Space matters: the relational power of mobile technologies

O espaço importa: poder relacional das tecnologias móveis

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Abstract

The ubiquitous presence of mobile telephony and proliferation of digital networks imply a critical role for these technologies in overcoming the constraints of space in fragmented cities. Academic literature draws from a range of disciplines but fails to address the significance of new technologies for African and South African cities. Debates on technologies and urban spaces reflect a Northern bias and case literature that dwells on the developmental aspects of ICT do not engage with the broader significance with regards to urban change in African cities. This research addresses these gaps by examining the local transformative qualities of mobile telephony in a South African city, Durban. It focuses on the ways in which informal traders active in the city use technology. Actor-network theory was used in the analysis of the field work, uncovering material and human actors, network stabilization processes and agency in determining the transformative potential of this form of digital networking at city and local scales. Findings indicate that appropriation of technology is informed by livelihood strategies. Innovation is enabled when translation extends to appropriation. More in-depth research is needed on how technology is molded and appropriated to suit livelihoods. Throughout the research the spatial dimensions of the relationship between mobile telephony and networks were considered. The network spaces that emerge from actor relations do not correspond with the physical spaces usually considered in policy.

Keywords: Mobile telephony. Digital networks. Informality.

Resumo

A ubiquidade da telefonia móvel e a proliferação das redes digitais concedem a essas tecnologias papel fundamental na superação das limitações do espaço em cidades fragmentadas. A literatura acadêmica se baseia em uma série de disciplinas, mas falha ao não abordar a importância das novas tecnologias para as cidades africanas e sul-africanas. Debates sobre tecnologias e espaços urbanos refletem um viés setentrional e os estudos de caso envolvendo os aspectos de desenvolvimento das tecnologias de informação e comunicação não se ocupam

do significado mais amplo relacionado às transformações urbanas nas cidades africanas. Esta pesquisa aborda estas lacunas, examinando as qualidades transformadoras locais de telefonia móvel em uma cidade sul-africana — Durban. O foco está nas formas pelas quais os comerciantes informais da cidade se utilizam da tecnologia. A teoria ator-rede foi utilizada na análise dos dados coletados em campo, revelando atores humanos e materiais, processos de estabilização da rede e o papel da agência em estabelecer o potencial transformador desta forma de redes digitais na escala local e da cidade. Os resultados indicam que a apropriação da tecnologia é orientada por estratégias de subsistência e que a inovação é acionada quando a tradução se converte em apropriação. Ressalta-se a necessidade de pesquisas mais aprofundadas sobre as formas pelas quais a tecnologia é moldada e apropriada para prover a subsistência. Ao longo da pesquisa as dimensões espaciais da relação entre telefonia e redes móveis foram consideradas. Os espaços da rede que emergem das relações entre atores não correspondem com os espaços físicos geralmente considerados nas políticas públicas.

Palavras-chave: *Telefonia móvel. Redes digitais. Informalidade.*

Introduction

[...] The actor-network approach is not a theory. Theories usually try to explain why something happens, but actor-network theory is descriptive rather than foundational in explanatory terms, which means that it is a disappointment for those seeking strong accounts. Instead it tells stories about 'how' relations assemble or don't. As a form, one of several, of material semiotics, it is better understood as a toolkit for telling interesting stories about, and interfering in, those relations. More profoundly, it is a sensibility to the messy practices of relationality and materiality of the world (LAW, 2007, p. 2).

People's stories are enmeshed with the material. Technology is assumed to enable mobility and immediate connection. Policy rhetoric and the media portray Information and Communication Technology (ICT) as a means to social and economic empowerment. The ubiquitous presence of mobile telephony and proliferation of digital networks imply a critical role for these technologies in overcoming access and mobility constraints due to uneven spatial geographies. This research is based on work done in South Africa, where cities remain stubbornly segregated despite the demise of Apartheid in the early 1990s.

Mobile telephony has enabled transcendence of physical boundaries and deepening of transnational networks. Focus groups conducted in South Africa's main port city Durban, in 2008, 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 fieldwork during a scourge of xenophobic violence countrywide. Text messages sent, received and forwarded by acquaintances, warned of places to avoidand advocated how to avoid unwarranted attention from aggressive South African nationals. Technology was deployed to render the visible invisible in this instance.This anecdotal introduction illustrates the different readings of space and place within the context of ubiquitous mobile telephony. 'Place' refers to the physical parameters defined by material elements such as streets, open space, surfaces and movement conduits. 'Space' refers to networks of social and economic relations transcend place.

This relational reading of space is further informed by the work on actor-network theory (ANT) and space. The study of associations betweenpeople and 'things', structures and systems "'stitched together' across divisions and distinctions" (MURDOCH, 1997, p. 322) transcends scale. Understanding these heterogeneous associations allows for analytical movement between the macro and the micro, the local and the global, the social and the material (MURDOCH, 1997, p. 322) ANT enables a perspective that is meaningful in this regard. Murdoch (1997) defines ANT as comprising strands that study science and scientific knowledge, technological development and general theory (as part of Science and Technology Studies). It is used here, as a sensibility that guides the design, execution and analysis of research that uncovers relationships between people, space and technology. The fieldwork examines how immigrant informal traders

in Durban use mobile telephony to enable livelihoods in places not well served by infrastructure, economic opportunities and housing. Place and mobility are important resources to the street vendor. These also pose the biggest constraints: traders are sometimes harassed and chased out of public spaces, they live in informal, marginal conditions and physical mobility is constrained by material barriers. This research probes the extent to which technology enables transcendence of the material barriers to access. It also examines how technology contributes to the making of place through the informal economy. The interface between human agency and technological artifact is the main theme of this research.

The first part of the paper describes the key tenets of ANT that apply to this research. The remainder of the paper examines the case study, with the paper concluding on the implications for reformulating ideas of space for future research.

Actor-network theory, Space and Technology

The premise of this research is that enquiry into appropriation of technology in citiesof the Global South should be contextually rich and acknowledge the interaction between technology and human as reciprocal and dynamic. Social networks are essentially livelihood arteries of the poor. Simone (2005) writes of the city as a site of change, as a place where social transactions abound, where people use their networks, relations with friends, lovers, family and associations to make sense of the daily grind of life. The urban terrain comprises a divergent range of intentions, communications and movements exchanged between a multiplicity of actors making sense of their life worlds; negotiating, scheming and bargaining between urban spaces. Movements and flows are manifested in urban spaces that are connected through networks and relations.

How those networks are defined and constituted in relation to technological artifacts is where the work of ANT is significant. Drawing on Latour and Law, Bingham argues how "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'" (BINGHAM, 1996, p. 647). These various entities are therefore not seen as separate objects that can be manipulated

from the outside, but all of them are actors, or in ANT language, human and non-human actants.

Actants are engaged in a heterogeneous network where any actor, whether person or object, or institution, is equally important in the maintenance and protection of the network (LAW, 1991). ANT requires that "everything, more particularly, that everything you seek to explain or describe should be approached in the same way" (LAW, 1994, p. 9-10). This notion of symmetry argues for analytical equality in the treatment of human and non-human actors. Their agencies are not equivalent in terms of character and intention (ROSE; JONES, 2005) but deserve equivalent interrogation with regards to understanding networks that contain technological elements: "...things act in concert with humans; humans act in concert with things" (MURDOCH, 2006, p. 67). Equality is measured in terms of the 'power to act' due to positionality within a network (ROSE; JONES, 2005). Machines do not have human characteristics, but in the process of acting, in the process of network formation and maintenance, human and non-human agency becomes entangled in ongoing interaction.

An actor-network is fluid. Change in one of the actants could have an impact on the identity and relations between them. Maintaining the integrity of this network would depend on how well it responds to a change in any of its components. The open-ended nature of these processes through which these relationships are defined and redefined means that; 'the actor is generated in and by these relationships" (CORDELLA; SHAIKH, 2006, p. 9). This implies that nothing can be intrinsically assumed as *a priori* and that actor-networks are potentially unstable. Furthermore, actors are contributors to networks, but they also emerge as outcomes of those relationships. The relationship becomes an actor/actant when relations are stabilised. This is enabled through translation.

Translation enables ongoing maintenance of the network. To be functional, there needs to be a convergence of interests between actors (MURDOCH, 2006, p. 63). Associations continue to exist through attribution and definition of roles, functions, systems and processes (VAN DER DUIM, 2007, p. 966). This is an emergent process that redefines relations, "achieved through the interplay between different actors, both human and non-human, with equal constitutive characteristics" (CORDELLA; SHAIKH, 2006, p. 14). "Translation is a definition of roles and the

delineation of a scenario" (CALLON apud VAN DER DUIM, 2007, p. 966). How that scenario plays itself out can only be understood by tracking the network, following its process and revealing the role definitions and assignations that take place during the process. The heterogeneous nature of associations and how they are defined in a network requires that "the tactics of translation" be uncovered (VAN DER DUIM, 2007, p. 966). Translation can either be negotiated consensually or imposed coercively; stabilisation of these conditions is best achieved through material artifacts since they are stable. "In short, technologies can make good disciplinary machines" (MURDOCH, 2006, p. 66). 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. 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 (ODENDAAL, 2002). 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.

Where ANT would define it as an outcome resource mobilization and is represented in institutions that seemingly 'hold power', a Foucauldian perspective would argue that power is an outcome of discourse formation that is deepened and translated through institutions and disciplines (FOUCAULT, 1989). The production of power within and by institutions and disciplines are critical contributions of Foucault's work. The circulation of power beyond and between these entities is explored by ANT (MURDOCH, 2006). Early ANT work in particular was concerned with the power relations within scientific communities and its ability to control beyond its disciplinary boundaries; relations between the laboratory and the outside environment (MURDOCH, 2006). Power can be stored, it has capacity, it can change and translate as an effect or product (LAW, 1991).

Space represents the territorial manifestation of resource consolidation. Representations of power (whether in political parties, institutions etc) are resource bases that have been created over time, "a capability or series of capabilities that have been produced through an ongoing process of mobilization. Resources are territorially embedded, but they are also mobilized through networked relationships" (VAN DER DUIM, 2007, p. 967). How the relationship between territory and networks translates in space is an important contribution of ANT, in particular through the work of the late Jonathan Murdoch.

Actor-network theory and Space

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 (CAMPBELL, 2005). Space is inherent in translation processes as the actor agencies in one-place impacts 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' (MURDOCH, 2006, p. 70). 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, their functions (VAN DER DUIM, 2007). Conversely, actor-network analysis will always have spatial implications since heterogeneous relations are able to connect social actors across distance (MURDOCH, 2006). Scale is determined by the length of the network.

The exchange between society and space works both ways. The collective activities of actors contribute to the creation of space; networks relations determine creation of place through investment decisions while space represents the material manifestations of what has been negotiated over time and what could be. The social as well as the material shape the interstices that define the interactions between actors, within actor-networks. This is where ANT departs from other perspectives. Following the

chains of interactions, the networks, could take the analyst through time and across space. Action that informs these networks could come from human and non-human actors — depending on the associations within the networks.

Distance becomes malleable in ANT; "Once distance is linked to process then it must be assessed from within such processes" (MURDOCH, 1998, p. 358). Murdoch (1998) 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.

The complex constellations that emerge from such an analysis captured in a particular interstice may therefore refer to histories, global references within local contexts, impressions of the future, fears for the future, present intentions etc. Analyzing a particular moment in networks may reveal neighbors to be distant, the global to be local and the foreign being 'here'. Latour (1994) argues that the inclusion of non-human actors in the creation of networks that provide the conceptual tools to analyze across space and time. The materiality of non-human actors can solidify networks into structure.

The way that a network may configure the actions of its associates over time could then stabilize into an actor-network translated into space at a particular time. If these networks are stable they become actors themselves, consolidated entities that Murdoch (1998) refers to the ways in which spaces are enrolled into networks: places are arranged and ordered in line with the terms established by the actor-networks. Space is 'arrived at': an outcome and manifestation of process.

Mobile telephony and informality in Durban, South Africa

This research examines heterogeneous networks across space in the African urban context. Inspired by Simone's (and others') work on African urbanism where the contingent nature of urbanity is assumed, where the fleeting exchanges in space speak to the importance of mobility as a livelihood strategy.

Two main objectives were to examine how informal traders use mobile phones to network, and how it influences trading in places and across space. The fieldwork consisted of two activities.

The first was a photographic record of the interface between mobile telephony services, and informal trade activity in two transportation nodes in inner city Durban.

Two photographic records were made of informal trade in Durban's Central Business District (CBD), one on a weekday, mid morning in the Durban CBD; the other in Isipingo Rail, a nodal area at an intra-city railway station in South Durban, on a late Friday afternoon. The photography focused on capturing the following through walking, talking to traders (including asking their permission to photograph) and noting specific features a shown in Figure 1.
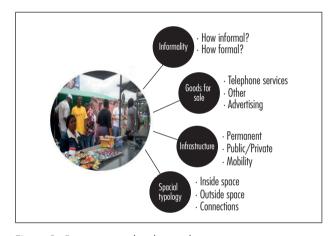

Figure 1 - Features captured in photography
Source: Research data.

The second was the interrogation of the use of technology by street traders. The use of technology foreign traders was documented. Siyagunda, an informal trader organization of mostly foreign traders, facilitated access to respondents. An open-ended interview was held with the chairperson of the organization (Respondent A). In following him, an actor-network is revealed that spans across country boundaries and temporal fixtures.

Focus group interviews were held with two groups from the organization active in the two spaces photographed. Group 1 consisted of 11 members aged between 18 and 60 and included 3 women only. All the men were street barbers, the

women were market sellers with one woman supplementing her trading activities working as a car guard also. All, except 2 (from Burundi), are from the DRC and are refugees. One woman is a musician, another is a nurse; there was one student present, a part-time translator. Proceedings were translated into and from French; Respondent A translated. The meeting lasted 2 hours. All those present had cell phones; 5 members had e-mail addresses.

Group 2 contained 6 members, aged between 18 and 40. It included 2 women; one was a housewife and the other a student (in nursing). The men included two car guards, IT person that worked from home (fixes computers and cell phones), and a student that worked part-time as a car guard. All the members are from the DRC. Proceedings were conducted in English. All members had cell phones. All but one member had e-mail addresses. The meeting was conducted over 1.5 hours.

Photography: mobile telephony in informal Durban

The appropriation of technology by traders operating outside the usual confines of formality is manifested implicitly and explicitly (ODENDAAL, 2008). Implicit uses relate to how traders use it for social and economic functions pertaining to their livelihoods and lifestyles. The explicit manifestation of technology and informality is evident in the many telephony services on sale in public space, and the use of phones by members of the public. Photographic documentation indicates a range of services.

Telephony services advertised

The presence of mobile telephony is evident in the use of phones in public spaces but also advertised as an integral part of the urban experience. The imagery (see Figure 2) depicts a youthful and diverse membership — a network of connected and informed individuals. This imagery is part of the visual language of these spaces and expanded to include culturally appropriate references such as the word'Teach' in isiZulu (the local indigenous language and one of South Africa's 11 official languages) and the rainbow emblem is a reminder of the integration ideal of the rainbow nation.

When referring to Figure 2, above right the 'community chat' advertisementusing a service provider

Figure 2 - Technology services advertised
Source: Research data.
Note: Collage created in April 2010.

brand and an informal makeshift sign displaying the availability of an array of services are juxtaposed. The notion of community in the former is interesting — using a cell phone to connect makes one part of a community. In the top-right physical comfort is advertised as a value added and implies some privacy when engaging telephonically. Repairs and starter packs are also available. Informal advertising is accommodated on an old sheet around the corner from where the above photos are taken. Cost is emphasized and some attempt at branding is made. Boards are placed on walkways; sheets are erected on lamp poles. Branding is important. Users know what is on offer but the marketing messages promises comfort, connection and economy in varied instances.

Agglomeration and clustering

Telephone services are offered within a context of other services. The photo in Figure 3, to the right below shows a phone kiosk in a container next to a street barber's tent. On the left cellular services are on offer in addition to a locksmith, small general store and others within a formal building. Location

of services is associated with foot traffic, clustering enables maximization of markets.

Diversification

Phone services are extensions of a range of products on sale. Fresh fruit and vegetables are available once that important phone call is made (payable at a by-minute rate) as are sweets and packets of crisps. The flexibility enabled through cellular technology enables incongruous mixes of products — people who make a phone call may well be compelled to extent their spending. The phones take up little space, are easy to manage and it is in the service provider's interest to maintain handsets and infrastructure. Call time vouchers are also available for sale.

Social spaces

The collage in Figure 5 shows telephone services provided by a trader in a public area adjacent to a shopping center. Chairs are provided for customers; clothes are for sale adjacent to telephony. These

Figure 3 - Agglomerations and clustering
Source: Research data.
Note: Collage created in April 2010.

service clusters are social spaces as customers and traders interact and chat. Talking is sociable after all!

Figure 4 - Diversification
Source: Research data.

Figure 5 - Social spaces
Source: Research data.

The public *versus* private

The use of cell phones provides a dynamic of the relationship between public and private. An image of someone comfortable in public space whilst engaging in a long private interaction shows the fine line between the public and private experience. A stool is provided for his comfort.

Boundaries between public and private are porous. Below is a street barber customer who chooses to interrupt his haircut, inside the enclosure provided by a tent, to conduct his business telephonically outside in a public space (until a nosy researcher interrupts…).

Figure 6 - Public/private
Source: Research data.

Infrastructure

The various infrastructural elements manifest spatially in many ways. Infrastructure starts with the mobile handset attached to body as calls are made in public space. The line between public and private can disappear in a moment and reappear once the handset is switched on. The corporeal is extended to include infrastructural elements that connect and transcend space.

Makeshift tables provide telephony amongst other services whilst municipality-provided stalls are used to do the same. Small branded trolleys have umbrellas attached to provide shade in the warm sun outside whilst containers are retrofitted accordingly whilst providing advertising. Infrastructure is provided by the private and public sectors determined by the dominance of services on sale. Phone services co-exist with other infrastructures: the battery operated haircutters used by the barbers in the tents that they trade for example.

Meanwhile landline phone booths stand empty or are left to rust. New kiosks are unused in the same way that demarcated trading areas are left vacant in favor of more appropriately located sites near the foot traffic that provide markets for the range of goods and services on offer.

Reflections on mobile telephony, informal trade and space

The photographs portray land uses and spatial configurations indicative of a physicality linked to communication. Mobile telephony expands the repertoire of informal traders and allows for diversification of trade.

How physical places combine with the informal, mediated and/or supplemented by the immediacy of mobile telephony gives insight into a different kind of space. An in-between space where the private interfaces with the public; whether outside a street barber's tent, sitting on a stool in the middle of a public space or talking on a fixed handset at a makeshift table on a sidewalk, emerges. The line between public and private recedes as conversations are initiated and resumed after interruptions. Talk attracts talk as booths become meeting places and the chatter extends from the private conversation to the face-to-face public chat. For those seeking privacy, telephony is available in formal booth housed in shops — for which advertising is not necessarily that formal. All this activity is indicative of an urbanity celebrated in advertising on colorful billboards. The urban metabolism that Townsend (2004) refers to is increased through ongoing communication and talk in public space.

New places are created as 'old' infrastructures are discarded or neglected. Networked spaces of communication and voice transfer as they manifest in physical spaces sit on a formal-informal continuum. Internet kiosks (that offer VOIP), cafes and phone shops are physical translations of digital technology into place.

The addition of digital technology constitutes new land uses and economic opportunities. Some of this economic activity is highly informal and entrepreneurial such as the makeshift phone tables on street corners. The typology of informal telephony services range from the highly informal to the more secure locations in containers. If the informal economy is seen as a continuum from the more to less formal, then such services occupy a number of points on that spectrum (as indicated in Figure 7). On the one end of the spectrum, phone services are advertised on sheets, offered on fold-up tables on sidewalks, a more formal representation is found in the kiosks and containers sporting service provider logos and internet cafes and phone shops in office buildings represent technology in the formal sector.

Movement between these points (as indicated by the horizontal arrows) is facilitated through physical movement but also underpinned (vertical arrows from below) by the social networks that enable participation in the city's activities. Communication between these physical spaces is facilitated through

Figure 7 - Infrastructures
Source: Research data.

the mobile telephony that is imprinted on the urban dweller's consciousness through billboard advertising. The rental of the infrastructure that enables the sale of telephony services is facilitated through agreements with service providers or their proxies. Cellular technology is able to accommodate the varying physical configurations that best suit the trader and buyer.

The flexibility afforded by mobile telephony enables the appropriation that translates into new 'spatialities'. It starts with the body. The line between the corporeal and public is blurred; a private conversation links the individual to another space while he sits on a small tool in the middle of a physical place designated in front of a shopping centre. It extends to community... albeit transient community as pedestrians go about their business, stopping to make a phone call at a table with an umbrella located on a paved space and then extending the chat to an interchange with the vendor and fellow callers. The space can become private again as booths in shops allow for separation from the bustle of city life. Throughout this experience the ubiquitous availability of mobile telephony and an extended array of services is advertised; cellular communication is never far away physically, or from our consciousness.

Focus groups: actor-networks, mobile technology and informality

The following themes emerged from the two focus groups.

Familial and kinship networks, personal mobility and support

The interface between technology and kinship networks is influenced by a number of factors. Flexibility with regards to cost as well as technology is important. Traders lead transient existences and mobile telephony is best suited to communication on the move and when in crisis. A range of payment options enables access. Temporal aspects are also important. The moment when connections are made relates to the technologies available for tapping into networks. Sometimes this moment is very short and immediacy is a priority.

"...have the presence of someone..."[1].

The networks that respondents have encountered on their journeys to South Africa reach across scales and provide the means whereby place is traversed.

Figure 8 - Telephony and the formal-informal spectrum
Source: Research data.

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[1] Focus Group A Respondent, 2008.

How technologies are used reveals the many relational encounters in actor-networks. Cell phones enable the micro-relations of organizing members of Siyagunda. Contact with loved ones in the DRC is facilitated through telephony, text messaging and e-mail. Information transfer during times of crisis is best served by the immediacy of text messaging (SMS).

Mobile telephony is part of a hierarchy of technologies. E-mail is associated with distance, the more urgent an interaction becomes the more immediate the communication is that is required and cost becomes less important. International phone calls are made in emergencies. Cell phones also provided important forms of contact when war ensued in the DRC; SMS and missed calls provided to means to establish that *"...he is still alive"* (Focus Group A Respondent, 2008).

The choice of technology is also dependant on the nature of communication and what is available. Cell phones are generally used to SMS contacts and loved ones in the DRC. Internet use is limited by little or no connectivity in rural DRC; often electricity is not available to charge cell phones. Voice-over-Internet Protocol (VOIP) enables cheap phone calls at Internet cafes.

"...people are living day to day"[2].

Business networks were enhanced through the use of cell phones and the Internet. Street barbers use cell phones to check on business and to make customer bookings. Communication between 2 barbers that work from the same site is facilitated, or in cases where they work alone, a neighbor could contact him/her when a customer arrives. Four of the focus group members were engaged in more than one trading activity. The mobile phone assisted in negotiating this. In the case where members had more than one phone it was to save cost by using SIM cards from different service providers.

The use of Internet for business purposes was not considered practical. Being away from trading sites for extended periods is simply too much of a business risk. Time is money; "*...by the time you have found an Internet Café, logged on, figured out how to use and then sent e-mail, you have lost substantial income...people are living day to day*" (Focus Group

B respondent, 2008). Traders were found to rely mainly on pedestrian traffic for business; physical presence was therefore considered to be important.

Cell phones assisted in administering the networks that enable employment access and training. Street traders spoke of training new recruits and then sharing their trade – cell phone communication enables keeping in touch and coordinating training schedules. The latter for example refers to car guards that are trained on quiet days in the week by more established ones. Cell phones enabledcoordination between locations.

Crisis networks

The process of network enrolment is sometimes fleeting and ephemeral. Fleeing war and/or uncertain economic and political conditions requires tapping into familial and kinship networks that are underpinned by tenuous circumstances. The short moment when a phone call is answered, a text message acknowledged or an e-mail exchanged can make the difference in determining choice or location when embarking on the emigration journey. The context of crisis insists on a quick coupling and uncoupling of networks as travel plans are made, unmade or remade on the basis of information exchanged across phone lines and cellular networks. The process of translation, where technology plays the communication actor in enabling connection, is associated with the purpose of communication at the stage of the emigration process. Two stories illustrate this.

Two respondents (participating in Focus Group A) described how technology assisted them in contacting associates in establishing themselves in Durban. Respondent 2 first came to South Africa with the first wave of violence in the DRC in the late 1990s, Respondent 3 after 2005.

Respondent 2 used letter writing to establish initial contact with a friend of a relative initially, and then used a landline phone to make contact upon arrival in Durban. Respondent 3 used e-mail to make initial contact. This was followed by SMS to establish more specific arrangements once she was in Johannesburg and then cell phone calls to

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[2] Focus Group B respondent, 2008.

make her final arrangements to get to Durban. Interestingly, when she left the DRC her original destination was Mozambique due to the presence of a relative there. Durban was decided to be a more favorable option once she had made contact with friends of family whilst on the move (and in the absence of contact from her relative in Mozambique). The technology enabled her to remain in contact through SMS. Once she required a more immediate response when arriving in Durban, the phone was used to establish voice contact. Respondent 2 noted the fear and frustration that accompanied him on the journey, given the open-endedness of the communication. Respondent 3 acknowledged the empowerment granted by the immediacy of the mobile phone, its size made travel easy, and SIM cards were available en route. The translation process was more finely grained. There were more connection points between human user and technological artifact. The power that emanated from that exchange was associated with the extent to which the technology could be appropriated. As a mutable mobile (Latour's term) its malleability enabled the flexibility she needed to remain connected whilst working at survival.

The 2 focus groups were held early 2008, 2 months after a month-long period of devastating xenophobic violence in Johannesburg and Cape Town in particular. Mobile phones were used to exchange information on pending threats and location of incidents. Text messages provided information on how to behave on minibus taxis in order to not be noticed, and how to dress in order to avoid harassment. Existing networks were used to exchange phone numbers and extend the reach of information webs. The crisis precipitated quick translation processes; goals were formulated, information gathered and the nature of information seen to be essential agreed upon. This was done on the fly, during crisis as required. The collective anxiety, the need for survival and urgency for information, contributed to a temporary actor-network needed in that particular moment in time. Whilst this provided an important resource it also increased anxiety amongst foreign nationals (Respondent 1). The immediacy of information sharing enabled through cell phones is prone to impulsive text messaging and alarmist responses to small incidences, understandable given the volatility of the situation.

The heterogeneity of spatial relations was revealed. Temporal bounds circumscribed by particular events determined an enrolment of actors across physical space. Danger in physical space was real. Mitigating it across scales was considered essential for survival. The role of technology was to enroll actors across space, whilst engaging with the specificities of place. Not only are the elements that contribute to new spaces (even if they are tenuous and temporary) multiple in type, but the topological spaces circumscribed by actor-network interface with the topographical spaces defined by place. Law's (1999) notion of fluid space is appropriate here. Spaces of exclusion, of the other, were danger zones in terms of place. The fluidity extends to the topological spaces created through crisis.

Reflections: actants, actors, relations and actor-networks

The notion of the actant is indicative of the conceptual equivalence afforded to human and non-human actors in networks. Latour (1999) claimed that ANT is not about networks, not is it a theory; it is in fact a sensibility, an emphasis on relations.

The smaller research population under scrutiny here allows for close examination of the energy, the agency that arises from the relations between actants and networks. The collective agency that emerges from the interaction between actors in a network means that the network becomes an actor. This implies transformative potential. ANT refers to the concept of translation as the process whereby network relations are negotiated. This is important in practical terms. The actor-network that emerges could become institutionalized to the point of becoming a more general player in broader relations (policy making, advocacy for example).

Evidence of this in the field is documented by 'following the actor'. The narrative above describes the choice of technologies used and their relation to function, urgency and livelihoods. The use of technology to manage risk during crisis times is important. Privacy emerged as an important factor in this regard: respondents noted that in addition to the time, physical and financial constraints in using e-mail, lack of privacy in Internet cafes bothered them. Anxiety during the xenophobic violence was

sometimes increased by too much information, according to one respondent.

The expansion afforded by a cell phone in particular plays an important role in the lives of street traders; one trader noted 'her best friend is her cell phone; she was without one for a couple of days and felt like a sick person' (Focus Group Respondent, 2008 - translated from French).

The need for co-presence: advocacy, mobilization and crisis

The role played by crisis situations in mobilization actors and networks, and in some cases creating actor-networks that play durable roles in ongoing crisis management is illustrated above. The special case of street traders from the DRC illustrates the extent to which fragile livelihoods are best accommodated through flexible, mobile and accessible technologies. These technologies are best appropriated when it suits livelihoods illustrated in extreme contexts such as severe crisis. A number of pertinent issues need to be highlighted here when related to larger questions of ICT and urban spaces in Durban and elsewhere.

Mobility

Street traders face uncertainty of place; much of their livelihoods are dependent on the ability to be mobile: adjusting trading spaces to foot traffic, clearing a space in the face of harassment and negotiating daily life with friends, family and colleagues. Mobility is really important to the street barbers; they have to be on site because they rely on passers-by trade. Thus e-mail is just not practical during the day. Street barbers also use cell phones for customer bookings, and to check their sites if they are away from it. It allows for contact between car guards; between supervisors and co-workers on coordination and alerts.

Respondents acknowledged this with regards to the functionality enabled through cell phone use: "...*you have contact on the go*" and "*let people know where we are, where we are going and where to find the best people for that location*" (Focus Group A Respondent, 2008).

The preference of cell phones over e-mail also relate to the fact that phones and private and discrete whilst being mobile. Within a context of uncertainty and angst, especially when first entering the country, the mobile is indeed the 'best friend' that allows for connectivity in transit.

Co-presence and the malleability of space

The 'always on' aspect of mobile telephony provides a secure space for members of a network in insecure surroundings. The notion of co-presence denotes the function of being present digitally but not physically. When loved ones in the DRC are in danger, when colleagues in Durban are under threat or when police harassment continues in Nairobi, a digital presence allows for mobilization and support.

A correlation exists between choice of technology, function and urgency. The need for immediate contact, enabled through cell phone calls is a luxury, especially where prices increase over distance. VOIP calls are cheaper but not practical when there is an emergency since they are only available in Internet Cafes. SMS messaging provides and immediate and informative alternative. E-mail plays the role of a letter: introductions to relatives across countries, news from home and bulk messages containing important information needed in detail are choices of functions. Two respondents (in two separate focus groups) indicated that technology enabled through cell phones provides a barometer of relationships: 'measure indicator of love' as digital presence accords interest.

Conclusion

Mobile technologies interface with informality, with the margins in a number of ways. It allows for visibility and advocacy, but also enables discretion when life preservation requires it. Flexibility and market conditions that allow for marginal livelihoods enable an engagement with the urban. Those market conditions inform methods and modes of communication, skewed often by urgency and crisis. In short, mobile telephony is appropriated because it accords with livelihoods; the need for mobility, flexibility in terms of payment options, airtime is

easily available and text messaging is a relatively inexpensive means to communicate across borders. This accords with the hypothesis that argues that technologies that best fit survival strategies are most effective in enabling network functioning.

The extreme version of this is illustrated through the crisis networks documented. Not only is technology required in negotiating the day to day activity of surviving in the city, it also assisted in mitigating the precariousness of life for the informal foreign trader. The corporeal functionality afforded by small mobile handsets enables the discretion necessary to stay anonymous yet connected and informed in an unstable urban setting.

Transformation of South African city places is typified by an increase in informality. What emerges from this research is that this to the informal trader is a resource and appropriated using mobile technologies. An example would be the functioning of informal trade in cities; 'formal' space such as that found at street intersections and on sidewalks play a particular role in the actor-network that comprises traffic engineers and planners for example. These are agreed-upon space for pedestrian movement, traffic circulation and control. Amongst traders these are productive spaces, places where money is made, these spaces are 'owned' and negotiated under a different set of norms that could easily change as something is added to the network – for example when a road is rerouted. Much of this communication occurs by cell phone.

The fieldwork shows the appropriation of space 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 fieldwork all contribute to transformative spaces that allow for the individual to exercise agency. Thinking about 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" (MURDOCH, 1998, p. 364).

Connection to place is important to the informal trader as a service is provided to footloose traffic, however, mobility is essential. Not just the ability

to move, 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 places. Mobile telephony enables local places to become enrolled into network spaces. The notion of co-presence is important 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 and is 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.

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 technology 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.

In conclusion then, the addition of mobile technology to informal networks has become a key enabler of livelihoods and mobility. The latter is an important factor; space is party to entanglements that enroll 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. 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 and place.

Acknowledgements

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