Stakeholder Relations and Ownership of a Community Wireless Network: The Case of iNethi

Jaydon Farao[1], Monet Burse[1], Hafeni Mthoko[1], Melissa Densmore[1]

[1] UCT Centre in ICT for Development, University of Cape Town, Cape Town, South Africa
jaydon.farao11@gmail.com

Abstract. The primary objective for this study is to investigate multi-stakeholder understanding of ownership of a community wireless network (CWN) located in Ocean View, Cape Town. This is important because ownership and stakeholder relations are components that contribute to the success of a CWN. Using the convenience and snowball sampling method, we completed 11 semi-structured interviews with stakeholders from the University of Cape Town and the Ocean View community. We consider different ways ownership is conceived between stakeholders and across disciplines. We found that the involvement of the community at initiation of a CWN project is imperative in establishing ownership of a CWN. We characterize some of the ways in which discordant conceptions of ownership have resulted in miscommunication within this project and offer considerations for researchers to take into account as they collaborate with communities on joint initiatives.

Keywords: ICT4D, Community Engagement, Ownership, Stakeholders, South Africa

1. Introduction

A community wireless network (CWN) is a network that is created to provide free and affordable Internet access to members of a community [3]. The CWN is usually created and maintained by members of a community primarily, but often include organisations, working towards shared objectives [4]. Some of the benefits of a community-owned network include: 1) community empowerment; 2) utilisation of community resources for project development; 3) working towards addressing contextual needs within the community; and 4) the sharing of local information and expertise [5]. Community ownership of a CWN is necessary because of the nature of the project, thus how the community and other stakeholders create ownership, and how that manifests, is important to understand for the success of such initiatives. When researching Information Communication Technology (ICT) interventions, it is beneficial to make use of narratives to explore stakeholder relationships. The relationship between primary and secondary stakeholders, as well as the relationships within the stakeholder groups, are a necessary focus to understand how ownership of ICTs manifests in project implementations.

Beyond network and internet coverage, CWNs have the potential to provide a platform for the distribution of locally created knowledge and artefacts within a community. That said, defining particular goals for a CWN project within a community can affect the success of that project along with the existing embedded community connections and relationships [1].

Participation in ICT4D projects has become an important way in which community engagement is improved [23]. This participation is usually prioritised in order to "improve success, ownership, and acceptability" of an ICT4D project [24]. There has been a movement from using participation as purely a means to meet the needs of users [25] towards Community based Co-design, which uses principles of Participatory Design and utilises community insights as an asset during the design process [26]. The involvement of the community early on in a project is a significant factor in ensuring effective ownership of an ICT4D project [27]. Pade, Mallinson, and Sewry [28] describe the involvement of the community, and continuation of their commitment throughout the project, as a factor to ensuring local sustainability. This sustainability is achieved best when the community perceives the project as their own. Pade, Mallinson, and Sewry further describe local ownership as something that should be taken at the initial stages of the project, and not given.

Ownership of ICT projects is an important characteristic for achieving autonomous, or semi-autonomous community engagement [2]. Ultimately, the goal of ICT4D projects is to empower the community through the use of ICTs.

1.1 Case Study: iNethi OV

The researched stakeholders for this study are involved in the iNethi deployment of a community wireless network (CWN) located in Ocean View (OV). "iNethi" is a University of Cape Town (UCT) led ICT4D non-profit organisation. The primary contributors to this organisation are a team of interdisciplinary researchers who seek to utilise ICTs as a vehicle to provide low cost services for connecting communities to; the rest of the world, the internal members of the community, and the surrounding populations. The goal of iNethi, as defined by Lorini et al. [1] is to "build up infrastructure to support community-based services and content sharing," whereas the priority of the community is the provision of reasonably priced internet access. iNethi's philosophy is centred around providing agency to people in the "creation, construction, management, and cost of a wireless network" [1]. The OV CWN is one of many in the Western Cape. OV was chosen because the iNethi network is currently being deployed in some parts of the community, with prospects of expanding further and of being fully community-owned

and operated. Additionally, OV residents also have an existing goal to create and distribute local content using a CWN. While the community has these ambitions, they are, however, an economically marginalized community, still affected by apartheid spatial planning and inequality. 48% of households in OV have a monthly income of 3200 rand or less, and 16% of households live in informal dwellings [1]. Previous research [1] has

shown that internet access is not affordable as a result of high data costs by cellular networks. iNethi has therefore been deployed in the community as a CWN. The OV deployment is a fairly recent implementation but has shown great potential for scalability and replication. However, potential tensions between stakeholder groups, lack of necessary technical skill, and possible miscommunication between the groups has caused the project to primarily be operated and mobilised by iNethi. What transpired in this case study, we argue, is the result of multiple, and at times, conflicting understandings of ownership.

1.2 Background

Stakeholder Theory and ICTs

Stakeholder Theory seeks to explain and guide the mechanisms of an organisation, including its structure and operation [6]. The organisation is described as a unit with which a variety of participants interact to accomplish multiple purposes [7]. It considers how stakeholders benefit from a project and uses stakeholder management to coordinate the relationships between different stakeholders in order to achieve a particular goal [8]. Stakeholder Theory can be categorised into three branches, namely normative, descriptive, and instrumental. The normative perspective is concerned with the moral and philosophical obligations to work towards the common good [9]. Since human beings are affected by any decision made within the project, they should have equal opportunity to contributing to those decisions. The second perspective, descriptive, is concerned with the interaction between stakeholders and the characteristics and behaviour of these stakeholders [10]. The instrumental perspective is concerned with organisations caring for their stakeholders to provide an advantage in ensuring success [11]. Bailur [12], and Donaldson and Preston [6] acknowledge that these perspectives are difficult to distinguish in practice. Bailur further emphasises that to carry out a stakeholder approach to development, one needs to have a "desire to understand what influence stakeholders have on the organization" [12]. He uses stakeholder theory and proposes a stakeholder analysis framework to analyse a telecentre project in the Dhar district, a rural area in central India.

Stakeholders in an organisation are defined by Freeman [16] as any group or person who is affected by the outcomes of a project, those who are "vital to the survival and success of the corporation". Freeman, Wicks and Parmar [17] emphasise the importance of stakeholders in achieving the goals set out by an organisation or project team. These stakeholders can be separated into primary or secondary stakeholders, the former having a direct relationship with the organisation and its progress, while the latter include the public who are affected by the organisation and its projects [18]. The relationship between stakeholders and their participation, both primary and secondary, is important in encouraging ownership and sustainability of ICT projects [19]. The

participation of community stakeholders, particularly, should be prominent in the initial stages of an ICT project in an effort to encourage leadership, while external actors, such as researchers, should attempt to limit their involvement and responsibilities as muchas possible [19].
The importance and needs consideration of stakeholders when designing ICT4D projects is highlighted in research done by Ho, Owusu and Aoki [20]. They sought out to identify various stakeholders and their respective requirements in order to design an appropriate mobile platform for the treatment of patients with sexually transmitted diseases in Uganda. They focused on seven "key stakeholders" and how their needs, which were often conflicting, affected the design and consequent outcome of the project. Ho, Owusu and Aoki note that while all stakeholders seek to "improve sexually transmitted infection (STI) treatment and reduce the prevalence of STIs", they are still bound by different financial interests, amongst other differences. For example, researchers need to produce data and outputs to ensure funding, and users need to have access to affordable healthcare. Additionally, conflicting stakeholder requirements, and the circumstances each stakeholder was in, determined how smoothly the project and operations could take place. A barrier to funding from one stakeholder inevitable resulted in stagnancy for the progress of other key stakeholders. When aid agencies, who are not involved in the direct operations of the project, had a delay in payment, an entire key process was halted which affected the success of the project. This financial and logistical delay could affect how well ownership is taken by the community involved. With a dependent relationship, ownership may be difficult to instil. Ho, Owusu and Aoki also found that because of the disruptive nature of an ICT4D project, as well as the potential disruption by other stakeholders and their internal dynamics, researchers and designers need to "position" themselves thoughtfully to consider the needs of all stakeholders, as far as possible, and not just focus on primary users.

Bailur [12] investigated the use of a stakeholder analysis framework along with existing Stakeholder Theory in an ICT4D project in a rural area in India. The aim of the project was to analyse telecentres in prominent locations in rural areas. When analysing the ICT4D project, Bailur found that the project had both a normative and instrumental perspective when it concerned stakeholders and their engagement. It was also found that the management of stakeholder arrangement and responsibilities was a top-down one which produced a lack of ownership of the project within the communities involved. The proposed stakeholder analysis framework is recommended to be applied on an existing project in order to better understand stakeholder relationships and engagement, as well as to determine why a project was not as successful as previously anticipated. Banda and Chigona [7] use Bailur's research to investigate stakeholders in a similar context, the analysis of a telecentre project in Malawi.

Ownership and ICTs

An ICT4D project such as iNethi is intended to be a grassroots project, seeing as it is a CWN. This kind of project is defined by Escobar [21] as a development initiative

coordinated by a local community for the benefit of that community. However, since there
are additional project partners that may include researchers, technical experts, and other external stakeholders to the community, additional factors lead to the management and resultant ownership of a grassroots project. The first being that the community involved; a) does not feel pressured into adopting extraneous practices, and b) allows the project to become embedded into their existing social structures [14]. The first factor acknowledges that the technologies may have been developed by external actors, but its implementation should be rooted in the natural conditions of the community. The second factor involves the continuous fluidity of the arrangement of the social structures within a community to gain momentum throughout development [14]. This means the reorganisation and dynamism by the community as a choice by that community, to act and react to ICT4D projects in certain ways. Overall, a grassroots approach describes a community-driven one, and resultantly a community-owned project, and this has been interpreted by Pade-Khene, Mallinson and Sewry [22] as a key factor to the success of an ICT4D project. Banda and Chigona [7] investigated the relationship between stakeholders and how it affects ownership in an ICT project carried out in a rural community in Malawi. The project they investigated sought to provide ICT services in the form of telecentres which they note have continuous barriers to sustainability. Bailur [12] describes one of the factors that act as a barrier to sustainability in ICT4D projects as a lack of meaningful stakeholder engagement and this motivated Banda and Chigona to explore how stakeholders engage in the project concerned. It was found that a lack of consultation and research with the community affected various stakeholder engagements, and as a result affected ownership of the telecentre service. There are two different kinds of ownership we consider in this paper, as defined in organisational studies. These are formal ownership and psychological ownership. Formal ownership is the legal arrangements which encompasses the possession of shares and revenue, the right to have influence and control, and the right to information about what is owned [29]. Psychological ownership is the perception and feelings of the community that the project or artefact is “theirs” [30]. The model of psychological ownership is expanded by Avey et al. [31] through the inclusion of accountability, sense of belonging, and self-identity, among others. Rey-Moreno et al. [32] use the two kinds of ownership to investigate the development of local ownership in a community network that is initiated by an external actor. They find that “ownership is a critical element to take into account when looking at externally initiated interventions.” With externally initiated projects, external actors are going to be stakeholders who are not necessarily residing in the targeted community. These stakeholders bring with their contribution, their methods of developing the project along with funding which could affect how the project is owned. The components of both formal and psychological ownership are thus important to consider when investigating how stakeholder relations affect the taking of ownership of an ICT4D project, especially when a stakeholder group is external to the community. Ultimately the different levels of stakeholder engagement, as well as who stakeholders are, help to shape what is understood by ownership.

1.3 Study Aims

The primary objective for this study is to investigate multi-stakeholder understanding of ownership of a community wireless network (CWN) located in Ocean View, Cape Town.
This study focused on the Ocean View (OV) community in the Western Cape Province. The study aimed to explore how ownership is defined and created amongst stakeholders at both UCT and the OV community as it pertains to the iNethi project.
To do this we epistemologically engaged with Stakeholder Theory to discuss how the different stakeholder groups organised themselves, interacted with each other, and how these interactions affected what was understood by taking ownership of the community network.
This study adopted Stakeholder Theory to investigate how ownership is created inICT4D projects such as the iNethi CWN initiative. Stakeholder Theory is used in this study in order to better understand the manner in which various participants in an organisation interact and organise themselves and how these aspects relate to ownership. It is used in an analytical way in order to identify the key stakeholders and how their knowledge, behaviour, and positions, among others, affect how ownership of a CWN is taken.
This research demonstrates an introductory exploration, with preliminary results, into how stakeholder relationships affect ownership of ICT projects in Cape Town, South Africa.

2. Methodology

2.1. Study Approach

The study formed part of the social constructivist paradigm [1] and utilised a qualitative approach. We chose to utilize a qualitative approach to investigate ownership because it allowed us to; explore the relationship between ownership and stakeholder relationships, provide context for individual understanding of ownership, and present the complexity of stakeholder relationships. Much of the data collected conformed to the descriptive perspective of Stakeholder Theory in that the relationships of stakeholders were investigated as well as their behaviours within those dynamics.

The study employed a purposive, convenience sampling technique [2]. This allowed for the recruitment of participants within Ocean View; however, using these sampling methods could result in skewed responses because all participants who are users of the network reside within the same geographical area and have a similar socioeconomic status. It is important to note who the stakeholders considered in the iNethi project are, as it exists in OV. Some of the stakeholders include the directors of the “OV Com Dynamic” (the deployment of the iNethi network in OV), residents of OV, researchers at the University of Cape Town, the UCT computer science department, and Telkom,

to mention a few. Samples were taken from two main stakeholder groups: UCT and the OV community. The reason to focus on these two groups is that they are the main stakeholders involved in the daily functioning of the iNethi project, including the weekly meetings they participate in. The sample size was 11, which included participants from UCT (5) and OV (6). Data was gathered through semi-structured interviews and observations; which was guided by Stakeholder Theory. The observations included taking notes during the weekly stakeholder meetings, while the interviews were with individual stakeholders.

Interviews

Interviews were conducted with stakeholders in the Ocean View community and UCT. Interviews lasted 20-30 minutes and were conducted at a time and place convenient to our participants. Permission was sought from participants to audio record interviews for analysis purposes.

Observations

Observations were carried out during three weekly stakeholder meetings. The meetings were attended by stakeholders within the management of iNethi, either in person or via video conferencing. The meetings consisted of a briefing on the agenda and discussions on the progress of the project in its various domains. During these meetings we sought to understand the relational dynamics between stakeholders such as: how stakeholders engaged during the meeting; the priority agenda items for different stakeholders; how the meetings were conducted, who took the lead, and how decisions were negotiated. Permission was sought from all stakeholders to take part in the meetings and gain insights on how the project is progressing.

2.2. Data Analysis

The semi-structured interviews were carried out by two researchers, one of which noted the responses during the interview. The notes that were taken during the observations of meetings were analysed immediately after in order to better understand how engagements between stakeholders in different contexts affect ownership of the iNethi project within OV. Both interviews and observations were analysed through a narrative and coded through a process of thematic analysis [3]. During the interviews with the iNethi users residing in OV, the research assistant who aided recruitment was present in those meetings. At particular points during the interviews the assistant interjected when a participant was unable to answer. This may have affected participant responses for the interview, as well as created bias. It should also be noted that the results presented in this paper are preliminary.

2.3. Research Ethics

The study complied with research ethics. Approval for the study was obtained from the University of Cape Town's Ethics Committee. Informed consent was carried out prior to interviews and observations. Participants were informed that their participation was voluntary and that their responses would remain anonymous. We worked closely with a prominent member of OV in order to recruit participants for the users of this study. This member occupied a research assistant role. When requesting consent, we used verbal consent primarily because some users were uncomfortable with written consent, viewing it as a form of contract. We decided to explain the purposes of the study, including the risks and benefits of their responses to our questions, verbally.

In order to allow participants to feel as comfortable as possible, we conducted interviews at locations participants requested to have them. Some interviews were held in participants' homes, and others were held in conference rooms. Accommodating participants in these locations was an effort to allow responses to be as authentic as possible as well as to mitigate the power dynamic that exists between us as researchers, and participants, especially in the case of OV stakeholders. Researchers from UCT entering the OV environment presents a power dynamic. This dynamic may have influenced some of the responses; however, we attempted to reduce this influence by allowing participants to guide where and how they were most comfortable. Similarly, when interviewing UCT stakeholders, we had to ensure that our treatment of different stakeholder groups was appropriate and maximises participants honest engagement, while also not emphasising our role as UCT researchers in a way that promotes bias.

Another ethical factor was the reporting of anonymised data. In some cases, information gathered could be clearly linked to a particular stakeholder if the reader was involved in the project. When this data had the potential to inflict more harm to stakeholder relations than positive impact, it was considered more closely for inclusion. While it is important to include as much of the information gathered as possible, we considered the overall impact on the various stakeholders as well.

3. Research Findings

In analysing our data collected during interviews and observations, the following key aspects were extracted (following the interview discussions) as it relates to ownership of the iNethi network in OV: stakeholder perceptions of ownership, perception of the iNethi project, stakeholder relations, and concluding with barriers to producing ownership. This section details the preliminary results and analysis.

3.1. Stakeholder Perceptions of Ownership

During our interviews with stakeholders, it was important to understand how ownership is perceived and understood by stakeholders as it pertains to the iNethi project. This is aligned with psychological ownership as defined by Pierce and Kostova [4], as their

perceptions could influence when and how ownership is taken. One of the UCT stakeholders defined ownership in the OV community as,

"Taking the power back in the form of a community network."

This stakeholder was cognizant to what that meant in relation to the positionality of the researchers in interacting with the OV community. They described the researchers as a "support system" while both stakeholder groups learnt from each other during the development of the project. Ownership, in their view, is related to empowerment. When questioned about whether OV stakeholders are empowered by iNethi, they expressed that they are, through the transferring of skills to operate the platform. This sentiment was shared with another UCT stakeholder, while noting that UCT still has more involvement than is preferable. This stakeholder defines ownership as,

"Owning infrastructure by building it, deciding the speed and price of internet, and owning content and services by creating local social networks."

This notion of ownership was shared by an OV director stakeholder who described it as,

"*local content creation while incorporating their own ideas that they relate to and that makes sense."*

The UCT stakeholder also described the OV stakeholders owning the iNethi network legally but that the project is not run independently, this indicated that they believed OV stakeholders had formal ownership of the project as described by Pierce and Rubenfeld [5]. This presented some conflict in the perception of ownership and legality. Having legal ownership, as found in the interviews with OV stakeholders has little bearing on their perceived ownership of the project. In other words, the formal ownership did not encourage the psychological ownership.

During the interviews with one of the directors of the iNethi network deployment in OV, the stated ownership was related strongly with the acquiring of skills, and elaborated further, that it is also related to having a qualification for those skills. The reasoning for this distinction is that they believe that the acquiring of qualifications increases the job opportunities as well as decreases the dependence on UCT for technical and business help. The emphasis on expertise and upskilling is likely due to the low availability of similar work opportunities in that area.

"iNethi is not owned by OV yet. It is still managed by UCT and funded by UCT."

Another director states,

"We [OV Com directors] do not have the intellect. Since iNethi is mostly technology, training would create ownership."

The comment on gaining skills agrees with the UCT stakeholder's comments on empowerment, but the comment that skills training is still necessary, along with relevant qualifications, suggests that the OV stakeholders believe that not enough has been done to empower them towards a sense of ownership. In this way, the formal ownership in the form of qualifications could advance psychological ownership of the project.

On the other hand, the stakeholders representing users of the iNethi network felt that there was a sense of ownership of the network as they were able to buy vouchers and connect to the network at a lower cost compared to their network providers. However, users described that there were still problems with connectivity and the occasional loss of data, which we understood as a barrier to taking complete ownership of the wireless network. Users had communicated these complaints to a director of iNethi in OV, and upon further investigation it was found that the concerns were not communicated to UCT researchers during their weekly meetings. This fragmented communication demonstrates the disconnect between stakeholders. It shows an uneven reliance on particular groups and does not portray balanced engagement.

Another component of ownership highlighted by a user stakeholder is the intention by OV Com Dynamic for the network to be distributed to the rest of the OV community. This would lead to having more users connected to the iNethi network and the stakeholder sees this as important to owning the project as a community. The user responded,

"It needs to be built across the whole of Ocean View."

Interestingly, one of the pitfalls of using the network has been the overwhelming demand by the number of users on the network at times, as noted by another user stakeholder.

"The signal is bad sometimes. It takes too long because there are too many users."

This results in slower network and was noted as a deterrent by users of the network. This means that in order to optimise ownership in OV, both the maintenance and managing of the network, and its distribution to the rest of the community should be a concern. Balancing those key components would be the challenge.

3.2. Perception of the iNethi Project

When asking the participants about what iNethi means to them we received a diversity of responses. This indicated some discrepancy on the understanding of iNethi. Much of this inconsistency was concerning the structure of iNethi as it relates to the OV community. One primary stakeholder, a founder of iNethi positioned at UCT, defined iNethi as

"the non-profit organisation to initiate infrastructure technology, to be deployed in OV".

They elaborated that the deployment of iNethi in OV is considered as a partner project to the overall iNethi project. That project partner is called "OV Com Dynamic". This is in contrast to other stakeholders who were unsure what the scope of iNethi was. A UCT researcher indicated that the definition of iNethi has been continuously negotiated, which has resulted in some confusion as to what it entails in totality. Interestingly, one of the directors of OV Com Dynamic began describing iNethi as first what UCT says it is, and then continuing to what they believe it entails. They defined iNethi as a Wi-Fi network that is used to generate money through the sale of vouchers. This, we have found, is the definition of OV Com Dynamic. The variance in the responses indicate that there is a level of disagreement and/or misunderstanding of iNethi and what the expectations of the project are. We believe that a lack of consensus in this regard can affect how effective ownership is taken by the community. This is evident in that when stakeholders have contrasting definitions of the project they are involved in, it may lead to the conflict of various expectations for that project, as well as misunderstandings on what the project's objective is.

Similar to the differing definitions of iNethi, the expectations from stakeholders also offer contention. Stakeholders in OV, being a part of a community with a significant unemployment rate, understandably have priorities concerning the creation of jobs and the generation of income. This is seen as one of the main expectations of the project by this stakeholder group. Stakeholders from UCT acknowledge the need to prioritise the needs of the OV community; however, the need to provide the infrastructure necessary for the implementation and use of the iNethi platform is the main priority for the UCT researchers. These conflicting stakeholder expectations and the effect on the success of an ICT4D project is supported by Ho, Owusu and Aoki [6]. When these expectations are in contention, the conflict can affect how well primary stakeholders in OV support and integrate within the project, and thus it affects how well ownership is taken by the community.

One of the methods used by ICT4D projects to address the differences mentioned above is a formulation of a memorandum of understanding (MOU) [7, 8]. Stakeholders at UCT described the MOU to be in development and discussion, but also that this has been the case for a significant period during the project development. Additionally, UCT stakeholders seek to step out of their roles in the project, giving full agency to the OV stakeholders, by the end of 2019, within 6 months at the time of writing. Not having the roles and expectations of stakeholders outlined in a form that is understood by all stakeholders in the late stages of the project could have effects on ownership of the project. If primary stakeholders in OV are not seeing official recognition of their needs and roles through a medium they acknowledge and understand, they may not feel confident enough to take the ownership of the project that is required of them. One could question whether the use of a document such as an MOU, a document that is perhaps foreign to the OV stakeholders and proposed by the UCT stakeholders, is effective and

appropriate. UCT stakeholders had mentioned that only one of the primary OV stakeholders, a director of OV Com Dynamic, was present during the development of the MOU, and this could affect how well the MOU is received by the rest of the directors in OV. An MOU can be seen as an attempt to create formal ownership of the project. Whether this evolves into psychological ownership is questionable, seeing as it is a largely foreign form of documentation to the OV community stakeholders. It has the potential to alienate and create barriers to ownership if it is not readily accepted. This negotiation between formal and psychological ownership, and who defines how these types of ownership are created, is a concern when navigating how different stakeholders operate and interact in a project.

3.3. Stakeholder Relations

One of the primary ways of stakeholder interaction include weekly meetings between the OV Com Dynamic directors and the UCT research team. These meetings alternate venues every week. One venue being the UCT offices and the other being at a high school in OV which serves as the offices of the OV Com Dynamic. During the observation of the meetings held at UCT it became clear that an agenda was set for each meeting, with main contributions by one of the founders of iNethi, a UCT researcher. The agenda was shared to all stakeholders before the meeting in order to allow for contributions from all concerned. The use of an agenda for a meeting was introduced by UCT stakeholders as the norm for weekly meetings. In this way it can be seen as imposed as the status quo for the running of meetings. We noted that stakeholders at OV may not be comfortable with this convention used at UCT, and upon further interviews with UCT researchers we found that when meetings are held in OV, an agenda is rarely set. We also found that UCT waited for OV to initiate the meeting (along with the sharing of the agenda), and multiple times a meeting at OV did not take place because it was not initiated. This, we observe as an attempt to allow OV to take control of one of the key structures for engaging with all stakeholders. Again, this is an attempt at instilling formal ownership. It is hinged upon conventions defined by the UCT stakeholder group, who have influence and power in the stakeholder relation by virtue of their position as researchers from a prominent university.

The lack of meetings in OV should not be concluded as a lack of initiative. Instead we would argue that the format of the meetings, including the setting of the agenda, could contribute to the lack of comfortability of the OV Com Dynamic directors with the status quo as defined by UCT. We presented this argument to one of the UCT stakeholders and they acknowledged that they had not thought of it that way and that they would not request an agenda for the next meeting at OV. This revealed that while the UCT researchers may be seeking to get OV stakeholders to take ownership, they may still be imposing methods of engagement they have normalised on a stakeholder group that have not. It should be noted that during our research period we were not able to attend an organised meeting in OV as one did not take place.

During the meetings held at UCT one of the directors in OV would usually Skype in. While this is a means of ensuring the stakeholders in OV are able to contribute to meetings, the variables associated with initiating a Skype call caused complications during meetings. During one of the meetings, the Skype call was disconnected due to a poor connection in OV. This, however, did not stop the meeting. It continued with only UCT stakeholders present. This meant that a significant portion of the meeting was involving only one group of stakeholders. Minutes were taken of the meeting; however, this is another way of operating meetings imposed by the UCT stakeholder group. While it may not be practical to conclude a meeting if a stakeholder cannot be present, the continuation of the meeting without a key group of stakeholders can influence the relationship between stakeholder groups.

Additional exclusionary aspects to the weekly meetings were found to be; the content discussed during the meeting, as well as a lack of effective communication by the OV Com Dynamic directors on the state of the project in OV to the UCT stakeholders. The content discussed during meetings observed was predominantly technical. This involved an opportunity for feedback from the OV stakeholder, and thereafter dealt with other technical issues concerning the researchers at UCT. These discussions are necessary according to a UCT stakeholder, however, a different approach to the structuring of meetings could be more effective in optimising engagement between stakeholder groups. An improved structure should highlight objectives for all stakeholders since the last meeting and establish any feedback received from users of the iNethi network. When interviewing a director at OV, many of the problems associated with the iNethi network, as well as the issues users of the network faced, were topics not communicated during meetings. This lack of openness indicates a weakness in stakeholder relations. It could lead to UCT stakeholders being unaware of issues faced by OV stakeholders and may produce expectations and progress that do not align with reality.

During a meeting in which stakeholder relations and ownership were discussed, tension arose as the OV Com Dynamic directors began sharing their feelings about ways in which they have felt isolated from the progression of the project. This included discussions around the naming of the network, as well as an understanding of what iNethi and OV Com Dynamic means to them. UCT stakeholders responded defensively at first, indicating that the concerns raised were not highlighted before, which the OV Com Dynamic directors disagreed with. This instance emphasised that: a) there was a miscommunication about the fundamentals of the CWN; b) OV Com Dynamic directors have either felt disempowered to speak openly before or UCT directors have misunderstood them; and c) stakeholder power relations remained in UCT stakeholder's favour. The meeting was felt to provide an important perspective on the CWN project, and the role each stakeholder plays in achieving shared objectives. Additional tensions that arose included how the social positions of directors within OV affect ownership.

The reality of operating a CWN such as iNethi was seen to be overlooked at times. One of these realities is how the directors in OV are positioned socio-economically. Differing positions of stakeholders can be perceived to have an influence on ownership.

Not all of the directors of OV Com Dynamic reside in OV, and this has opened discussions on how the proximity to the project by location, as well as the priority of the project in a stakeholder's daily life can affect the involvement and ownership within the project. This was highlighted by both UCT and OV stakeholders and has indicated that tension exists surrounding these stakeholder characteristics. Thus, how stakeholders are positioned within the project and its location may influence how ownership is produced and should be considered when developing the project.

The interaction between stakeholders, both between and within respective groups, create tension and a lack of cohesion which lead to barriers to taking ownership as described by Pade and Mallinson [8].

3.4. Barriers to Producing Ownership

The findings presented offer some insights into how ownership can be hampered in the development of ICT4D projects, specifically a CWN. Stakeholder relations and the perceptions of ownership by stakeholders have highlighted some of the barriers to producing or taking ownership of a CWN such as iNethi, by a community, particularly because an ICT4D project of this nature should be community-owned. Stakeholder relations, both within and between stakeholder groups, affect how successfully the community stakeholder can take ownership. A cohesive and strong stakeholder group is necessary to allow for a smoother transition into ownership. A cohesive stakeholder group should be encouraged and developed during the initiation of the project, similar to ownership as stated by Ballantyne [9]. In this way, navigating stakeholder expectations, conflicting objectives, and overall understanding of the project can be addressed early in the project.

Other barriers to ownership, as described by user stakeholders and directors within OV, include the lack of awareness of the project, the limited reach of the network within the community, the technical limitations to access, and the maintenance of the network. These are not necessarily the barriers to ownership as defined by UCT stakeholders. A UCT stakeholder described one of the barriers to be the lack of initiative shown by the OV Com Dynamic and how it has been challenging not to aid when the OV directors require assistance. The power dynamic between researcher stakeholders and the OV stakeholders influence much of this barrier to ownership and it would be interesting to investigate how this dynamic would change should OV Com Dynamic directors be empowered in the way they would want i.e. the gaining of qualifications for the work they do. According to one of the directors, this would mitigate the demand for UCT's help as a regular occurrence and provide directors a sense of achievement. Managing this dynamic between stakeholders is an important component of creating the circumstances for the "taking" of ownership.

4. Conclusion and Future Work

This study explored how stakeholders and their positions affected the sense of ownership of a community wireless network ICT4D project. The study has shown through preliminary results that various stakeholder relations can affect how effectively ownership is created, especially if a stakeholder group is external to the community and in a position of influence and power. Consolidating the relationship between formal ownership, which is often conferred by external stakeholders, and psychological ownership, that needs to be created within community stakeholders, is a key component, and challenge, in creating ownership of a CWN. Future CWN projects should prioritise ownership and healthy stakeholder relations at the initial and throughout all stages of the project and this should include conforming to conventions within the community when developing plans and arranging engagements between stakeholders. External stakeholders should attempt to remove all bias when organizing how the project will commence. This could prevent future barriers to ownership within the community and could create the optimal path towards autonomy in the community.

External stakeholders to the community should attempt a co-design process when initiating a CWN project. This could involve the understanding of the existing mechanisms and practices within which the community functions and formulating a strategic plan thereafter. Any form of hierarchy or imposition of external practices should be avoided in an effort to recognise the importance of community norms and cultures. Community leaders and members should be engaged early on and a leadership team constituting of key members trusted by the community should be formed if the community encourages this form of management and planning. It is important to centre the community as much as possible so as to instil ownership of the project and final product, as well as work towards a sustainable and community-endorsed solution.

Investigating the power dynamics and effects on stakeholder relations within CWNs could provide further insight into how ownership and stakeholder relations are associated; however, this is outside the scope of this study. Since this study presents preliminary findings, future work could elaborate on this study by providing a supplementary understanding of community-owned projects such as CWNs. Further research could also include an in-depth study into the components of psychological ownership, and how it manifests in ICT4D projects such as iNethi. As well as expounding on the relationship between formal and psychological ownership.

Acknowledgements

We would like to thank the Ocean View community for their engagement, contributions, and feedback. In addition, we would also like to thank the directors of OV Com Dynamic for their assistance with fieldwork and the arrangement of interviews.

References

1. Lorini, M.R., et al. Localize-It: Co-designing a community-owned platform. *International Development Informatics Association Conference 2018.* 2019. Vol. 933. 243-257. Springer International Publishing.(2019).

2. Myers, B., *Imagine, invent, program, share: A library-hosted computer club promotes 21st century skills.* Computers in Libraries., 29.(3): p. 6-9. (2009).

3. Abdelaal, A. and H.H. Ali. Community wireless networks: emerging wireless commons for digital inclusion. *IEEE International Symposium on Technology and Society*. 2009. Arizona, USA. 1-9. IEEE, Arizona, USA.(2009).

4. Kuchibhotla, H.N., et al. An empirical analysis of collective actions in university anchored community wireless networks. *IEEE Southeastcon*. 2013. Jacksonville, USA. 1-5. IEEE, Jacksonville, USA.(2013).

5. Siochrú, S.Ó. and B. Girard, *Community-based networks and innovative technologies: New models to serve and empower the poor*, in *Making ICT Work for the Poor*. United Nations Development Programme: New York, USA. (2005)

6. Donaldson, T. and L. Preston, *The stakeholder theory of the corporation: concepts, evidence, and implications.* The Academy of Management Review, 20.(1): p. 65-91. (1995).

7. Banda, C. and W. Chigona. The impact of stakeholder management on the sense of ownership in telecenter projects: The case of Malawi. *International Conference on Social Implications of Computers in Developing Countries.* 2017. Yogyakarta, Indonesia. 439-450. Springer International Publishing, Yogyakarta, Indonesia.(2017).

8. Fontaine, C., A. Haarman, and S. Schmid, *The stakeholder theory.* Edlays Education, 1.(1): p. 1-33. (2006).

9. Phillips, R.A., *Stakeholder theory and a principle of fairness.* Business Ethics Quarterly, 7.(1): p. 51-66. (1997).

10. Jawahar, I. and G.L. McLaughlin, *Toward a descriptive stakeholder theory: An organizational life cycle approach.* Academy of Management Review., 26.(3): p. 397-414. (2001).

11. Clarkson, M.E., *A stakeholder framework for analyzing and evaluating corporate social performance.* Academy of Management Review., 20.(1): p. 92-117. (1995).

12. Bailur, S., *Using stakeholder theory to analyse telecenter projects.* Information Technology & International Development, 3.(3): p. 61-80. (2006).

13. Sen, A., *Development as Freedom.* 1 ed. Knopf. New York (1999)

14. Breytenbach, J., C.D. Villiers, and M. Jordaan, *Communities in control of their own integrated technology development processes.* Information Technology for Development., 19.(2): p. 133-150. (2013).

15. Toyama, K., *Geek Heresy: Rescuing Social Change from the Cult of Technology.* PublicAffiars. 352 (2015)

16. Freeman, E.R., *Strategic Management: A Stakeholder Approach*. Cambridge University Press. New York (2010)

17. Freeman, E.R., A.C. Wicks, and B. Parmar, *Stakeholder theory and "the corporate objective revisited"*. Organ. Sci., 15.(3): p. 364-369. (2004).

18. Buchholtz, A.K. and A.B. Carroll, *Business & Society: Ethics & Stakeholder Management*. 8 ed. Thomson/South-Western (2012)

19. Ballantyne, P. *Ownership and partnership – Keys to sustaining ICT-enabled development activities.* International Institute for Communication and Development., **8**. (2003).

20. Ho, M.R., E.K. Owusu, and P.M. Aoki. Claim mobile: engaging conflicting stakeholder requirements in healthcare in Uganda. *2009 International Conference on Information and Communication Technologies and Development (ICTD).* 2009. Doha, Qatar. 35-45. IEEE, Doha, Qatar.(2009).

21. Escobar, A., *Reflections on 'development': grassroots approaches and alternative politics in the third world.* Futures., 24.(5): p. 411-436. (1992).

22. Pade-Khene, C., B. Mallinson, and D. Sewry, *Sustainable rural ICT project management practice for developing countries: Investigating the Dwesa and RUMEP projects.* Information Technology for Development, 17.(3): p. 187-212. (2011).

23. Mpazanje, F. and I. Brown. Participation in rural community ICT4D project initiatives: A literature review. *International Conference on Social Implications of Computers in Developing Countries*. 2013. Montego Bay, Jamaica. Vol. 9. 375-393. Montego Bay, Jamaica.(2013).

24. Winschiers-Theophilus, H., T. Zaman, and A. Yeo, *Reducing "white elephant" ICT4D projects: a community-researcher engagement.*, in *7th International Conference on Communities and Technologies.* ACM: Limerick, Ireland. p. 99-107. (2015)

25. Ramirez, R., *A 'meditation'on meaningful participation.* The Journal of Community Informatics, 4.(3). (2008).

26. Kapuire, G.K., et al. Community-based co-design in Okomakuara a contribution to'design in the wild'. *13th Participatory Design Conference*. 2014. Windhoek, Namibia. Vol. 2. 207-208. ACM, Windhoek, Namibia.(2014).

27. Bridges.org. *12 Habits of Highly Effective ICT-enabled Development Initiatives*. 2007 [cited 2019 15 May]; Available from: http://archive.kubatana.net/html/archive/resour/070117bridges.asp?sector=RESOU.

28. Pade, C., B. Mallinson, and D. Sewry, *An elaboration of critical success factors for rural ICT project sustainability in developing countries: Exploring the Dwesa case.* Journal of Information Technology Case and Application Research, 10.(4): p. 32-55. (2008).

29. Pierce, J.L., S.A. Rubenfeld, and S. Morgan, *Employee ownership: A conceptual model of process and effects.* Academy of Management Review., 16.(1): p. 121-144. (1991).

30. Pierce, J.L., T. Kostova, and K.T. Dirks, *The state of psychological ownership: Integrating and extending a century of research.* Review of general psychology, 7.(1): p. 84-107. (2003).

31. Avey, J.B., et al., *Psychological ownership: theoretical extensions, measurement and relation to work outcomes.* Journal of Organizational Behavior, 30.(2): p. 173-191. (2009).

32. Rey-Moreno, C., et al., *Local ownership, exercise of ownership and moving from passive to active entitlement: A practice-led inquiry on a rural community network.* The Journal of Community Informatics., 11.(2). (2015).

33. Vygotsky, L.S., *Mind in Society: Development of Higher Psychological Processes*. Harvard University Press (1978)

34. Emerson, R.W., *Convenience sampling, random sampling, and snowball sampling: How does sampling affect the validity of research?* Journal of Visual Impairment & Blindness, 109.(2): p. 164-168. (2015).

35. Aronson, J., *A pragmatic view of thematic analysis.* The Qualitative Report., 2. p. 1-3. (1994).

36. Tanner, M. and A. du Toit, *The influence of higher education institutions on the sustainability of ICT4D initiatives in underserved communities.* The Electronic Journal of Information Systems in Developing Countries, 71.(1): p. 1-16. (2015).