitally connected communities are not yet common place, there is political will among some countries who are taking responsibility to create ICT infrastructure for change. South Africa in particular has progressive 'Universal Access,' policies that favour the roll out of ICT infrastructure to schools and rural areas through the country.

Certainly, this ICT platform could engender profound changes to the community. Therefore, further research is needed to stress the degree to which the urban digital mapping systems can be used by social agencies and communities bent on using ICTs in making cities more accessible and liveable for marginalised communities. In addition, the causal relationship between ICT and how it influences what a community knows and understands about their developmental needs, needs further interrogation. ICTs changes working methods and the ways in which people communicate. Similarly, it affects how the community accesses and shares it with others and establishes information as an important source of power (Heeks, 1999). ICTs can potentially be an important instrument of creating an ecosystem through which poor communities can directly help improve the welfare of their urban context. The concern is how modern ICTs can be utilised to strengthen and develop the information systems for marginal communities. However, recent trends of information and communication technologies are rapidly consolidating global communication network with implication for communities in developing countries. The implications and constraints of existing information systems on poor marginal communities and their intersection with ICTs are also little understood in relation to urban transformation. There should be further investigation on the importance of ICTs as a necessary condition to empowering marginal communities to engender urban transformation.

4.4.7 Synthesis

There is considerable evidence to suggest that ICTs can become an enabler that can facilitate community building and urban renewal. Social movements have the digital tools can harness its power by linking it to improvements in service delivery. The digital mechanics needed are available but it will take time to foster the effective information use and perhaps political will on the side of government to encourage civic engagement that will support improving services. It is clear across the three studies that for government to succeed in delivering effective municipal services the opportunities and gains are embedded in using ICTs more effectively as a participatory civic tool. It leads to greater social inclusion and bridges the pervasive gaps between social movements, communities and the state.

5. Conclusion

This study has made an attempt to provide further understanding on how ICTs can play an effective role in modern social movements operating in deprived communities in the South Africa. The aim of the research was to assess how the use of ICTs in informal settlement communities could contribute to community empowerment. The research used the case study method and viewed the research results through the Actor Network Theory lens to unpack the three main datasets. Yin describes the case study method as a logical model of proof that allows the researcher to draw inferences regarding causal relationship among variables under investigation. This research endeavour was an attempt to demonstrate the potential use and deliver relevant answers to the main research questions.

In terms of ICTs playing a significant role in the lives of organisations like the SJC, the observations prove that they are making the linkages that will enhance the fragmented relationships between the communities they serve and the powerful state agencies they want to hold accountable. It is important to note that the influence of ICTs on social movements like the SJC is at the developing stage, ultimately it will be able to extract true potential new media holds as a powerful tool in community empowerment. The SJC's continued endeavours will pave the way for even these marginalised communities to become fully engaged and civic minded citizen, determining their own urban transformation linked abilities to participate community building.

The SJC plays a critical role in building a consensus block for marginalised information settlement communities. Organisations like these, provide avenues for collective action, cultivate social capital, and act as channels of information gathering, which mediate on behalf of deprived communities and state authorities (Chaskin, Brown, Venkatesh, and Vidal, 2001; Putnam, 2000). Therefore, its increased scope of moving some of its traditional grass-root activism work into the digital education and information sharing space plus their ICT enabled mapping and monitoring systems

are now dramatically transforming how the SJC does its community work. In addition, they face substantial coordination costs in reskilling field staff and upgrading internal technology systems to implement these ICT strategies. As the means of communication available to SJC community advocates influences their success in overcoming these barriers.

But it is early to make conclusive arguments about the role of modern ICTs and SNS such as Facebook, Twitter and other online content sharing platforms rapidly, altering or becoming the most significant communications mediums for informal settlement communities and organisations working in these areas, that will lead to citizen led digital urbanism. But Olsson's et.al., (2008) perspective suggests that new technologies offer a host of opportunities in close-knit communities, where online content could be used in a collective manner. This phenomenon of increased use of ICTs and the Internet becomes critical in the modern urban environment where support for social issues are driven by critical collective action and moving it into the information age. In civic organisational terms, the Internet and allied technologies offer the SJC, the ability to affect the social networks of the organisation. It is able to reach and connect to individuals and organisations that otherwise would be impossible to network with off-line.

However, it seems clear that in informal settlement communities and for organisations like the SJC operating in this context, the tendency is for the web not to automatically translate itself into a radical online participation tool for constant citizen engagement. Nor to counter tendencies that will combat poor urbanisation practices, or to radically empower the poor, the digitally disenfranchised, and dispersed organisations against the powerful. But from the research results, computer-mediated communication only reinforces the existing power structures within society.

These results serve as a novel framework, in whether the experience of computer-mediated communication encourages a detailed understanding of the structures of power that lie behind machines, the web and of disadvantaged communities**.** Proponents of the Internet have long advocated a kind of cyber-democracy and the civic-led participation that would drive development and community empowerment. As, ICTs and the Internet have the potential to become an important catalyst for interaction and creating community participation within close-knit informal settlement communities. But, clearly virtual communities as set up by organisations like the SJC with low technical skills levels, don't flourish on close inspection but only promote a centralised experience, as community participants are largely marginalised in this gravitation towards modern ICTs. This detracts from the models in which computer-mediated communication was successful in building an effective engagement platform that would increase multi-stakeholder input and empowerment opportunities for the poor in cities.

However, this research contributed to the use of ANT in delivering a deeper understanding as to how the various ICT actors played their roles in the formation and the proposed extension of ICT as empowerment tool in various projects and instances.

ANT also enhanced the understanding of differences in the methods and materials that actors deploy to achieve their individual as well as common goals. The detailed translation process described how the actor-networks influenced different actors, which were initially separate in some instances, and how their interest had ultimately unified them towards a common goal. This study through the empirical case study method, examined how a focal actor, the SJC, enrolled different actors, such as sister activist organisations, technical experts, active online users, data, mapping technological platforms and the Internet through enrolment process, to mobilise their ICT initiatives. ANT as a research methodology, uncovered that the formation and extension of ICTs in community projects and how it evolved through the different phases of identification of relevant actors, roles, negotiations, and their interest alignment. By using the ANT translation phases to explain the various cases in the study, it assisted our understanding of the processes involved and ICT development and actors, showing that ANT could explain and be used to describe the elements of the SJC's ICT campaigns and mapping project.

The potential for ICT actors to play an important role in the growth and extension of ICT as an empowerment tool in poor communities, in turn could enhance the effectiveness of urban transformation and foster socioeconomic development in the disadvantaged communities. However, more research needs to be done to understand the role of these actors. The study revealed that positive steps could be established, drawn from different social actors and community organisation, despite the many challenges, to enable education, online community participation, and empowerment opportunities in informal settlements. The roles of different ICT actors and interconnection between technology and society can provide us with a better lens to understand how ICTs can effectively be used to enhance the livelihoods of poor and marginalised communities (Unwin, 2009).

In the end, the research had delivered some practical insights and implications, which showed that ICT actors could play a major role in the formation and extension of community empowerment and foster participation by enrolling various online campaigns. For example, the Internet influenced communication, information, collaboration and knowledge management in an urban environment not traditionally associated with technological innovation. Some online users had sufficient incentive to participate and some users distributed and shared voluntarily the SJC content of their campaigns online. As the opportunity costs associated with mobile Internet access decrease, the promising signs are that this will empower marginalised groups. However, at the same time, the challenges like lack of smart phone accessibility, technical skills needed, and physical infrastructures can agitate the enrolment process and dissolve the actor network.

The study has revealed that the introduction of the Internet into an existing social network does increase the network ability of the organisation. This is what Castells refers to as a result of the Internet ability to enable individuals to establish "weak ties" with others with whom they might not otherwise connect (Castells, 2000). The Internet is also likely to affect the pattern of centralisation within the networks.

Among the SJC staff examined here, wide use of mobile technologies by all staff members were observed, although the skills level of each staff member varied, it did increase the density of the information exchange within the organisation and with its partners. An important contingency factor was the distribution of Internet use. The results show that on an organisational level, the impacts of ICTs provided important infrastructural support to mitigate obstacles of collective action. Its online activity strengthened and expanded the role of associational activity with a wider range of social actors in the urban governance arena.

The limitations of this study relates to the data that was collected in a short time frame and that Internet and ICT applications were fast moving and ever evolving environments that could see rapid innovations at organisational level. This could restrict the generalisation scope of the research. The time frame of the research also raised the possibility that the study may not have captured the effects of ICT implementation phases at the crucial time in the organisations' technological lifecycle. This kind of research on the SJC's ICT projects and campaigns may require longer periods of study to have more sustained influential results. The research also didn't include the informal settlement communities as a focus area or group in the research; results could therefore have been different if other multi-stakeholder communities were involved. The research relied on SJC community advocate and staff inputs on the perceptions and online data collection to understanding informal settlement community's engagement levels on SJC online campaigns and attitudes to the SJC's digital migration.

The research results offered a view that challenged conventional thinking around community engagement practices and to consider the possibilities that, ICTs could bring poor urban communities into the information age, with the possibility of accessing knowledge and information. Failure by local government stakeholders, urban planners and policy makers to acknowledge information poverty as a form of poverty and that ICT infrastructure provision should form part of the essential service delivered to communities must be realised. Only then will cities of the global South be able to fully develop into digital cities, where access to ICTs by the poor could be seen as a necessity able to improve the sustainable development of communities and overall good governance.

References

Abrahams, L & Newton-Reid, L, 2011, *Local Government and ICTs in Africa*, Pambazuka Press, 213-234

Aurigi, A, & De Cindio, F, 2008, *Augmented Urban Spaces: Articulating the Physical and Electronic City*, Ashgate Publising

Barker-Plummer, B. 2002, Producing public voice: Resource mobilization and media access in the National Organization for Women. *Journalism and Mass Communication 79*(1), 188- 205.

Bell, D. 1974. *The Coming of Post-Industrial Society: A Venture in Social Forecasting*. London, UK. Heinemann.

Bell, G. (2005) 'The age of the thumb: A cultural reading of mobile technologies from Asia'In P., Glotz, Bertschi, S. & Locke, C. (eds.) (2005) Thumb Culture –The Meaning of Mobile Phones for Society. (pp. 67-88). New Brunswick: Transaction Publishers.

Blignaut, A.S., & Howie, S.J. (2009). National Policies and Practices on ICT in Education. In T. Plomp, R. E. Anderson, N. Law & A. Quale (Eds.), *Cross-National Information and Communication Technology: Policies and Practices in Education* (Revised Second Edition ed., pp. 653-670). Charlotte: Information Age Publishing, Inc.

Bolter, J. and Grusin, R. (2000) *Remediation: Understanding New Media*. Cambridge, Mass.: MIT Press.

Bonfadelli, H. (2002) 'The Internet and Knowledge Gaps: A Theoretical and Empirical Investigation', European Journal of Communication 17(1): 65-84.

Boyd, D. (2008). Why Youth (Heart) Social Network Sites: The Role of Networked Publics Youth, Identity, and Digital Media, 119–142. Cambridge: The MIT Press.

Brandtzaeg, P.B., Heim, J: (2008) User loyality and Online Communities: Why Members of the Online Community are not faithful: ICST Second International Conference on Intelligent Tecnologies for Interactive Entertainment

Buckley, S. (2000), *Community Radio – the New Tree of Speech*, Imfundo Background Paper, No. 19.

Callon, M. (1986) '*The Sociology of an Actor-Network: The Case of the electric Vehicle*' in M. Callon, J. Law and A. Rip (eds) *Mapping the Dynamics of Science and Technology*.

Castells, M, 2004, *The Network Society*, Great Britain by MPG Books, Bodmin,

Castells, M. 2001, Virtual communities or network society? In *The Internet galaxy: Reflections on the Internet, business, and society* (pp. 116-136). Oxford: Oxford University Press.

Castells, M, 2004, *Space of flows, space of places: Materials for a theory of urbanism in the information age.* In S. Graham (Ed.), *The Cybercities reader* (pp. 82-93). London: Routledge.

Castells, M, 2012, *Networks Of Outage and Hope, Social Movements in the Internet Age*, Cambridge Polity Press

Cullen, R (2002). Addressing the digital divide, Online Information Review, 25 (5), 311 – 320

Castells, Manual (2001), *The Internet Galaxy*, Oxford, Oxford University Press

Castells, Manual (2004), *The Power of Identity*, 2md Edn, Oxford; Blackwell

Cha Jeong-Won, Lee Hyun-woo, Han Yo-Sub, and Kim Laehyun (2009) Changwon National University, Changwon, Republic of Korea, Dept. of Computer Science, Yonsei University, Seoul, Republic of Korea

Cha, J., S. Choi, H. Yu, H. Kim and C. Kim, 2010. Directly applicable microbial fuel cells in aeration tank for wastewater treatment. Bioelectrochemistry, 78: 72-79. DOI: 10.1016/j.bioelechem.2009.07.009

Census, 2011, Statistics South Africa

Chen, K. K., & O'Mahoney, S. (2007). The selective synthesis of competing logics [MIT working paper]. Available at http://web.mit.edu/iandeseminar/ The_Selective_Synthesis_of_Competing_Logics_3_3_07.pdf.

Cleaver H (1998) The Zapatista effect: The Internet and the rise of an alternative public fabric. *Journal of International Affairs* 51: 621–632.

Costanza-Chock, S. (2003) 'Mapping the Repertoire of Electronic Contention', in A. Opel and D. Pompper (eds) Representing Resistance: Media, Civil Disobedience and the Global Justice Movement, pp. 173-191. Westport, CT: Greenwood Publishing Group.

Cranshaw, Schwartz, J. I. Hong, and N. Sadeh. The Livehoods Project: Utilizing Social Media to Understand the Dynamics of a City. In The Sixth International AAAI Conference on Weblogs an Social Media, ICWSM-12, Dublin, Ireland, June 2012.

Cullen, R. *Addressing the Digital Divide*, LIANZA, 2002

Davies, W. (2004). *Proxicommunication: ICT and the local public realm*. London: The Work Foundation.

Davis, F. D., Bagozzi, R., and Warshaw, P. R. "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," Management Science (35:8), 1989, pp. 982-1003.

Diani M (2000) Social movement networks virtual and real. *Information, Communication & Society* 3(3): 386–401.

Donath, J.S. (1999), Identity and Deception in Virtual Community in Smith, M.A. and Kollock P (eds) Communities in Cyberspace (London/New York; Routledge).

Downing, J. (2001). *Radical media: Rebellious communication and social movements*. Thousand Oaks: Sage Publications.

Eikelmann, S., Hajj, J., & Peterson, M. (2008). Opinion piece: Web 2.0: Profiting from the threat. Journal of Direct, Data and Digital Marketing Practice, 9(3), 293-295.

Elgin, D (1994*), The Awakening Earth: Global Communications and the Social Brain*, Morrow, New York

Facebook. 2013, Statistics. Retrieved November 1, 2013 from http://www.facebook.com/press/info.php?statistics.

Feeney, M., Welch, E.W. and Haller, M. (2011). Transparency, civic engagement, and technology use in local government agencies: Findings from a national survey. March 2011. Institute for Policy and Civic Engagement/Science, Technology and Environment Policy Lab, University of Illinois at Chicago, March 2011.

Fisher Claude, (1992) *A Social History of the Telephone to 1940*, Berkeley, CA

Florida, R. L. (2003). Cities and the creative class. *City and Community*, *2*(1), 3-19.

Florida, R, 2004, *Cities and the Creative Class*, Volume 1, Part 1

Friedland, L. A. (1996) 'Electronic Democracy and the New Citizenship', *Media, Culture & Society* 18(2): 185–212.

FrontLineSMS in Action, 2012, *SMS in Action,* from https://smsinaction.crowdmap.com/main.

Gates, B. (1999) *Business @ The Speed of Thought: Using a Digital Nervous System*. New York: Warner Books.

Giddens, A, 1990, *The Consequences of Modernity* (Stanford, CA: Stanford University Press).

Giddens, A. (1984). The constitution of society. Berkeley, CA, USA: University of California Press.

Graham, S, 2004, *Cities, War and Terrorism Towards an Urban Geopolitics,* Blackwell, Oxford.

Graham, S. (Ed.). (2004). *The cybercities reader*. London: Routledge.

Gottman, Jean. "Megalopolis and Antipolis: The Telephone and the Structure of the City" in Pool, ed. 1973.

Gumpert, G & Drucker, S, 2005, *The perfection of sustainability and imperfections in the digital community: Paradoxes of connection and disconnection*, In P van den Besselaar & S Koizumi (eds), Digital cities

Gutmann, A. and Thompson, D. 2004. Why deliberative democracy? Princeton, NJ: Princeton University Press.

Habemas, Jurgen (1989). Structural Transformation of the Public Sphere. Cambridge, Mass: MIT Press.

Hamel, Pierre, Henri Lustiger-Thaler, and Margit Mayer, eds. Urban movements in a globalising world. Routledge, 2003.

Hamelink, C, 2008, *Article in Media, War & Conflict*, Philip Lee. World Association for Christian Communication, Toronto, Canada

Hartley, J., Hearn, G., Tacchi, J., & Foth, M. (2003). The Youth Internet Radio Network: A research project to connect youth across Queensland through music, creativity and ICT. In S. Marshall & W. Taylor (Eds.), *Proceedings of the 5th International Information Technology in Regional Areas (ITiRA) conference 2003* (pp. 335-342). Rockhampton, QLD: Central Queensland University Press.

Heeks R, (2001), *Understanding e-Governance for Development, i-Government Working Paper Series*, Paper No. 11.

Heim (1991) ‘The Erotic Ontology of Cyberspace’, in M. Benedikt (ed.) *Cyberspace: First Steps*. Cambridge: MIT Press.

Howard, P (2011), *The Digital Origins of Dictatorship and Democracy. Information Technology and Political Islam.* Oxford University Press, Oxford

Hussain, M. M. and Howard, P (2012) *Democracy’s Fourth Wave? Information Technology and the Fuzzy Causes of the Arab Spring*, unpublished paper presented to the meeting of the International Studies Ass, San Diego, April 1-4

ICT Charter Steering Committee, 1996, ‘*Draft Black Economic Empowerment Charter for the ICT Sector’, ICT Charter Steering Committee*, available at http:// ictcharter.org.za/content/ICTbeecharter04May2005-

Isaías, P., Miranda, P., & Pífano, S. (2009). Critical Success Factors for Web 2.0 – A Reference Framework. Heidelberg: Springer-Verlag Berlin.

Ito, M., Okabe, M., & Matsuda, M. (2005). *Personal, portable, pedestrian: Mobile phones in Japanese life*. Cambridge: MIT Press.

Jacobs, Jane. The Death and Life of Great American Cities. (Random House, New York, 1961)

Jacobs, S.J, & Herselman, M.E. (2006), Information Access for Development: A Case Study at a Rural Community Centre in South Africa: Issues in Informing Science and Information Technology, 3, 295 - 306

Jung, Joo-Young, Jack L. Qiu, and Yong-Chan Kim. 2001. "Internet Connectedness and inequality: Beyond the "divide"." *Communication Research* 28:507-535.

Juris, J. S. (2005). The new digital media and activist networking within anti-corporate globalization movements. *Annals of the American Academy of Political and Social Science, 597*(1), 189-208. doi: 10.1177/0002716204270338

Kaplan, A.M. and M. Haenlein. (2010). Users of the world, unite! The challenges and opportunities of social media. Business Horizons 53: 59-68
Keck, M.E. & Sikkink, K, 1998, *Transnational advocacy networks in international and regional politics*, Issue International Social Science Journal Volume 51, Issue 159, pages 89–101, March 1999

Kelly, Kevin (1994a). Out of Control. The New Biology of Machines, Social Systems and the Economic World. Reading, MA: Addison-Wesley

Kellner, Douglas (2000) “Habermas, the Public Sphere, and Democracy: A Critical Intervention,” in Perspectives on Habermas, edited by Lewis Hahn. Open Court Press.

Keskinen, A, (1995), *Introduction to Tele-democracy and Information Networks*, Helsinki, Finland, Painatuskaskus

Khalil, Elias L. (1996). Social Theory and Naturalism: An Introduction. pp. 1-39 in Khalil, Elias L.; Boulding, Kenneth E. (eds.) Evolution, Complexity and Order. London: Routledge

Kim, T,J, Claus, M, Rand, J,S, and Xiao, Y, 2009, *Technology and Cities; Processes of Technology-Land Substitutions in the 20th Century*, Journal of Urban Technology, Vol, 16

Kim, M, 2002, *“Planning for the Next ICT Cluster? Seoul’s Digital Media City Project,”* Technology and Society, 1:2 347–352

Kim, W., Jeong, O. R., & Lee, S. W. (2010). On social Web sites. Information Systems, 35(2), 215-236.

Kindsmüller Martin C. (2009), *Online Communities and Online Community Building*, University of Lübeck, Germany

Kleinman, S, 2007, Displacing Space – Mobile Communication in 21st Century, Peter Lang Publishing, Inc, New York

Koumirov, V (1994), *Tele-democracy*, Helsinki University of Technology

Kopomaa, T, 2000, *The city in your pocket. Birth of the mobile information society,* Publisher : Gaudeamus

Latour, B. (1991) ‘Technology is Society Made Durable’ in J. Law (ed) *A Sociology of Monsters: Essays on Power, Technology and Domination*. London: Routledge,

Latour, Bruno (1993), *We have never been modern*, Cambridge, MA, Harvard University

Latour, Bruno (1996). Aramis, or, The Love of Technology (translated by C. Porter). Cambridge, MA: Harvard University Press

Law, John; Callon, Michel (1992). The Life and Death of an Aircraft: A Network Analysis of Technological Change. pp. 20-52 in Bijker, Wiebe; Law, John (eds.) Shaping Technology / Building Society Studies in Sociotechnological Change. Cambridge, MA: MIT Press

Li, C., & Bernoff, J, 2008, *Groundswell: Winning in a World Transformed by Social*

Technologies. Boston, MA: Harvard Business Press.

Ling, R. S. (2004) The mobile connection: The cell phone's impact on society. San Francisco: Morgan Kaufmann.

Loges, William E. and Joo-Young Jung. 2001. "*Exploring the digital divide: Internet connectedness and age*." Communication Research 28:536-562.

MacGregor Wise, J. (1997) *Exploring Technology and Social Space*. Newbury Park: Sage.

MacKenzie, David; Wajcman, Judy (eds.) (1985). The Social Shaping of Technology. Milton Keynes: Open University Press

Macome, E. (2002). *The Dynamics of the Adoption and Use of ICT-Based Initiatives for Development: Results of a Field Study in Mozambique.* Unpub- lished Ph.D. dissertation, Faculty of Engineering, Built Environment and Information Technology, University of Pretoria, Pretoria, South Africa

Manji in Ekine, S. (ed.) 2010.SMS Uprising: Mobile Activism in Africa. Oxford: Pambazuka Press. p.67

Marathe, J, Creating Community (1999), http://jay.marathe.net/profile/articles/1999-11community.htm

Marcelle, G. (2002). *Information and communica- tion technologies (ICT) and their impact on and use as an instrument for the advancement and empowerment of women.* Report presented at the online conference conducted by the Division for the Advancement of Women. Retrieved June 20, 2002, from http://www.un.org/ womenwatch/ daw/egm/ict2002/reports/Report-online.PDF

Maturana, Humberto; Varela, Francisco (1987). The Tree of Knowledge: Biological Roots of Human Understanding. Boston: Shambala Publications

McLeod DM and Hertog JK (1999) Social control, social change and the mass media's role in the regulation of protest groups. In: Demers D and Viswanath K (eds) *Mass Media, Social Control and Social Change: A Macrosocial Perspective*. Ames: Iowa State University Press, 305–330.

Minkley, G. (1998). 'Corpses behind Screens': Native Space in the City. *In Blank Architecture, Apartheid and after.* H. Judin and I. Vladislavic. Rotterdam, NAi Publishers.

Mitchell, W, J, 1995, *City of Bits: Space, Place, and the Infobahn* (Cambridge, MA: MIT Press). Quotation from page 163.

Mitchell, W. J. (2003). *Me++: The cyborg self and the networked city*. Cambridge, MA: MIT Press.

Mitchell, W, J, 2003, *Me++: The Cyborg Self and the Networked City,* Cambridge MA: MIT Press

Mitchell, William J, (2003), *ME++: The Cyborg Self and the Networked City*, Cambridge, MA; MIT Press

Monge, Peter R and Contractor, Noshir, S (2003), *Theories of Communication Networks*, Oxford: Oxford University Press

Monteiro, E. (2000). Actor-network theory. In C. Ciborra (Ed.), *From control to drift: The dynamics of corporate information infrastructure* (pp. 71– 83). Oxford: Oxford University Press.

Moodley S, 2006, *The Promise of E-Development? A Critical Assessment of the State ICT for Poverty Reduction Discourse in South Africa*, University of Durban Westville Press.

Morales-Gomez, D., & Melesse, M. (1998). Utilising information and communication technologies for development: The social dimensions, *Information Technology for Development, 8*(1), 31–39.

Mwesige, P. G. "Cyber Elites: A Survey of Internet Cafe Users in Uganda," Telematcs & Informatics (21), 2003, pp. 83-101.

Negroponte, N, 2005, *Being Digital - The Fundamental Change,* Massachusetts Institute of Technology, MIT

Nimmo Richie, (2011*), Actor-network theory and methodology: social research in a more-than-human world*, University of Manchester

Nip JYM (2004) The Queer Sisters and its electronic bulletin board: A study of the Internet for social movement mobilization. In: Van de Donk W, Loader BD, Nixon PG and Rucht D (eds) *Cyberprotest: New Media, Citizens and Social Movements*. Routledge, London, 233–258.

Norris, P. (2001). Theories of digital democracy. In Norris, P (Ed.), *Digital divide*: *civic*
engagement, information poverty, and the internet worldwide. (pp. 95-111).

Norris, P., Curtice, J., Sanders, D., Scammell, M., & Semetko, H. A. (1999). *On message: Communicating the campaign*. London: Sage.

Norris, P. (2001) 'Digital Parties. Civic Engagement and Online Democracy', paper prepared fo r the ECPR Joint Sessions, Grenoble, 6-11 April 2001.

Noveck, B. S. (2009). Wiki government: How technology can make government better, democracy stronger, and citizens more powerful. Washington, D.C.: Brookings Institution Press.

Obrist, M., Geerts, D, Brandtzeaeg, P.B. Tscheligi, M.: Design for creating, uploading and sharing user generated content. In: CHI 2008, Human Factors in Computing Systems, pp 2391-2394. ACM, Florence (2008)

Odendaal, Nancy, Urban Space as a site of collective actions -: towards a conceptual framework for understand- Augmented public spaces: articulating the physical and electronic city. Aldershot: Ashgate, 2008.

Odendaal, N. (2011) "Splintering Urbanism or Split Agendas? Examining the Spatial Distribution of Technology Access in Relation to ICT Policy in Durban, South Africa" in Urban Studies Vol 48, No 11.

Oldenburg, R. (2001). *Celebrating the third place*. New York: Marlowe & Co

Opp KD (2009) *Theories of Political Protest and Social Movements: A Multidisciplinary Introduction, Critique, and Synthesis*. London: Routledge.

Orkin, M, 2012, *The New Wave*, University of Witwatersrand, Johannesburg, Johannesburg, South Africa

O'Reilly, T. (2005) "What Is Web 2.0." Article on tim.oreilly.com. Retrieved March 2008 from
http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/whatisW eb20.html.

Ozok A.A. and Zaphiris P. (Eds.): Online Communities, LNCS 5621, pp. 305–311, 2009. © Springer-Verlag Berlin Heidelberg 2009

Patel, Z. , 2000a, *Rethinking Sustainable Development in the Post-Apartheid Reconstruction of South African Cities*, Local Environment, 5(4), pp.383-399.

Pendakur, Manjunath and Roma Harris. 2002. *Citizenship and Participation in the Information Age* (pp: 56-64; 300- 335). Aurora, Ontario: Garamond Press.
Pedersen, P. & Methlie, L. (2004). Exploring the relationship between mobile data services business models and end-user adoption. Paper presented at the Fourth IFIP Conference on e-Commerce, e-Business, and e-Government (I3E).

Philliber, S.G., Schwab, M.R., & Samsloss, G. (1980). Social research: Guides to a decision-making process. Itasca, IL: Peacock.

Picon, A, 2010, *Digital Culture in Architecture, An Introduction for the design Professional,* Publisher: Birkhauser Verlag AG; Published

Pieterse, Edgar, (2014), Epistemological Practices of Southern Urbanism
African Centre for Cities, University of Cape Town Draft Paper to be presented at the ACC Academic Seminar

Pitkin, B 2001, *Community Informatics: Hope or Hype*, paper presented at the 34th International, Conference on System Science, Hawaii (Big Island, HI, January 15–18)

Postmes T and Brunsting S (2002). Collective action in the age of the Internet: Mass communication and online mobilization. *Social Science Computer Review* 20(3): 290–301.

Preece, J. 2000. Online Communities - Designing Usability, Supporting Sociability. Chichester u.a.: John Wiley & Sons.

Putnam, Robert D. 1993. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton, NJ: Princeton University Press.

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster

Pyle, R, (1996), Commerce and the Internet, Communication of the ACM

Rheingold, H, 2000, *The Virtual Community* (Cambridge, MA: MIT Press)

Rheingold, H, 2002, *Smart mobs: The next social revolution*. Cambridge, MA: Perseus

Ribeiro, G. L. (1998). Cybercultural politics: Political activism at a distance in a transnational world. In S. E. Alvarez, E. Dagnino & A. Escobar (Eds.), *Cultures of politics, politics of cultures: Re-visioning Latin American social movements* (pp. 325-352). Boulder, CO: Westview Press.

Robinson, D.G., H. Yu and E.W. Felten. (2010). Enabling Innovation for Civic Engagement. In Lathrop, D. and L. Ruma, eds., 83-89, Open Government: Collaboration, Transparency and Participation in Practice. O'Reilly Media. Available [online]: http://shop.oreilly.com/product/9780596804367.do

Rodriguez, C. (2001). *Fissures in the mediascape*. Cresskill, NJ: Hampton Press.

Rolfe B (2005) Building an electronic repertoire of contention. *Social Movement Studies* 4(1): 65–74.

Roma Maria Harris & Manjunath Pendakur, 2008, *Citizenship and participation in the information age,* Document. English, Aurora Publishing

Sen, A. (1993). Capability and Well-Being. In Quality of Life: 30-553, edited by M. Nussbaum M and A. Sen, Clarendon Press, Oxford

Singh, S, 2010, *The South African 'information Society' 1994-2008: Problems with Policy, Legislation, Rhetoric and Implementation,* Journal of Southern African Studies, Volume 36, Number 1.

Smits, R. (2002). Innovation studies in the 21st century: Questions from a user's perspective. *Technological Forecasting & Social Change, 69*, 861-883
Walmsley, D. J. 2000, Community, place and cyberspace. *Australian Geographer, 31*(1), 5-19.

Smith, Merrit Roe; Marx, Leo (1994). Does Technology Drive History? The Dilemma of Technological Determinism. Cambridge, MA; London: MIT Press

Smith, Marc. 1999. "Invisible Crowds In Cyberspace: Mapping The Social Structure of The Usenet.", edited by Marc Smith and Peter Kollock. London: Routledge.

Smith, A. 2009, *Online participation in the social media era*. Retrieved March 28, 2010 from http://www.pewinternet.org/~/media//Files/Presentations/2009/ AWS_RTIP_DEC_10_PD
F.pdf.

Star, S.L. (1991). Power, Technologies and the Phenomenology of Conventions: On Being Allergic to Onions. In a Sociology of Monsters: Essays on Power, Technology and Domination, edited by J. Law, Routledge, London.

Snyman M & Snyman R, (2003), Getting information to disadvantaged rural communities: the centre approach. South African Journal of Library and Information Science, 69 (2), 95 - 107

Thiagara jan A, Ravindranath, L; LaCurts,
K; Madden, S; Balakrishnan, H; Toledo, S and
Eriksson, J. Vtrack: accurate, energy-aware road traffic delay estimation using mobile phones. In Proceedings of the 7th ACM Conference on Embedded Networked Sensor Systems, SenSys '09, pages 85–98, New York, NY, USA, 2009. ACM.

Tilly C (1978) *From Mobilization to Revolution*. Reading, MA: Addison-Wesley Publishing Company.

Thompson, D. and Gutmann, A. (2004). Why deliberative democracy? Princeton, NJ: Princeton University Press.

Toffler, Alvin (1980). The Third Wave. New York: William Morrow and Company

Townsend A M. (2000). “Life in the real- time city: mobile telephones and urban metabolism”. Journal of Urban Technology. (7)2:85-104.

Toussea-Oulai, A., and Ura, S. “Information Technology Transfer: Problems Facing African Developing Nations,” International Journal of Human-Computer Interaction (3:1), 1991, pp. 79-93.

Tsagarousianou, R., D. Tambini and C. Bryan (eds) (1998) Cyberdemocracy: Technology, Cities and Civic Networks. London: Routledge.

Tschangho John Kim, 2009, “Planning for knowledge cities in ubiquitous technology spaces: opportunities and challenges”, in Tan Yigitcanlar, Koray

United Nations Development Programme, 2011, *Mobile Technologies and Empowerment. Enhancing Human Development through Participation and Innovation. Democratic Governance*. UNDP. New York, UNDP

Van de Donk W, Loader BD, Nixon PG and Rucht D (2004) *Cyberprotest: New Media, Citizens and Social movements*. London: Routledge.

Vargas Antonio, 2008, By Web Politics Editor | November 20, 2008; 8:00 PM ET, Washington Post

Velibeyoglu and Scott Baum (eds), Creative Urban Regions: Harnessing Urban Technologies to support Knowledge City Initiatives, IGI Global: Hershey, PA.

Venkat, K (2002), *Delving into the Digital Divide*, IEEE Spectrum, Volume 39, Issue 2.

Walsham, G. (1995a). Interpretive Case Studies in IS Research: Nature and Method, European Journal of Information Systems 4: 74-81.

Walsham, G. (1995b). The Emergence of Interpretivism in IS Research, Information Systems Research, 6(4): 376-394, December.

Walsham, G. (1997). Actor-Network Theory and IS Research: Current Status and Future Prospects. In Information Systems and Qualitative Research: 466-480, edited by A.S. Lee, J. Liebenau and J.I. DeGross, Chapman & Hall, London.

Walsham, G. (1998). IT, Globalisation and Cultural Diversity. Proceedings of the IFIP WG 9.4 International Working Conference - Implementing and Evaluation of Information Systems in Developing Countries, Bangkok, Thailand.

Walsham, G. (2001). Making a World of Difference: IT in a Global Context, John Willey & Sons, West Sussex, England.

Walsham, G. and Han, C-K. (1991). Structuration Theory and Information Systems Research, Journal of Applied Systems 17: 77-85.

Walsham G. and Sahay, S. (1999). GIS for District-level Administration in India: Problems and Opportunities, MIS Quarterly, 23(1): 39-65, March. (Special Issue on Intensive Research in Information Systems).

Warschauer, M. (2003). Technology and Social Inclusion: Rethinking the Digital Divide. Cambridge MA: MIT Press.

Wasserman, S., & Faust, K. (1994). Social network analysis: Methods and applications. Cambridge, UK: Cambridge University Press.

Weare, Christopher. 2002. "The Internet and Democracy: The Causal Links Between Technology and Politics." *International Journal of Public Administration* 25:659-692.

Weiss, M. (2008). Results-Based Interaction Design. Educause Quarterly, 31(4), 42-49.

Wellman, Barry. 1999. “The Network Community.” Pp. 1-47 in Networks in the Global Village, edited by Barry Wellman. Boulder, CO: Westview.

Wellman, Barry. 2002. “Little Boxes, Glocalization, and Networked Individualism.” Pp. 10-25 in Digital Cities II: Computational and Sociological

Winseck, D, 2008, *The Future with High-Speed Broadband*, School of Journalism and Communication, with a cross appointment at the Institute of Political Economy, Carleton University

Wolf, S (2001), *Determinants and Impact of ICT Use for African SMMEs Implications for Rural South Africa*, Center for Development Research (ZEF Bonn) Walter Flex-Str, 3 D-53113 Bonn.

Wojcieszak M (2009) *Carrying online participation offline: Mobilization by radical online groups and politically dissimilar offline ties*. Journal of Communication 59: 564–586.

Wood, A.F. and M.J. Smith. 2001. *Online communication: Linking technology, identity, & culture*. Mahwah, NJ: Laurence Erlbaum Associates.

World Bank, (1999). Knowledge for Development, The World Bank Annual Report 1999, Oxford University Press, UK.

World Bank, (200)). The World Bank Annual Report, Oxford University Press, UK.

World Bank, Annual Report 2008 Environment Matters (Washington: World Bank, 2008b), http://siteresources.worldbank.org/EXTENVMAT/Resources/EnvironmentMatters2008-a.pdf. Accessed March 25, 2011.

Xavier, M. J., (2002), Citizen Relationship Management: Concepts, Tools and Research Opportunities, ICRauthor

Yin, R. K. 2003, *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

Yin, R.K. (1993). Applications of Case Study Research. In Applied Social Research Methods Series, edited by L. Bickman, L. and D.J. Rog , Sage Publications, London, England.

Yin, R.K. (1994). Case Study Research, Design, and Methods, 2nd ed. Newbury Park, Sage Publications.

Yin, R. K. 2003. Case Study Research: Design and Methods (3 ed.). Thousand Oaks, Calif. [u.a.]: Sage.

Young, O. G., Brown, E. G., Keitt, T. J., Owyang, J. K., Koplowitz, R., & Lo, H. (2007). Global enterprise Web 2.0 market forecast: 2007 to 2013. Cambridge, USA: Forrester Research.

Yu, B and G. Cai, 2009, *Facilitating Participatory Decision-Making in Local Communities Through Map- Based Online Discussion*, "paper presented at Fourth International Conference on C&T, University Park, PA.

Zhang,Y.,Zhang,L.,Zhang,Y.,Li,X.:XRank:LearningMorefromWebUserBehaviors. In: Sixth IEEE International Conference on Computer and Information Technology (CIT 2006). IEEE Computer Society, Seoul (2006)