Digital Platforms for Livelihoods in the Global South

Developing the Tech Mediator Model

Pietari Keskinen
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A doctoral thesis completed for the degree of Doctor of Science (Technology) to be defended, with the permission of the Aalto University School of Science, at a public examination held at the lecture hall T2 of the school on 1 April 2022 at 12:00.

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Abstract

Various types of digital services can offer multiple opportunities to improve livelihoods in the informal economy of the Global South. One of these types of services are the digital multi-sided platforms which create value by facilitating transactions between different types of users. Using these services, informal economy workers in the Global South could connect with users from the Global North to access resources outside of their own communities. However, there are various barriers that prevent informal economy workers from utilising these platforms. They might lack access to the necessary technical infrastructures or not possess all the required skills. This dissertation aims to find practical solutions to connect the users from the Global South to the beneficial global platforms.

To utilise the resources available to Global South workers, this dissertation introduces the concept of a tech mediator, a person specifically trained to help their community members. Tech mediators carry this out by identifying which services fit their context, explaining the services to their community members, and supporting the community members while they use the services. Briefly, the tech mediator is a human interface to services which would benefit their community.

Furthermore, this dissertation presents the full tech mediator model, lists their responsibilities, and positions them in relation to other stakeholders and resources in their community. The concept of tech mediator has been created in collaboration with two communities in Namibia by using participatory design methodologies. In the workshops presented in this dissertation, the need for tech mediators was identified, the concept was developed with the community members, and then tested in their community. A study is also presented of a similar structure used in commercial operations in Tanzania.

The tech mediator model is the central contribution of this dissertation. The tech mediator model is in itself a practical solution which can connect users from the Global South to the global platforms; thus, it should be of interest to practitioners. The tech mediator model also contributes to the concept of technology champion by providing a connection to the digital platforms, as well as a complete list of the responsibilities held by the mediators when serving their community.

Finally, this dissertation advocates the use of digital platforms to alleviate issues in the Global South, while acknowledging the potential issues that might rise.

Keywords Global South, digital platforms, sustainable livelihoods, informal economy

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Teknologiavälittäjän konsepti on tämän väätöskirjan keskeinen kontribuutio. Teknologiavälittäjä on itse asiassa käyttäjän malli, jolla käyttäjiä globaalista etelästä voidaan yhdistää globaalisti toimiviin digitaalisiin alustoihin. Näin ollen se on sinänsä relevantti alan toimijoille.

Teknologiavälittäjän malli on nykytä ”teknologia esitaitelijan” (engl. technology champion) käsitteeseen yhdistämällä siihen digitaaliset alurat. Lisäksi teknologiavälittäjän mallissa määritellään yhteisöä palvelevan toimijan vastuut ja velvollisuudet. Lopuksi, tämä väätöskirja ottaa myös positiivisen kannan digitaalisten alustojen käyttämiseen globaalissa etelässä, muistaen tosin aiheeseen potentiaalisesti liittyvät riskit.
Completing this dissertation is my ode to stupidity. There are very little reasonable reasons for writing it, yet I spent five years of my life typing various parts of this book. However, here at the finish line, I cannot help but feel somewhat proud with my accomplishment. Looking back to this journey, there are acknowledgements to be given.

First of all, I want to thank my supervising professor Marko Nieminen for all the support you have given me during all these years. There have definitely been adventures, both figuratively and literally, that we have gone through. In retrospect, these adventures have made this process so rewarding.

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February 22, 2022,

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This thesis consists of an overview and of the following publications which are referred to in the text by their Roman numerals.


List of Publications

*patiation(s) Otherwise - Volume 2*, Manizales, Columbia, p. 30-34, DOI: 0.1145/3384772.3385147, June 2020.
Author’s contributions

Publication I: “A Community-Initiated Website Development Project: Promoting a San Community Campsite Initiative”

Mr Keskinen was the main author of this paper. He was responsible for leading the planning and executing the research activities described in the paper with other authors in supporting roles. He also wrote the theoretical framing of the paper with comments from other authors. The data analysis was led by Mr Keskinen. Mr Keskinen wrote the paper with comments and small contributions (about 20% in total) from the other authors.

Publication II: “Local Tech Mediators - A Human Access Point to Global Crowdfunding Platforms”

Mr Keskinen was the main author of this paper. He was responsible for leading the planning and executing the research activities described in the paper with other authors in supporting roles, besides the technical content where Author 2 was leading, and Mr Keskinen was in a supporting role. The theoretical framing of the paper was created in collaboration between the authors, with Mr Keskinen in leading role. The data analysis was done in collaboration between Mr Keskinen and Author 2. Mr Keskinen wrote the paper with comments and small contributions (about 15% in total) from the other authors.

Publication III: “Digital microwork as a livelihood strategy in a Namibian informal settlement”

Mr Keskinen was the main author of this paper. He was responsible for leading the planning and executing the research activities described in the
paper with other authors in supporting roles. He also designed and wrote 70% of the theoretical framing, with contributions from Authors 3 and 4. The data analysis was done by Mr Keskinen. Mr Keskinen wrote the paper with comments and small contributions (about 10% in total) from the other authors.

Publication IV: “The Effect of Digital Community-Based Tourism Platform to Hosts’ Livelihood”

Mr Keskinen was the main author of this paper. He was responsible for leading the planning and executing the research activities described in the paper with other authors in supporting roles. He also wrote the theoretical framing of the paper with comments from other authors. The data analysis was led by Mr Keskinen and done in collaboration with Author 2. Mr Keskinen wrote the paper with comments and small contributions (about 20% in total) from the other authors.

Publication V: “Worker Empowerment in the Era of Sharing Economy Platforms in the Global South”

Mr Keskinen was the main author on this paper. He was responsible for writing the paper, with comments from Author 2.

Language check

The language of my dissertation has been checked by the Language Center of the Aalto University. I have personally examined and accepted/rejected the results of the language check one by one. This has not affected the scientific content of my dissertation.
1. Introduction: Digital Platforms for the Global South

An increasing number of the world’s population can globally access a device suitable for Internet usage with a connection. The progress in the availability of mobile devices and internet connections has brought new digital services to previously underserved areas (International Telecommunication Union: Development Sector, 2020). These new services offer myriad opportunities for the betterment of the quality of life around the globe by providing access to essential resources, such as banking (Batista & Vicente, 2020), education (Lim, Ra, Chin, & Wang, 2020), and e-government (Elbahnasawy, 2021). However, a lack of access to digital services, also known as “the digital divide”, has become a tangible threat to sustainable growth (World Bank, 2016). United Nations Department of Economic and Social Affairs (2015) has also raised the same topic in their Sustainable Development Goals 8 and 9.

Moreover, even if these new services are theoretically available to new users, there are numerous issues that have prevented their adoption (Pankomera & van Greunen, 2019). There are still many in the Global South that either lack a device or an Internet connection. For example, only 28% of urban and 6% of rural households in Africa had Internet access by 2019 (International Telecommunication Union: Development Sector, 2020). Even when the technical infrastructures are in place, there are cultural and social barriers that prevent the adoption of new digital services (Pankomera & van Greunen, 2019). Potential users in the Global South might lack knowledge of the available services (Osei-Assibey, 2015) or the necessary skills to use them (Chauhan, Gupta, & Jaiswal, 2018). Many of the services are also designed with users from the Global North in mind, which might prevent users from different contexts from adopting them.

One of the possible digital services are the digital multi-sided platforms (Hagiu, 2014). They create value by facilitating transactions between different types of users (for example, buyers and sellers). Transactions between the users from the Global South and the Global North allow the users from the south to access markets and resources that are not constrained by their
own environments. There are platforms that allow the users to directly earn money (gig economy platforms (Heeks, 2017)), or that could help them to access resources capable of enhancing the entrepreneurship in the Global South (for example, crowdfunding platforms, such as Kickstarter). In this dissertation, these services are called “global platforms”, and they are explained further in Section 2.2.

While these digital services offer new opportunities (World Bank, 2016), they may also exacerbate global inequalities (Koskinen, Bonina, & Eaton, 2019). It is the platform owners who dictate the policies, and the users have very little power to influence them (Srnicek, 2017). Moreover, the types of the livelihoods these platforms provide for their users are typically precarious by nature (Webster, Ludwig, Masikane, & Spooner, 2021), raising valid debate in the communities of the Global North on their role and effect (C. J. Martin, 2016). If these platforms are introduced to users in the Global South, it is critical to ensure that they are treated fairly.

1.1 Initiatives for Connecting the Global South to Global Services

The benefits and further promises of digital services for the livelihoods in the Global South have been widely recognised. Several initiatives have aimed at providing access to digital services for the new disadvantaged users in the Global South. In the publications of this dissertation, participatory design methodologies have been used to facilitate access to digital services by users in the Global South. Thus, the research carried out can be seen to contribute to such initiatives.

These initiatives have also been governed by private companies, non-governmental organisations, and different levels of governments of the Global South. This section briefly elucidates examples of different types of initiatives. These examples are meant to provide some framework on the ways different types of organisations have supported digitalisation and livelihoods based on digital services.

One of the better known privately-owned initiatives to introduce digital services to previously underserved areas is Free Basics (formerly Internet.org) by Facebook which was launched in Zambia 2014 (Romanosky & Chetty, 2018). Free Basics is a platform which hosts a variety of applications that are free (not counted towards the airtime bought by the user) to use (Romanosky & Chetty, 2018). The applications accessible in Free Basics vary in their content and quality ranging from useful services, such as news (Sen et al., 2016) and empowering women (Poveda & Roberts, 2018), to spam (Sen et al., 2016). Google has also explored the area through their Project Loon, a high-altitude balloon-based attempt to bring connectivity to remote areas of the world (Nagpal & Samdani, 2017).

The government of Nigeria, with support from the World Bank, has
launched a NaijaCloud service, that has aimed at supporting online outsourcing in the nation (Malik, Nicholson, & Heeks, 2018). The idea behind this initiative is that, in theory, anyone from anywhere in the globe can participate in the global labour markets facilitated by digital outsourcing platforms (Graham, Hjorth, & Lehdonvirta, 2017). Similar arrangements have also been launched in Pakistan by the Khyber Pakhtunkhwa (KPK) provincial government, which has launched an initiative to train 40,000 young people to use digital labour platforms (Malik et al., 2018). However, these initiatives have left the workers without the necessary support, and the workers have suffered from issues (unpaid salaries, precarious labour positions) similar to those presented in Section 2.2.4 (Anwar & Graham, 2021).

One of the forms of support often adopted is the provision of various technology hubs, physical spaces that enable visitors to engage in various digital activities, and receive support and education regarding the possibilities afforded by the services (Paxling, 2020). There are over 200 tech hubs across the African continent and they serve a critical role in supporting digitalisation as well as young entrepreneurship in Sub-Saharan Africa (SSA) (Csikszentmihalyi, Mukundane, Rodrigues, Mwesigwa, & Kasprzak, 2018). One example of these spaces is RLabs. RLabs is a South African-based initiative offering Living Labs. Within this space, visitors can collaborate with companies and governments to create and test new services (Parker, Wills, & Wills, 2013). The initiative has since also spread to Namibia, where youth entrepreneurship has has been supported through it (Winschiers-Theophilus et al., 2017).

Overall, these initiatives have focused on two factors: providing the necessary technical infrastructures for using the Internet, and on building individual capacities to use such services. These appear to be the two broad elements that any initiative needs to consider. However, there is always a risk involved in these types of initiatives. They are almost always funded by outside stakeholders, and there needs to be a careful plan to support the transfer of power from the outside to the communities themselves. For example, Project Loon by Google ended January 2021 with continuation of the provided services remaining unclear (Wakabayashi, 2021). The users from the Global South have little power to influence the decisions made by multinational companies who control the services they use. Locally controlled solutions would allow the users to have more power to control the services to which they resort.

1.2 Technology Champions in the Global South

The importance of certain individuals in the adoption of new technologies has been recognised in the literature for some time. Maidique (1980)
presented the already developed idea and established term of "champion" which describes these individuals. Beath (1991) offers the following description for champions, based on the work of earlier researchers: "Champions are managers who actively and vigorously promote their personal vision for using information technology, pushing the project over or around approval and implementation hurdles. They often risk their reputations in order to ensure the innovation’s success". Since the time that description was offered, the definition of champion has broadened, and the role in management is no longer seen as a part of the definition for a champion. For example, Kamal (2010) refers to champions as "the existence of a person in the organisation who is committed to introduce ICT related initiative to the organisation". A champion may be formally appointed to the task, or informally emerge among the project participants (Grobbelaar & Schwaag Serger, 2015).

In the research area of ICT for development (ICT4D), the importance of champions in development projects has also been realised. Renken and Heeks (2013) define the ICT4D project champion as "any individual who makes a decisive contribution to the ICT4D project by actively and enthusiastically promoting its progress through critical stages in order to mobilise resources and/or active support and cooperation from project stakeholders". Project champions are often recognised in the literature; for example, Smith and Turpin (2017) have called the key individual in the community with whom they work a "project champion". Defining local champions and building a pathway to develop new champions is also recognised as requirements for a successful ICT4D project (van Biljon, Marais, & Platz, 2017).

Besides the project champions, ICT4D research has also recognised a second category of key individuals who affect the technology usage in the Global South. In cases where an individual lacks a device or skills to use digital services, intermediaries may be used (Sein & Furuholt, 2012). Intermediaries is "a technologically-skilled or literate member who enables technology use for persons whose technology access is affected by non-literacy, lack of digital operation skills, financial constraints, and socio-cultural and empowerment issues including gender, employment, and social status", as defined by Sambasivan and Smyth (2010). Intermediaries may be organisations (Wahid, Seina, & Furuholt, 2011), or even user-friendly technologies (Chandwani & Kulkarni, 2018). The intermediaries are not always just enabling. For example, parents, who their children depend upon to use technology, might limit the access they offer (Zelezny-Green, 2018).

The importance of champions is also recognised in the related fields of research. Identifying a project champion is one of the first steps of a community-based co-design project as described by Ssozi-Mugarura, Blake, and Rivett (2017). Although the term "champion" is not always used, the
support from key figures in the communities, such as village elders, is a critical asset for participatory design (Kapuirie, Winschiers-Theophilus, & Blake, 2015). Kambunga, Winschiers-Theophilus, and Goagoses (2018) have identified key individuals from the community to work as messengers between the researchers and community members, naming them tech ambassadors.

However, the literature has lacked a completed list of the responsibilities for champions (Shea, 2021). Typical tasks for champions include influencing the organisation at different levels to adopt new services, adopting an active role in implementing the change, and overcoming any inertia or resistance within the organisation (Shea, 2021). In participatory design projects, the role of the champion might also include working between the community members and outside researchers, such as helping the researchers to act both efficiently and respectfully with the community members (Winschiers-Theophilus, Zaman, & Yeo, 2015).

Renken (2019) have investigated the motives of the ICT4D champions. He found that the champions are motivated by the need for self-actualisation, personal business success, and a will to address local social concerns. The strong emphasis on social concerns differentiates the ICT4D champions from other types of technology innovation champions (Renken, 2019). Champions themselves need considerable amounts of social capital to efficiently operate (Renken & Heeks, 2018). They might not have all the social connections held by other project stakeholders, but they still appear to gather more social capital from their limited connections than other stakeholders (Renken & Heeks, 2018). Gachago, Morkel, Hitge, van Zyl, and Ivala (2017) have found elements of design-thinking from the mindset of technology champions in South African universities. They are oriented to solving problems and are, for example, interested in implementing the changes they wish to see.

Renken and Heeks (2017) have presented an ESPOSE-model to describe the origins of ICT4D champions. In their model, the champion origins are influenced by Environmental factors, Social networks, Personal characteristics, Organisational factors, Skills and education, and Experience. The first three elements are especially influential in the early incubation states of champions development, whereas the last three elements are more present in the later phases during which the champions work in the actual project.

There is a gap in the literature regarding the intersection of digital platforms and various types of technology champions. Digital platforms are typically owned by multinational companies (Srnicek, 2017) with limitations on ways to influence their design. They are often also designed primarily for users from the Global North (Muralidhar, Bossen, & O’Neill, 2019). Therefore, a champion pushing for adoption of a platform in the Global South must overcome a barrier in usability with very little means
for influencing the digital service itself. Additionally, the global platforms create value by enabling communication between different types of users (Hagiu, 2014). The adaptation of platforms is also a long process, which requires continuous support with different types of skills, such as intercultural communications when interacting with other platform users (Arvila, Winschiers-Theophilus, Keskinen, Laurikainen, & Nieminen, 2020).

Technology champion literature often focuses on the adoption of the service within a pre-determined project in a pre-determined organisation or community. In contrast, the usage of the global platforms in the Global South requires continuous support for the users. It is insufficient that the champions enable the community with access to the platform resource-wise; they must also train their peers to efficiently use the platform. This includes both the technical usage of the platform, but also the ways of interacting with other users. There are also no superiors to force the community members to use the platform, as is case within a professional organisation. The community members need to understand the ways by which usage of the platform would improve their lives, and their champion needs to continuously demonstrate its benefits. These differences imply that the technology champion models need to be altered to cater to the usage of global platforms in the Global South.

### 1.3 Scope and Aim

This dissertation focuses on the digital services and their users in the Global South. Its scope does not include the ways of and reasons behind Global North users’ global platform usage. It is assumed that users from the Global North use the global platforms and are capable of interacting with those users from the Global South who are also using these same platforms.

The aim of this dissertation is to find practical solutions with which to close the digital divide, thereby making the world more equal place. The focus is on those digital services that allow their users to earn more money either directly from the service, or by improving their resources used in the livelihood creation. The support for livelihood creation is understood in a broad manner. Services that provide indirect support, such as messaging applications, are also considered. However, services that are used purely for leisure, such as games, are excluded.

To achieve the aim of this dissertation, the context and the resources held by the potential service user in Global South are explored. The characteristics of the global platforms are also investigated. The central research objective of this dissertation is to attain a flexible way of connecting the demands of the users from the Global South to the supply provided by the global platforms. This needs to be executed in a manner that accounts for
the contexts and the barriers they might face when trying to connect these services. A practical solution such as this would be apt to helping potential users connect to available resources to improve their daily livelihoods.

1.4 The Structure of the Dissertation

This dissertation consists of five peer-reviewed, published research publications, and this summary part. In this summary, the overall results and overarching themes from the publications are presented. There is no new data presented in the summary. The individual publications include descriptions of the research methods and data analysis used, as well as elaborate reflections of the research. The summary avoids repeating the content of the publications. The summary part is intended to understandable as an independent text, and thus the publications are referenced only when their content are directly discussed.

Publication I presents a research intervention in a small, rural Namibian community, that resulted a website for the campground the community was planning. The need for a tech mediator for sustaining the website was noted in the end of the research.

Publication II presents workshops held with the group from an informal settlement "Havana" next to Windhoek, Namibia. In these workshops, the concept of tech mediator was discussed, and the preliminary description was developed with the participants.

Publication III presents an experiment from the same informal settlement, where a simulation of a digital gig economy platform was introduced to the community members as possible source of livelihoods. The participants from Publication II helped to organise the workshops, and acted in a role that the tech mediators should fill in the future.

Publication IV is a study of a business model where a tech mediator-like structure is used to support rural Tanzanians utilising a community-based tourism platform.

Publication V is a short exploratory paper, that discusses the effects of gig economy platforms in the Global South.

Chapter 4 includes more elaborate summaries of all the publications.
2. Background: Digital Services for Improving Livelihoods in the Global South

This chapter discusses the literature regarding digital services and their support of livelihood creation in the Global South. First, 2.1 briefly presents the typical characteristics of informal economy in which the service users in the Global South operate. After that, in 2.2, the characteristics of digital platforms are presented as well as the means by which they can support livelihoods. Then, 2.3 examines the local infrastructures used to support livelihoods. Finally, in Section 2.4, the factors hindering the adoption of digital services in the Global South are inspected.

This dissertation discusses the differences between the Global South and the Global North. The following definitions are used to describe them.

The Global South – the low and middle income countries mostly located in the southern hemisphere. Includes countries in Latin America, Africa and the Caribbean, Pacific Islands, and Asia (excluding Russia, Israel, Singapore, Macao, Hong Kong, Taiwan, Japan, and South Korea).

The Global North – the industrialised countries mainly located in the northern hemisphere, including the USA, Canada, Europe, Russia, Israel, Singapore, Macao, Hong Kong, Taiwan, Japan, South Korea, Australia, and New Zealand.

The terms "Global South" and "Global North" have been criticised (Traxler, 2018). Not all the of the Global North is located on the Northern Hemisphere, and vice versa. Additionally, there are also large differences within countries, that are not observed in the Global South — Global North dichotomy. However, in this dissertation the terms "Global South" and "Global North" are used, as they describe areas that have differences between them, and the terms Global South/North appears the best alternative.

The central difference between the Global South and the Global North are the income levels. The most of the Global North are among the high income countries, while the Global South is not (United Nations, 2020). The main outliers are certain Eastern European countries being among the middle income nations, and the fuel-exporting Middle Eastern and Caribbean countries being among the high income nations (United Nations,
However, much of the Global South has historically been subjected to colonisation, which has impacted the culture in the countries, but also the position of these countries in the global stage (Dados & Connell, 2012).

There are several terms that have been used to describe similar dichotomy than terms Global South and Global North. For example, third world, low and middle income countries, developing countries, and emerging economies have been used. Third world was used to describe the countries that were not part of the western world or the communists bloc during the Cold War. As the Cold War has ended, the third world has become largely obsolete. Low and middle income countries is used by the UN, but the term refers only to the incomes, and excluded the other elements of the differences between these areas. Similarly, developing or emerging countries imply, that the countries in the Global South are currently not developed, and should aim at becoming more like the countries in the Global North.

2.1 Informal Economy in the Global South

An exact definition of informal economy appears to be difficult to articulate in the current literature (Benjamin, Beegle, Recanatini, & Sanntini, 2014). Indeed, a standard definition has been lacking for some time (Medina et al., 2017). In general, informal economy means economic activities that are outside of normal regulations. In this dissertation, definition by ILO (2015) is used, presented in Recommendation 204, in which informal economy refers to "all economic activities by workers and economic units that are – in law or in practice – not covered or insufficiently covered by formal arrangements", but "does not cover illicit activities, in particular the provision of services or the production, sale, possession or use of goods forbidden by law, including the illicit production and trafficking of drugs, the illicit manufacturing of and trafficking in firearms, trafficking in persons, and money laundering, as defined in the relevant international treaties". These types of economic activities also have several other names, such as "hustling" (Thieme, 2013a) or "zigzagging" (Jeffrey & Dyson, 2013).

Due to its informal nature, the exact size of an informal economy is difficult to estimate. Nevertheless, an informal economy is very common; it is estimated that 61% of the world’s employment is part of informal economy (Bonnet, Vanek, & Chen, 2019). The poorer the country, the larger the informal sector tends to be (Bonnet et al., 2019). Among the countries from which our fieldwork stems, Namibia Statistics Agency (2018) estimates that 57% of the Namibian workforce are part of the informal economy. In Tanzania, 75% of workers are in informal forms of employment (Bonnet et al., 2019). A lack of education or other qualifications can prevent informal economy workers from entering regulated job markets, which draws people
to the informal sector (Bajpai, Larson, & Mehta, 2013). Informal economy jobs are often the last resort for workers (Mandelman & Montes-Rojas, 2009; Ram, Edwards, Jones, & Villares-Varela, 2017)

Typical for an informal economy is the usage of several different ways of earning money (Hammer, 2019). An individual might opportunistically act in both self-employed and employed roles depending on the task (Thieme, 2013b). The work in the informal economy is often opportunistic by nature (Thieme, 2018). Operating outside regular employment requires the workers to try to find livelihoods from differing sources (Bajpai et al., 2013). Informal economy workers might sell something one day (Romanosky & Chetty, 2018) and work on construction sites the next (Altındağ, Bakiş, & Rozo, 2020).

Term informal economy worker – is used in this dissertation to describe a person who seeks to earn their livelihood outside regular employment or governmental support systems with a mix of entrepreneurial activities and positions of short-term employment.

Informal economy workers are in a vulnerable position in job markets (Kabeer, Milward, & Sudarshan, 2013; Valodia & Devey, 2012); earning one’s daily livelihood from informal markets is uncertain (Thieme, 2018) with the workers holding a precarious position with few guarantees (Webster et al., 2021). They might be abused by the more powerful entities in the markets (Ram et al., 2017). Moreover, the workers might face defrauding (Anwar & Graham, 2021), unpaid salaries (Matte Guilmain & Hanley, 2021), and dangerous tasks (Davy et al., 2019). The lack of regulations and the power differences within society frustrate the ability of the workers to defend themselves against malpractices. UN SDG 8 discusses the informal economy and demands that decent labour conditions are guaranteed for all. The lack of social security forces workers to enter unregulated job markets as the workers need to resort to all sorts of means to earn their livelihood (Thieme, 2018).

We worked with informal economy workers from Namibia and Tanzania. These workers use different methods of earning livelihoods, and our aim was to find ways to support some of these methods via digital services. These workers are often self-employed in the sense that they lack an employer paying them a regular salary. However, not all of them own a business — many work in different positions depending on the places in which they can find work. This appears to be a fairly typical way for those in an informal economy to act. The prevalence of an informal economy in the Global South and the amount of issues the actors often experience due to its nature means that there is a great need for ways to support those affected by this type of economy.
2.2 Global Platforms in Improving Livelihoods in the Global South

The concept of "platform" has been defined in multiple ways (de Reuver, Sørensen, & Basole, 2018; Thomas, Autio, & Gann, 2014). In general, platforms mean technical systems on which new technical systems can be built. Platforms can be either digital or non-digital. For example, a credit card infrastructure can be understood as a non-digital platform (de Reuver et al., 2018). This dissertation focuses on digital platforms and, namely, their subset multisided platforms. Digital platforms can be defined from a technical view as "an extensible codebase to which complementary third-party modules can be added" or from a more sociotechnical view as "technical elements (of software and hardware) and associated organisational processes and standards" (de Reuver et al., 2018). Multisided platforms generate value by facilitating interactions between different user groups with differing but similar goals (i.e. buyers and sellers) (de Reuver et al., 2018; Gawer & Cusumano, 2013; Hagiu, 2014).

The term global platform is used to describe a multisided platform which facilitates communication between users from the Global South and Global North.

Section 2.2.1 presents the distinct characteristics of global platforms. These characteristics determine which tools are available to the designers who wish to encourage users from the Global South to use these platforms to benefit their livelihoods. In Section 2.2.2, the platforms that directly provide the users with payable gigs are presented in the context of the Global South. Then, Section 2.2.3 reviews the other types of platforms that could benefit the informal economy workers. Finally, Section 2.2.4 examines the critical discussion regarding the platforms and the gig economy.

2.2.1 Characteristics of Multisided Platforms

This section introduces the defining characteristics of global platforms. These characteristics are adapted from Gawer and Cusumano (2013), de Reuver et al. (2018), Srnicek (2017), and Hagiu and Wright (2015), and they affect the ways in which the platforms can be utilised in the work of informal economy workers in the Global South. Five distinct characteristics or concepts emerge from the literature:

1. platform ownership
2. platform openness
3. network effects
4. difficulty of start
5. tendency to seek dominant positions

These characteristics determine the potential uses and applications of global platforms in the Global South.

**Platform Ownership**
A platform owner is the stakeholder who provides the users with a platform (Thomas et al., 2014). Generally, the platform owners are the companies behind the platforms. For example, the social media platform Facebook is owned by Facebook Inc. Platform owners have the power to modify the rules and policies of the platforms, thus granting them significant power over the smaller entities who may greatly rely on the platform to conduct their business (Wen & Zhu, 2019).

**Platform Openness**
de Reuver et al. (2018) refers to platform openness as the extent to which the platform supports the new users and complementors (smaller stakeholders, who "leverage platform resources to offer complementary products or services to prospective end users" (Wen & Zhu, 2019)). However, openness can also refer to the degree of inclusion of the users (Karippacheril, Nikayin, de Reuver, & Bouwman, 2013). Platform owners may use various degrees of openness to govern and control the actions on the platform (Thomas et al., 2014). Openness generally supports the participation of the users with lesser resources (Karippacheril et al., 2013).

**Network Effects**
Network effects (or network externalities in de Reuver et al. (2018)) refer to the increased value that the greater number of users bring to individual users (Hagiu & Wright, 2015). Especially prevalent in global platforms are the indirect network effects, which specifically refer to the value the different type of user brings to the user. For example, the more there are sellers, the more value a buyer extracts from the platform.

**Difficult to Establish**
Due to these indirect network effects, multisided platforms are notoriously difficult to establish (Evans & Schmalensee, 2010). The platform owners need to attract all types of users to the platform, thereby providing them with value. For example, a marketplace with numerous sellers but no buyers provides no value to any user. This paradox is sometimes referred to as the chicken-and-egg problem (Hagiu, 2014; Rossootto et al., 2018). Although there are proposed strategies for overcoming this problem (for example, starting with the single-side market, and then expanding to the multi-sided market (Wanner, Bauer, & Janiesch, 2019)), establishing new platforms remains a challenging task.
Tendency to Seek Dominant Positions
The difficulty of starting a platform hinders the starting of new platforms, which in turn leads to less competition as well as markets dominated by a single platform (Rossotto et al., 2018). In his critique of platforms, Srnicek (2017) directly states that due to network effects and the capitalistic nature of the companies who typically own the platforms, the platforms usually display monopolistic tendencies.

2.2.2 Gig Economy in the Global South

One of the examples of global platforms is the gig economy platform. Gig economy platforms offer the users a way to directly earn money by completing different tasks offered on the platform. In this dissertation, the terminology to distinguish the different types of gig economy platforms presented by Heeks (2017) is used. He divides the gig economy into digital and physical gig economies. Digital gig economy tasks can be completed online (therefore, theoretically from anywhere on the globe), but physical gig economy platforms offer tasks that need to be completed offline, therefore rendering them location-specific. Common to all gig economies is that the workers work as independent contractors instead of being employed (Bajwa, Knorr, Ruggiero, Gastaldo, & Zendel, 2018; Lehdonvirta, Barnard, Graham, & Hjorth, 2014). This predicament has been further problematised in Section 2.2.4.

The exact numbers of gig economy workers in the Global South are difficult to estimate, but there has been a sharp increase in the adoption of microwork in SSA in recent years (Idowu & Elbanna, 2021, p. 77). Fairwork (2020b) has estimated that about 1% of the workforce uses gig economy platforms in South Africa. The microwork platforms have brought economic opportunities to areas that have previously lacked them (Malik, Heeks, Masiero, & Nicholson, 2021).

Gig economy platforms are an interesting sub-set of multi-sided platforms as they provide direct, low barrier possibilities to earn money in the Global South. This section reviews the literature concerning the role of both digital and physical gig economy platforms in the Global South.

Digital Gig Economy
Heeks (2017) further divides digital gig economy into crowd work, in which tasks are not assigned to specific individuals, but rather posted on the platform for any user to complete; and to online freelancing, during which identified individuals are hired from the platform to complete tasks. Especially relevant for informal economy workers in the Global South is microwork, a subset of crowd work, in which “tiny units of piecemeal tasks” are completed on the platform (Heeks, 2017). Typical tasks include, for example, image-tagging, moderating content, and transcribing short texts.
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(Casilli, 2017; D. Martin, O’Neill, Gupta, & Hanrahan, 2016). Single tasks are typically very short (from seconds to minutes), and the workers are paid cents per task (D. Martin et al., 2016).

Microwork platforms are especially widely used in India, where highly educated workers use them to earn a living (Difallah, Filatova, & Ipeirotis, 2018; Hara et al., 2019; Ross, Irani, Silberman, Zaldivar, & Tomlinson, 2010) for the average hourly wage of $2.64 (Hara et al., 2019). Amazon Mechanical Turk is a prevalent platform in India, while platforms, such as Upwork, are more used in SSA (Fairwork, 2020a). Eagle (2009) has introduced "txteagle" (which has later changed its name to Jana) in Kenya to offer crowd work tasks through SMS. Jana currently reaches more than 30 million users (Altenried, 2020).

As presented in Section 1.1, there have been several initiatives launched by the governments in the Global South aiming at adopting a digital gig economy into parts of their citizen’s livelihoods. In theory, microwork separates the labour from location, which allows the workers from the Global South to enter global markets (Graham et al., 2017). However, the flexibility and other gains do not benefit the workers in the Global South, who have little power to regulate their use of the platforms (Anwar & Graham, 2021). In China, there are private companies that have hired a host of individuals to complete microwork tasks as employees, but this has not alleviated the stress the workers experience (Wang et al., 2020).

Despite the criticism, there has been much interest in utilising a digital gig economy in the Global South as it is seen as providing the workers with access to foreign labour markets (Kuek et al., 2015).

Physical Gig Economy

A physical gig economy is often also called an on-demand economy as it consists of physical tasks that are ordered to be completed by using a digital platform whenever the need arises (Heeks, 2017). Typical tasks include taxi services, general small household tasks, and hosting visitors (Heeks, 2017). In recent years, there has also been a rise in courier services, especially in delivering food (discussed, for example, in Webster et al. (2021)). All of these are also relevant in the Global South. All of these platforms do not necessarily fall under the definition of "global platform" as all the users may be part of the same community. For example, taxi services might be relevant to the buyers from the same community. Despite this small discrepancy, all of these are briefly discussed in this subsection as they 1) sometimes are global platforms, and 2) the platforms that enable the earning of money are relevant to the aim of this dissertation.

Digital platform-based taxi services have become prevalent all around the Global South. Ahmed et al. (2016) presents an ethnographic study carried out with drivers of the Ola platform created in Bengaluru, India. The study reveals the ways in which Ola has failed to reach its potential to
improve the quality of life for its drivers as the amount of rides have not substantially increased; accessing the customers now requires operating a digital application. In South Africa, the Uber drivers have recently suffered from a decrease in the number of customers, not to mention the increased risk of working due to the recent COVID-19 outbreak (Otieno, Stein, & Anwar, 2020). These decreases in working conditions have not been adequately compensated for by either the platform or the South African government.

Taxi services have been widely discussed in the literature due to the leading platform Uber having become an example and synonym for the development of the gig economy (term "uberization" is used in the literature, for example, in Wentrup, Nakamura, and Ström (2019)). However, the other types of physical gig economy platforms also exist in the Global South. SweepSouth provides customers with housecleaners in South Africa and has successfully adapted to the Global South context by providing the cleaners with help to use smart phones and rides to the destinations if needed (Dreyer, Lüdeke-Freund, Hamann, & Faccer, 2017). Recently, food couriers in Kampala, Uganda organised strikes to demand better working conditions (Webster et al., 2021). Finally, the potential hosts in disadvantageous areas of South Africa have received training from AirBnB Africa Academy to support their skills in hosting tourists from the digital accommodation platform, AirBnb (Henama, 2021).

2.2.3 Other Types of Platforms

In addition to the gig economy platforms, there are several other types of platforms that could benefit informal economy workers in the Global South. For example, YouTube and other video services can be used as educational resources (Sobaih, Moustafa, Ghandforoush, & Khan, 2016). It is worth noting that these platforms are not necessarily global platforms as understood in this dissertation. They might be used to connect to users from the Global North, but they can also be used locally. To delineate the content of this subsection, only the different types of platforms that were encountered in the publications of this dissertation are presented. They all supported the local livelihoods, thus rendering them relevant to the aim of this dissertation. These types of platforms are namely:

1. social media
2. messaging applications
3. crowdfunding

The following subsections briefly present the state-of-the-art of these
services in entrepreneurial use in the Global South.

**Social Media**
The focus of this subsection is especially on the most well-known social media platform, Facebook. Messaging services, such as WhatsApp, are sometimes considered as social media services, but they are excluded in this section, instead being focused on in the next section.

Small-scale craftworkers in southwestern Nigeria have started to use Facebook for business purposes, but they have encountered problems in maintaining the usage (Aljuwaiber, 2020). These problems are related to difficulties in using the platforms as well as issues of constantly accessing the Internet. Usage of social media can also empower the users by building social capital and self-efficacy (Crittenden, Crittenden, & Ajjan, 2019). Facebook can also be used in non-entrepreneurial livelihood seeking. S. P. Wyche, Forte, and Yardi Schoenebeck (2013) report that Facebook is regularly used to seek short-term employment in Kenyan informal settlements. Maasai farmers also share information regarding their circumstances on the field and in the markets through social media (Baird & Hartter, 2017).

**Messaging Applications**
Messaging applications are not always considered to be platforms. Nevertheless, informal economy workers in the Global South can use them to enable communication with potential employers as well as with other business partners outside of their communities; thus, they can be understood to act as global platforms as defined in this dissertation.

Internet-based messaging services, particularly WhatsApp, have become an integral part of daily life in SSA. For example, in Namibia, the leading local mobile operator MTC offers WhatsApp (and other social media) data in a separate bundle from other data that is offered as part of pre-paid packages (MTC, 2021). Some of the cheapest plans in Malawi exclude all other Internet access, except for WhatsApp (Brown & Desire, 2020).

WhatsApp has been used to support various functions, such as education among disadvantaged students (Madge et al., 2019; Rambe & Chipunza, 2013) and to support medical professionals dealing with fractures (Kauta et al., 2020). Therefore, it is no surprise that the entrepreneurs in the Global South have found ways to use these services in business functions including marketing (Ameen & Willis, 2016). WhatsApp is accessible to users with low digital literacy with its features allowing users to use WhatsApp in various ways to enhance their business (Brown & Desire, 2020).

In South Africa, young entrepreneurs use WhatsApp to access financial services as they are easier to access than the standard services (Kariuki & Ofusori, 2017). In Iran, the agricultural entrepreneurs use WhatsApp and
a similar messaging app Viber to share information to expand their professional networks as well as to find new business ideas in large messaging groups (Zamani, Kazemi, & Masoomi, 2021).

Crowdfunding
Crowdfunding has the potential to create jobs and increase innovation in the Global South (Best, Neiss, Swart, Lambkin, & Raymond, 2013). Crowdfunding can also reduce gender bias and empower the economic development of women (Pekmezovic & Walker, 2016).

Since its emergence, crowdfunding has attracted noteworthy interest in the developing world (Best et al., 2013) with the first Africa-based crowdfunding platforms being established in 2012 (Boum, 2016). However, despite the high interest in crowdfunding, the amounts of money raised have stayed relatively low (Arvila et al., 2020). World Bank (2015) says that countries in Africa are among the lowest performing in the world in terms of utilising crowdfunding. Crowdfunding holds significant potential to bring financial assets to the Global South from Global North (Behi, Agarwal, & Brem, 2020).

Crowdfunding in SSA has suffered from similar issues as have the other e-commerce services (Best et al., 2013). In the Global South, the social networks of actors are involved to a greater degree than in the North (Behi et al., 2020). There are problems with national regulatory and legal frameworks as well as suitable payment solutions (Berndt, 2016; World Bank, 2015). For instance, the international platform Kickstarter requires the use of a major credit card (World Bank, 2015) to which people in emerging economies rarely have access.

2.2.4 Critical Views to Platform Economy

While the potential of the global platforms has been recognised, there has been criticism, doubts, and suspicions presented. Private platforms have occupied a central role in many important functions of current society, but as private companies they exist to benefit the platform owners (Srnicek, 2017). Gig economy platforms especially have also been criticised for their treatment of their workers, who exist as independent contractors without the protections that regular employees would enjoy (Malin & Chandler, 2017; C. J. Martin, 2016; Tan et al., 2020). This criticism is relevant to understand as it signals potential issues that should be considered when reaching the aim of this dissertation.

As mentioned in Section 2.2.1, the digital platforms tend to seek dominant positions in the markets. Due to their characteristics, the dominant platforms are fairly well protected from smaller competitors. Dominant platforms also often seek to spread to new areas of business (Srnicek, 2017). This leads the users to often entrust their operations to dominant plat-
forms who might not have their well-being at heart (Langley & Leyshon, 2017). Especially users on the fringes (often the case for users in the Global South) are irrelevant in the greater scheme of the platforms (Nicholson, Nielsen, Saebo, & Sahay, 2019).

The gig economy platforms force the workers to assume the role of independent contractor (Drahokoupil & Piasna, 2017; Kenney & Zysman, 2016). While this could theoretically provide the workers with more freedom, in reality, the workers have no choice to refuse gigs and tasks for fear of losing their livelihoods (Ahmed et al., 2016; Anwar & Graham, 2021). The platforms have been designed to mainly benefit the gig employers, who use the service to outsource work (Irani & Silberman, 2013). The tasks offered on the platforms are often monotonous (Williams, Mark, Milland, Lank, & Law, 2019), and pay little (Hara et al., 2018). The workers are pushed to the platforms by other factors (such as lack of available employment) rather than drawn by the features offered (Malik et al., 2018).

The “push rather than pull” factor is especially true for the workers in the Global South who often lack government safety nets to provide them with financial leverage to choose not to work for the platforms (Anwar & Graham, 2021). The availability of vulnerable job-seekers allows the platforms to continue to act in their own interests rather than building policies that would support these workers (Anwar & Graham, 2020). If there were more regular employments available, or the government supported the unemployed, the platforms would need to provide better labour conditions to attract workers.

2.3 Local Infrastructures Supporting Livelihoods

This section examines the localised digital services utilised by Global South users to benefit their livelihoods as well as other local technical infrastructures that enable them to use those services. The innovative small-scale entrepreneurs might exploit a very wide and differing range of resources; therefore, attempting to cover all of them is beyond the scope of this dissertation. Thus, this section focuses on the services that are either commonly used by the informal economy workers, or which have been observed during the fieldwork. Section 2.3.1 elucidates the common digital services that are used in the Global South, and Section 2.3.2 examines the other supporting physical infrastructures needed to use digital services. Together, these elements form local infrastructures.

The separation between the digital parts of the local infrastructures and global platforms is not always clearcut. Services, such as social media, can be used to communicate either locally or to clients in the Global North. In these situations, the services in question tend to be rather included in the local infrastructures as they have been adopted by the communities
without interference from the tech mediators.

2.3.1 Localised Digital Services Supporting Livelihood Activities

This subsection establishes the different types of non-platform digital services that are commonly used by the informal economy workers in the Global South. They are part of the context in which the informal economy workers operate; thus rendering them important to understand when designing solutions to benefit the communities in the Global South. The main focus is on the e-commerce services, but non-commercial services are also briefly considered.

E-Commerce in the Global South

In general, e-commerce means services that enable business transactions to be completed via the Internet. The exact definition varies (Hamad, Elbeltagi, & El-Gohary, 2018) as understanding has expanded of the means by which online services can support businesses. The definition of e-commerce by Cao and Yang (2016) is that e-commerce consists of digital services that are used for the "buying and selling of goods and services or the conduct of financial transactions over the Internet". This dissertation uses the same definition with one change: e-commerce is defined as digital services whose main purpose is to be used in the buying and selling of goods and services, or for conducting financial transactions over the Internet.

E-commerce consists of different types of digital services. Typical examples include online sales and marketing services. Rahayu and Day (2017) reports, that e-commerce provides many benefits to the Indonesian SMEs who have adopted them, for example, by extending market reach, increased sales, and improvements in external communication. E-commerce services also help SMEs to expand their businesses (Hamad et al., 2018). Marketing through a website is seen to increase the level of sophistication of an SME, and a business without a website might appear to be a liability to potential customers (Kabanda & Brown, 2017b). In addition, e-commerce services facilitate the access to goods and services for both the businesses and customers, as well as lowering the costs for the business operations (Johnson & Iyamu, 2019).

The adoption of e-commerce among the SMEs in the Global South has been a fairly well researched topic, and the consensus among researchers seems to be that the potential exists to further raise the rates of adoption. However, despite the potential benefits, the adoption rate in the South African retail grocery sector remains low (Johnson & Iyamu, 2019). Hamad et al. (2018) say that the adoption of e-commerce has remained at a relatively low level among the Egyptian manufacturing SMEs.

The technology acceptance model (TAM) displays a highly accurate rate
of prediction of the adoption of e-commerce (Pipitwanichakarn & Wongo-tada, 2019). Of the components of TAM, perceived ease of use has an especially significant influence, followed by trust towards the services (Pipitwanichakarn & Wongo-tada, 2019). In Tanzania, the SMEs feel that the adoption of e-commerce remains low due to a lack of awareness, lack of understanding the context, and lack of support from governments and industries (Kabanda & Brown, 2017a).

A subset of e-commerce, m-commerce (mobile-commerce) has grown in the Global South in recent years (Pankomera & van Greunen, 2019). This is understandable due to much of the Global South shifting to the digital age through mobile devices. Many of the benefits of m-commerce remain generally similar to those of e-commerce, although m-commerce has proven to enable better efficiency and lower operating costs for some SMEs, such as Vietnamese SMEs (Chau & Deng, 2018). However, the barriers are also similar for both types of commerce in terms of different technical, financial, cultural, and social aspects as presented by Pankomera and van Greunen (2019).

In the last decades, one of the e-commerce services that has heavily impacted lives in the Global South is mobile money. The most well-known example is the Kenyan M-Pesa, launched in 2007, but there are also several regional applications. For example, in Publication IV, the Tanzanian community-based tourism hosts were paid by the platform owners in Tigo Pesa. Mobile money allows the users to deposit, send, and withdraw money through a mobile application without any need for a bank (Jack & Suri, 2011). This is often executed through an SMS or other easily accessible technology. The introduction of mobile money has enabled access to financial services, such as digital money transfers, for many previously unbanked users (Kanobe, Alexander, & Bwalya, 2017), and it has been called a game-changing technology for financial inclusion (Burns, 2015). Indeed, the mobile money services have been considered so essential, that even visually impaired people wilfully trust shopkeepers to use the service for them (Barbareschi et al., 2020). Rahman, Alam, and Taghizadeh (2020) state that the usage of mobile money improves the well-being of micro-entrepreneurs in Bangladesh. However, M-Pesa has been criticised for its dependance on the underpaid workers, who accept and process deposits and withdrawals (Park, 2020).

Non E-Commerce Digital Services
In the previous subsection, e-commerce was defined by excluding services that can be used in conducting business but which are not necessarily meant for that purpose. For example, general messaging services, such as WhatsApp, can be (and are) used to conduct business in the Global South, but are not specifically intended for that purpose. Additionally, there are resources, such as e-learning services, that are beneficial to aspiring
entrepreneurs. Global South users are known for their innovative usage of digital services to support their businesses (van der Boor, Oliveira, & Veloso, 2014), and there is a wide variety of services from which they can benefit.

World Bank (2012) lists the many different types of different mobile applications used in development. They specifically mention agriculture, health services, and mobile money, viewing as larger themes the promise that mobile technologies should improve the governance and entrepreneurship in the Global South. Mobile services display a sizeable potential in the development of agriculture in the Global South (Emeana, Trenchard, & Dehnen-Schmutz, 2020), and they are important for the communities involved in agriculture. Similarly, there is a wide variety of mobile health initiatives in the Global South (Chib, van Velthoven, & Car, 2015), and these initiatives hold the promise of empowering local health workers to provide better care for their patients in resource-stricken areas (Molapo, Densmore, & Morie, 2016). Mobile financial services have been discussed in the previous subsection.

Excluded from the list by World Bank (2012) is online education. Mobile learning (or m-learning) is being used in Botswana to increase the learning results of nurses in training (Witt et al., 2016). Massive Open Online Courses can be globally used as a learning tool in the institutes of higher learning, but there are barriers, such as a lack of faculty support for the students from the Global South (Mohan, Upadhyaya, & Pillai, 2020). There is also a lack of institutional ICT policies to support e-readiness in Zambian universities (Chipembele & Bwalya, 2016). E-learning systems are often designed from the perspective of the Global North, meaning that they may not optimally support learners from the Global South (Mawere & van Stam, 2019).

This dissertation focuses on the digital services that have been deemed useful. The discourse often rejects the services meant for enjoyment, such as games (Sey & Ortoleva, 2014). However, it is worth mentioning that digital games are also part of the digital application landscape in the Global South, and their usage supports the adoption of all digital services (Sey & Ortoleva, 2014).

### 2.3.2 Required Non-Digital Local Infrastructures

In order to utilise digital services, certain non-digital infrastructures are a must. The users need devices to use services, electricity to use the devices, and an Internet connection to connect the online services (such as global platforms). It is not a given that informal economy workers have access to all these resources. Additionally, to fully utilise the potential of global platforms, a set of non-physical infrastructures, such as banking services, are also needed (see Publications II and III).
It is worth noting that, in practice, different types of municipal infrastructures, such as roads and water, are required to live in certain areas. The condition of these infrastructures may affect how well digital services can be utilised. For example, gig economy relating to transportation requires road system. However, these are not directly linked to the use of digital devices, therefore rendering them extraneous to the purposes of this dissertation.

Electricity or rather a lack of it is also an issue for much of the Global South, which still clearly suffer from this lack. According to the World Bank (2020), 78% of urban population and 28% of rural population (47% total population) had access to electricity by 2019. There have been initiatives to build local micro-grids to help local populations (Lana, Demidov, Pinomaa, Carrillo, & Pyrhonen, 2019) with the rate of the access steadily increasing through the years (World Bank, 2020). There are also charging kiosks from which mobile devices can be charged for payments available in the Global South (S. P. Wyche, Schoenebeck, & Forte, 2013).

GSM Association (2020) estimated that by the end of 2019, 50% of the Sub-Saharan African population would own a smart phone. The rate of adoption has steadily increased as there are now cheaper smart phone models entering the market (S. Wyche & Olson, 2018). GSM Association (2020) also predicts that the rate of smart phone adoption will grow rapidly in the future, reaching 65% by 2025. It is worth noting that actual ownership of a smart phone is also not an absolute requirement for accessing devices due to device-borrowing being a known phenomenon in the Global South (Duncombe, 2011; Hasbi & Dubus, 2020). Additionally, internet cafes and other publicly accessible Internets can also provide access to those who lack their own device (LeBlanc & Shrum, 2017).

However, it is not a lack of access to devices which often causes the bottleneck in utilising digital services. Access to the Internet, often via mobile data, is relatively expensive for many in the Global South (Winschiers-Theophilus, Cabrero, et al., 2015; S. Wyche & Olson, 2018). Finding a seller for airtime might also be problematic (Wamuyu, 2015). Multi-SIM devices are popular in Africa as they enable the users to seek the cheapest airtime from multiple service providers (Lu, 2021).

Access to financial services has traditionally been an issue for the communities in the Global South as an only minority of people have accounts in financial institutions, such as banks (Demirgüç-Kunt & Klapper, 2012). Access to banking services is necessary to reduce poverty in the Global South (Karakara & Osabuohien, 2019). Instead of just bank accounts, the banks could provide their customers with advisory services regarding to their finances (Uchenna, Evans, & Stephen, 2015). There has been hope that mobile money and other more agile digital solutions could help to close the gap in financial inclusion (N’dri & Kakinaka, 2020).
2.4 Barriers to Digital Services

Pankomera and van Greunen (2019) have presented a systematic literary review of the factors that prevent actors in informal sectors in Africa from adopting mobile commerce services. They use a broad definition of m-commerce service including aspects such as banking services and text messaging. As defined in this dissertation, global platforms can also be understood as e-commerce if a definition as broad as that used by Pankomera and van Greunen (2019) is employed. Thus, their review is perceived as valid for explaining reasons that might prevent users in the Global South from adopting global platforms. They have divided the barriers into four categories, namely, financial, technical, social, and cultural. In addition to those four categories, a fifth one, "skill barrier", emerged especially in Publication III; therefore, it is included in this analysis.

2.4.1 Financial Barriers

Financial barriers that hinder the usage of mobile services are mostly related to accessing financial assets or banking services (Pankomera & van Greunen, 2019). Traditional financial services are sometimes inaccessible to unbanked informal economy workers since bank accounts are too expensive for them to maintain (Deen-Swarray, Ndiwalana, & Stork, 2013). Nevertheless, the adoption of mobile money has been found to significantly increase the degree of financial inclusion experienced by rural Ugandans, suggesting that mobile telephone companies should develop their mobile money services to better suit the needs of the poor (Okello Candiya Bon-gomin, Ntayi, Munene, & Malinga, 2018). Indeed, Zambian micro-finance operators find that enhancing their operations with ICT-based services is becoming critical for the survival of the operators (Wakunuma, Siwale, & Beck, 2019).

2.4.2 Social Barriers

Social barriers that hinder the usage of m-commerce services are related to a lack of knowledge about existing services (Pankomera & van Greunen, 2019). It appears that word-of-mouth is a highly important channel for discovering new services and that a lack of information in one's social setting decreases the number of new applications adopted. Osei-Assibey (2015) has studied savings operations in Ghana and argues that the adoption of mobile money increases when savers observe others using it. Similarly, in Nigeria, women marketeers introduce each other to new mobile-service applications, which advances the adoption of these services (Boateng, Hinson, Galadima, & Olumide, 2014). Social influence is also an important factor in
determining mobile-money adoption in Tanzania (Lwoga & Lwoga, 2017). Equally, social influence is considered to be an essential external factor in the communities’ technology adoption model presented by Kambunga et al. (2018), based on their empirical work in a Namibian informal settlement.

2.4.3 Cultural Barriers

Cultural barriers that hinder the usage of m-commerce services are mostly related to the lack of trust in digital services (Pankomera & van Greunen, 2019). For example, Lafraxo, Hadri, Amhal, and Rossafi (2018) have shown that a lack of trust and perceived risks negatively affect the adoption of mobile banking in Morocco. The lack of trust is also one of the leading reasons that Nigerian small and medium-sized enterprises do not utilise digital tools (Gbadegeshin et al., 2019). Both individual characteristics and the quality of the service affect the degree to which the user trusts the service (Masele & Matama, 2019). How to encourage trust in users of digital services depends on the user’s culture; thus, it might be difficult to build trust on globally operating platforms, considering that they are often designed from a western point of view (Olaniran, 2018).

2.4.4 Technical Barriers

Technical barriers that hinder the usage of mobile services include access to network coverage or mobile devices (Pankomera & van Greunen, 2019). Infrastructural characteristics, such as unreliable access to devices, broadband, and electricity, hinder the adoption of e-commerce in developing countries (Wresch & Fraser, 2011). In Ghana, it is reported that only 68% of farmers own mobile phones but that phone ownership is linked to an increased usage of mobile services (Issahaku, Abu, & Nkegbe, 2018). In the Philippines, the lack of connectivity infrastructure is one of the key challenges that the government has faced when deploying e-government services (Roberts & Hernandez, 2019).

2.4.5 Skill Barriers

Utilising digital services requires a certain skillset. This skillset, or the lack of thereof, has been called with several terms in the literature. van Deursen, Courtois, and van Dijk (2014) have listed the skills that are required to efficiently use the Internet; these skills are not specific to the Global South, but they are relevant in all conditions. The Internet skills listed by van Deursen et al. (2014) include 1) operating applications, such as browser, search bars, and forms; 2) navigating the Internet; 3) communicating on the Internet; and 4) successfully exploiting the advantages of the Internet. For users unfamiliar with ICT devices, simple tasks, such
as typing, may require practice (Krauss, 2013). S. Wyche, Steinfield, Cai, Simiyu, and Othieno (2016) have also identified this barrier preventing the usage on m-agriculture services in rural Kenya, calling it “device literacy”. They also note that there is a gap in the ICTD literature regarding the usability and the skills needed to use the digital services (S. Wyche et al., 2016). Chetty et al. (2018) have called these skills digital literacy. In addition to the skills directly related to using digital services, users are in practice required to possess some level of reading fluency in English; a lack of this ability might also prevent Global South users from using the services available (Chauhan et al., 2018). Both literacy and device literacy are needed in order of using devices (Velghe, 2014).
3. Research Problem and Questions

3.1 Gap in Connection: Connecting the Global South Users to Global Platforms

The literature reviewed in Chapter 2 reveals the conditions in which the global platforms and other types of digital services are used in the Global South. The issues preventing the adoption of potentially beneficial digital services were also presented. Therefore, bridging the connection gap between the users in the Global South and the global platforms would help disadvantaged users to unlock the promise held by the global platforms.

Section 2.1 describes the conditions of informal economy workers. They often work with little protection in precarious positions (Webster et al., 2021). Earning livelihoods from unregulated markets in uncertain (Thieme, 2018), and the jobs offered on these unregulated markets might be dangerous (Davy et al., 2019).

Global platforms could ease the situation for informal economy workers. The gig economy platforms presented in Section 2.2.2 could directly offer informal economy workers with ways to earn money with at least some documentation (Heeks et al., 2021). Additionally, the other types of platforms described in Section 2.2.3, such as crowdfunding, could also help users in the Global South by providing them with resources, such as education, connections, and funding.

Although there are well-argued concerns regarding global platforms (presented in Section 2.2.4), I still observe that the potential of the platforms is worth investigating in the context of the Global South. As described in Section 2.1, informal economy workers are often in vulnerable and unstable positions. The criticism towards the platform economy in the Global South (for example, Anwar and Graham (2021)) fails to explain the means by which participating in the global job markets would decrease the conditions in the Global South. The platform workers are vulnerable to being abused by the platform owners and the users offering the tasks...
Research Problem and Questions

through the platform. They also suffer from low payment for menial tasks. However, the reality for many informal economy workers outside the platforms is currently not any better. I believe that, at the very least, the gig economy platforms could offer informal economy workers with other methods to earn their livelihood.

Additionally, the global platforms already exist for many in the Global South with there being no reason to believe that the effect of these platforms would decrease in the near future. Glöss, McGregor, and Brown (2016) have reminded us that HCI researchers and practitioners are in the novel position of forming the realities of the era of platform economy. Thus, in my opinion, aiming to find a way of using platforms for the benefit of the Global South is the most responsible way of approaching this sensitive topic of utilising global platforms in the Global South.

The characteristics of the global platforms described in Section 2.2.1 imply that there are few possibilities when trying to supplant the dominant global platforms with more localised and equal platforms. For the users from marginalised communities in the Global South to create value with the new global platform, the users from the Global North (or from privileged communities in the Global South) would need to be lured onto same platform. The already established platforms have the network effects on their side, which hinders alternative platforms from gaining much foothold in the markets. Thus, to fully realise the potential of the global platforms, the users from the Global South need to enter the same dominant platforms used by the Global North users.

Figure 3.1 presents the current positioning of the local infrastructures and global platforms towards informal economy workers (presented in Section 2.1). They would benefit from the global platforms (presented in Section 2.2). There are local infrastructures (presented in Section 2.3) to which they have access. These infrastructures consist of both digital and non-digital parts. However, the barriers presented in Section 2.4 prevent many potential Global South users from fully adopting the global platforms. This is the gap in this connection that this dissertation aims to bridge.

It is worth noting that Figure 3.1 is a simplification. The access to local infrastructures is far from a given (Kambunga et al., 2018), and not all global platforms are unavailable to the users in the Global South (as is evident, for example, by the numerous users of Amazon Mechanical Turk in India (Difallah et al., 2018)). Nevertheless, this dissertation focuses on connecting the communities in the Global South to the global digital platforms. It is assumed that these communities have access to the local infrastructures that are available to them, and that they mostly face barriers when attempting to use global platforms.

Additionally, as the communities built around AMT in the Global South indicate, the separation between a global platform and a digital local infrastructure is not always clear. The global platforms can be adopted in the
Global South rendering them part of the local infrastructure. Furthermore, the same services (such as social media) are versatile, sometimes being used as local infrastructure and sometimes as a global platform. In this model, the separation into two sometimes needs to be carried out on an ad hoc basis. In practice, the amount of the adoption often indicates the classification label for a particular service. Those already adopted are mostly local infrastructures, whereas the unadopted are global platforms.

### 3.2 Bridging the Gap: A Human Interface to Global Platforms

Global digital platforms are often owned and operated by multinational companies. These platforms are often mostly designed for Global North users, and some of the features and functionalities may not be suitable for those in the Global South. Additionally, there are barriers to the global platforms, such as access to devices, that would still need to be
Figure 3.2. Positioning of tech mediator. This model adds to the framework in Figure 3.1 with it being explained and elaborated in this dissertation.
solved. Due to the global platforms being controlled by large corporations, affecting the decisions they make when designing is outside of the scope of this dissertation. Also, the global platforms generate value due to their accumulated network effects. Supplanting them with new, competing platforms is also not a suitable approach. Thus, an alternative solution is needed for bridging the gap between the global platforms and potential users in the Global South.

There have been attempts to connect the users from the Global South to the global platforms, such as those presented in Section 1.1. However, there is a lack of solutions which are owned locally and not by outside stakeholders, such as private companies or governments. Outside stakeholders might withhold their support to these solutions without much warning. Moreover, third parties might hold priorities that do not match the ones of the community. For example, a solution controlled by an owned platform inherently prioritises the owner's platform. The Facebook-owned Free Basics has been criticised as being a closed version of the Internet in which the provider selects which applications are available to the users (Romanosky & Chetty, 2018). What if the community using Free Basics decides that Twitter would be more beneficial for their use than Facebook? Does Facebook then allow Free Basic users to access the service of their competitor? If the solution for bridging the gap between global platforms and potential users in the Global South is locally controlled, the communities in the Global South are empowered to independently select the global services they wish to use. Thus, a flexible, local solution that would be independent of the platform owners is needed. A proactive, trained person would be this type of solution.

In this dissertation and in its publications, the concept of a tech mediator has been tested. A tech mediator is a person who has been selected from a marginalised community in the Global South to receive training on using digital services. The tech mediators then help their fellow community members to utilise services that would benefit them. A fellow community member forms an adaptable interface to the global platforms, one that is needed to truly connect the potential users in the Global South to the global platforms. A tech mediator understands the context in which the other community members operate. They understand the needs of a true user as well as the possible limitations the other community members might encounter. They can suggest solutions that work in the local context. All in all, a tech mediator is a human being acting as an interface to the global platforms — a human interface.

Figure 3.2 shows the positioning of the tech mediator between the community and the global platforms. Tech mediators understand both the global platforms and the users from both the Global North and South, thereby placing them in a unique position to help others to efficiently use them. Tech mediators can also use the existing local infrastructures as a
tool in their work. Figure 3.2 focuses on the positioning of the tech mediator and does not describe the possible connections that might exist between other instances, such as outside designers and local infrastructures.

### 3.2.1 Outside Designers and Positionality Statement

The tech mediator model did not come into existence by itself, but it was introduced by an outside force. In our case, the outside force was myself and my research colleagues. Our position is pictured in Figure 3.2 as "outside designers". We interacted with the potential users in the Global South and trained the first tech mediators. The initial idea tech mediators was also introduced to the communities by us. Although an academic research team has adopted the role of outside designer in this dissertation, this role can be easily passed onto others in the future. Examples of such suitable instances could be non-government organisations (NGOs), governments or even private companies.

The tech mediator model has been built in the collaboration with the communities. In this collaboration, one of our central roles was to bring the initial idea of utilising global platforms via trained peers. Our background in the field of computer science allowed us to know the state-of-the-art of the global platforms, and conceptualise an initial plan for our collaborating communities to utilise them. These resources were not available for the collaborating communities, nor are they likely available for the communities where the tech mediator model could be used in the future. Thus, the role of outside designers is critical in realisation of the tech mediator model.

I personally am a doctoral candidate in Finnish university, in the department of computer science. My background is mostly in the human-computer interaction. In my research, I have aimed at finding practical ways for improving the livelihoods in the Global South. This has been motivated by my personal desire to improve the human conditions in areas, in underprivileged areas. This background has affected how I have made my research.

My background renders me an outsider to the communities where I have worked, which are located primarily in Namibia (Scheyvens, Scheyvens, & Murray, 2003). My background is on the other side of the World, and I am from different race. My background has also provided me with an access to better material resources than the collaborating community members have. This might have led me to appear as an authority towards the community members. I have tried to mitigate this in the way I act with the communities. However, the cultural ideas that generally put people with background similar to me in the position of power are nearly impossible to eradicate completely within a frame of research fieldwork. Thus, I have acknowledged my position, and tried to use my authority in beneficial
3.2.2 Research Questions

There are global platforms that I estimate would be of overall benefit to the users in the Global South. The global platforms, such as crowdfunding ones, would enable functions that would be difficult or even impossible to locally recreate. Thus, in this dissertation, I aim to devise a means to connect users from the Global South to beneficial global platforms employing a solution that could independently operate in local conditions. Based on the aim of the dissertation, the main research question is:

*How could users from the Global South be connected to global platforms to improve their livelihoods?*

This dissertation examines the concept of tech mediator of global platforms, and the research questions discuss different elements of the model. The concept is introduced in Figure 3.2 and is based on the theory presented in Chapter 2. As the contribution of this dissertation lies in the tech mediator model (as specified in Section 3.2.3), the research questions do not individually contribute towards the practice or theory. Nevertheless, the tech mediator model which is built based on the research questions contributes towards both.

First, the role of a tech mediator itself needs to be further defined. The tech mediators connect the users from the Global South to the global platforms, and they need certain skills for the task. Additionally, the task of connecting should also be further elaborated. Thus, the first research question for this dissertation is:

*RQ1: What skills and responsibilities should the tech mediator have?*

As shown in Figure 3.2, the tech mediator should interact with both the community they are representing and the global platforms. They work with the local community, and connect them to the global platforms. The mediators need to understand both the community and the platform in order of them efficiently filling their role. The exact interactions to both need further elaboration. Therefore, the second and third research questions are:

*RQ2: How should the tech mediator interact with global platforms?*

*RQ3: How should the tech mediator interact with their community?*

The local infrastructures, both digital and non-digital, form a toolbox for the tech mediators and the communities to use. However, the ways need to be defined by which the local infrastructures can form an ecosystem to be used for supporting the creation of livelihoods through global platforms. Therefore, the fourth research question is:

*RQ4: What is the role of local infrastructures in the tech mediator model?*
Lastly, the influence of an outside force (in our case, the university researchers) is required to realise the tech mediator model. To help other academics and practitioners to replicate our research, the role of outsiders also needs to be defined. Thus, the fifth and final research question for this dissertation is:

**RQ5: What is the role of outside designers in realising the tech mediator model?**

The publications answer these questions as presented in Table 3.1. However, Publication V does not answer the research questions, but is referred to in the Discussion, Section 6.1.

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### 3.2.3 Research Contribution

The main contribution of this dissertation is the conceptualised model of tech mediator, which is presented in Section 5.2.

Recently, there has been an ongoing discussion in the literature concerning the role that platforms should occupy in the digital development of the Global South. Journals in both design (CoDesign 2019) and ICT4D (The Information Systems Journal 2021) have published special issues on the matter, indicating its topicality. One of the central debates is focused on the overall impact the multi-sided platforms have on the communities in the Global South. Do these platforms have a positive impact on the developing societies, or do they just exacerbate global inequalities (Koskinen et al., 2019)?

*This dissertation contributes to the ongoing discussion on the role of gig economy platforms in the Global South.* The publications of this dissertation provide mostly positive examples on the means used by the gig economy to provide new possibilities to earn livelihoods for the communities who have adopted them. Thus, this dissertation predominantly views the effects of the adoption of gig economy as being a promising development. The tech mediator model is designed to allow the communities in the Global South to use the potential of global platforms to their benefit. The model also aims at minimising the negative effects of the gig economy.
such as dependence on the whims of the global platform owners. The overall impact of the model as well as its opportunities and possible threats towards the livelihoods are assessed in Section 6.1.

The concept of technology champion, presented in Section 1.2, is well recognised in both design and ICT4D fields. However, there is a lack of literature on the position the champions should adopt towards the global platforms. Global platforms require a different approach from the champions than the services tailored for the Global South users as specified in Section 1.2; thus, there is a need to elaborate the concept of the technology champion in regards to global platforms.

This dissertation contributes to the concept of technology champion by presenting a systematic description of tech mediator. A tech mediator is conceptually related to a technology champion as both emphasise the role of exceptional individuals in facilitating the community’s access to new digital services. The contribution to the theory intertwines with the concepts of technology champion and digital platform. This dissertation conceptualises the capabilities needed by the tech mediator and describes the position which the tech mediator should adopt between the other stakeholders and elements of the digital landscape of the Global South. The comparison between the tech mediator model and the concept of technology champion is presented in Section 6.2.

The contribution to practice is the tech mediator model itself. The model can be adapted by academics and practitioners who wish to facilitate the usage of global platforms within communities in the Global South. These are elaborated in Section 6.3.
4. Publications

This chapter reviews the publications of this dissertation. In Publications I - IV, the research context, used research methods, and the findings are elaborated. Special focus is afforded each publication's advances towards answering the research questions presented in Section 3.2.2. Publication V is an exploratory conference paper and does not answer the research questions. Nonetheless, it is referred to in Discussion Section 6.1, thus including it in this dissertation and is presented in Section 4.5.

4.1 Publication I: Need for Tech Mediator

This section examines Publication I "A community-initiated website development project: promoting a San community campsite initiative". This publication presents a research project carried out with a remote San community in Donkerbos, Namibia. They contacted the local Namibia University of Science and Technology (NUST) who had earlier collaborated with the Donkerbos community, and asked for help in establishing a community-owned campground. We travelled to meet the community and used participatory design methods to help them design a website for the campground. This research displayed the gap between the global platforms and the marginalised potential users in the Global South; this gap has been elaborated in Section 3.1. This publication contributes to the answers of Research Questions 4 and 5.

4.1.1 Research Context

*Donkerbos*

The fieldwork for Publication I occurred in a remote San community called Donkerbos. Donkerbos is a San resettlement farm in the Omaheke region in eastern Namibia. It is a five-hour drive away from the capital Windhoek and is only reachable with a 4x4 vehicle. The community itself
Publications currently lacks cars. The nearest settlement Talismanis is located about 40 kilometres away directly from Donkerbos.

Donkerbos has about 200 San inhabitants. In the past, their forefathers were hunter-gatherers. Currently, Donkerbos is surrounded by fenced farms, thus rendering impossible the opportunity to practise traditional livelihoods which has forced inhabitants to resort to small-scale agriculture. The community is also supported by the office of the Vice President, the Division of the Marginalized Communities, with regular food supplies and educational resources. The community has a primary school, but few other services.

During our visit to Donkerbos, the community enjoyed only a very weak mobile connection. It was only reachable from nearby hills during evening times. The connection allowed text messaging and calling, but could not support a meaningful Internet connection. Nevertheless, a local mobile operator had promised to build a cell phone tower close to the community, which would allow the community to regularly access the Internet. This meant that the digital services were becoming available for the first time to the community members.

**Community-Initiated Campground Project**
The Donkerbos community wanted to start a campground to attract tourists in order to enhance the livelihood options they had at their disposal. Some community members had received some training on using digital services, but they did not possess the skills to independently build a website. NUST had established a long-term reciprocal partnership with the Donkerbos community in the field of digital service design with the collaboration having started in 2018. In early 2020, the community contacted the university research team to receive help with designing and developing a website for the community-owned campground they were planning. Donkerbos was selected to be the field site of this publication, because of the past research collaborations with the community allowed us to shorten the time period needed to build connections with the community members. Continuous, reciprocal collaborations with the communities are also encouraged in participatory design (Harrington, Erete, & Piper, 2019). National and institutional ethical approvals had been granted for the hosting university in Namibia, and the author worked in this project as visiting researcher.

At the time of our visit to Donkerbos, the community had started to plan for the campground, the physical structures needed, and the activities they could offer for the tourists. However, the building of the structures had not yet started, and the other business plans were still in their early stages.

The university research team decided to implement a design intervention in Donkerbos in order to co-design and gather material for the website from the community. The design intervention consisted of several workshops focusing on different elements of the website. As the community members
did not possess the necessary skills to realise the website by themselves, the research team promised to create the first version for the site, and to then transfer the maintaining of the website to the community in a controlled manner.

4.1.2 Methods

Research Team
The research team that travelled to Donkerbos consisted of five people. They also acted as co-authors of Publication I.

1. Heike Winschiers-Theophilus, a professor from NUST, who leads the research cluster that has been collaborating with Donkerbos. She is specialised in co-designing technologies with the indigenous and marginalised communities.
2. Helena Afrikaaner, a San activist and community coordinator, who works in affiliation with NUST. She was fluent in Afrikaans and Ju/'hoansi, the local San language. She had been working with the Donkerbos community since the beginning of the collaboration.
3. Marly Samuel, a Oshiwambo-speaking Informatics graduate student from NUST, also involved with the Donkerbos community collaboration since the beginning. She was also fluent in Afrikaans.
4. The author as a visiting foreign researcher
5. Riikka Eskola, a Finnish undergraduate student, tasked to document the visit with photographs.

Methodological Approach
The design intervention in Donkerbos followed participatory design methodologies, which had already been used with the community in earlier parts of the research collaboration (Winschiers-Theophilus, Virmasalo, Samuel, Stichel, & Afrikaner, 2020). Participatory design is widely accepted as a methodology when working with indigenous communities (Racadio, Rose, & Kolko, 2014). The participatory design methodologies aim at democratising the design process between the researchers and participants (Lee, Dickey-Kurdziolek, & Branham, 2018; Spinuzzi, 2005) and allow the designers to immerse themselves in the community context, which helps in creating relevant solutions (Winschiers-Theophilus, Chivuno-Kuria, Kapure, Bidwell, & Blake, 2010). We wished to emphasise the views of the Donkerbos community in the design intervention, which is why this methodology was selected. All the sessions were recorded for post-situ analysis. All posters and other artefacts created were photographed. Every evening the researchers recorded collective audio reflections, which
were transcribed post-situ. All of the researchers who were present in the community participated in the data analysis.

### 4.1.3 Design Intervention Donkerbos

![Figure 4.1. Workshop on the way in Donkerbos](image)

The design intervention in Donkerbos consisted of ten workshops, which focused on different aspects of the website. The workshops were held trilingually in English, Afrikaans, and Ju’hoansi. The workshops were translated in-situ and recorded for post-situ analysis. The data analysis for Publication I was done in collaboration with all the researchers present in Donkerbos. The workshops were held in the open area in the middle of the Donkerbos community. The community members were free to come and go as they pleased during the workshops. The university research team provided the participants with all the necessary equipment as well as lunches during the workshops.

The workshop began from a very rudimentary level. In the first workshop, we were asked to precisely clarify and define the meaning of Internet to ensure that all of the participants understand the focus of our discussions. The research team had prepared some examples of websites for campgrounds in Namibia to be usable offline (there was no functional Internet in the community during the time of the intervention), and those were shown to the community. The research team also pointed out typical features and information found on the websites. This included pricing, contact information, amenities offered, and possible activities on the site. Gathering that information for the Donkerbos campground became the
goal of the intervention.

The community members proved to understand the imagery of the Internet well. The research team had brought some smart phones with them and asked the community members to take photos of the community. These photos proved to be of good quality. The community members also understood ways of presenting themselves online in a light-hearted manner. They suggested that holding a photoshoot at which the members of the research team would wear their traditional San outfits while they would posed in their normal, western clothes. This sort of humorous content is well suited to the Internet. Creating text on the site in English was more difficult, but the community members showed that they can operate on a functional level with English text.

The community’s plan for the campground was in the early phase during the intervention. They had found an area suitable for camping from a hill next to the village and had planned the location of the different amenities, such as fireplace, lavatories, and showers. No building of any kind had yet occurred. Moreover, the exact target group of tourists was still undecided. When asked about this, the community members said that they would like to host anyone who was friendly and interested in San culture, which includes a very wide variety of people with different interests.

The Donkerbos community had not planned the best way to divide the money among the community. When we discussed the activities the community could offer to the tourists and the possible prices, there was a variety of opinions. Some planned activities, such as bead jewellery-making, were priced at such a low price, that it was questionable whether the price would cover the material costs. On the other hand, activities, such as traditional dance performance, were over-priced rendering it rather unlikely that many tourists would be willing to pay the asking price. The high price for the dance was because of the revealing nature of the traditional outfits the dancers would wear. The dancers felt that they needed good compensation for performing. The outlaying expectation seemed to be that the community member responsible for the activity would receive the full price from the tourists, which led some community members to outbid each other when pricing the activities. The division of the profits from the actual campground was not discussed.

The design intervention in Donkerbos was distinct as it was

1. community-initiated
2. aimed at creating e-commerce service
3. service aimed at users other than the community itself

Due to the remote location of Donkerbos, designing with the actual users
of the website, in other words, the potential tourists, was not possible. This meant that the researchers, especially the foreign ones, needed to adopt a more active role in developing the website and advocate for the foreign tourists’ viewpoints. One of the main outcomes in Publication I was the elaboration of the role the designer needs to occupy in a design process such as this. In some respects, the role resembled more the role of an outside consultant than the role of a co-designer. This duality is further reflected in the publication itself. For example, in policies regarding to alcohol, what appears good decision for the campground business might not have been the best for the community. Nevertheless, we felt that in our case it was the responsibility of the researchers to address the potential outcome of some decisions on outsiders, thus allowing the community to arrive at more informed conclusions.

4.1.4 Findings and Outcomes

The most concrete outcome from our design intervention in Donkerbos was the website that was created for the campground. The website is located at https://donkerboscampsite.wordpress.com/donkerbos-campsite/. The website displays a simple design with a small survey with potential tourists confirming that it is not much more than a minimal viable product at this point. Despite its shortcomings, the information on the website can be used to plan a tourist visit to the community, and the website has the required contact information for carrying out bookings and other similar activities. The website was created using Wordpres by the undergraduate student who was present on the research visit. After the design intervention in Donkerbos was over, the community members did not have further input in developing the website. The website is ready to be presented for the use of Donkerbos community when they have moved further on in their plans regarding the campground.

However, a single website is likely not sufficient to garner much traffic. The Donkerbos campground website is not linked to any aggregating services, and it does not appear in Google Maps, or other map services. Thus, it is difficult for prospective tourists to find the campground.

As our research for Publication I ended, it was still slightly unclear in what ways the work with the website and campground should continue. The academic goal of our design intervention was to work with the community to develop a functional website for their campground, which was fulfilled. Our research project was not equipped to accept the job of maintaining the website, nor to further build the campground. The next steps would include contacting the Namibian tourist authorities and other relevant officials, mapping potential partners around the tourism industries, and possibly connecting the campground to global platforms, such as AirBnB or Booking.com.
Even if the campground was listed in these global platforms, the website created could still act as a "calling card" for the Donkerbos community. They have total control on the way that they are presented on their own website and can change it without interference from outside stakeholders if they so wish. The website provides the campground and the community with an online presence that is independent from others.

The creation of the website also served as a probe to design a business plan for the campground. For example, the amount of disagreements experienced among the community during the design workshops indicates that the plan for the campground had not been thoroughly thought out. The workshops that we organised with the community allowed them to examine some of the changes that the campground could mean for the community. Without the workshops to create a website, the idea of the campground would have remained at a much more abstract level, and the underlying issues would have remained untouched.

Some Donkerbos community members had earlier participated in the crowdfunding trainings described by Arvila et al. (2020), and Publication II. Due to these trainings, these community members have basic digital skills and some knowledge of the global platforms that are available on the Internet. With some additional training, they would be able to manage the campground’s presence on selected global platforms. The intervention in Donkerbos showed that tech mediators are needed to help the community to maintain and expand the usage of digital services, after the outside designers inevitably leave the community. Our hope is to continue to work with these individuals and provide them with sufficient training to enable them to act as tech mediators of the digital services for their peers in the community.

**Answering the Research Questions**

In this publication, we created a website for the campground, which serves as a local infrastructure in the future. Its role as a basis of Internet presence was explored. Additionally, the role of researchers in creating the initial versions of local digital services was discussed.

### 4.2 Publication II: Co-Designing Tech Mediators

In this section, Publication II "Local Tech Mediators - A Human Access Point to Global Crowdfunding Platforms" is presented. Publication II displays a series of workshops in which the concept of tech mediator for global platforms was developed with a group of inhabitants from the Havana informal settlement outside Windhoek, Namibia. The settlement is named after the city in Cuba. Participatory design methodologies were used in the process. The goal of these workshops was to help the small-
scale entrepreneurs in Havana to reach the global crowdfunding platforms. Publication II provides the first draft of the tech mediator concept, as well as describes the ways they should work between the global platforms and marginalised communities. This publication contributes to the answers of Research Questions 1, 2, 4 and 5.

4.2.1 Research Context

Previous Research Collaboration in Havana

Havana is an informal settlement on the northern outskirts of Windhoek. Havana greatly lacks communal infrastructures, although there have been developments in recent years. Most of the houses in the area are built from corrugated iron and lack running water. Access to electricity is also scarce in the area with many relying on unofficial connections to the electric grid. The settlement has grown significantly in recent years with new houses being built further north. Much of the Havana population is part of the informal economy, meaning that they are outside regulated employment (ILO, 2018).

Collaboration between the Havana community and NUST began in 2014. The author has been personally involved in this collaboration from 2015. The collaboration has aimed at improving the well-being of the community members by co-designing digital services. The collaboration has been documented, for example, by Winschiers-Theophilus et al. (2017), Samuel, Taylor, Winschiers-Theophilus, and Nieminen (2017), Winschiers-Theophilus, Keskinen, et al. (2015), and Kambunga et al. (2018). National and institutional ethical approvals have been granted for the hosting university in Namibia, and the author worked in this project as visiting researcher.

The pre-built trust between the participants and the university research team was essential in our collaboration for this publication. The community members and the university researchers have had continuous collaboration for over four years (at the time of the fieldwork for this publication). The community members have seen, that the university researchers keep supporting the projects and initiatives that have been started together in the community. There is a precedent of the research projects improving the community, and providing resources for the participating community members. Building this trust is often an issue for the participatory design projects (Harrington et al., 2019). The university researchers have also known the community members for such a long period that they can passably assess the resources and needs of the Havana community. This allows the researchers to proactively consider the concepts that are introduced to the community. In turn, the community members can also freely comment on the researcher’s plans in all phases of the design, which focuses the collaboration on relevant topics. This history with the Havana community
supported Havana being the field site of this research.

Namstarter
In previous collaborations in Havana, the idea of crowdfunding had arisen as a tool for the small-scale entrepreneurs in Havana with which to find funding for their business endeavours (Kambunga et al., 2018). In 2016, a prototype for crowdfunding called "Namstarter" was co-designed with NUST students and the Havana community with a prototype being developed by a Honours student of NUST. The prototype was launched in 2017 containing 41 projects from Havana. At this point, the Namstarter was a local service owned and controlled by the collaboration of Havana community and NUST.

Major challenges hampered the operation of the Namstarter platform. The potential funders were required to make bank transfers in order to donate money. Bank transfers to a Namibian bank account was deemed to be too laborious for the foreign users to complete. Usability is a key component of a successful crowdfunding platform (Kang, Gao, Wang, & Zheng, 2016; Masele & Matama, 2019). Direct bank transfers might also appear untrustworthy, which is a serious issue for a crowdfunding platform (Gerber & Hui, 2013; Kang et al., 2016; Kim, Shaw, Zhang, & Gerber, 2017; Möhlmann & Geissinger, 2018). Additionally, Namstarter did not reach a sufficient number of potential funders, many of whom are located in the Global North. To summarise, the Namstarter failed to create a paying public, which is one of the most important goals of crowdfunding platforms (Light & Briggs, 2017).

Rationale for Tech Mediators
These issues with Namstarter seemed impossible to solve within the normal constraints of an academic project. Establishing a multi-sided platform requires much work with different groups of people located around the world (Wanner et al., 2019), and was not possible for our research team. Thus, it was decided that Namstarter should be connected to the global crowdfunding services with the platform providing the needed infrastructure for easy online payments and improving the visibility of the project to potential funders.

However, registering and maintaining a crowdfunding campaign on global platform requires certain resources, such as a bank account and reliable access to Internet, both of which are not available to all the interested informal economy workers in Havana. Moreover, the informal economy workers might not possess all the required computer skills. Therefore, it was decided that Namstarter should be uploaded as one campaign, and the campaign managers would receive training to be able to act in their required role. Namstarter would then act as a business incubator for the informal economy workers in the area providing them with funding, train-
ing, and access to other resources. This campaign manager’s role between the community and the global platform was called "tech mediator".

A group of six Havana community members who had been active in previous collaborations were invited to participate in trainings and workshops to further develop their role. The participants were aged between 21 and 52 years, and all spoke English. Three of them were females and three males.

4.2.2 Methods

Research Team
The facilitating research team consisted of two Finnish, and three Namibian-based researchers. They also acted as co-authors of Publication II:

1. Heike Winschiers-Theophilus, a supervising professor from NUST
2. Marly Samuel, a tech hub innovation coordinator affiliated with NUST
3. Anton Lungameni, a student who was developing Namstarter. Affiliated with NUST
4. The author
5. Niina Arvila, a Finnish female graduate student, focusing on developing the crowdfunding campaign

Methodological Approach
We followed an action research approach deploying participatory design methods (Given, 2008). These methods have been previously used in Havana collaboration by, for example, Kambunga et al. (2018), resulting in the community members being familiar with the methods. Participatory design methods empower the participants to contribute. This emphasis combined with the participants' familiarity with the methods guided us in the selection of the methodology. During the workshop, both written and audio recordings were made. The audio notes were transcribed post-situ. The participants created posters about the future roles of tech mediators, and these posters were scanned. A role-playing exercise was also recorded and transcribed. The data was then labelled according to our initial tech mediator concept by the two Finnish researchers.

4.2.3 Co-Designing Tech Mediators

The workshops with the Havana community aimed at two goals: 1) to develop and define the tech mediator model with the participants, and 2) to produce a crowdfunding campaign for Namstarter. In Publication II (and in this dissertation), the focus is on Goal 1. The technical content of Goal 2 has been elaborated by Arvila et al. (2020). During the course
of the workshops, the role of the participants in shaping the role of the tech mediators increased, as they started to better understand the idea presented originally by the university researchers. This development as well as the interactions between the participants and the researchers are further elaborated in the publication itself.

**Tech Mediator Workshops**

Three workshops were held with the participants to further develop the concept of tech mediator. The workshops were held at NUST with the participants being provided a ride to the site as well as lunch during the day.

**Tech Mediator’s Tasks:** In this workshop, the participants created a persona-like description of the role of the tech mediator. At this point, the participants had already familiarised themselves with the global crowd-funding platform, and were able to outline the ways in which a person between their community and the global platform should act. The description is presented in Figure 4.2.

![Figure 4.2. The Poster Co-Created in Tech Mediator’s Tasks Workshop as presented in Publication II](image)

The participants saw three areas of responsibilities for the tech mediator:

1. entrepreneurial advisor
2. crowdfunding advisor
3. community informant
Entrepreneurial advisor teaches the community entrepreneurial skills, such as accounting. Crowdfunding advisor helps the community members to technically use crowdfunding platforms, and, for example, to create engaging media content. Community informant coordinates and informs the community about the services the tech mediators can offer.

A Tech Mediator Collective: In the beginning of the workshops, the researchers had anticipated that the tech mediator position would be filled by one person. However, the participants suggested that the role should rather be given to a collective that would share the roles and responsibilities. The participants then led a workshop that explored the roles the collective should occupy. This was done through the list of responsibility areas created in the tech mediator's tasks workshop.

In the end, the participants had decided that the following roles should be in the tech mediator collective:

- Chairperson
- Secretary
- Treasurer
- Administrator
- Community Relations Person
- Marketing and communications manager
- Advisor
- Business Developer

Additionally, the committee would have an advisory board with external members.

Role-Playing Activity: The tech mediator concept was quickly tested with a role-playing activity in which one of the participants was selected to represent the tech mediators, the other participants formed the Havana community, and the researchers were the potential funders from the Global North using the crowdfunding platform.

The participants prepared a project for which they wanted to receive funding, and then the selected tech mediator would come to the researchers to explain the project and answer their questions. The researchers would then decide whether they would fund the project.

The selected crowdfunding advocate struggled to present the idea to the potential funders, needing some guidance. The other participants needed to remind him about the details, such as the amount of money being requested, and the means to which it was supposed to be used. The researchers also needed to create specific questions to better understand the use for which the project money was meant.
Post Workshops

The workshop participants decided to create an independent closed corporation, Havana Entrepreneurs CC, for which they chose six directors. A local university representative was named as one of the directors to provide an outside perspective. A bank account was created for the closed corporation to receive donations and to facilitate online payments.

Eventually, the crowdfunding campaign for Namstarter was completed and was ready to be uploaded to the global crowdfunding platform. However, at this point the platform changed its policies and no longer supported payments to Namibian bank accounts. As a result, the campaign could not be uploaded.

4.2.4 Findings and Outcomes

As the outcome of the tech mediator workshops, the first model of a tech mediator’s role was created. Our preliminary idea was that the tech mediator would be an individual person, but the participants of the workshops suggested that the role should instead be held by a collective, in which the members would have different responsibilities according to their skills and interests. We outlined both the tasks of the tech mediator collective, and then the positioning of the tech mediators between the global platforms and their community.

During the workshops, the participants received sufficient training to allow us to explore the concept of tech mediator with them acting in the role. The testing of the concept with the Havana community is presented in Publication III. In these workshops, we used crowdfunding as an example of digital services. Nevertheless, we plan to also expand to other types of services in the future.

The Roles of Tech Mediator Collective

The workshops specified three different roles for the tech mediators’ collective. First, the tech mediators should act in community management roles in which the mediators facilitate the usage of digital services by the community by providing them with resources. These resources can include information about services, helping community members acquire email addresses and other requirements for the services, and to help the community to access devices.

The second role specified is the role of technology advisor in which the tech mediators seek new services and introduce them to the community.

Finally, the third role for the tech mediator collective is the role of administration in which the tech mediator collective manages their funds, is in contact with other stakeholders, and general administration, such as governing memberships.
**The Positioning of Tech Mediator**

The position of tech mediators between their community, global platforms, and their users in the Global North is presented in Figure 4.3.

Our work with Namstarter created a local infrastructure which can be accessed by local informal economy workers. The platform consists of the first version of the Namstarter crowdfunding platform with all the services (such as access to tech mediators) that have been built around it. The tech mediators interact with both the local infrastructure and informal economy workers.

The tech mediators are also trained to use the global platforms. They work to facilitate the usage of these services for the informal economy workers. The tech mediators need to understand the way the global platforms work in order to help the informal economy workers in their communities to use services. We also strive to empower the tech mediators to proactively find suitable digital services for their communities.

However, it is not sufficient that the tech mediators are able to technically use the digital services. Many of the services in which they might be interested in using can be classified as multi-sided platforms, which, by definition, facilitate interactions between different types of users (Hagiu & Wright, 2015). In crowdfunding, as well as in many other relevant services, the other types of users might well be located to the Global North. The tech mediators need to be able to understand the uses they potentially want to communicate with via digital services in order to create value.

**Answering the Research Questions**

In this publication, the first description of the tech mediator in the tech mediator concept was shared. The Havana community members received
training on use of global platforms. We also explored the role Namstarter should occupy as a local infrastructure in the future. Additionally, the role of designers in creating the first version of a tech mediator was observed.

4.3 Publication III: Testing Tech Mediators

This section presents Publication III "Digital microwork as a livelihood strategy in a Namibian informal settlement”. We continued the work presented in Publication II. In Publication III, the tech mediators trained in previous workshop worked with their community in Havana to test digital microtasks as a possible way to improve the livelihoods in the area. This experiment allowed us to test ways that the tech mediators could work with the community they represent. We received promising results from both the way the tech mediators interact with their community, and the possibilities of digital microwork as livelihood in Publication III. This publication contributes to the answers of Research Questions 1, 2, 3 and 5.

4.3.1 Research Context

Havana Informal Settlement

This research project was located in the Havana informal settlement where previous research collaborations had also transpired. The location and the previous collaborations have been further explained in Section 4.2.1. Building on the previous collaboration is also the reason, why Havana was again selected to be the research site. National and institutional ethical approvals that had been granted for the hosting university also covered these research activities.

Physically, our research was carried out in the Kabila community centre, which has also been used for previous research activities. However, during the research activities for Publication III, a youth cafe was being built on a nearby site. The youth cafe has been planned with the Havana community and has been financed by the Embassy of Finland in Namibia. The youth cafe is meant to be a financially self-sustainable place, where different types of services could be offered to the wider Havana community. It is also meant to be the headquarters of tech mediators of Havana in the future. The future research activities will also be located at the youth cafe.

The tech mediators, who had participated in the workshops described in Publication II, were tasked to 1) use word-of-mouth to gather responders for the surveys, and 2) to help the responders with their technical difficulties. The author and another postgraduate student, Shilumbe Chivuno-Kuria (author 3 of the publication) from NUST were present representing the research team.
Rationale for Microwork Simulation

Much of the workforce in Namibia work in the informal economy (Namibia Statistics Agency, 2018). Thus, we decided to introduce digital microwork to the community as a possible way of earning livelihoods to examine their possibilities. Microwork platforms might ease and improve the way for workers entering the labour markets (Drahokoupil & Piasna, 2017; Heeks et al., 2021).

One of the most well-known digital microtask platforms is Amazon Mechanical Turk (AMT). AMT was released in 2006 (Prassl, 2018). AMT is a marketplace in which requesters can publish small digital tasks, (called microtasks by D. Martin et al. (2016)), and other users can perform them for pay (Amazon Mechanical Turk, 2021). Microtasks are often data processing tasks, surveys, or content moderation (Amazon Mechanical Turk, 2021; D. Martin et al., 2016), and do not require many special skills from the worker. The workers’ hourly wage averages $2.64 (Hara et al., 2018).

Using AMT requires registering on the platform and a bank account that can be used in international transfers to receive payments. We could not presume that all the interested Havanans would have these; therefore, it was decided that we would simulate tasks from AMT by preparing five surveys using Google Drive. The tasks would be available for all community members to try at the community centre, and then we would compensate the community members who completed the tasks by paying them 50 Namibian Dollars (NAD) (approx. three euros) for completing all five tasks. Theoretically, it would have been possible for the participants to complete only some tasks, and earn 10 NAD per completer task. However, all participants wished to complete all tasks.

4.3.2 Methods and Data

Methodological Approach

We utilised the full six activity Design Science Research Methodology process model described by Peffers, Tuunanen, Rothenberger, and Chatterjee (2007). This methodology was created to support the usage of innovative artifacts in the information systems discipline. An artifact is a critical component of Design Science (Hevner, March, Park, & Ram, 2004; Peffers et al., 2007), and in our case, the artifact was the microtask simulation itself. In this research, we aimed at studying something that could be, but does not exists yet. Thus, we interjected the simulation as the artifact to the community. The emphasis on the artifact supported our selection of Design Science Research Methodology.

Data

Publication III had three primary types of data:
1. Results from the microtasks
2. Notes and observations from the simulation site
3. Concluding group discussion with the tech mediators

The Microtasks: Five microtasks were created to replicate the different types of tasks that could be found from AMT or other similar platforms. We had two laptops, two smart phones, and two tablet computers for the respondents to use, and the URLs to the surveys were also provided to those participants who had brought their own smart devices. It was approximated that a person with average computer skills could complete these tasks in 20 minutes, which means that the earnings from these tasks (50 NAD) were in line with the earnings the actual workers earn from AMT (D. Martin, Hanrahan, O’Neill, & Gupta, 2014). The tech mediators helped all respondents who required help. The help and devices were available on a first come, first served basis.

The tasks were carried out by using Google Forms online service, and the responses were recorded on a separate Google Sheet. These responses were analysed post-situ by the author.

The five tasks were:

1. A survey to map the socio-demographic facts and experiences with digital services.
2. 20 photos from a bush camera trap containing Namibian animals. The
respondents were asked to name the animals using check boxes.
3. Writing short descriptions for 7 photos showing people engaged in vari-
ous activities.
4. Simple usability testing by using screen captures of a digital service,
and asking the respondents what they would click to complete different
tasks.
5. A survey to map the respondents’ experiences of the microtask simul-
ation.

*Notes and Observations:* Written and audio notes were recorded from
the simulation site. These include 6–10-minute interviews with randomly
selected respondents as well as brief discussions between the organisers.
The notes were recorded and transcribed post-situ. The data was labeled
by the author, and all the researchers present at the site commented the
resulting analysis.

*Group Discussion with Tech Mediators:* On the day after the field work
ended, we held a half-hour round-table discussion with the tech medi-
ators, who helped us to organise the event. Five group members were
present with four university researchers. The discussion was recorded
and transcribed post-situ. The data was labeled by the author, and all the
researchers present at the site commented the resulting analysis.

The topics discussed in this meeting included the tech mediators’ ex-
periences of organising the simulation, the future support that the tech
mediators could provide for the other community members, as well as
potential business models that could support these activities.

### 4.3.3 Findings and Outcomes

The microtask simulation was a successful activity that garnered much
interest in the Havana community. We had planned to run the simulation
for four days and reach about 100 respondents. However, we had to stop
the simulation after two days, as we began to reach the limit of our funds
from which to pay respondents.

*Community’s Experiences with Digital Services*

The Havana community had experience with using mobile devices. Of
the respondents, 79% said that they had access to the Internet either
through their own devices, a borrowed device, or a public Internet point.
Additionally, 54% said that they owned a smart phone.

In general, the community members were able to use digital services on a
basic level. All the respondents who came to test the microtasks were able
to complete them with the support of the tech mediators. However, the
respondents had difficulties in understanding the nuances of typical user
interface elements. For example, respondents often did not choose more
than one check button, even when that would have been a correct answer. Additionally, text creation seemed to be difficult for many respondents, as they provided very short descriptions for the activities in Task 3.

**Tech Mediators Working with the Community**

Tech mediators enabled us to fluently implement the microtask simulation. Their proactive work allowed the researchers role in Havana during the microtask simulation to be limited to providing facilities. This indicates, that the mediators should be able to work independently with their communities after a short training. The tech mediators helped the respondents who needed guidance in filling the surveys. Additionally, they helped the respondents to understand English. Many respondents mentioned in the surveys that they had difficulties understanding English, which is the language in which practically all global platforms operate. These difficulties were also confirmed by the tech mediators in the group discussion, during which they suggested that the services would be easier to use if they were in local languages.

Another way that the community was supported in the simulation was with access to the device and the Internet. While most of the Havana community members do enjoy access to the Internet, the devices they use might not be suitable for microtasks. Moreover, the community members might not have a constant or stable connection to Internet. If the tasks in question are, for example, related to video files, when using limited data packets provided by local mobile operators, the Havana community members might rapidly exhaust their data plans. While in this simulation these resources were provided by the university research team, there is no reason to doubt that they could be provided by the tech mediators in the future.

In this simulation, we bypassed the need for registering on the platform. The registration process assumes certain prerequisites are held by the platform user, such as a bank account suitable for international money transfers. It cannot be expected that all interested users would necessarily have these in the future. It would be beneficial for the community if the tech mediator collective also found a way to circumvent these requirements. One solution for this problem could be collective accounts if they are possible to use for selected platforms.

In addition, the tech mediators provided the Havana community with information about our simulation, which was a new digital service temporarily available to them. Lack of information is one of the leading reasons behind available services not being accessed (Pankomera & van Greunen, 2019). Providing information on the new services is one of the key roles for tech mediators.
**Developing the Tech Mediator Model Further**

The future youth cafe offers opportunities to further develop the tech mediator model. First, it offers a physical headquarters, a location in which the mediators can hold trainings and organise business activities. The physical space also simplifies the offering of necessary infrastructures, such as electricity, internet connections, and devices.

We aim to ensure that the youth cafe becomes financially self-sustainable, which implies that the tech mediators and other correspondent community members need viable business models. There have been preliminary plans about the uses the youth cafe could offer their community. If the youth cafe can receive the infrastructure through donations, one of the possible business models could be to charge the community members who wish to use them. It could also be feasible that a share of the profits earned by the community members using the services (for example, from AMT) could go to the youth cafe.

One of the possible new business models that was suggested in the group discussion was that the tech mediators could offer the local businesses a chance to collect data from potential customers via surveys or simple usability tests, such as modelled by Task 4. The tech mediators demonstrated that they can use word-of-mouth to reach a large number of Havana community members in a relatively short amount of time. The mediators could be asked to distribute a customer survey to interested local businesses. That would generate profit for both the community members, the youth cafe, and the mediators themselves. A local survey could also use a language that most of the community members are truly fluent in, thus overcoming one of the issues identified in the microtask simulation.

**Answering the Research Questions**

This publication examines the ways in which the tech mediators interacted with their community. The vision of their responsibilities and skills was also expanded, as we realised the degree to which they were instrumental in organising the experiment from inviting participants to helping them complete the tasks. Their proactive way of working decreased the role the university researchers held in operating the experiment. They also suggested new ways for the tech mediators to work in the form of suggesting collaboration with local businesses. Finally, as the tech mediators were introduced to new digital services, a deeper understanding was gained of the interactions between the tech mediators and the global platforms.
4.4 Publication IV: Tech Mediator -like Structures in Commercial Use

In this section, Publication IV "The Effect of Digital Community-Based Tourism Platform to Hosts’ Livelihood" is presented. This publication scrutinises a Finnish community-based tourism (CBT) platform which uses a tech mediator-like structure, community contact persons, in their operation. This publication provides an example of a way that the tech mediators could be adopted to commercial use by a platform owners. The usage of tech mediator -like community contact persons allow the platform to enlist users from the Global South with little resources. This provides a complementary viewpoint to the tech mediator concept when compared to the more research oriented implementations of the concept presented in the other publications of this dissertation. This publication especially explores which local support systems are needed to use tech mediator-like concepts on the field, and the optimal positioning of the tech mediator towards their community. This publication contributes to the answers of Research Questions 1, 2, 3 and 4.

4.4.1 Community-Based Tourism Platform

Community-based tourism is a form of tourism in which tourists are hosted in local communities that have not been specifically planned for tourism. CBT allows rural communities in the Global South to monetise resources they have, such as beautiful locations or interesting heritage (Kontogorgopoulos, Churyen, & Duangsaeng, 2014). This diversifies the way these communities earn livelihoods (Lasso & Dahles, 2018; Tao & Wall, 2009), which might protect them from any potential economic turmoil affecting their other sources of income (Dodds, Ali, & Galaski, 2018). However, CBT often negatively affects the hosting community’s inner workings (Kontogorgopoulos et al., 2014; Novelli & Gebhardt, 2007; Sloan, Legrand, & Simons-Kaufmann, 2014). Tourists may select staying in communities to gain experiences they find authentic (Hüncke & Koot, 2012).

In Publication IV, we collaborated with a Finnish platform that offered CBT experiences around the Global South. The platform had listed several communities willing to host tourists, as well as the opportunity to book a stay through the website. However, the platform ceased its operations after our research activities were completed. The selection of communities limited our possibilities to select the research site. Two communities in Tanzania were selected, as Tanzania was the only Sub-Saharan African country on the platform, and the selected communities were popular destinations that had previously hosted travellers. The hosts therefore were experienced with the platform provided tourists. The exact communities are not named, as there is only limited amount of host families per com-
munity, and naming the communities would endanger the anonymity of the respondents.

The communities listed on the platform were hand-picked by the platform owners as they wanted to ensure that the communities could offer the tourists a satisfying experience. All the communities offered 3-4 host families, which hosted tourists in turn. The communities also all had a community contact person (CCP), who lived in the community or in the nearby area.

**Community Contact Persons and Operation of the Platform**

When the tourist booked a stay from one of the communities, the platform first contacted the CCP of the selected community. The CCP then appointed a host from the community and was in email contact with the tourist to agree on all the details of the visit. CCP was also in contact with the platform owners. When the tourist arrived at the community, the CCP directed them to the allotted host. The tourists would first pay the platform owners, who then distributed the shares to the host, CCP, and the community.

Not all of the hosts possessed the required skills or smart devices with which to directly use the CBT platform. The contact persons used the local languages and technologies, such as SMS, to communicate with the hosts. Acting as a tech mediator for the platform, the CCP allowed the hosts to use the platform. Furthermore, without the presence of the CCP, the platform could not operate as it would not be able to contact the hosts in rural areas of the Global South.

**Communities Visited in Tanzania**

The author and another postgraduate student, Niina Arvila (author 2 of the publication) from Finland booked two 3-night stays in separate rural communities in Tanzania through the CBT platform. Both communities consisted of about 100 houses and had primary schools. Community 1 was located about 30 km from a popular tourist area and fishing was an important trade. Although Community 2 was located next to a major road, it was a 3-hour drive from the nearest major city. Farming was an important livelihood in Community 2.

### 4.4.2 Methods and Data

We used a contextual inquiry (Beyer & Holtzblatt, 1997) as part of the rapid ethnography methodology framework presented by Millen (2000). Rapid ethnography allows the usage of the ethnographic methods in limited amount time (Millen, 2000). This made the methodology suitable to be used in this publication. We identified topics (effects of hosting on livelihoods, role of digital services), key informants (CCPs), and used two
researchers on the field. Whilst in the communities, we interviewed the hosts and contact persons, and observed the ways in which the hosting was intertwined with their daily activities. The data was transcribed post-situ and labeled by the authors who visited the sites. The authors on the site also held daily discussions on the evenings to summarise the findings. These discussions were also recorded, transcribed and labeled by the authors.

4.4.3 Findings and Outcomes

Overall, our research suggests that hosting has been a positive experience for the hosts. Hosting has diversified their livelihood strategies, which has granted them with more financial stability. Additionally, the extra income that the hosts receive from hosting has enabled them to plan and invest in actions that will benefit them in the long term. These investments include education for their children and renovating their houses. One of the hosts mentioned buying a refrigerator, which enhances and supports her fish-selling business.

The hosts benefit from a system of local infrastructures that enable them to generate profits as a part of global value networks with few resources. This system includes all the digital services they use with their (feature) phones, as well as the connections which the local contact persons provide for them. The hosts can be part of the global platform economy because the digital services that are critical to them are simple and usable with feature phones. They do not need to communicate digitally with the tourists or the platform as the CCPs are responsible for that. The hosts can either call or send an SMS to the CCP, who then communicates with other stakeholders. They also receive payments from the platform via an SMS-based e-money application, Tigo Pesa.

However, this predicament leaves the hosts also vulnerable to issues that arise from the customs of digital platforms of which they are not directly part. The hosts did not understand exactly where the tourists came from and they asked us to send more people there. The platform also encouraged the tourists to share photos from their trips on social media, which angered some outside community members who were unwillingly photographed in those photos. The hosts were the ones who had to locally handle these disagreements.

The CCP provides the hosts with several services. Although the CCPs do not help the hosts to use the platform, or other services directly related to it, they allow the hosts to be connected by being responsible for the interactions that hosts require to use the platform. The platform has been designed in such a way that it requires a little interaction from the actual hosts and emphasises the role of CCPs. The CCPs also help the hosts in their jobs by translating for the hosts. The CCPs could also act as
intermediaries if there are issues between the hosts and the tourists. The hosts were paid for their time and services, as is normal with the tourists. We stayed with them for three days each, and they were mostly not able to do other livelihood generating activities during that time. However, this lead to some frictions, as the hosts prioritised earning money from us to their own well-being. These perspectives are further elaborated in the publication itself.

Answering the Research Questions
In this publication, an alternative model for tech mediator was presented for commercial use. This expanded our understanding of the skills and roles of the tech mediator, and tech mediators’ interactions with global platforms and their community. Additionally, the CBT platform used a variety of digital services to create a local infrastructure in which the hosts were able to work.

4.5 Publication V: Assessment of Global Gig Economy

This section introduces Publication V "Worker Empowerment in the Era of Sharing Economy Platforms in the Global South". This publication has been published as a short exploratory paper at a Participatory Design Conference, and it does not present any new data. Thus, it does not contribute to answers of the research questions. Nevertheless, this publication has been included in this dissertation as it advances the assessment of the role of digital micro-jobs and a platform economy in improving livelihoods in the Global South. The assessment is presented in Section 6.1

Publication V presents the concept of "empowerment" concluding that there are two primary ways of understanding it in the human-computer interaction literature: empowerment as a power to act more efficiently, and empowerment as liberation from oppression.

These two definitions are then compared to the work carried out under sharing economy platforms. Publication V argues that the sharing economy platforms can be understood as empowering if the word is understood as the power to act more efficiently, but the work does not liberate anyone from oppression. The paper also suggests that participatory design methods should be used to create more empowering conditions for platform workers in the Global South.
5. Tech Mediator – A human interface to global platforms

The previous chapter outlined the publications of this dissertation. This chapter answers the research questions placed in Section 3.2.2 based on the evidence from the publications. The answers are then combined in a presentation of the complete tech mediator model which answers the main research question.

5.1 Answers to the Research Questions

5.1.1 Characteristics of Tech Mediator Collective

Research Question 1 for this dissertation is "What skills and responsibilities should the tech mediator possess?". This section answers that question. The summarised answer is presented at the end of this section.

The tech mediator concept was first co-designed with the Havana community in workshops presented in Publication II. During the workshops, the community stated that the tech mediators should be a collective instead of an individual person. They felt that the collective could better serve the community as the collective would allow its individual members to better apply their individual strengths. Being a collective would also lower the amount of responsibilities an individual mediator faces, which renders the role more desirable. This is important as the tech mediator cannot operate in a full-time position at least in the beginning due to the lack of outside funding, and the activities are not yet self-sustainable. By the tech mediators being a collective, the availability of the mediator’s services is also eased. Individual tech mediators are very likely to also have other obligations to fulfil as they need to earn their livelihood by other means.

The Havana community also found three types of roles for the mediators: community management, technology advisor, and administrator. These roles show that the Havana community members view the tech mediators as being in a wider role than just working with the technology.
They realised that the mediators should act as community leaders, who proactively advocate the other community members in finding beneficial services, both digital and non-digital. The responsibilities and skills are examined through these roles.

**Community Management**
Publication IV introduces community contact persons, who act in a tech mediator-like position as a part of the business model of a community-based tourism platform. CCPs provide the actual hosts who host the visiting tourists. The CCP not only use the global platforms for the behalf of the hosts, but they also help the hosts in an advisory role. They may, for example, translate for the hosts, help them communicate with the platform owners, and act as an intermediary in potential conflicts between the tourists and hosts.

In Publication III, we tested the tech mediators in Havana. They helped their community members to use digital micro-tasks to earn a small amount of money. In that research activity, the mediators very efficiently used word-of-mouth to invite community members to our experiment. In the end, we had more interested respondents than we were equipped to welcome. Good social skills are required for this kind of task.

In the discussions with the Havana group described in Publication III, it was presented that the mediators could adopt a more proactive role in contacting local businesses to discover tasks that they could complete with the other community members. Data gathering for customer surveys was one of the suggested ones, but there could also be other tasks available if the mediators know what to look for. Finding new tasks from the local businesses would require good relations with the businesses that could be interested in collaborating with the Havana community.

**Technology Advisor**
The original idea for tech mediators was to be specifically involved in helping other community members to use digital services. Although the concept has since expanded, work with the technology is still a core part of the tech mediator role description.

In Publication IV, the CCPs directly used the platform instead of the hosts they were serving. The hosts did not need to use anything more complicated than SMSs and calling to communicate with the CCP, as well as a local mobile money application to accept payments from the platform. The CCP was responsible for other digital activities, such as communicating with the platform owners and tourists.

However, the tech mediators are not meant to use the digital services on behalf of the community members, but rather to support them themselves to use the services. In Publication III, the tech mediators provided hands-on support for the community members who required assistance in filling
the digital surveys. Some respondents needed the mediators to actually fill in the surveys for them, but for the most part the mediators provided assistance and instructed them in independently filling-in the surveys.

In both of these cases, tech mediators needed sufficient computer skills to independently use global platforms. The results from the surveys used in Publication III provide an example of what this could mean in practice. The respondents had difficulties in understanding the differences between typical user interface elements, such as radio buttons and check boxes. The respondents also had challenges in creating text. The tech mediator needs to be able to fluently use typical digital services to be able to assist others.

Another required skill that was displayed in both Publication III and Publication IV was the ability to use English in interactions. The tech mediators must be able to communicate with other users of global platforms; in practice, that means that English is the lingua franca. The mediators in Havana in Publication III mentioned that one of the obstacles the respondents faced was that they were not sufficiently fluent in English to understand all the tasks. Therefore, it is essential that tech mediators possess at least adequate English skills to help others to use global platforms.

Requiring English has different implications in different countries. In Namibia, practically all participants from urban Havana possessed the required English skills, as the language is used as “lingua franca” within the country, especially in urban areas where the people from different tribes are mixed. However, in Donkerbos, the required English skills were much more uncommon, as the community consists practically only San people, who use their native language in the daily life. In Tanzania, the English skills were also quite uncommon, as Swahili is much used in intertribal communications. Finding potential mediators with required English skills especially in rural communities or in countries, where the language is less used, could prove to be problematic. However, there is hope that translation softwares could ease this issue in the future. Additionally, not all the tech mediators need to be fluent in English, and the language skills should be considered as another skill that only someone in the tech mediator collective need to possess.

In addition to the technical English skills, the tech mediators need to understand to present themselves and their communities online in a persuasive manner. In Publication I, we worked with a rural San community who wished to open a community-operated camping ground. Some of the activities they planned were priced in such a way that would deem them as being too expensive for the majority of tourists. On the other hand, some activities were to be offered at too low a price for experiences that tourists would likely gladly pay double or even triple the asking price. The community members lacked an understanding of their target audience. It would
be important for tech mediators to be able to aid them in understanding the impression they present online.

**Administration**

The final role that the tech mediators should master is that of the required administration. In this case, administration refers to the structures that guide the inner operations of the tech mediator collective.

One of the outcomes of Publication II is the closed company the tech mediators form to operate their crowdfunding initiative Namstarter, Havana Entrepreneurs CC. The Havana Entrepreneurs CC has bank accounts which can be administered by the tech mediator collective with the accounts being meant for receiving money from the funders. The Namstarter crowdfunding campaign could not be launched for unrelated reasons, but the Namstarter and Havana Entrepreneurs CC were meant to operate as a business incubator, offering funding and other resources to promising entrepreneurs in the area.

Operating Namstarter and Havana Entrepreneurs require administrative skills from the tech mediators. They need to be able to work as an executive board and decide on the way that their collective should operate. Other skills, such as accounting and writing minutes, would also be important for keeping the Namstarter operational.

**Summary of Tech Mediators Skills and Responsibilities**

This Section 5.1.1 presents the skills and requirements for the tech mediator. This forms the answer to RQ1: "What skills and responsibilities should the tech mediator possess?". The summary of the skills and requirements is presented in Table 5.1.

**5.1.2 Tech Mediators and Global Platforms**

Research Question 2 for this dissertation is "How should the tech mediator interact with global platforms?". This section answers that question. The summarised answer to the research question is presented at the end of the section.

In the publications, two different ways emerged for the tech mediators to align towards the global platforms. In Publication IV, the CCPs used the global platforms on behalf of the community members. On the other hand, in Publication III, the tech mediators used global platforms with the community members they were helping.

In Publication IV, the CCPs were active communicators towards both the platform owners, and the other users. The platform owners had hand-picked the CCPs to represent their communities and to be responsible for communicating with them. The CCPs had the skills that the technology advisors need as specified in Table 5.1. They also had the means for
<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
<th>Skills</th>
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<tbody>
<tr>
<td>Community Management</td>
<td>Advising the community members</td>
<td>Understanding the business models and customer needs</td>
</tr>
<tr>
<td></td>
<td>Ability to reach community members</td>
<td>Good social networks within the community</td>
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<tr>
<td></td>
<td>Ability to reach local business</td>
<td>Understanding of business logic</td>
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<td></td>
<td></td>
<td>Good networks with the local businesses</td>
</tr>
<tr>
<td>Technology Advisor</td>
<td>Possible usage of global platforms on behalf of the community members</td>
<td>Good computer skills (for example, typing, understanding of typical user interface elements)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fluency in using global platforms</td>
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<tr>
<td></td>
<td>Teaching other community members to use digital services</td>
<td>Ability to teach others</td>
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<tr>
<td></td>
<td>Communicating with other users of global platforms</td>
<td>Fluency in written English</td>
</tr>
<tr>
<td>Administration</td>
<td>Operating the tech mediator collective</td>
<td>Working as an executive board</td>
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<tr>
<td></td>
<td></td>
<td>Accounting and managing the bank accounts</td>
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Communicating: the requisite device and constant access to Internet. The CCPs were in contact with the incoming tourists before they arrived via email. They, for example, sent them the rules of the visit, gathered dietary requirements, and helped the tourists to organise their arrival.

While using digital services on behalf of the community is suitable for a single platform that wishes to engage the marginalised communities from the Global South into its business, a more passive role is suitable when the tech mediator model is built from scratch. The tech mediators in Publication II and Publication III were asked to help the other community members to use the digital services rather than using the services on behalf
of the community. In Publication III, the mediators were introduced to the real micro-task platform before they helped other community members to use simulated micro-tasks. Supporting the other community members to use the global platforms should be the main way for the tech mediators to interact with the global platforms.

However, the tech mediators need occasionally to use digital services on behalf of their community. In Publication II, the mediators were asked to create a crowdfunding campaign to be published on a global platform. The campaign was meant to represent the whole community and its entrepreneurs. The mediators were taught the ways and means of creating a campaign by utilising the tools the platform possessed. It was decided that not all community members should publish their own campaigns. Creating an effective crowdfunding campaign requires many skills, such as media creation, understanding of persuasive communications, and the overall computer skills required by an international platform. Additionally, managing an ongoing campaign requires constant access to the Internet. Not all the community members could be taught and provided with the necessary resources to manage their own personal campaigns, resulting in the tech mediators being selected to create it on behalf of the whole community.

The publication of the campaign was not completed as the crowdfunding platform changed their policies, and they no longer allowed campaigns from Namibia to be published. This shows that not only do the tech mediators interact with the platform, but also that the decisions of the platform owners and other users affect the tech mediators and their communities. There is little that the tech mediators can do to influence the owners of global platforms. The tech mediators should still be able to understand the logic of global platforms to enable them to explain situations, such as the aforementioned ones, to their community members.

Additionally, the reason for using global platforms is to interact with the users from the Global North. The tech mediators should have the cultural understanding to effectively present themselves and their communities online. In Publication I, the community members showed a good understanding of the type of online content which would appeal to potential customers of their campground. They produced relevant photographs and had suitable ideas about the use of humour to promote their community online. However, in the role-play exercise of Publication II, the participants failed to explain their ideas to the researchers representing the users from the Global North. This indicates that the ability to act online needs to be practised, as well as that the tech mediators need to be able to represent themselves and to guide their community members on appropriate online behaviour and communication.
Summary of the Interaction Between the Tech Mediator and Global Platforms

Overall, the tech mediators should be prepared to help the other community members to use global platforms. In the case of more difficult services, or services that require longer term maintenance, the tech mediators likely need to use digital services on behalf of the community. Using global platforms means that the mediators also need to interact with the digital service, service owners, and other users. This also demands a degree of cultural skills.

5.1.3 Tech Mediators and Community

Research Question 3 for this dissertation is "How should the tech mediator interact with their community?". This question is answered in this section. The summarised answer to the research question is presented at the end of the section.

In Publication III, the tech mediators worked with their community to help them to complete digital micro-tasks that were part of the digital microwork simulation experiment implemented in the Havana informal settlement. The mediators contacted the respondents, organised them into a queue, and helped them to use the devices.

During the experiment, the tech mediators (and the university research team, but the tasks by the researchers can, and should, be transferred to the tech mediators in the future) offered a holistic service. The community members were invited to try the service at the site. They were offered an Internet connection, including the device and the mobile connection. They received help and advice on using the services.

The tech mediators should aim to offer community members a one-stop service. The community members should be able to come to meet the mediators with only a few resources, with the mediator collective being able to help them to find useful services and provide them with the needed materials to use them.

However, there are certain resources that are required from the community members. Material resources can be relatively easily provided by the tech mediator collective, but the community members themselves need some computer skills to utilise the services to which the mediators guide them. In Publication III, the mediators occasionally used the devices for, not with, the community members. While this was possible in our simulation, in the long term, the mediators cannot be expected to directly use the devices for their community. The community members need to mostly understand the language the services use, and they need to be able to interact with the devices, and to independently create simple digital text. The mediators can help them when issues arise, but the tech mediators cannot use all their time helping community members with very
limited computer skills as they themselves are a resource which needs to be available to the whole community.

The Havana tech mediators saw themselves as being in a wide community leader role. In the workshops of Publication II, they viewed themselves as being in a position that included a variety of tasks related to community management and business incubation. For example, they wanted to have a person responsible for business advocacy on the Namstarter board. In Publication III, the mediators suggested new business plans in which they could find larger tasks from local businesses and perform them with the community. Again, when developing a business, it is important that the mediators support the community members in their business endeavours, but do not become too involved in them and remain fairly impartial. The tech mediators need to save their own time to share their time with all the community members. Additionally, if the tech mediators become overly involved with a certain business, their independence and objectivity among the community might become endangered and suffer a loss of trustworthiness.

The CCPs in Publication IV offered the hosts a narrower set of services. The CCPs helped the hosts to connect to the digital tourism platform, but they did not offer many other services. This is understandable as the CCPs worked as a part of the business model of a certain platform. Expanding their responsibilities to other services would not serve the business. Nevertheless, the way the CCPs operate indicates that the tech mediator model could also work with a narrower set of services.

The tech mediator model carries the risk that certain community members might face inappropriate conduct from the tech mediator. While it is important that the mediators are members of the community they serve, the mediators might bring their personal disputes and conflicts to the role. The tech mediators being a collective rather than individuals should mitigate this problem as the members of the collective will watch each other’s conduct, and there are always several individuals who can be contacted by community members. This possibility should be realised and monitored when realising the tech mediator model.

Summary of the Interaction Between the Tech Mediator and Their Community

The tech mediators should help the community members to utilise the services that benefit them. The tech mediators should provide the community members with the materials they need, as well as the help they require for using these said services. However, the community members cannot expect the mediators to use the services for them, but the community members require basic computer skills to work with the mediators. The mediators should treat the community members fairly and equally, and their conduct should also be monitored.
5.1.4 Role of Local Infrastructures

Research Question 4 for this dissertation is "What is the role of local infrastructures in the interface model?". This section provides a response to this question. A summary of the research question answer is presented at the end of the section.

The local infrastructure serves as a critical enabling tool for both the tech mediators and their community. In a tech mediator model, the local infrastructures are understood to be the locally used digital services that are not global platforms, and the non-digital technical infrastructures that enable digital service usage. For example, messaging services, such as WhatsApp, are understood to be a local infrastructure when they are used to communicate within the community, as well as the electricity and Internet connection. The local infrastructures support the community members and tech mediators who wish to expand to global platforms.

In Publication I, we worked with the San community to build them a website for their campground to act as a "brochure". In this case, the website that was delivered to the community formed the backbone of the local infrastructures for the community. Similarly, in Publication II, the Namstarter platform that had been previously built was the local infrastructure that was left under the control of the tech mediators.

In both cases, the local infrastructures served as a "headquarters" for the community. In Donkerbos, the website for the campground serves as the one piece of Internet that the community can fully control within the loose limits of Wordpress. However, if an issue should arise with Wordpress, it is possible to migrate the site to another service provider. The Donkerbos community has the possibility to control the way in which they and their campground are presented on the website without any interference from others. A website also provides functionalities, such as separate pages for a prices, amenities etc. These cannot easily be introduced on a controlled platform such as Facebook.

It is likely that the local website is insufficient for the Donkerbos community to start gathering Internet traffic and business for their campground. The website could be connected to aggregating platforms, both digital (such as booking.com) and non-digital (such as Namibia’s tourism board), to ensure that potential tourists can more easily locate the campground. However, the platforms have a set frame controlling the way that campgrounds and other sites can be presented. This frame might be different from the style that community itself would like. The website they control provides the community with its own possibility to influence the way they are presented online.

In the addition to the website, the Donkerbos campground intends to use WhatsApp to communicate with the tourists, and Facebook to market their offerings. These digital services are widely adopted by the intended
tourists, and they enable easy communications between the Donkebos community and potential tourists. Additionally, the community members were already familiar with these services, which eases the adoption in the Donkerbos. WhatsApp allows international communications in less expensive manner than a traditional phone calls and SMSes. Email could be another, less platform dependant, possibility but it would require more work from the Donkerbos community members to adopt than WhatsApp. Emails are generally longer than the instant messages sent in WhatsApp, which could make adopting it more difficult for the users with limited English skills.

Using these services to communicate with the tourists would in itself define them as global platforms. However, as these services have already been adopted by the community members, and they are also used in local communications, they can be included in the local infrastructures. Services such as these form a digital service ecosystem that is needed to support the campground. When the campground is fully operational, the community might need to adopt new services, such as ways to account for the finances and to collectively control the tourist bookings.

The local digital ecosystem supporting the usage of global platforms is also displayed in Publication IV, in which the hosts use services, such as WhatsApp, to communicate with the local contact persons and, occasionally, the community-based tourism platform owners. The hosts and contact persons also receive payments from the platform via a third-party SMS banking application. These supporting services enable hosts, who might not have bank accounts or other means to accept digital payments to work for the platform.

Namstarter of Publication II is a more versatile service platform, which has both digital and non-digital elements. The crowdfunding campaign was meant to raise funds for Namstarter to enable it to act as a business incubator for the Havana entrepreneurs. Namstarter was meant to offer training, support, and funding for entrepreneurs who seek to expand their businesses. The first incarnation of Namstarter had a digital listing of all the entrepreneurs who were part of the platform, which is still a useful tool for tech mediators in the future.

When the Namstarter crowdfunding campaign was excluded from the global platform, the role of the Namstarter as a local infrastructure changed. Namstarter could store the efforts that the mediators had already committed to building the crowdfunding campaign. The local Namstarter platform did not support the usage of the global platform but operated independently in a limited, local manner. The existing, local Namstarter platform serves as a homepage for the Namstarter initiative at this point.

The tech mediators require the non-digital parts of the local infrastructures to operate. They can help provide them to the community members, but it cannot be solely their responsibility. In Publication I, the idea for the
campground website was created when the community was promised one by a local mobile operator. Without the Internet connection, the community would have been unable to operate a website, and they had only a limited influence on ensuring that the local mobile operator would provide that connection.

The Havana tech mediators will have the youth cafe serving as the physical headquarters for their operations (as presented in Publication III). The youth cafe will provide electricity, devices, and the Internet connection for the community members. The tech mediators have been part of the design for the youth cafe, but they have required help from external forces to realise the cafe. In the optimal case, the outside designers will help the tech mediators to acquire the non-digital infrastructures, and the tech mediators can then provide them to their community members.

Summary of the Role of Local Infrastructures in Tech Mediator Model
The local infrastructures are a tool that enables the tech mediators and the communities they represent to operate as a part of global platforms. They offer supporting services, such as messaging. The local infrastructures can also serve a wider role, in which the operation of tech mediators in local community is built through a frame offered by a local infrastructure, such as Namstarter. Non-digital infrastructures are needed by the tech mediators in order to operate, and the mediators cannot be responsible for independently acquiring these infrastructures.

5.1.5 Role of Outside Designers

Research Question 5 for this dissertation is "What is the role of outside designers in realising the tech mediator model?". This section responds to that question. The summarised answer is presented at the end of this section.

Outside designers is the expression used in this dissertation to describe the expert, who initially establishes the tech mediator model in the community. In our research project in Havana (Publications II and III), the outside designer was us. In Publication IV, the role of the outside designer was assumed by the platform owners, who started the community-based tourism platform, and trained the community contact persons to help the hosts. In the future, the role can be filled by an academic, business, government, or NGO, who wishes to implement the tech mediator model in a community. The nature of the outside designer is not important to the role. The “outside designer” needs to be able to identify the potential tech mediators, train them, and to support their operation. Who ever is capable of doing that, is capable of being an outside designer.

It is not a requirement for the outside designers to really be outsider to the community. If there are individuals in the community, who posses the
required skills and resources, there is no barrier for them to implement the tech mediator model without interference from outside instances. However, in the future, it is likely that the role is mostly filled by an instance, who is not a community member or community owned. In the real settings, the question who is insider to the community is fluid. There are instances that the community members might perceive as insiders, although they are not locally owned. Likewise, the community might not perceive some community members to truly be insiders. In this dissertation, the structures and dynamics within the community are not scrutinised, and the community is treated as nearly homogenous group of people. This is more elaborated in Section 6.5.

Publications I, II, and III describe the research activities that we have implemented in two Namibian communities. In these activities, the role of outside designer is filled by university researchers. However, in the future, that role can also be filled by other types of stakeholders. Critical for the outside designers is understanding the context of the community and knowing about possible existing services that would be beneficial for the community. The activities described in this dissertation are parts of lengthier research projects. These research projects have allowed us to familiarise ourselves with the individuals of the community. This has enabled us to identify the individuals who have shown the interest and ability necessary to adopt a more active role in collaboration than others. These individuals have also formed the core group which we have trained to become tech mediators.

In Publication I, the rural San community in Donkerbos requested help from the local university to help them realise the community-owned campground they were planning. The university research team promised to help them in designing and developing a website. During the design process, it became clear that the Donkerbos community had not thoroughly developed the business plan for the campground. While they had devised the initial idea of the campground, the business models, including the way the profits would be shared, had not been discussed.

In a more traditional co-design project, the researchers would have occupied the role of supporting the community by allowing them to arrive at their own conclusions. However, this project had been initiated by the community, and it aimed at creating business whose customers would be from outside the Donkerbos community. The researchers, who had a better understanding of the context in which the potential tourists would look at the website and the information on them, needed to adopt a more active role, and proactively advise the community on creating policies that would be attractive to foreign visitors.

In Publication II, the initial idea of using the global crowdfunding platforms came from the researchers. The community had previously used an unsuccessful crowdfunding platform, that was locally owned. Thus they
were familiar with the concept of crowdfunding, but had not themselves considered expanding to global platforms.

In both these cases, the communities become more empowered and were able to adopt a more active role during the design interventions. The Havana tech mediators started to assume the lead in planning the ways the tech mediator committee should operate and forming a closed company in which the university researchers only held an advisory role. Similar to Donkerbos, the community started to realise the types of decisions they needed to make when planning the campground, as well as the criticality of their own activity in constructing the campground.

We continued our work with the Havana community in Publication III. The group who had received tech mediator training in Publication II was able to adopt a proactive role in realising the micro-task experiment in the Havana community. They independently interacted with the community with the role of university researchers diminishing into the researchers simply providing them with facilities in which they could operate. In the discussions following the experiment, during which the future activities for the mediators were planned, the mediators were more active than they had been in the beginning of the process in Publication II, although the input from the university researchers again increased when planning for new businesses and other ideas.

**Summary of the Role of Outside Designers in Tech Mediator Model**

The publications of this dissertation show a consistent model of the outside designers’ role in realising the tech mediator. Their first role is to select and train the tech mediators. Their role is critical at the beginning of implementing the tech mediator model as they possess the required knowledge to suggest new services for the communities. However, after the start, the role of outsiders starts to decrease as the tech mediators become more empowered to independently act.

### 5.2 Tech Mediator Model as a Solution

In the previous Section 5.1, the research questions were answered. Based on the answers, this section describes the full tech mediator model. The tech mediator is a realisation of the tech mediator model that has been examined in this dissertation.

The full model presented in this section is the answer to the main research question of this dissertation presented in Section 3.2.2 "How could the users from the Global South be connected to global platforms to improve their livelihoods?"

The tech mediator model is presented in Figure 5.1. The textual elements of the Figure 5.1 are explained in the previous section as follows:
• The roles of the tech mediator collective in Section 5.1.1

• The connection between tech mediator collective and global platforms in Section 5.1.2

• The connection between the tech mediator collective and the users in the Global South in Section 5.1.3

• The connection between the tech mediator collective and local infrastructures in Section 5.1.4

• The connection between the tech mediator collective and outside designers in Section 5.1.5

5.2.1 Description of Tech Mediator Collective

The tech mediator collective, which is the central element of the model, is comprised of several individuals who have been trained to act in the role by outside designers. The exact roles and responsibilities within the tech mediator collective are described in Section 5.1.1.

The tech mediators (members of the tech mediator collective) serve their community members, described as "Users in the Global South" in Figure 5.1 with the main purpose of introducing new beneficial digital services. The tech mediators should proactively seek digital services that could benefit the community members and introduce them to the community members. The introduction should include both technically teaching the community members to use the services, but also to help them realise the sort of role the particular services should have in the operation of their daily struggle to find a livelihood.

Special focus should be afforded to global platforms which have not yet been adapted by the community members. The global platforms offer the community members the opportunity to expand their search for a livelihood to new, global markets. The tech mediators should transform the previously unused global platforms into part of the local digital infrastructure by building supporting systems (including access to the services, technical support, and help in contextualising the service) that allow the locals to adopt the global platform into their daily lives.

The global platforms are promising for the users in the Global South since they allow them to interact with the users from the Global North to create value. There is a promise, that the users from the Global South could earn money from outside of their community, if they are able to conduct business with the users from the Global North. However, even if the mediators were capable of technically connecting their communities to the global
platforms, the community members need to understand what they should do on the platform. This includes understanding both the technology and the other users. The tech mediators should understand the possibilities the technology offers, but also to have sufficient understanding of what the users from the Global North might be looking for and for what price. For example, in Publication I, the community needed understanding of
activities the potential tourists could find interesting, and the prices that would be maximise the earnings of the community.

However, as described in Section 5.1.1, the tech mediators of Havana saw their role as being more holistic advocates for digitally enhanced entrepreneurship. They should offer their community members advises on ways to develop their business ideas as well as ways to harness different digital services to support their businesses. In Publication II, the tech mediators created a global crowdfunding campaign for the community. If the campaign would have succeeded, they would have been able to create a local small scale business incubator, which would have offered the local entrepreneurs some funding with which to start businesses as well as advisory services and support in accessing resources.

The tech mediators are members of the community they serve; thus, they should be able to relate to the context in which the community operates. The connections within the community allow the mediators to reach the community members who need their services. Additionally, being local should favourably support the community members’ view of the tech mediators as being trustworthy as well as easy to access.

5.2.2 Positioning of the Tech Mediator Collective

The tech mediator collective is positioned between their community and the global platforms they wish to use. At the core, the tech mediators are a tool for the community to bridge the gap to new, beneficial digital services.

In practice, this means that the tech mediators use the global platforms for or with their community members. Using the platform for the community means that the mediators represent the community members on the platform, and the other community members do not directly interact with the digital service. Using the platforms with the community means that the mediators support the other members while they use the platforms independently. The publications provided examples of both approaches, and as was concluded in Section 5.1.2, the preferred option depends on the type of platform.

The position of being the go-between for the community members and the platform allow the tech mediators to protect the community members from the potential abuse that they could face from the platform. The mediators could, for example, monitor that the other community members do not become exploited by low payments. In the physical gig economy, the mediators could also represent the community members if a dispute were to arise between them and the gig givers.

The tech mediator collective also has access to the same local infrastructure used by the community members. The tech mediators should use the same digital local infrastructures the other community members are using to ensure that they can establish a working communication channel to
their community members. Understanding the digital services currently in use in the community also helps the mediators to understand the digital capabilities possessed by the community members.

The tech mediators should also add to the local infrastructures. As described in the previous section, the tech mediators should both add new services to the local digital infrastructure as well as create supporting structures for the local entrepreneurs.

5.2.3 Training Tech Mediators

Training the tech mediators is the most important task of the outside designers. The skills of the tech mediators are described in Section 5.1.1. Not every member of the tech mediator collective needs to have all the skills listed, but the collective should possess all of them in order to operate. The outside designers need to ensure that the collective possesses the capabilities to successfully act before implementing the tech mediator model in the community.

The training that was provided to the Havana tech mediators is described in Publication II and by Arvila et al. (2020). Their first technical task was to publish a crowdfunding campaign to represent their collective and the small-scale entrepreneurs of Havana. For that task, the mediators received technical training on the way to use the crowdfunding platform and create the needed content for the campaign.

As stated in Section 5.2.1, the core idea of a tech mediator collective is to connect their communities to the global platforms and other previously unused digital services. The community members likely also need support in using the services to which they are introduced. To guide the community members, the tech mediators need adequate computer skills to independently operate the services without external assistance or support. The exact computer skills are explained in Section 5.1.1.

It is not sufficient that the tech mediators can use the digital services as technical objects, they also must understand the inner logic of the service and the user need that it is designed to fulfil. In the case of global platforms, intercultural communication with the users from the Global North is also needed.

For the Havana tech mediators, these skills were trained via discussions. Both of the concepts of crowdfunding and microwork (in Publication III) were introduced to the mediators with them provided a chance to test the platforms by themselves. The function of the platforms was also introduced to the mediators, and we discussed the way the platforms could be used to benefit the Havana community. The function of these platforms was relatively easy for the mediators to understand. They had previously participated in local crowdfunding, and the concept of earning money from small tasks is obviously very familiar to the Havana community members.
The cultural communication skills needed on the platform were more difficult to teach. Some of the outside designers (including the author) were from the Global North, and they attempted to describe to the tech mediators the way in which their ideas might appear to potential users from the Global North. If there is no access to people from other cultural backgrounds, intercultural communication is nearly impossible to teach. Nevertheless, if the mediators are aware of the target group to whom they are communicating and the aspects of intercultural interaction that are important to keep in mind, the usage of the actual platforms can teach the mediators to practise culturally appropriate behaviour.

It was stated in Section 5.1.1 that the mediators need "good" computer skills for the platforms. However, what is good enough has not been fully conceptualised. The outside designers obviously should have very good skills to easily use the platforms to successfully teach the mediators. However, the level of fluency required by the mediators depends on the case. Some services (such as messaging platforms) require very basic technical skills, while others (such as crowdfunding) require a much more complete understanding of the context and various technical skills. Ultimately, the level of the skill required depends on the specific case and needs to be estimated in situ.

The same logic that is in the skill transfer from the outside designers to the mediators also exists between the mediators and the community members. The mediators need to teach the community members a sufficient level of skills to ensure that they can independently use the digital services which the tech mediators wish to introduce to them. The level of skills needed from the community members is lower than from the mediators. The mediators should be able to independently use the services, while the community members have the mediators from whom they can ask support whenever needed.

In the training we gave to the Havana tech mediators, we did not address the other skills that the tech mediators should possess. The mediators were hand-picked from the community, and it was assumed that they already have the social skills and connections they need to operate. We had worked with the same Havana community for several years before the tech mediator trainings, and during that collaboration, the community members had learned about business models and working as a team. If the work starts with a new community, naturally, the mediators must be introduced to the business models and the concept of entrepreneurship.

However, outside designers should be careful when selecting the individuals who are to receive the tech mediator training. Some requirements, such as good social skills, cannot be taught. Similarly, the selected community members should already possess some degree of entrepreneurial skills and the right attitude. Without them, the training required for a more heterogenous and less skilled group would demand vast resources which
are very unlikely to be available.

5.2.4 Tech Mediators Overcoming the Barriers of Digital Service Adoption

The tech mediators are meant to overcome the barriers of digital service usage presented in the Section 2.4. These barriers are divided to financial, social, cultural, technical, and skill barriers.

Financial barrier refer to the lack of access to financial services. The mediators can organise the community members to co-operatives, or other similar larger entities, that could have more negotiating power with the financial institutions. For example, in Publication II, the mediators organised themselves into registered closed company, that was meant to offer services for other locals. However, the financial barrier is the barrier that the mediators can affect the least.

Social barrier refer mainly to the lack of knowledge about the available digital services. The mediators are meant to proactively discover new services, and then to share the information with their community members.

Cultural barrier refer to the lack of trust towards the digital services. The tech mediators are community members, who receive special training. The background in the community should help them to alleviate worries that the other community might have about these services.

Technical barrier refer to the lack of access to devices or network coverage. The tech mediators are meant to provide the community members with an Internet access. In order of doing that, the tech mediators will likely need outside support. However, the outside designers implementing the tech mediator model in the community should provide the tech mediators with the necessary devices and connections.

Skill barrier refers to the lack of skills to use the digital services that are available. The tech mediators are meant to help their community members to use the services. This can mean translations, help in using the computer devices, or explaining the logic of the services for the community.

5.2.5 Sustainability of Tech Mediator Model

The goal of the tech mediator model is to be financially self-sustaining. In practice, this means that the mediators need a way to earn money for the collective to pay for the operating costs, and to pay themselves a salary. In Publication II, we tried to launch a global crowdfunding project that could have supported the operation of the tech mediators for some time. However, that project failed to launch and more sustainable ways of generating income would be needed irrespective of the results of a single crowdfunding initiative.

Different ways to earn money were discussed in Publication III with
the Havana tech mediators. The discussion was held after the microwork simulation was held in the community, which likely influenced the ideas the mediators offered. It was suggested that a share of the microwork task earnings, which the community members completed with the help from the mediators, could go to the collective. The mediator collective could also rent out computer or Internet time to the community members.

Another idea presented was that the tech mediators could seek out tasks from local businesses to be completed for compensation. These tasks could be, for example, organising a user study for a service or product that is offered to the community members. The mediators have good connections within the community, and they have received computer training. They could circulate a user survey in the community and collect a large number of answers from the community members.

Currently, the Havana tech mediator initiative has been supported by the local university NUST, Namibia Tech Hub, and the Embassy of Finland. A community centre is to be built in the Havana community in the near future. The tech mediators have been involved in concepting the community centre and will be able to use the community centre as a headquarters. The community centre also allows them to have a stable Internet connection as well as devices available.

In addition to the financial independence, there is a need to make the tech mediators operationally independent from the outside designers. The transition from Publication II to Publication III showed that the mediators had become more independent and required less guidance from the university team while working with the community. This is an encouraging development, but more work is needed before the tech mediators can act proactively as pictured in Section 5.2.1.

Slowly transforming the users to become more independent is a perpetual challenge for design interventions (Fitton, Horton, & Read, 2014). Currently, the operation of tech mediators can be supported as a part of the same continuous university projects that have been their introduction. However, the university projects are bound to end at some point, and the university workers cannot support the Havana tech mediators for an unlimited time.

Both of the experiments with technology (crowdfunding and microwork) were instigated by the university researchers. In the future, the responsibility for finding and introducing new services would need to shift from the university researcher to the tech mediators themselves. This transition has not been yet completed in the Havana project; thus, directions to solve this issue are not provided here. In the future, the Havana tech mediator should receive training that is at a more conceptual level and less bound to particular services. If the tech mediators learn to perceive the problems they face in their everyday life as being limited issues which could be solved using digital services, they could also learn to independently seek
existing services to solve those issues.

5.2.6 The Goal of Tech Mediator Model

The ultimate goal of the tech mediator model is to create communities in the Global South that are able to independently seek digital services that could help them to solve the issues their community faces. The global platforms offer possibilities that have not been previously present, namely, access to the global markets. The global markets do not suffer from the same resource constraints that their own communities might face. Thus, on the whole, access to these markets could be very beneficial for the communities and societies.

Simultaneously, the goal of the tech mediator model is to lessen the risk of exploitation that could be faced by the community on the global markets without mediators. The mediators should understand the sorts of risks there exist on the platforms (such as low/no payments, or livelihood controlled by unknown algorithms). If the tech mediators are capable of recognising these risks, they could be mitigated in the local community. The tech mediators could help the community members to negotiate with the task givers in the physical gig economy and could share the best practices of the community members to help others to benefit from the possibilities of new digital services as efficiently as possible.
6. Discussion and Conclusions: The Impact of the Tech Mediator Model

This final chapter discusses the contributions of this dissertation both for theory and practice. Additionally, the limitations of the research, as well as possible future directions are considered. In the end, the final conclusions are provided.

6.1 The Future Role of the Global Platforms in the Global South

As presented in Section 2.2.4, the sharing economy has been much criticised in the discussion for its impact on labour conditions (Anwar & Graham, 2021; Malin & Chandler, 2017; C. J. Martin, 2016). Moreover, global platforms have generally been accused of wielding unchecked power over their users (Srnicek, 2017). Nevertheless, in this dissertation, I have presented a tech mediator model which aims to facilitate the usage of global platforms in the Global South. It is relevant to wonder whether the tech mediator model facilitates a positive change in the communities it is meant to serve. Koskinen et al. (2019) have argued that investigating whether platforms have a positive impact or not on the Global South is one of the most pressing questions regarding the topic. This dissertation contributes to ongoing discussion regarding the role of platforms in the Global South by presenting findings from the Global South concerning the role of global platforms. This section provides the central contribution to that debate.

In Publication V, the global platforms were examined through the concept of "empowerment". The literature offers several definitions of empowerment (Miedema, Haardorfer, Webb Girard, & Yount, 2018), but the two main ways of understanding it emerge: the empowerment is either the power to act or liberation from oppression (Publication V). Nevertheless, in all the definitions, empowerment was something positive and worth pursuing. In Publication V, it was concluded that the global platforms can provide the users in the Global South with new ways to act, but they are unlikely to liberate anyone from oppression.
This potential for empowerment through the global platforms is the motivation behind the tech mediator model. Ultimately, this dissertation argues that the opportunities the global platforms offer are greater than the threats they pose for their potential users. The main reason for that is the change these platforms represent in the individual users’ lives. As described in Section 2.1, many of the potential users already lack the protections the platforms are said to threaten. Informal economy workers operate in an opportunistic way, seeking short-term jobs or gigs from various sources (Hammer, 2019; Thieme, 2018). Incidentally, the central argument against gig economy platforms is the contractorship in which the users operate instead of being employed (Graham et al., 2017). The gig economy work is also monotonous (Williams et al., 2019) and pays only a little (Hara et al., 2018). However, informal economy workers also face low quality jobs (Davy et al., 2019) with uncertain payment (Matte Guilmain & Hanley, 2021). Using platforms to earn livelihoods does not change the life of an informal economy worker for the worse, but they offer new opportunities to earn a daily living. Gig economy platforms have closed institutional voids in many areas, where the inefficient governments have previously left them (Heeks et al., 2021). Although the platform owners have also increased inequality in the market by seizing powers that have previously belonged to the governments (Heeks et al., 2021), it is difficult to argue that the situation of workers worse. For example, the taxi drivers using platforms have more information about their customers than before, which can protect them from potential abuse (Heeks et al., 2021).

The issue seems to be on the overall quality of work that is available in the informal economy. Much of the critique towards the gig economy in Global South needs to be careful to separate topics that are unique to the gig economy from topics that are more related to all the work or the conditions of the society in which the gig economy work is being done. The focus of the research should be more on the possibilities that the global platforms can bring to the Global South, rather than on the issues that are already present in the communities. While not without issues, the platforms provide new opportunities for the communities in the Global South without worsening the current conditions.

The empowerment from global platforms is not confined to the gig economy. In Publication II, it was argued that the exclusion from global platforms is a serious issue. The participants wished to use a global crowdfunding platform to collect money to start businesses, but the global platform changed its policies, and the completion of the campaign was no longer possible. The crowdfunding platform possessed the potential to provide them with the resources (funding) that they lacked in their own community. Although the platform would have taken a cut from their funds, thus oppressing them by definition, they were still eager to launch their crowdfunding campaign. The promise of empowerment through the power to act
was greater than the threat of disempowerment through the oppression of a platform benefiting from their work. Similar to the case of a gig economy, the real issue seems to be that the small-scale entrepreneurs from the Namibian informal settlement need to resort to global crowdfunding platforms to fund their small businesses.

This dissertation can rightfully be criticised for promoting suboptimal and possibly even harmful technologies (global platforms) to the vulnerable populations in the Global South. I have carefully considered this view and still decided to aim at finding even simple remedies to some of the more serious global issues, such as poverty. Different fields of research can provide different types of answers or contributions for building a better world. As a participatory design researcher, in this dissertation, I have tried to find ways to help the underprivileged populations to utilise existing digital tools that would be available to them. I see that as being preferable to trying to find a perfect solution to solve the inequalities of the world.

Although this dissertation has argued that the global platforms hold much promise for the potential users in the Global South, the acceleration of global inequality is a relevant concern (Koskinen et al., 2019). The tech mediator model aims to answer these concerns. The model is a tool that is owned locally by the community. The tech mediators might be unable to negotiate the policies with the platform owners or the users from the Global North. Nonetheless, the flexible and proactive nature of tech mediators means that the tech mediators are capable of finding alternatives if the policies of a certain platform become untenable for their community.

Providing the local communities with a tool, such as tech mediators, can empower them in both meanings of the word. Tech mediators enable the community workers to use the resources that have been previously been inaccessible to them. In addition, the tech mediators only answer to their local communities, which enables them to protect their community members from possible oppression coming from the platforms.

It is worth noting that the viewpoint of this research is in the interests of the individual. As is noted in Publication V, even if an individual is empowered through the use of global platforms, the overall societal impact of these platforms might be negative. This negative impact could lead to more disempowering conditions in society in the future (Srnicek, 2017), and negate the overall impact of the global platforms. There is a risk, that the governments in the Global South start to trust that the digital services, and the small-scale entrepreneurship they facilitate are enough to support the populations in the future (Jeffrey & Dyson, 2013). If the independent contractor model that is used by gig economy platforms is accepted in digital work, why would the companies offer regular employment in the future? Similarly, if global crowdfunding is seen as the answer, what incentives are there to develop local funding schemes. The solutions in which the power would remain closer to the local populations would be
preferable to the global platforms, in which the platform owners in the Global North have total power over the policy.

Qualitative participatory design or ICT4D research is not well-positioned to analyse societal change in the long term. It would require a much broader perspective of the communities, and more time than is available in most of the research projects. The research can provide information on the ways that society and digital services appear from the perspective of the individuals using them, but wider perspectives are also needed to determine the best policies that protect individuals and societies in the long term. If new research reveals that the global platforms have had a detrimental effect on the societies in the Global South, the central arguments of this dissertation need to be re-evaluated.

6.2 Comparison of Tech Mediators and Technology Champions

The concept of technology champion was introduced in Section 1.2. In short, technology champions are key persons in organisations, who push the organisation to change, for example, by adopting a new technology. The importance of exceptional individuals has been recognised in both design and ICT4D research. Most of the definitions of a technology champion, for example by Kamal (2010): "the existence of a person in the organisation who is committed to introduce ICT related initiative to the organisation", would include the tech mediator model presented in Chapter 5.

The central difference between the concepts of technology champions and tech mediators is that in the literature the technology champions act within much more pre-determined environments. They are appointed (or emerge) to work with a certain project with a pre-determined goal. Usually, the organisation or community they work in is also pre-determined. These determinants are presented in the definition cited (Kamal, 2010). The definition specifically mentions "initiative" and "organisation", which indicates that the technology champions operate inside a specified frame. The definition for the ICT4D champion provided by Renken and Heeks (2013) ("any individual who makes a decisive contribution to the ICT4D project by actively and enthusiastically promoting its progress through critical stages in order to mobilise resources and/or active support and cooperation from project stakeholders") also mentions the frame of the project.

On the other hand, the work of the tech mediators is continuous instead of being project-based. They are supposed to continuously and proactively seek new services for the communities they serve. While there is the idea that the tech mediators should work within their own communities, in the field, the communities can easily mix. For example, while we worked mainly with the Havana community in Publication III, we did not check that all the participants were from Havana. It is likely that some partici-
pants also came from neighbouring areas, which is understandable in an informal settlement environment in which the borders of the communities are fluid.

The tech mediators continuously add new services to the disposal of the community. They find a service, determine whether the service would be useful for the community members, help the other community members to use it in continuous and overlapping cycles. The tech mediators’ work emphasises the ability to maintain change rather than purely implementing it, which in turn is emphasised in the work of the tech champions. Nonetheless, it is likely that a person who champions one project in a community or organisation will also champion another. A person who embraces the championing in their role by continuously championing projects is close to the tech mediators’ role.

The lack of pre-determined limits also means that the tech mediators need to act in a more proactive manner than the tech champions. The different types of technology champions work in projects that are often launched by others. Champions are often appointed in the beginning of the project (Grobbelaar & Schwaag Serger, 2015; Shea, 2021). This indicates that the idea for the project comes from source other than the champion itself. While it is true that the tech mediators need training before they can act in their role, the idea of the training is to empower the mediators to independently act in their role. The tech mediators are expected to do more planning of their own work. They need to identify the ways in which they wish to help their community at a more abstract level than the tech champions. For example, the technology champion would need to decide on ways to facilitate the adoption of a certain service, whereas the tech mediators would need to first consider whether the said service would actually benefit their community. The amount of pro-activity required from the tech mediator also differentiates a tech mediator from a technology champion, who champions several projects in the organisation.

In this regard, the tech mediators resemble ICT4D intermediaries also mentioned in the Section 1.2. The intermediaries facilitate others to use the technology via providing them access and help in using the actual technology. The tech mediators could be seen as systematically described extension of the ICT4D intermediaries. However, the technology mediators are more goal focused than the intermediaries. The intermediaries act in their role because they happen to have the necessary resources to do so, and they mostly do not guide the community members to use certain services to achieve a defined goal. In comparison, the tech mediators aim at improving the livelihoods of the community members by introducing new digital services to them. Intermediaries, tech mediators, and technology champions can be seen as continuum, where the role of the intermediaries is the least defined and the most self-imposed, and the technology champions in turn are the most strictly defined and the least self-imposed, with
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tech mediators being in the middle of the spectrum.

Additionally, the description of technology champion, as its name indicates, typically involves technology. However, being a technology advisor is only one of the roles the tech mediators should adopt. The tech mediators offer more holistic services to their communities than the technology champions for their organisations. This is due to the environment. The service users in a community in the Global South typically require much more assistance in a wider variety of topics than the users in the professional environments. For example, it cannot be automatically assumed that the community members for the tech mediators have access to the required technical infrastructures. The typical technology champions do not need to build the environments from the beginning for their peers in a similar fashion. However, the specifically determined ICT4D project champion that works with a community in the Global South, is likely to have a similarly broad set of responsibilities. The ICT4D and design projects champions described in the literature work in a similar environment with the tech mediators and share the broad responsibilities held by the mediators.

There is a lack of a systematic description of the responsibilities of the technology champions in the literature (Shea, 2021). The tech mediator model could serve as a starting point for determining the role in the future. The role of the tech mediator model as a stepping stone for building better technology and ICT4D champions in the future is one of the central contributions of this dissertation.

The description of the tech mediator should be especially useful for the concept of an ICT4D project champion, who works in a similar context. If the concept of champion is limited to pre-determined projects, the role of a tech mediator needs to be adjusted accordingly. For example, administrative roles are not as important in a project-based work as they would be in creating the continuous support for which tech mediators are meant. However, the ICT4D projects often suffer from the lack of continuity (Sanner & Sæbø, 2014). The same is also true for the participatory design projects (Iversen & Dindler, 2014) which are often used in a design research in the Global South. The tech mediator model is designed to support continuous change. The emphasis on maintaining the change could help future research projects to better implement sustainable improvements.

6.3 Implications for Practice

The tech mediator model is a practical way of facilitating the use of new digital services in previously underserved areas. The notion that a fellow human serving as an interface towards digital services is a flexible way of rendering the global platforms more accessible. The global platforms are otherwise difficult to modify, but a tech mediator can be taught the
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The clearest contribution this dissertation makes for the practice is the presentation of the tech mediator model in Chapter 5. The tech mediator model is meant to facilitate the availability and use of digital services within communities in the Global South. This goal is relevant for many governments, organisations, and businesses; therefore, the tech mediator model should be a useful tool for different types of practitioners in the future. In fact, Publication IV describes the ways in which a tech mediator-like structure can be used by a private company to ease the use of their platform.

6.3.1 Implications for NGOs and Other Community Development Organisations

The tech mediator model is mainly for the use of NGOs and other organisations, who wish to improve the technology adoption in the communities of the Global South. These organisations could implement the tech mediator model to communities they work with. The tech mediators should facilitate the technology adoption of other community members. This adoption should also improve the livelihoods in the community.

A community needs to have some prior qualities in order to utilise the tech mediator model. First, the community needs to have access to basic infrastructures. This means that there needs to be access to electricity and the (mobile) Internet within the community. The tech mediators need those to operate, and cannot be responsible for acquiring them for the community. Digital devices are also needed, although the mediators might be capable of obtaining them.

Secondly, the community needs to have potential tech mediators who could act in the position if they received training. We had previously worked with communities in which the tech mediators were developed and trained. This eased the identification of the potential individuals. Familiarity with the community and its members is recommended for any practitioner who wishes to implement the tech mediator model.

There should be special attention given for selecting participants, who represents groups that might be otherwise under-represented in the community. These could include women, ethnical minorities, or minority tribes. These groups will likely have less resources for acquiring skills that the tech mediators need, and the organiser of the tech mediator trainings might need to use special measures, such as extra trainings to include these groups. The identity of these groups, and how to best participate them depends heavily to the research context, and thus universal guidances cannot be given. The organisation implementing the tech mediator model needs to understand the context, and what vulnerable groups might
be present.

6.3.2 Implications for Governments

The governments can also use the tech mediator model to improve the technology adoption and livelihoods. The governments may implement the model by using similar processes than the organisations. The governments could have interest to use tech mediator model to spread e-government services to the communities they have not been able to previously reach.

However, governments have more power than the organisations, and they can impact the resources the communities have in much wider manner than the organisations can. Much of the work that the tech mediators do is providing resources for the community members. The tech mediators facilitate their communities to access digital services by providing an Internet access and help in using the services. The governments have more tools for providing an access to the communities than the mediators have. Similarly, the governments have tools for providing the necessary education for the community members so that they would not need the mediator's skills to use digital services. The governments can use the tech mediator model to alleviate small local issues, but they should aim at making the tech mediators useless by providing the communities with enough resources to use digital services independently.

6.3.3 Implications for Global Platforms

The tech mediator model can also be used by the global platforms to gain users from the Global South. Publication IV provides a model of how a community-based tourism platform used community contact persons to reach users with little resources from the rural communities in the Global South. A global platform, that wishes to reach similar goal could apply the tech mediator model to their business.

The tech mediators are meant to freely select digital services to serve their community. A business likely would like their tech mediators to be limited (or at least focusing) to their own platform. Thus the training the mediators receive would need to be more structured and focused to using the hosting service than the more open ended training described in this dissertation. This would be quite big philosophical change to the tech mediator model presented in this dissertation, and it is questionable whether these types of business-run mediators can be considered to be real tech mediators. However, this dissertation shows that the global platforms can be adopted in new communities in the Global South, if there are people trained to use them, who can spread the word and help others. These people need to be equipped with necessary technical resources in order of succeeding.
The global platforms should also mindful of their impact to the labourers in the Global South. As described in Section 6.1, the global platforms can be used as a tool for improving livelihoods in the Global South, but there are also societal risks involved. Being mindful of their impact might not improve the profits the platform generates in short-term. However, if their impact is negative, the platforms risk to have stricter regulations put in the place by the governments.

6.3.4 Implications for the Communities

For the communities, where the tech mediator model is implemented, the tech mediators should mean improvement in the resources the community has. The tech mediators can provide access to digital services, and improve the local livelihoods by offering new ways for earning money.

There are requirements for the community members who wish to utilise the tech mediator model. Those requirements are discussed in greater detail in Section 5.1.3. In summary, to successfully work with the tech mediators, the community members need basic computer skills. The mediators should help the members of the community to use digital services, but they are mostly meant to use the services with, not for, the other community members. If they lack the most basic skills of operating the computer (for example, using a computer mouse and keyboard), the mediators cannot help them.

Acquiring the required skills could become important task for the community. This dissertation has not suggested a good way for acquiring these basic skills, as the tech mediators likely do not have resources to teach the very basics of the computer usage for the community members. The individuals in the community might also have very different baselines for acquiring the skills required. There is a risk that implementing tech mediator model widens the resource gaps within the community. It is likely, that those who have resources to use the tech mediator model already have more overall resources than those who do not. The tech mediators helping the ones who have already have resources can accelerate the inequality in the community.

6.3.5 Implications for the Tech Mediators

Receiving the tech mediator training obviously affects the individual. The training gives them skills that can used to improve the livelihood of the mediator in several ways. The training helps them to use digital services, which is a skill that is easy to apply also outside of the tech mediators role. The tech mediators can personally use their training to, for example, find educational materials to learn other skills that can be used for earning livelihoods. Becoming tech mediator could also impact the status the
individual has in the community, as the tech mediators possess skills that the other community members wish to use.

In order of the tech mediators to serve their community, they need resources to act in that role. In practice, this means that the mediators need be paid. One of the first tasks of the newly trained tech mediator collective should be to plan how their own operation can be profitable in a way that they can receive wage. The tech mediator training is not meant to be a shortcut to profits for the individuals, but the mediators cannot be expected to act as volunteers in the long term.

6.4 Future Work and Considerations

As mentioned in 6.1, the long-term effects of the global platforms in the Global South need more research. It is likely that quantitative research methods are needed to provide a wider societal angle to complement the qualitative methods used in the research such as the one presented in this dissertation. If it is discovered that the effects of the platforms are overwhelmingly negative on a wider level, the work of the mediators needs to be restructured. Our results seem to indicate that the global platforms have promise especially on the individual user level. Based on that, the tech mediators model has been presented to support the usage of these platforms. If that central reasoning is overturned with new evidence, the recommendations made in this dissertation need to be re-evaluated.

The work presented in this dissertation has focused on the collaboration between the tech mediators and their community. However, the tech mediators also need to be in collaboration with various other stakeholders, such as local industries, governments, and organisations. In the future, more research is needed on the way these relations should be structured. Moreover, if the tech mediator model would be successfully implemented into several communities, there would be a need for a structure that would facilitate the communication between the mediators from different communities. This would allow them to share best practices as well as to receive peer support.

Additionally, the tech mediator model itself would benefit from more validation. As presented in the publications, the model was co-designed with a group of Havanans, and was briefly tested in their community. The results from the test were promising, but more validating tests are needed to really confirm the functionality of the tech mediator model. Especially interesting would be the results from implementing the model in a novel community in which prior collaborations would be shorter than they were in Havana.

In the future, the tech mediators that have been trained in Havana must become operationally independent. The idea behind the tech mediator
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The model is that the mediators act in a proactive manner with diminishing input from the outside designers. Similarly, at some point, the responsibility of financing the tech mediator collective needs to shift to them. There is a risk that the collective cannot support itself once the outside actors leave them to it. To prevent operations from ceasing, scaffolding the tech mediator collective towards lasting independence needs to be carried out carefully and over a sufficient period of time.

6.5 Limitations

6.5.1 Limitations to the Methodologies

Similar to much of the qualitative research, this dissertation is limited by its low number of respondents. The concept was created in Publication II with six participants, and the same number of mediators were present in the microwork simulation of Publication III. Participatory design methodologies often use low number of participants who are highly invested in the design process (Bossen, Dindler, & Iversen, 2016). However, the generalisability of the research is affected by this factor.

However, even with these limitations, the results appear at least somewhat generalisable. Havana and Donkerbos fairly well represent a typical informal urban settlement and remote rural community, respectively. These types of communities are prevalent all over the Global South. The conditions of these communities, as well as the participants, have been described in this dissertation and in the publications. Any of the research activities described did not rely on any specific local circumstances. There appears to be no reason to believe that the same activities could not be executed in similar conditions with similar results.

The usage of participatory design methods has been criticised in a work involving participants from different backgrounds than the researchers. This often means researchers from the Global North and the participants from the Global South, or other similar predicaments. The participatory design research is often done from the viewpoint of the Global North, even if it is namely meant to support the communities in the Global South (Tunstall, 2013). Harrington et al. (2019) have identified four specific areas of tension, that might hinder the collaboration between the researchers and the participants: history of research injustice, gaining access among presumptions of gatekeeping, adverse sociocultural interpretations of materials and activities, and risks associated with obtaining full personal narratives.

In our work, we aimed at mitigating the adverse effects of these factors. There is a previous history of research collaboration between the local
university (whose guest the author was), and the communities in both Donkerbos and Havana. These collaborations also have an history of delivering results to the communities. However, this does not change the fact, that the author, and much of the other research team comes from different cultural background. Our research did not specifically try to investigate what was left unsaid in the workshops and other research activities. However, it is safe to assume, that there are perspectives that have been excluded from the conversation. This might be intentional, or because of lacking understanding of the elements that are relevant in the participants lives.

However, these criticisms do not affect the research presented in this dissertation in greater degree than research with similar methodologies in similar environments. The tech mediator model as it is presented in this dissertation has likely excluded some relevant perspectives. However, the core idea has been discussed and approved by the Havana community, and thus should be valid. The future research in Havana, and other communities, will hopefully provide insights that complement the model presented in this dissertation, and increase its validity in a work on the field.

6.5.2 Working with the Community

In this dissertation, the communities we have worked with have been treated as homogenous groups of people. There has not been much consideration to the skills and resources that the specific members of the communities have. Also, the inner dynamics of the communities have been mostly excluded from this dissertation. It has been assumed, that once the tech mediators have been employed to the community, all of the community members around them suddenly have an access to them.

This is obviously a simplification of the reality in the community. In Havana, we have worked with a certain group of people. They have been nominated to represent their community in our research project by the fact that they have enthusiastically participated in the previous research projects. However, it is unknown how they are perceived by the "regular" community members, who we have had no contact with. The group was able to efficiently find new participants to the microtask simulation in Publication III. This indicates, that the group is able to participate other community members at least to some extent. Yet, it remains unknown whether even this wider group of participants can be said to represent all Havanans, or just a certain subgroup of the community members.

There are also factors that might affect the ability of the certain individuals to act as tech mediators. For example, women tend to have less access to the ICT technologies than men (S. Wyche & Olson, 2018), which hinders them from acquiring the skills needed to act as tech mediator. However,
having female tech mediators would be very important for the tech mediator collective in order of effectively reaching the community members with different backgrounds. In Havana, we had three females and three males participating in the tech mediator trainings. This dissertation does not delve deeply into the important topic of women and ICT in the Global South, as it would require much work beyond the scope of the research presented here. Nonetheless, there needs to be special attention given to the finding tech mediators among women and other underprivileged members of the community.

The prior work done in the communities could has changed the resources the communities have. We had carried out previous research activities with both Havana and Donkerbos communities, during which the fieldwork for Publications I - III was completed. While the previous research collaboration allowed us to effectively work together, due to a familiarity with the methods and trust between the participants and the university research team already in place, the previous collaborations have likely affected the skills and attitudes held by the participants. It is to be expected that the participants were more familiar with technology, and had more entrepreneurial mindsets as a result of previous research as described by Stichel et al. (2019) and Winschiers-Theophilus, Cabrero, et al. (2015).

Another limitation this dissertation displays is that the tech mediator model presented here is still much work in progress. There has been no validation of the model on a new community, and the model has not been truly tested in the field. The research activities for Publication III yielded promising results on ways that the model could work with a real community. However, more testing in the real settings are needed to validate and improve the tech mediator model.

As pointed out by Harrington et al. (2019) and Cupples and Kindon (2003), the results of the participatory design projects as well as the academic outputs should always be shared with the communities, but this is often neglected. The collaboration between the local university and the communities in Namibia has continued after the fieldwork for this dissertation, which has offered the researchers a possibility to update the community members on the later developments of the research work. However, the author has not been personally been able to discuss with the communities after the fieldwork. The last data for the publications was gathered in February 2020, just before the global Covid-19 pandemic, and at that time, only Publication IV had been accepted for publication. Due to the pandemic, the author has not been able to personally visit the communities to share the status of the research. However, the sharing of these results should be done in the future, after the pandemic has passed.
6.5.3 Reflection on Positionality

My personal position as a white male, coming from the Global North has affected the results of the publications in this dissertation. This is unavoidable, as just me being in the field sites affects the life of the participants. It is not normal for the communities to have person such as I am present, and the situation on the field is altered by the simple fact that I am there.

My position easily gives me authority over the participants. I am a foreign, academic male visiting underprivileged communities. I have intentionally tried to decrease my authority. I try to dress modestly, and to act humbly towards the participants. I have assured the participant that they are experts on the subject that I am researching, which is why I have came to meet them. However, these efforts cannot change the demographic facts that give me unearned authority in the research settings.

This position of authority was especially reflected in the Publications I and IV. These were also the communities, where I had not visited before the research described in those publications. In Publication I, my background was useful, as I could represent the potential tourists the Donkerbos community wished to attract to their campsite. As stated in the publication, this complicated my position, as I was simultaneously researcher, consultant helping the community to plan campground business, and a representative of the actual users of the website constructed. In Publication IV we visited mostly female hosts with a female co-author. It was clear on the field, that the hosts rather interacted with my co-author, as she was easier for the hosts to discuss with.

In Publications II and III, I had personally done prior collaboration with the Havana community for several years. This collaboration had allowed me to build somewhat personal relationships with the participants. I knew their names, and had an idea who they were in the community. Although it is impossible to prove, the personal relationship with Havana community members decreased my position of authority. I was able to have more reflective discussions with the community members, and they were willing to share their thought more openly with me than the participants in Tanzania and Donkerbos.

Although the suggestion that a pre-built trust allows better and more reciprocal communications with the participants is hardly a surprising one, it is still worth making. I have been fortunate to be able to work with the same community on the other side of the World for several years. This has been made possible by the collaboration with local university. The local university owns the research projects, and our collaboration has allowed me to visit their research regularly. It is generally difficult for the researchers to maintain relationships with communities located to foreign countries, especially when the communities do not have resources.
for video calls or other forms of non-textual communications. However, the collaboration with the local university NUST, that has been presented in this dissertation, underlines the critical importance of local research partners for the researchers coming from the Global North.

6.6 Conclusions

This dissertation has presented a tech mediator model to facilitate access to global platforms to the underserved communities in Global South. The model is presented in Chapter 5, and it has been further scrutinised in Chapter 6.

The aim of this dissertation, as stated in Chapter 1, is to find practical solutions for closing the digital divide, thus rendering the world a more equal place. The tech mediator model is a tool for reaching that aim. The tech mediators obviously cannot solve all the inequalities regarding the digital divide between the Global North and the Global South. Nevertheless, our field work has shown some promise. If the model is properly implemented, the tech mediators can facilitate the local utilisation of digital tools.

Recently, there has been debate on the role the global platforms should occupy in the Global South in the future. This dissertation has supported the use of global platforms despite the possibility of them exacerbating global inequalities. This is due to the promise the global platforms offer in providing new results and tools for those communities previously lacking them. The tech mediator is a locally controlled model; thus, it should help to prevent and protect the platform users from any exploitation they might face.

The growing global access to the Internet provides many opportunities for human development in the future. Global networks provide possibilities for improving the quality of life all over the globe. With suitable support, such as the one from the local tech mediators, underprivileged communities in the Global South can benefit from these new opportunities. Utilising the possibilities offered by the digital services is one step in the right direction for the betterment of global human conditions.
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