

The Spaces Between: ICT and Marginalization in the South African City

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ABSTRACT

Popular media and policy rhetoric often portray Information and Communication Technology (ICT) as a means to social and economic empowerment. Many assumptions embedded in ICT for Development (ICT4D) literature do the same. The ubiquitous presence of mobile telephony in emerging countries such as South Africa and proliferation of digital networks imply a critical role for these technologies in overcoming physical constraints in space. Is access to technology enough however?

This paper responds by reflecting on two sources of data collected over a three-year period in Durban, South Africa. A web development process for community organizations in two townships was followed and documented. The second data source entailed focus groups conducted with foreign street traders (hawkers) active in many parts of the city.

The notion of ‘spaces between’ refers to the in-between physical places not well served by ICT and other infrastructure, where cell phone access provides the only opportunity for digital connection. It also refers to the ‘blind spots’ in policy making and city governance. Here it refers to the in-between ‘spaces’ of those engaged in the informal economy, many of whom are foreign nationals exposed to harassment and violence off the landscape of legitimacy and economic inclusion.

Keywords

ICT, digital networks, informality, marginalization, space

INTRODUCTION

“...the new era will still contain many echoes of the old. In other words, business will go on, but never as usual – because it never has” (p. 1488) [24].

One cannot dispute that the world is fundamentally

changed due to the relentless pace and nature of advances in technology research and design. ICT has enabled a certain transcendence of spatial boundaries and deepening of transnational networks. Focus groups conducted as part of this research revealed the importance of mobile phone as livelihood arteries for the indigent. Many in these groups were subject to harassment and violence a month before the field work during a scourge of xenophobic violence which left 62 people dead. Many respondents reported the use of cell phones as critical in averting danger. Text messages sent, received and forwarded by ‘networked’ members warned of places to avoid, advised on how to dress, recommended on how best to behave and advocated how to avoid unwarranted attention from aggressive South African nationals. In short, technology was deployed to render the visible invisible in this instance; a collective infrastructure was used to protect selected personal boundaries.

In addition to focus group interviews with foreign street traders, a second part of the field work interrogated the impact of the introduction of technology into community networks. The design of the research and the analysis of data was informed by actor-network theory (ANT) considered most appropriate given its relational lens. The conceptual tools used are outlined in the following section, following by presentation of the research findings and final conclusions.

The personal interface between human agency and technological artifact is the main theme of this research. The essential research question is: does this relationship influence a larger transformation that could be of value in a broader city policy context? Does the personal appropriation of technological power enable a transcendence of physical space?

ENGAGING HETEROGENEOUS NETWORKS IN SPACE: THE CONTRIBUTION OF ACTOR-NETWORK THEORY

Social networks are important livelihood strategies for the poor. This emphasis in the literature is not new. Putman’s work on Italy and the United States [18;19], Portes’s sociological reflections [17] and work in development studies [23] highlight the benefits and limits of social capital. Recent literature on virtual capital explore the

extent to which ICT-enhanced networks replace or supplement social interaction [24; 16; 9; 27].

What much of this writing lacks is a meaningful engagement with socio-cultural contexts. Literature on social media and digital networks in developing countries sit largely outside writing on African cities which emphasizes the importance of associational life in information exchange and resource access [25; 22; 21; 15]. The agency that emerges from network connections that enroll digital artifacts needs to be uncovered.

Intimately related to the need for deeper contextual engagement is taking on board the distinguishing feature of new technologies that blurs the experiential line between infrastructure and cognition. The touch of a computer key can transport the user into another world. A mobile phone call transcends a public space into a private moment. Convergence enables infrastructure to be more intimately connected with human agency. Not only does this bring human experience into the realm of infrastructural engagement, it also transcends conventional readings of space. How technology is appropriated in the livelihood dynamic between human agency and artifact is integral to understanding the empowering potential of ICT. Why are some technologies used and others not? Interrogating market trends and distribution of infrastructure is not enough. A relational understanding that interrogates the interface between human agency and technology appropriation is more appropriate.

Actor-network theory (ANT) provides an avenue for such an enquiry given its contestation of the objectification of scientific artifacts and knowledge production processes, where "...machines, texts, buildings: all of these, as well as people, come to be seen as (potentially) embodying networks, and thus (potentially) the loci of 'action'." (p. 647) [1]. Humans and artifacts enrolled in networks are actants. One of the distinguishing features of ANT is that material and human actors are given equal analytical attention; the principle of symmetry applies. Material artifacts are considered to have agency in a network.

Time is considered elastic where histories and anticipated futures influence action. The incorporation of technology into social networks deepens process where ICT is an additional resource factored into the equation. It carries history, expectations, definitions and intention. The functioning of social networks is revealed as an unstable process that can be highly volatile yet also reassuringly supportive of livelihood strategies. Considering ICT as part of these networks requires deeper insights into how these networks stabilize and evolve and how digital technologies may alter these dynamics. ANT contributes through a deeper understanding of the interplay between actor, agency and structure [6].

This approach allowed for a richer relational understanding to emerge from the field work. Material and human elements are enrolled into a network in order to maintain it:

"... things act in concert with humans; humans act in concert with things" (p. 67) [13]

Actants are engaged in heterogeneous networks where any actor, whether person or object, or institution, is equally important in the maintenance and protection of the network [7]. Actants enrolled in a network are engaged in "connection, interdependence, mutuality, and.... relations, above all" (p. 644) [1]. An actor-network is fluid, where a change in one of the actants could have an impact on the identity and relations between actors; "every actor is also a network" (p. 647) whilst agency refers to the impact generated by a network. Maintaining the integrity of this network would depend on how well it responds to a change in any of its components. An inherent instability results from the fact that the network is open-ended. These relations are fluid, dynamic and potentially unstable, according with much of what is written about associational networks in African cities.

Interaction between structure and agency occur at a range of scales. Analytical movement between scales is facilitated through consideration of technology as an actor as part of a network. For example, when examining mobile phone use amongst informal street traders one would include considering the mobile phones they use, the cell phone operators that enable this use and the airtime vendors. In addition to enabling analysis that moves beyond dualities, the consideration of ICT as actor opens up expanded network possibilities.

Time is considered elastic where histories and anticipated futures influence action. The incorporation of technology into social networks is not just deepening process where ICT is an additional resource factored into the equation. It carries history, expectations, definitions and intention. The functioning of social networks is revealed as an unstable process that can be highly volatile yet also reassuringly supportive of livelihood strategies. Considering ICT as part of these networks requires deeper insights into how these networks stabilize and evolve and how digital technologies may alter these dynamics. Moving across temporal and spatial boundaries is what makes ANT a particularly powerful analytical tool.

The understanding that "technologies only have contingent, and diverse, effects through the ways in which they become linked into specific social and cultural contexts by linked human and technological agency" (p. 69) [4] reminds us that physical infrastructure, ICT 'bits', are ascribed value in a multitude of contingent actor-networks. Agency in ANT language differs from traditional conceptions of agency as evolving from autonomous individuals driven by their own values and inclinations unless constrained by other forces. The actor-network definition of agency sees it emerging from network relations, relations perform agency (p. 68) [13]. Non-human actors are equal contributors to the agency dynamic; they have 'transformative capacity' [20].

Maintaining heterogeneous networks

Ongoing maintenance of networks entails definition, interpretation and negotiation. Network elements need to have interests in the network; actant goals need to align. This process of translation enables ongoing maintenance of the network. The notion of interest is particularly important in understanding how translation is operationalised. For translation to be functional there needs to be a convergence of interests between actors (p. 63) [13]. This is the means whereby associations continue to exist through attribution and definition of roles, functions, systems and processes [26]. This process redefines and reasserts the position and functions of the actants in the network on an ongoing basis. The emergent process redefines reality which is "achieved through the interplay between different actors, both human and non-human, with equal constitutive characteristics." [26].

The energies created by the interaction between technology and society constitute a layer of inputs, contributions and outputs that sometimes deepen, sometimes constrain and potentially broaden human experience. "Translation is a definition of roles and the delineation of a scenario" [26]. How that scenario plays itself out can only be understood by tracking the network, following its process and revealing role definitions and assignations. This was core to the research process where the web development process was followed in 'real time'. It was also necessary to ensure that "the tactics of translation" be uncovered (p. 966). Translation can either be negotiated consensually or imposed coercively. Network 'rules' are best embedded by material artifacts; they are stable and often immutable. "In short, technologies can make good disciplinary machines" (p.66) [13]. This entails an exercise of power.

Power in ANT is investigated as a relational outcome within actor-networks -invested in associations, not things. Defining power as a dynamic that is translated (not diffused) accords with the Foucauldian conceptualization of power. Power is significant when considering the entry of ICT into a network in the developing context. Interactions with machines are not neutral; they are imbued with disciplinary power, discourses and aspirations. In a resource-scarce context the relationship between technological knowledge and power can potentially influence the outcome of a network relationship in ways contrary to its original intention [14].

There is similarity between Foucauldian and ANT notions of power in that it is not seen as a resource, but as a dynamic that derives from process. Discourse making is key to the former whilst ANT sees power being drawn from how resources are mobilized and deployed across space and over time through network translation. The two ideas are not unrelated.

ANT AND SPACE

"Societies – and spaces – emerge from the collective activities of these heterogeneous actors between which powers are distributed, responsibilities are allocated, actions are constructed and spaces configured. It is the distributions, allocations, constructions and configurations which should catch our attention. "

(p. 334) [11]

There are three contributions that ANT makes to the study of relations in space: it forces an engagement with context, it moves beyond conceptual dualisms (such as macro/micro, local/global etc) and it provides the means whereby associations across different scales can be understood [2]. Space is inherent in translation processes as the actor agencies in one place impact on another through networks. The term local refers to the translated practices within a particular locale, as well as the "... strategies of 'localization' being employed as places are 'lined up' within a given network" (p.70) [13]. Local and global are determined in accordance with the extension of networks.

Analysis of space is not just concerned with the physical, but the various energies that influence movement and place making. It is concerned with the relationships between elements and their functions [26]. Conversely, actor-network analysis will always have spatial implications since heterogeneous relations are able to connect social actors across distance (p. 3) [13]. Scale is determined by the network.

Like power, size is manufactured as part of the workings of the actor-network. This implies a particular conception of distance. Distance becomes malleable in ANT. Murdoch [12] uses the term 'topological textures' to describe what emerges when space and networks are combined in analysis, particularly within an analysis that recognizes heterogeneous associations within these networks. Following a network may reveal complex relationships between space and time that defies the conventional understanding that tends to be static. "There is no one time or space; rather there are a number of co-existing space-times" (p. 360) [13].

An actor-network translates into space at a particular time. Once stabilized, actor-networks become actors, consolidated entities that include enrolled spaces. Places are arranged and ordered in line with the terms established by the actor-networks [13]. Space is 'arrived at' therefore: an outcome and manifestation of process.

The cases examined in this paper represent two different representations of space. The two townships in Durban (Inanda and Lamontville) are geographically delineated places, marginal in many respects. The street trader network is an association that stretches across city and country boundaries. As a functional entity street traders face restrictive circumstances, representing a contested network space. Field work sought to uncover the role played by ICT in these two types of spaces.

ICT AND SOCIAL NETWORKS IN DURBAN

Two cases of marginalized networks were selected in Durban. The one entails a process, the other a specific interest group. The advantage of the case method is that the focus is on the object of study, the focus of enquiry, not the methodology. The range of methods employed to probe the case is determined by what suits the particularity of it. Enquiry is therefore intensive, rich and deep. It allows for developmental factors to emerge as underlying processes are unveiled. The environment within which the case features requires a layered understanding of context. Thus each of the stories told in this research were given space to speak for themselves.

Technology Introduction in Marginal Physical Spaces: Inanda and Lamontville

Inanda and the Southern Basin are two South African townships, districts designated specifically for South Africans of African origin in the Apartheid era. These areas were traditionally under-resourced with many parts of them still very poor.

Four community groups in each of the areas, 8 in total, were engaged in a web development process undertaken by Internet Studies students from the University of Kwazulu-Natal¹. The full research process unfolded over two years from 2006 to 2007. Each of the processes lasted 9 weeks.

Students were briefed and examined on this process. They were required to use Drupal. As an open source content management systems it was seen to be appropriate to the nature of the student project. Both processes were intended to be ongoing as subsequent student groups assisted in ongoing training in web site maintenance and other student groups within the Internet Studies program reflected on the web design experiences as part of their curricula. The data draws from the actual web site development process not the subsequent interactions between students and community.

Action Research defines the mode of data collection. Meetings were held with the primary contacts, with key persons within those groups and with the community groups involved in the project. The process was followed carefully as community web sites were built by undergraduate students from the Internet Studies program at UKZN and members of the various project teams. The aim of the sites was to provide interactive web presence for community organizations operational within Inanda and the Southern Basin whilst also allowing for e-democracy and e-governance initiatives.

The role of the researcher was that of participant observer—studying how the process of developing a community web site unfolds, what content is required, who determines that content, what formatting is required, language and cultural

variables as well as understanding what the site will ultimately contribute to associational life through information exchange and on-line interaction. The research revealed the inter-group dynamics in building the site, what was seen as important, what not, and the constraints to doing this. Sustainability issues were addressed by ensuring ongoing maintenance through the projects teams.

The researcher was an integral part of this process. Notes were made on an ongoing basis in case diaries. Minutes of meetings were distributed for comment and filed. Photographs were taken also.

Open-ended interviews were held with actors central to the Inanda project: the leader of the Inanda project team², and the director of the Inanda Digital Hub where much of the training required for community members was done. Focus Group interviews were used to gather views and experiences of the student web site developers. The intention was to gain a deeper understanding into the process constraints, the power-knowledge dynamic that emerged from the technology introduction process and the interpersonal energies that were generated by the processes.

Data was analyzed using the technological 'space' provided by NVIVO, software designed for qualitative analysis. Substantive themes were used to classify data. These themes were informed by ANT: uncovering actors and actants, following the network, probing translation processes and employing the principle of symmetry. Stories unfolded. Space was treated relationally.

Technology use in a Contested Network Space

In order to ensure that informality is considered, research included the use of ICT by street traders. The selection of street trader organizations has been done for three reasons: they are operational across the city and internationally, they include members from other African countries and they represent the interests of particularly marginalized groups. Furthermore, informal trade activity is ubiquitous across the continent.

Two organizations were selected as entry points into the workings of informal traders. The first is Street Net, an umbrella organization that has international standing, and plays a global networking function. The second is Siyagunda a body comprised of street barbers that are mainly from the Democratic Republic of Congo (DRC).

In looking at the use of ICT by Street Net, the web site emerged as an important tool for ongoing mobilization and information dissemination. Two respondents were interviewed in this regard: the Street Net director, and the web master. The intention was to determine the genesis of

¹ At this time the author was employed by the University of KwaZulu-Natal

² Inanda is part of a national urban renewal programme managed by a specifically mandated project team that also reports to local government.

the site, its central function and how this intention had shifted over time.

Two focus groups were held with foreign street traders associated with Siyagunda. The intention was to determine the value attached to ICT, how ICT is used to support social capital and changes that may have occurred to associational dynamics since the introduction of ICT. The use of a French interpreter (DRC participants) was used with Siyagunda respondents.

THE ROLE OF ICT IN ACTOR-NETWORKS IN DURBAN

Introducing Technology into Marginal Places in Durban

“I am the boneless skeleton you guys are going to put the body on....”³

Introduction of technology into the networks had mixed consequences and limited impact. The project was largely unsuccessful. The findings indicate that material actors in networks have varying influence depending on intergroup relations. The limited sustainability of the project was due to a number of issues. The first was due to procedural arrangements and lack of accountability as well as confusion with regards to the roles of participants in Inanda. The project in Lamontville continues, but student web developers were concerned that their web sites would not be used due to a lack of computer skills and access. Translation is required for network relations to stabilize, for the actor-network to settle and develop its own agency. There was varying potential in the 8 groups considered here for that to happen.

The actual technologies had an impact on networks but not the extent that some literature would suggest. The efficacy of the web development processes were informed by how well the networks were functioning beforehand (or whether they existed at all). An interesting issue that emerged in Inanda was the tension in expectation. Participants expected the web development process to reinforce networks, the UKZN group, on the other hand, relied on the smooth functioning of the associations in order to effectively design the web pages. Clarity on roles, on members of networks, and a clear organizational goal was needed. ICT is not enough to form network. The terms of enrolment, the need for translation processes to mature were important determinants in the sustainability of the process. This related to all types of actants, human and artifact.

“...he is young and it is technology”⁴

³ Student Web Developer

The addition of actants shifted dynamics but did not impact in profound ways. The one possible exception was where one member's domination due to increased confidence had an impact. The relationship between power and technology was discerned. Network members with computer skills were more powerful and able to exert more influence in relations. Self-imposed discourses were observed where computers were defined as 'young and male' and in some cases 'Western'.

Some actants were incorporated into networks with more ease. The cell phone was a very strong actor in terms of substance and process. It was often referred to when putting participants at ease with digital technology, was an essential tool of connection and organization. The notion of convergence did not come across as a possibility to participants, but was voiced by the institutional actors and web designers.

“...they are also hoping that this form of technology will be what they need and will make their working lives easy as they do not have to travel in order to market themselves in future”⁵

The intended process of forming new actor-networks through introduction of web sites into community group functions was constrained in a number of ways. The first is limited hardware access. In Inanda, the project relied heavily on the Inanda Digital Hub, which had its own limits with regards to venue availability and space. In the Southern Basin, the Engen sponsored computer room at Fairvale School which was used as a base was not always available to learners and other participants. In Lamontville, access to the library for computer access was constrained by library hours and availability. These material parameters are what ANT calls immutable mobiles, malleable to some extent but not to the actors enrolled. The line between mutable and immutable can shift, depending on the rules of network engagement.

The second constraint relates to the psychological barriers to digital access. There is an uncertainty and loss of confidence that often permeates interactions with computers. The third deals with an understanding of virtual space: the rules and procedures that underpin communication through web sites, the media textures and the potentials. Virtual space is different. It requires lines of accountability if it is to enhance networks (as found in Inanda) and it requires an understanding of its norms if it is to be used to its full potential. It requires translation that goes a step further towards ownership and appropriation.

⁴ Community Network Member

⁵ Student Web Developer

The choice of technology used in this regard was predetermined by the nature of the process: web design. However, the cellular phone is an entrenched part of urban life in Inanda and Lamontville and relate to livelihoods with regards to payment options, access and lifestyles. Choice is impacted upon by computer and web access. Participants rely on public buildings (schools and libraries) and private Internet Cafés (where they are available) for access. Physical travel to those is constrained by transport options and cost, while use is constrained by bandwidth and physical availability. Some technologies are more mutable than others and this affects how possible appropriation is. That in itself is a power dynamic.

“...we need the web site, we are not known without it, people need to know about us; the web site will assist in this regard”⁶

The spatial dimensions underpinning these processes are not unfamiliar to the spatial planner. Access, transport routes, defensible space and facility hours of access are all factors that influence digital access. Layered upon this seemingly mundane interaction of barriers and access is an interesting range of typologies that has emerged as a result of ICT. The odd Internet café is discernable, but it is mobile telephony that is ubiquitous. Typologies range from the highly informal facility in the home (often part of a small tuck shop) to tables on sidewalks offering telephony to the customized container phone shops leased from one of the three private service providers. These are meeting places and clusters of local people can be seen gathering around these shops. They are often located close to other facilities with some clustering occurring. These are opportunities for empowerment. Availability of mobile telephony in particular has availed spaces of transformation albeit in small local ways.

Examining a process was valuable in determining the formation of actor-networks, processes of translation and the unfolding roles of actants. The location of research provided an opportunity to commence engagement with the physical features of ICT in urban space. The limit to this method was that the process was contingent upon limited time frames, not allowing enough time for network relations to stabilize. The following chapter addresses this limitation by examining an existing network that has stabilized, that uses material tools to advocate and mobilize. It continues examination of ICT in space by focusing specifically on the informal sector.

Uncovering Technology Use in Contested Network Spaces

⁶ Community Group Member

“you have contact on the go...”⁷

Field work with street traders examined existing networks and the ways through which material actants are enrolled into those networks. The roles ascribed to ICT, the ways through which mobile phones, computers and other artifacts are incorporated into the lives of these marginalized groups is contingent upon livelihood strategies. The immigration and assimilation process of foreign traders was punctuated by stages, each associated with different dimensions of technology use. Strategies that focus on everyday survival require tools that are malleable. The research found that the flexibility, immediacy and affordability of the cell phone best suited informal livelihoods.

The field work shows the appropriation of space through use of ICT extends from the private spaces created in public through mobile telephony and the nodal points create through telephony and other sales. These small physical transformations are important contributors to city life. The networks documented in this field work all contribute to transformative spaces that allow for the individual to exercise agency.

Urban transformation could begin with a different set of spaces in mind. Not only can the same spaces be contingent upon the actions of different associations, but “...differing spaces can emerge from the same networks...within these networks such spaces can shade, dissolve or flow into one another” (p. 364) [17].

“...cell phones let people know where we are, where we are going and where to find the best people for that location”⁸

Physical space is important to the informal trader; service is provided to footloose traffic and mobility is essential. Not just the ability to move however, but the ability to remain connected whilst moving; not just connected to clients and co-workers, but to friends, family and loved ones in other spaces. The notion of co-presence is vital to the foreign trader, as s/he remains a part of many spaces across physical boundaries. How movement across that space is negotiated depends on cost, livelihoods and the communication codes that inform modes. Space matters, as a resource, as livelihood and as a point of negotiation with other actants are the subject of ongoing negotiation.

Mobile telephony contributes to the flexibility to achieve this. Internet use relates to a more grounded and solid form of communication; when something has to be documented articulated and explained.

⁷ Focus Group Participant

⁸ Focus Group Participant

The addition of technology to networks enables new actor-networks that stabilize, translate into dynamic entities that carry agency in the world of the marginal. In the absence of the usual resources, under the tyranny of misguided and ill implemented city policy, actor-networks evolve quickly. Mobilization becomes meaningful when the event or cause is defined. And in the world of the informal, there are causes aplenty. These threats, these displays of power, provide the impetus for actor-networks to translate into actor, and carry agency. The addition of ICT enables a malleability of space, and a temporal awareness that makes meaningful input into mobilization. Power is translated into further actor-networks. This power is potentially transformative. The question perhaps is to whom.

New networks are created by ICT but only insofar they merge into actor-networks that translate and stabilize. For example; no new networks were created by the Street Net site but it provides a forum for existing networks to function and multiply as combinations of actors rally around a particular cause. Functions of technologies change as the roles of actants and the agency carried by actants evolve. The Street Net web was initially created as information resource but later adopted advocacy qualities (it was created before the days of web 2.0). The advocacy function has now become deliberate and is a key informant of civic interaction in Durban.

“...to have the presence of someone...”⁹

The addition of ICT to informal networks has become a key enabler of livelihoods and mobility. The latter is an important factor; space becomes background to relationships, romances, work arrangements and travel plans. The life of the informal trader is precarious. Social networking is important as is the support enabled through advocacy. Technology assists in both. It also leads to a metamorphosis of both as actor-networks evolve and translate. Somehow these processes are precipitated and in many cases accelerated through crisis which in many cases deepens networks and expands networks across spaces. Where the Inanda case needed a well functioning network to receive technology, informal networks increase in efficacy in volatile contexts. Actors are created through actor-networks in these times as the translation function speeds up due to necessity. The mobility afforded by digital technology, ironically, enables the grounding necessary to defend space.

UNDERSTANDING THE SPACES BETWEEN

The notion of 'the spaces between' in this research refers to the in-between physical places not well served by ICT infrastructure, where essential services are lacking and in

some cases, cell phone access provides the only opportunity for digital connectivity. It also refers to the blind spots in policy and governance. In this regard, this research focused on the informal sector, in this case foreign nationals subject to harassment and violence outside the landscape of 'legitimacy' and economic inclusion. Addressing these spaces is normatively linked to urban transformation.

The spaces between were reliant on social networks for information, resources and collaboration. These 'outside' spaces became 'insiders' in webs of relations that enabled inclusion, some fleetingly as in the case of foreigners in transit and those under threat of violence. These networks provided important entry points as shown in the ways through which they are employed by refugees from the Democratic Republic of Congo (DRC) to find employment and shelter in South African cities. A hierarchy of technologies was employed in ongoing network relations with family far away (e-mail; text messaging mostly for relay of ongoing information; phone calls in times of emergency), in facilitating access to South Africa (an initial e-mail, followed by text messages and concluded with phone calls). Translated actor-networks were of value and functioned for a short while (during xenophobic violence) and in more established contexts.

The range of social networks in the Inanda and Southern Basin cases was testimony to the diversity of interests that concern the 'spaces between'. This research probed the workings of technology as an actor, or in ANT terms an actant, in these networks. The actual presence of technology was not enough. Simply introducing the web development process as an opportunity in a participatory and consultative fashion did not lead to the 'buy-in' from network members required to ensure the sustainability of the project, nor did it contribute to the intended enhancement of fledgling networks. The relations between actors and actants were important as were the usual factors that negotiate personal experience and technology appropriation. Cultural and language issues were important in determining uptake. The psychological barriers to digital access were underestimated; uncertainty and loss of confidence permeated interactions with computers. To some extent this could be contributed to the more subtle dimensions of the digital divide, but relations between actors and the network maintenance that that entails is as, if not more, important.

The constraints to accessing the Internet were mundanely practical. Transport costs constrained use of Internet Cafés and the Digital Hub in Inanda. Venues were not always available. In the Southern Basin, the Engen-sponsored computer room at Fairvale School was not always available to learners and other participants. In Lamontville, access to the adjacent library for computer access was constrained by library hours and availability. Street barbers prefer to use mobile phones to connect since accessing the Internet in

⁹ Focus Group Member

cafés exacts a cost: time away from the street, the place of work. Physical space matters.

New spatial configurations have emerged from ICT. Interstices on the streets where umbrellas and trolleys combine in physical space to provide telephony to the passer-by co-exist with containers situated on open spaces often providing community focal points. Telephony extends the repertoire of goods for sale by hawkers as they diversify and agglomerate. Boundaries between the public and private became blurred as a pedestrian takes a moment to have a telephone conversation in a public space. The informal-formal enterprise spectrum incorporates a number of entry points for the telephony trader: from second-hand mobile sales to side walk phone booths and sponsored container shops

Thus, new spaces were created but old barriers remain. The notion of co-presence featured strongly in the findings in the form of existing and potential use. Probing the aspirations of respondents in the web development process yielded an interesting array of expectations. Visibility emerged as an important aim: the need to be seen recognized and be part of the larger urban and global fabric. Foreign street traders preferred to be invisible given the constant threat of harassment and xenophobia. Mobile phones assisted in conveying information on how best to achieve that. On the other hand, SMS functionality reassured Diaspora communities that loved ones in conflicted home countries are safe; "...you have the presence of someone" were the words of a focus group respondent.

Flexible and affordable means to enable connectivity is important in times of crisis. ICT in the form of mobile telephony for vulnerable foreign traders and facilitated through a web site and associated media used by Street Net proved to be highly resourceful. Quite when it moved from being a connector to being an essential part of the social infrastructure people employ to access the city depended on how well it fitted in with the day-to-day strategies of the marginalized.

Field work with street traders revealed a sliding scale of use; as the need to communicate became more urgent, cost as a deciding factor decreased in importance. A correlation existed between choice of technology, function and urgency.

The range of findings offered expected and unexpected responses to the research questions posed at the outset of this research. Clearly the incorporation of new technologies into urban life was not a straightforward cost-benefit equation. It promised a lot and delivered to an extent, but sometimes in unexpected ways. ICT in the form of mobile telephony, computing and the Internet are different from other networked infrastructures and historical means to communicate. The lines between personal and public, between the corporeal and outwardly expression are blurred. Space matters, but in ways generally unanticipated.

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REFERENCES

1. Bingham, S. (1996). 'Object-ions: from Technological Determinism towards Geographies of Relations.' *Environment and Planning D: Society and Space* 14
2. Campbell, M.O.N. (2005). "Actor Networking, Technological Planning and Conceptions of Space: the Dynamics of Irrigation Farming in the Coastal Savanna of Ghana." *Applied Geography* 25: 367 -381.
3. Cordella, A. and M. Shaikh (2006). From Epistemology to Ontology: Challenging the Constructed "truth" of ANT. *LSE Working Paper Series*. London, London School of Economics and Political Science.
4. Graham, S. (2004). Introduction: From dreams of transcendence to the remediation of urban life. *The Cybercities Reader*. S. Graham (Ed). New York, Routledge: 1-30.
5. Hampton, K.N. and B. Wellman (2003). "Neighboring in Netville: How the Internet supports Community and Social Capital in a Wired Suburb." *City and Community* 2(4): 277 -311.
6. Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford, Oxford University Press.
7. Law, J., Ed. (1991). *A Sociology of Monsters: Essays on Power, Technology and Domination. The Sociological Review*. London, Routledge.
8. Law, J. (2007) "Actor Network Theory and Material Semiotics." www.heterogeneities.net (Accessed 18 May 2007) Volume, DOI.
9. Liff, S. (2005). Local Communities: Relationships between 'real' and 'virtual' Social Capital. *Communities and Technologies 1*, Milano, Italy, Springer.
10. Moyi, E.D. (2003). "Networks, Information and Small Enterprises: New Technologies and the ambiguity of Empowerment." *Information Technology for Development* 10: 221 -232.
11. Murdoch, J. (1997). "Towards a Geography of Heterogeneous Associations." *Progress in Human Geography* 21(3): 321-337.
12. Murdoch, J. (1998). "The Spaces of Actor-Network Theory." *Geoforum* 29(4): 357 -374.
13. Murdoch, J. (2006). *Post-structural Geography*, 68.
14. Odendaal, N. (2002). "ICT's in Development -Who benefits? Use of Geographic Information Systems on

- the Cato Manor Development Project, South Africa." *Journal of International Development* 14: 89-100.
15. Pieterse, E. (2005). At the Limits of Possibility: working notes on a Relational Model of Urban Politics. *Urban Africa: Changing Contours of Survival in the City*. A. Simone and A. Abouhani. London, Zed Books.
 16. Pigg, K.E. and L.D. Crank (2004). "Building Community Social Capital: The Potentials and Promise of Information and Communication Technologies." *The Journal of Community Informatics* 1(1): 58 -73.
 17. Portes, A. (1998). "Social Capital: Its Origins and Applications in Modern Sociology." *Annual Review of Sociology* 24: 1-24.
 18. Putman, R. (1995). "Bowling Alone: America's Declining Capital." *Journal of Democracy* 6.1: 65-78.
 19. Putman, R.D. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. New Jersey, Princeton University Press.
 20. Rose, J. and M. Jones (2005). "The Double Dance of Agency: A Socio-Theoretic Account of How Machines and Humans Interact." *Systems, Signs & Actions: An International Journal on Communication, Information, Technology and Work* 1(1): 19 -37.
 21. Simone, A. (2004). *For the City Yet to Come*. London, Duke University Press.
 22. Swilling, M., A.-M. Simone, et al. (2002). 'My Soul I can See': The Limits of Governing African Cities in a Context of Globalisation and Complexity. *Democratising Local Government: the South African Experiment*. S. Parnell, E. Pieterse, M. Swilling and D. Wooldridge. Cape Town, UCT Press.
 23. Taylor, M. (2000). "Communities in the Lead: Power, Organisational Capacity and Social Capital." *Urban Studies* 37(No. 5 -6): 1019 -1035.
 24. Thrift, N. (1996). "New Urban Areas and Old Technological Fears: reconfiguring the goodwill of electronic things." *Urban Studies* 33(8): 1463 – 1493.
 25. Tostensten, A., I. Tvedten, et al. (2001). The Urban Crisis, Governance and Associational Life. *Associational Life in African Cities* A. Tostensten, I. Tvedten and M. Vaa. Stockholm, Nordiska Afrikainstitutet.
 26. Van Der Duim, R. (2007). "Tourismscapes." *Annals of Tourism Research* 34(4): 961-976.
 27. Williams, D. (2006). "On and Off the Net: Scales for Social Capital in an Online Era." *Journal of Computer-Mediated Communication* 11: 593 -628.