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Connecting the disconnected: The role of ICT in livelihood restoration for women in the resettlement site Kannagi Nagar in Chennai, India

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Summary

The growing scale and impact of development-induced displacement and resettlement (DIDR) have shown the threat to livelihoods of the resettled people. Chennai, the capital city of the state Tamil Nadu in India, has a growing number of DIDR with the development of resettlement sites in the outskirts of the city. One of those sites is Kannagi Nagar, a home for 15,656 tenements which is located 15 km from the city center. The women in Kannagi Nagar suffer from more significant livelihood deprivation; thus, a gender-sensitive approach is required in their livelihood restoration. As there is evidence of ICT being useful in development, supported by the growing availability and affordability in developing countries, there is an opportunity of applying ICT in livelihood restoration of resettlers in Kannagi Nagar.

This research aims to explain the role of ICT in the livelihood restoration of the social and financial capital for women in the resettlement site Kannagi Nagar. This research adopts the case study as a research strategy with a blend of quantitative and qualitative techniques. A closed-ended questionnaire survey included a total number of 100 respondents. An additional of 12 interviews with the women in Kannagi Nagar and seven key informants were conducted to enrich the discussion. The quantitative data were analyzed through regression analysis to explain the relationship between perceived attributes of ICT with ICT use, and enabling factors with ICT use. A t-Test is also conducted to differentiate the livelihood restoration between the group 'with ICT use' and 'without ICT use'.

Among the women in Kannagi Nagar, ICT use is prevalent; however, they have not fully optimized the potentials of ICT, especially for their livelihood restoration. The use is still limited to the purpose of maintaining the contact they already have. However, some women have been able to use ICT, especially their phone, for the restoration and enhancement of their social and financial capital, such as for better skills, a better job, increased income and savings. The study also reveals that ICT use correlates positively with better skills, participation in an organization, and increased support from the community. The last two variables also lead to better job and increased income. Thus, ICT-based solutions should be acknowledged by the stakeholders. The delivery should consider the provision of ICT infrastructure, ICT education, and the perceived attributes of ICT: triability, complexity, and compatibility with the needs of women in Kannagi Nagar.

Keywords

ICT, DIDR, resettlement, livelihood restoration, Chennai

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Foreword

This thesis is written for the submission to the Institute for Housing and Urban Development Studies, Erasmus University Rotterdam, Netherlands, as the requirements to obtain an MSc degree in Urban Management and Development, for the specialization of Urban Housing, Equity, and Social Justice. The subject of this thesis is about livelihoods restoration and enhancement of social and financial capital with the role of ICT in it, especially for women, in the context of a resettlement site, Kannagi Nagar, in Chennai, India.

The topic is urgently necessary to be discussed as the trends show that development-induced displacement and resettlement increasingly occur and livelihood restoration is a huge challenge in that context. The problem for women is even more significant. Thus, an innovative approach is necessary for helping women in their livelihood restoration in post-resettlement. ICT might help to support those innovative approaches with the current accelerating diffusion and advancement. As there is limited previous study about the role of ICT in the context of livelihood restoration in post-resettlement, this research might start the discussion and bring the issue forward.

Abbreviations

IHS	Institute for Housing and Urban Development
CMDA	Chennai Metropolitan Development Authority
DIDR	Development-induced Displacement and Resettlement
HLRN	Housing and Land Rights Network
ICT	Information and Communication Technology
IRR	Impoverishment Risks and Reconstruction
ICT4D	Information and Communication Technology for Development
LAST	Livelihood Asset Status Tracking
LARR	Land Acquisition, Rehabilitation, and Resettlement
SLF	Sustainable Livelihood Framework
PAPs	Project affected persons
TNSCB	Tamil Nadu Slum Clearance Board

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Chapter 1: Introduction

1.1 Background

In the recent decades, development-induced displacement and resettlement (DIDR) have gained its scale and impact because of rapid urbanization, highly increasing population growth, and infrastructure booms (Asthana, 1996; Van Eerd, 2016). Approximately 15 million people had to leave their homes (Cernea, 2007); either for urban development, mining activities like coal, infrastructure construction, water supply, agricultural expansion, or population redistribution schemes (Van Eerd, 2016). However, although the word 'development' seems to be promising for livelihoods improvement, vast literature shows that the outcome of DIDR is the opposite. DIDR not only causes stress and trauma physically, economically, and socio-culturally but also gives rise to what Cernea (2000) asserts as impoverishment risks (De Wet, 2009). The negative impact of DIDR is also rising since resettlement is moving towards the outskirt of the city (Van Eerd, 2016). From the perspective of the sustainable livelihoods (DFID, 1999), the resettlers had to deal with vulnerability due to the shocks from resettlement, which impact on their livelihood. The shocks have different intensities for different people (Cernea, 2000; Koenig, 2009), as shown by the fact that women experience the more severe impact of resettlement in most cases (Anand and Tiwari, 2006; Bisht, 2009; Mehta, 2011; Sikka and Mathur, 2018). Thus, building on heterogeneity is crucial in urban resettlement by acknowledging different needs and concerns of specific groups, including women (Koenig, 2009). Addressing the necessities will help to accelerate the livelihood restoration for the resettlers.

Besides the dynamics of increasing DIDR, the diffusion of digital technology, supported by the fourth industrial revolution and preceding digital revolution, has brought up the discourse of the role of technology in development (Leliveld and Knorringa, 2018). Some literature argues that digital technology might be a great catalyst in solving the problems of the urban poor, such as accessibility to public services and economic opportunities (Sharma and Sturges, 2007; Omole, 2013; Proenza, Jagun, et al., 2015). Nevertheless, with the fact that digital technologies or ICTs have spread quickly in developing countries (Leliveld and Knorringa, 2018), and enormous investments have been put to build telecenters and software applications (Chipidza and Leidner, 2019), there a is limited study about the role of ICT in the context of DIDR. Arguably, ICT might help the process of livelihood restoration in post-resettlement, as shown by some evidence in other development contexts. Thus, it is relevant to study the role of ICT in livelihood restoration in resettlement to help policymakers and planners developing appropriate policies and strategies in DIDR. Furthermore, this study might be relevant for community-based organizations and non-governmental organizations to deliver a new approach in the process of livelihood restoration.

1.2 Problem Statement

Among the significant causes of displacement natural disaster, conflict, and development (Muggah, 2008), India has experienced all the three types during the last 50 years or more. Along with China, India is one of the two countries that largely contributes to the increasing number of people affected by DIDR (Stanley, 2004). Although displacement and resettlement have become recurrent, India has not appropriately addressed this issue.

Chennai, which is the capital of the state of Tamil Nadu, shows a growing number of DIDR cases. While Chennai is one of the world's ten fastest-growing cities, 28% of the population live in slums because of untamed urbanization and development (Krishnamurthy and Desouza, 2015). Resettlement is the primary solution from the Tamil Nadu Slum Clearance Board (TNSCB) to deal with slums. In the practice of resettlement, there is a signal of non-inclusive

growth, as shown by policies favoring the growing middle class and forcing the poor to the fringes (Van Eerd, 2016). However, despite the increasing practices of large-scale resettlement sites, the policy to guide rehabilitation and resettlement in Tamil Nadu remains unclear (HLRN, 2014). As a result, there is no safeguard for the human rights of the resettlers in the existing resettlement sites.

One of those sites is Kannagi Nagar, a resettlement colony constructed by TNSCB that is home for 15,656 tenements (HLRN, 2014). The distance to the central business district from Kannagi Nagar is 15 km (Srinivasan and Rogers, 2005), and it induces spatial disintegration to the city. Besides, the resettlers in Kannagi Nagar suffer from marginalization not only from being forced to the fringe but also from "ghettoization" that deprived them socially and financially (HLRN, 2014). Considering the location that is near the IT corridor in Old Mahabalipuram Road, TNSCB intends to provide access to jobs (Coelho, Venkat, et al., 2012). However, the result is unlikely since the posts are inaccessible for the skills that the resettlers currently have. Almost 80% of the resettlers lost their employment as they moved in to Kannagi Nagar; 62% of the households only gained less than Rs 5,000 as their monthly income (HLRN, 2014), not even 10% of Chennai's average income per capita which is Rs 57,706 according to the Ministry of Housing and Urban Affairs (2016).

The impact on women is more severe as they suffer from more significant livelihood deprivation. Due to their low skill, most women rely on location-specific occupation, such as domestic workers (Coelho, Venkat, et al., 2012, Coelho, Venkat, et al., 2013). Relocation to the outskirts causes women to lose their job or to experience transport deprivations (Anand and Tiwari, 2006). Moreover, the resettlement process is gender-insensitive as women feel threatened in terms of security and safety due to the lack of sufficient basic services that should serve women's specific necessities (HLRN, 2014). Thus, livelihood restoration in the resettlement for women requires a unique approach.

The digitalization in Chennai as a vision of becoming a smart city could be an opportunity for livelihoods improvement. The Corporation of Chennai has invested considerable resources in building its digital capacity (Krishnamurthy and Desouza, 2015). However, even though extensive studies have shown that there is evidence of ICT being useful in development, the opportunity of applying ICT in livelihood restoration of resettlers in Kannagi Nagar remains unattained. As ICT could be a catalyst of improved accessibility and enhanced social networks, it might also benefit to the livelihood restoration of social and financial capital in the resettlement site Kannagi Nagar, especially for women, who suffer from more severe impoverishment risks. Therefore, understanding ICT use in livelihood restoration might help to improve the livelihood strategies for women in Kannagi Nagar.

1.3 Research Objectives

The objective of the research is to explain the role of ICT in the livelihood restoration of the social and financial capital of women in the resettlement site Kannagi Nagar in Chennai, India. The research will describe how resettled women in Kannagi Nagar perceive and use ICT with regards to the restoration of social and financial capital. This research will draw the correlation between livelihood restoration and ICT use. As some restricting or enabling factors might influence ICT use, the study will also explore those factors to give more understanding of what stakeholders could provide to allow ICT use in women's livelihoods.

1.4 Provisional Research Questions

This research is a form of explanatory research with the provisional main research as follows

> How does ICT help in livelihood restoration and enhancement of the social and financial capital of women in the resettlement site Kannagi Nagar?

The sub-questions of this research are:

1. What is the current ICT use for women in Kannagi Nagar?
2. What is the perceived attributes of ICT for women in Kannagi Nagar, and how does it influence the ICT use?
3. What are the factors that enable or restrict ICT use for women in Kannagi Nagar?
4. What is the impact of ICT use in the restoration and enhancement of social and financial capital for women in Kannagi Nagar?

1.5 Significance of the Study

As ICT has shown its impact on the various context of development, it should have potentials in the livelihood restoration. However, there is not any study on ICT use in development-induced resettlement. This research will fill that gap in the body of knowledge. Moreover, the focus on women will enrich the knowledge about the relationship between gender and resettlement, as well as the relationship between gender with ICT.

This study focuses on how ICT use as a livelihood strategy might help to restore livelihoods, exceptionally social and financial capital. The researcher will illustrate the relationship between livelihood restoration and ICT through building the understanding of ICT use and the improvement of social and financial of women in the resettlement site Kannagi Nagar. Thus, the study might contribute to better planning of ICT-based solutions in resettlement. This study will draw the importance of integrating ICT to the resettlement planning and provide a recommendation of possible actions through ICT by various stakeholders to improve the livelihoods of women in Kannagi Nagar.

1.6 Scope and limitations

The scope of this research is within the role of ICT in livelihood restoration of the social and financial capital of women in the resettlement induced by development projects. This study mainly focuses on the social and financial capital of women as those two capitals are assumed to have high potentials to be restored after colossal deprivation. Both capitals are also severely affected and therefore plays a significant role in the improvement of livelihoods. Some scientific literature suggests that livelihood restoration needs various strategies; however, this study only focuses on the role of ICT, especially the internet and mobile technologies that have been increasingly adopted recently in developing countries. Furthermore, this study will not deeply elaborate on the technological aspect and will go deeper into the ICT use to improve livelihoods of the resettlers.

Chapter 2: Theory Review

2.1 Introduction

This chapter will present the academic debate to explain the concepts that are useful for the conceptualization of the research. It will firstly elaborate on the concept of resettlement in DIDR followed by the discussion about the scale and impact of DIDR as well as the approaches to deal with it and the legal framework in India. The concept of livelihood restoration is further elaborated in the context of DIDR with a specific notion on social and financial capital, and also the perspective of women. Furthermore, this chapter presents the concept of ICT along with the perceived attributes of ICT, restricting and enabling factors of ICT use, and ICT use for women. The researcher will also discuss the implementation of ICT in livelihood restoration, especially in the context of resettlement. Following the discussion, this chapter will deliver a conceptual framework of the research at the end part.

2.2 The concept of resettlement in DIDR

Development-induced displacement and resettlement (DIDR) started to be widely recognized in the 1980s as global infrastructure booms occurred in the 1970s, followed by massive resistance to DIDR in the 1990s (Dwivedi, 2002). Development as the cause of DIDR is defined by Oliver-Smith (2006, p.142) as a "process through which the productive forces of economies and supporting infrastructures are improved through public and private investment." According to that definition, DIDR mainly deals with physical development projects, and commonly embeds a loss of land (Stanley, 2004).

Displacement is described by Cernea (2006) as people losing their house, land, or both simultaneously. In some cases, displacement happens in the form of occupational and economic dislocation without the occurrence of physical relocation of the local users. On the other hand, resettlement combines two things: displacement of people and livelihoods restoration (Asthana, 1996; Terminski, 2013). The term resettlement is widely used interchangeably with relocation and rehabilitation. As it should include appropriate planning and support system in the new location, resettlement constitutes both spatial element and social control (Muggah, 2008; Terminski, 2013).

Displacement and resettlement could be both voluntary and involuntary, and it is essential to distinguish them since involuntary resettlers tend to feel more anxious and insecure (Asthana, 1996). However, identifying both is not always easy; even a case that is well-known as voluntary resettlement was arguably involuntary (Schmidt-Soltau and Brockington, 2007). Thus, displacement and resettlement will induce impoverishment risks regardless of the consent of the displacees.

2.2.1 The scale and impoverishment risks of DIDR

In developing countries, the scale of DIDR is increasingly growing because of the provision of infrastructure for the fast-growing population (Asthana, 1996; Van Eerd, 2016). In India, Taneja and Thakkar reported in 2000 that displacement from dam projects alone could reach the number of 21 million to 40 million displacees (Stanley, 2004); and even 60 million between 1947- 2000 according to Samling, Ghosh, et al. (2015).

Cernea (2000) has argued that DIDR brings impoverishment risks to the resettlers. He asserted that impoverishment implies the lack of social justice and equity coupled with social exclusion. Any form of social exclusion is contradictory to what Amartya Sen argued as the nature of development, which is increased freedom (Cernea, 2000). Based on that understanding, Cernea developed the model of Impoverishment Risks and Reconstruction (IRR). Other than for

research purpose, this model is intended to predict and to diagnose problems in resettlement for planners and policy makers; thus, they could deliver better solutions for the project affected persons (PAPs)

The impoverishment risks are social disarticulation, landlessness, marginalization, homelessness, loss of access to common property and services, increased morbidity and mortality, joblessness, and food insecurity. Among them, joblessness and landlessness might cause severe impact on financial capital, a form of livelihood assets, which is an essential building block of livelihoods with its versatility. As the resettlers move to a new location, they tend to lose jobs or live farther away from work and other places. Either the joblessness or the distance causes a decrease in their regular inflows of financial capital and threatens their savings. The other two risks, marginalization and social disarticulation causes deprivation of social capital. Marginalization occurs due to the loss of economic power and being in a spiral on "downward mobility"; while social disarticulation caused by ripped social fabric. These social traumas could break the already established social networks and membership, which are the critical features of social capital.

The impact of resettlement suggested by Cernea might have different intensities for particular subgroups depending on site circumstances, season, and characteristics of the resettlers themselves. Consequently, building on heterogeneity is vital in resettlement as different individuals might have different needs and concerns (Koenig, 2009). One of the examples is that women tend to experience more severe shocks. Therefore, understanding the vulnerability context of women is very important to introduce gender-sensitive solutions in livelihood restoration.

2.2.2 Approaches to DIDR

Generally, DIDR is not the preferred approach in development projects due to the negative impact that it brings (Terminski, 2013). However, researchers have different ideas about how to deal with DIDR; some might against it totally, and the others tend to propose a way to reduce the impoverishment risks.

Researchers like Parasuraman pictures DIDR as the evil face of development and propose that policy should adopt right-based development (Dwivedi, 2002). They pay attention more on the human rights aspect and the consent of the PAPs. De Wet's (2009) ethical questions on DIDR also implies similar cynicism.

According to Dwivedi, World Commission on Dams tried to propose a more moderate approach through their "rights and risks approach" in which they suggest that decision-making process should be inclusive in terms of stakeholder involvement in decision-making (Dwivedi, 2002). Therefore, stakeholders should acknowledge the rights of the people in the process of consultation and negotiation in which stakeholders deal with and communicate about the risks explicitly.

Although it is not favored, the occurrence of DIDR is still increasing; thus, when DIDR is inevitable, it is crucial to ensure that resettlement is well-planned when displacement takes place. This focus is what some other researchers propose. IRR that is introduced by Cernea (2000) might be the most prominent model that explains how planners should be sensitive to local needs when dealing with resettlement planning. In a top-down manner, Cernea asserted that risk prevention combined with the reconstruction of livelihoods is essential in resettlement; preceded by the understanding of the impoverishment risks (Dwivedi, 2002). The model suggested by Cernea includes some measures as follows: social inclusion, land-based re-establishment, community reconstruction, re-employment, provision of adequate nutrition, house reconstruction, improved health care, and restoration of community assets and services.

International organizations have also released guidelines to resettlement. In 2016, The World Bank released a document which includes resettlement guidelines, which are:

1. Physical and economic displacement should be avoided or minimized if inevitable.
2. Stakeholders should give compensation at replacement cost in an exchange of land acquisition or restriction on land use
3. Land-based re-establishment should take place if the livelihoods of displaced persons are land-based or on collectively-owned land
4. Livelihood restoration program should be designed to ensure the ability of project affected persons to capture new livelihood opportunities
5. Stakeholder engagement should include affected communities
6. The process should pay attention to gender impacts and the rights of vulnerable groups

2.2.3 Legal framework for DIDR in India

The Land Acquisition, Rehabilitation, and Resettlement Act (LARR Act) of 2013 regulates the DIDR in India (Van Eerd, 2018). Through this Act, social and environmental impact assessment is made compulsory before the practice of land acquisition, compensation, rehabilitation, and resettlement, particularly where it takes place for public interest through eminent domain. Also, the Act comes up with stricter rule with consent required from 70-80% PAPs and with a restriction on multi-cropped and agricultural land. Nevertheless, in most cases of displacement, people do not legally own the property; thus, LARR does not apply for safeguarding the urban poor in that context.

In terms of housing policies, the National Urban Housing and Habitat Policy of 2007 regulated the increasing housing supply, the innovative financing instruments, the attraction of Foreign Direct Investment, and the introduction of Public-Private Partnership (Van Eerd, 2018). Also, it prioritizes *in situ* upgrading for slum dwellers and closer location of shelter replacement to where their livelihoods take place. When relocation is inevitable, stakeholders should provide reliable transportation to the workplace. However, the implementation is far from the ideal situation designated in the policy since slum dwellers are often pushed to the peripheries with the increasing favoritism upon the rich and middle class.

In Tamil Nadu, the regulation of slums is the Tamil Nadu Slum Areas (Improvement and Clearance) Act of 1971; in which TNSCB was established (Van Eerd, 2018). There are three approaches from TNSCB to deal with slums that are declared by the State Government of Tamil Nadu: *in situ* development, *in situ* reconstructions, and reconstruction and rehabilitation. However, despite the increasing practice of resettlement, Tamil Nadu does not have a clear policy to guide rehabilitation and resettlement (HLRN, 2014). The current resettlement and rehabilitation policies occur in the project levels such as in the development of 600km of State Highways and the Chennai Metro Rail (Government of Tamil Nadu, 2014; CMRL, 2017). As projects may differ from one another, there is no safeguard of the livelihoods of the resettled people.

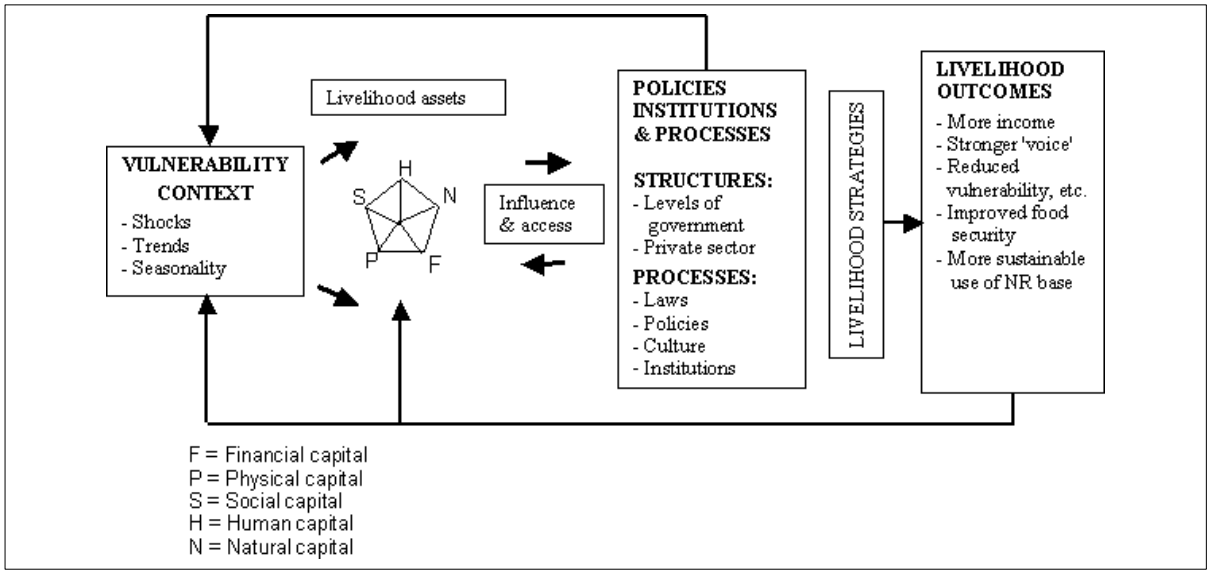
2.3 The concept of livelihood restoration in resettlement

As the practice of DIDR is highly increasing, Vanclay (2017) argues that livelihood restoration requires more attention than how it gets now. Understanding the concept of livelihood in relation with DIDR is essential to recognize how the resettlers can cope with impoverishment risks and how planners and policy-makers should address it when resettlement has to take place. The challenge lies in how the assessment and conceptualization of livelihoods because resettlers, planners, and policymakers might perceive development differently (Parkinson and Ramirez, 2006). The resettlers often have more complex strategies compared to what planners and policy-makers have envisioned.

Sustainable livelihood approach is considered appropriate to overcome the challenge of portraying the complexity of the urban poor's perspective and realities. Among various frameworks of sustainable livelihood that researchers have introduced, the sustainable livelihood framework (SLF) from DFID is one of the most prominent concepts.

DFID (1999, p.1) defines livelihood as a mix of "the capabilities, assets (including both material and social resources) and activities required for a means of living." A livelihood is sustainable if it bounces back from stress and moves forward to develop assets in both short-term and long-term, without threatening the natural resource base. The stress or vulnerability context could be in the form of shocks, trends, and seasonality. In the SLF, five livelihood assets, which are social, financial, natural, physical, and human capital, are interlinked with each other and become the building blocks of livelihood strategies. SLF recognized the macro and micro level of structures and processes that might transform the livelihood assets and influence the vulnerabilities. With regards to those factors, households are working through combinations of actions that build up to livelihood strategies, resulting in livelihood outcomes. Figure 1 below shows the complete framework of SLF

Figure 1. Sustainable Livelihoods Framework



Source: DFID, 1999

Among the livelihood assets, resettlement severely deprives two types of assets. They are social and financial capital. Both capitals have potentials to plays a significant role in the livelihood restoration.

Social capital is multi-dimensional (Grootaert, Narayan, et al., 2004). While DFID defines social capital as resources that comprise networks, membership, and trust, Woolcock (2001) highlights collective action as a result of it. Type of social capital also varies: from bonding, bridging, to linking. "Bonding" explains the interaction between individuals with similar characteristics with shared goals. While "bridging" allows access to resources outside the community. The latter, "linking" is no different from bridging but with power differential embedded. It comprises institutional rules and regulations as well as the politico-cultural aspect (Hawkins and Maurer, 2010; Babaei, Ahmad, et al., 2012; Koh, Walker, et al., 2018).

Financial capital is also an essential building block to accumulate another type of assets. According to a case study of a resettlement program in Mekong River Basin, those who owned the more financial assets before being resettled can invest in a longer-term livelihood strategy (Kura, Joffre, et al., 2017). Financial capital might be the most versatile asset as it is easily

exchangeable with the other forms of capital (Bajwa, 2015). It is also necessary for dealing with emergencies (Adjei, Arun, et al., 2009). However, financial capital is commonly the least livelihood assets owned by the urban poor (Kollmair and Juli, 2002). Hence, improving this capital is essential in livelihood restoration. According to DFID (1999), there are two primary sources of financial capital, which are savings and regular inflows of money. Savings are not limited to cash, but also include liquid assets like livestock, jewelry, and bank deposits. Aside from those above, chit funds are also a means of savings that are common in everyday life of urban poor in south India (Van Eerd, 2008). Chit funds are indigenous financial institutions that offer quick fundraising in inadequate banking and credit circumstances. The element of reciprocity, possibility to save in installments, compulsory nature, and the convenience due to the absence of formalities are some compelling characteristics of chit funds. Aside from regular income, inflows include pensions, transfer from the state, and remittance. Other than those indicators that define the level of inflows and available stocks, income sources, stability, and sufficiency are also essential indicators (Boateng, 2013).

2.3.1 The challenges of livelihood restoration of social and financial capital

Evidence has shown that a lack of attention in livelihood restoration will cause greater impoverishment to the resettlers. Moreover, livelihood restoration in the urban context is highly complex (Koenig, 2014). The increasing competition of land in the urban area is the cause of this complexity (Vanclay, 2017); hence, land-based resettlement is implausible.

Koenig also argued that the expanding distance from previous employment becomes the most significant factor in the failure of sustaining their standard of living, resulting in "joblessness" as the impact. Due to that distance, the cost and time spent on travel are increasing. This problem is more severe on women and business owners than other groups since they find it difficult to continue their previous livelihood.

From a social perspective, resettlement disrupts the social networks of the resettlers. The changes in the social network result in difficulty to access mutual assistance in the community. Moreover, they separate from the ties with previous neighbors that did not move (Koenig, 2014).

Authorities often neglect the long-term process in livelihood restoration as they prioritize cash and physical compensation as solutions. However, evidence has shown that cash compensation fails to assist in the reconstruction process (Mathur, 2006). Mathur argues that is not only because this approach excludes those who lack ownership but also due to the incapability to acquire the way they lived before in their new shelter. Moreover, DIDR might cause stress and trauma for various aspects: not only physical but also economic and sociocultural (De Wet, 2009).

Building an understanding of the resettlers' characteristics should precede all the complex processes of livelihood restoration (Koenig, 2014). Koenig also suggested that pre-resettlement studies are crucial to capture the diversity in the needs of the resettlers. These pre-resettlement studies will be the foundation of how planners and policymakers develop livelihood restoration programs.

Capturing Cernea's IRR model, livelihood restoration with regards to social and financial capital should re-establish employment, promote social inclusion, and rebuild the community. As land-based resettlement is unlikely, Xiao, Liu, et al. (2018) argued that income-based resettlement is more critical in the urban context. These measures should result in increased income, savings, and business performance; better job with improved employment and skills training opportunities; maintained relative contacts and ability to make friends; increased support from neighbors and communities; increased participation in organizations (Van Eerd,

2008, Souksavath and Nakayama, 2013, Perera, 2014, Sayatham and Suhardiman, 2015, Randell, 2016, Ismail, Okazaki, et al., 2018).

2.3.5 Women and the challenge of livelihood restoration in DIDR

In DIDR, women must endure social, cultural, occupational uprooting with higher intensities (Bajpai and Gautam, 2018). Women tend to experience shrinking livelihood opportunity due to exclusion from building an everyday routine (Bisht, 2009; Sikka and Mathur, 2018; Smyth, Steyn, et al., 2015). One of the practical examples is the unequal benefits in compensation as men commonly get it while women have no authority over it (Bala, 2006). Bajpai and Gautam also denote the fact that most women lose their steady income. As many women previously worked as domestic workers, they were able to gain sufficient wages by working for many clients who lived nearby (Koenig, 2014). However, when they moved to the resettlement site, they were segregated from the employers, causing them to lose their job. As a result, financial contributions from women is decreasing (Sikka and Mathur, 2018)

From the social perspective, resettlement undermines social networks and causes disruption of family ties, resulting in the shrinking of the space a woman enjoys (Bajpai and Gautam, 2018). In some cases, as resettlement brings a defeated feeling in men, there is a tendency of venting frustrations on women and children. Unfortunately, women and children tend to lose their safe space, and they have no buffer of domestic disputes due to the social disarticulation after resettlement (Mehta, 2011). In general, a resettlement undermines the economic independence and social autonomy of women (Bisht, 2009).

However, despite the severe impact they have to endure, women can also be the pioneer of change. Particularly in the urban context, women tend to have "triple roles" which are not only the reproductive role but also productive and community-managing role (Moser, 1987). The case of displaced Muslims in Sri Lanka is one of the examples (Ghani, 2014), in which the women were actively involved in economic activities as income earners; also, in the case of women in Indio Guayas (Moser, 1987) where they struggled to acquire decent infrastructure. Specifically building on women's livelihood will bring two objectives: to rescue them from harsh impoverishment risks and vulnerabilities and to empower them to be an agent of change in their household and community.

2.4 The concept of ICT

ICT can be defined as digital technologies with specific properties, characteristics, and functionalities (Thapa and Hatakka, 2017), in which information passed through, and communication is served. Among those technologies, the internet and mobile technologies have highly increasing diffusion in the recent decade (Leliveld and Knorringa, 2018). This diffusion has enabled many actions through innovation since the cost of innovation has significantly decreased. While in the past, ICT professionals tend to serve only the top of the pyramid in the population (Heeks, 2008), ICT has now become more available and affordable for the lower-income groups.

The diffusion of ICT certainly brings impact and interact with the socio-technical aspects that arises the notion of development since the 1980s (Thapa and Sæbø, 2014). The discourse of ICT for development (ICT4D) brought a broader understanding of ICT, including its use and its impact (Thapa and Hatakka, 2017; Sein and Harindranath, 2004).

The use of ICT for development varies from a bigger context of national development, such as ICT as a commodity or ICT as an economic driver; to a specific context where ICT supports specific development project (Sein and Harindranath, 2004). However, this research will focus on the latter, in which the use means the adoption of ICT by the users to support their

livelihoods. The level of ICT use in this context will vary in terms of frequency due to the difference in how they perceive ICT and the obstacles they have in using ICT (Best and Maier, 2007)

In general, the application of ICT for development has shown evidence of the impact that, according to a literature review by Chipidza and Leidner (2019, p.6), constitutes at least four perspectives: "increased freedom, expanded inclusion, increased economic productivity, and improved well-being." They argued that the beneficiaries of ICT4D could not harness the impact unless there are enabling factors that support ICT use. Rogers (1995) asserted that the adoption of innovation, including ICT, will be influenced not only by the existence of the enabling factors but also how the people perceive innovations.

2.4.1 Perceived attributes of ICT

Impact of ICT will not result in the same form and level for everyone who uses it. The same technology with the same functionalities could benefit differently for each user. Rogers' (1995) concept of "diffusion of innovations" is the most renowned concept to explain this. He argued that the adoption of innovations occurs because of these determinants that influence the perception of the adopters: the relative advantage compared to the existing technology, the compatibility to the users' necessity and context, the complexity of the technology, and the ease of trialability and the observability.

The first two determinants might be the most significant factors of perceived attributes of ICT (Martin and Abbott, 2011). The level of perceived compatibility and advantages correlates with ICT adoption (Alam and Noor, 2009). Relative advantage is the comparative benefit to the previous tool or system used. It varies from a relatively cheaper cost to a decrease in discomfort. Compatibility or how innovation can meet the needs of the adopters is another factor that will impact on ICT use. The rate of adoption will also increase if the people perceive the ease of use, have the opportunity to try it and have been exposed to it.

2.4.2 Restricting and enabling factors in ICT use

The success of harnessing the impact of ICT lies on several key factors. When unattained, these factors can also be considered as barriers to gain positive impact from ICT application.

Chipidza and Leidner (2019, p.14) assert that infrastructure such as "reliable power supply, internet, and hardware" will ease the implementation of ICT for development. In terms of hardware, mobile phones and computer might be the two most crucial ICT tool as they provide a connection to the internet, with the first offer higher impact on development. According to Proenza, Jagun et al. (2015), a combination of mobile phones and public access ICT such as telecenter and cybercafe might increase accessibility. Thus, establishing an adequate infrastructure that will support the use of mobile phones and public access ICT will help to obtain the livelihood objectives.

It also suggested that education is necessary to optimize the potentials of ICT (Chipidza and Leidner, 2019). According to Chipidza and Leidner, building ICT skills as a means of education is essential. Other important factors of education are English language competency (Felton, 2015), or other language barriers (Chipidza and Leidner, 2019), that should be supported by literacy.

Affordability is another significant factor in ICT use. When power supply, internet, and hardware are available, it is crucial to ensure that the cost of them is also affordable. In relations with affordability, the poor have constraints in accessing ICT due to a more significant portion of household expenditure for basic needs (Duncombe, 2006).

Aside from the factors above, personal or demographic characteristics also influence ICT use; for example, gender, age, disability status, and education (Dobransky and Hargittai, 2006; Gillard, Howcroft, et al., 2008; Wamala, 2012; Alam and Imran, 2015; Francis, Ball, et al., 2019). Men, the younger cohort, people without disabilities, and well-educated groups generally have better access to ICT than the rest of them. Therefore, from this understanding, the other groups will need specific support to use ICT in their livelihoods.

2.4.3 Women and ICT

As the visibility of women is considerably low in the field of ICT, gender should be a central issue in ICT4D discourse (Gillard, Howcroft, et al., 2008; Huyer and Sikoska, 2003; Walsham, 2017). Women's access to ICT remains low since the barriers mentioned above even pose a more significant challenge in women (Hafkin, 2002; Wamala, 2012). They tend to possess all those barriers: from illiteracy and weak economic power to limited mobility due to domestic roles (Gurumurthy, 2004). Moreover, gender interplays with social identities, for instance, class, caste, and age; thus, women in poor communities with marginalized caste might have more severe issues in accessing ICT.

When it is attained, the ICT use could result in a positive impact (Buskens and Webb, 2014). The effect could be in personal transformation such as self-efficacy, capacity improvement, dissemination of right-based information, and amplification of voices and perspectives; or even impact on the community level (Gurumurthy, 2006; Crittenden, Crittenden, et al., 2019). In economic activities, ICT might help women in male-dominated market to bypass the dependence. For example, the internet could bring women's products to the market directly or maximize productivity through knowledge-based improvement in their business. Moreover, if ICT could enable connectedness, social transformation through the role of women is possible (Buskens and Webb, 2014). This kind of transformative societal change could happen if only women have the capacity as collective political actors through the improvement of social capital (Huyer and Sikoska, 2003; Crittenden, Crittenden, et al., 2019).

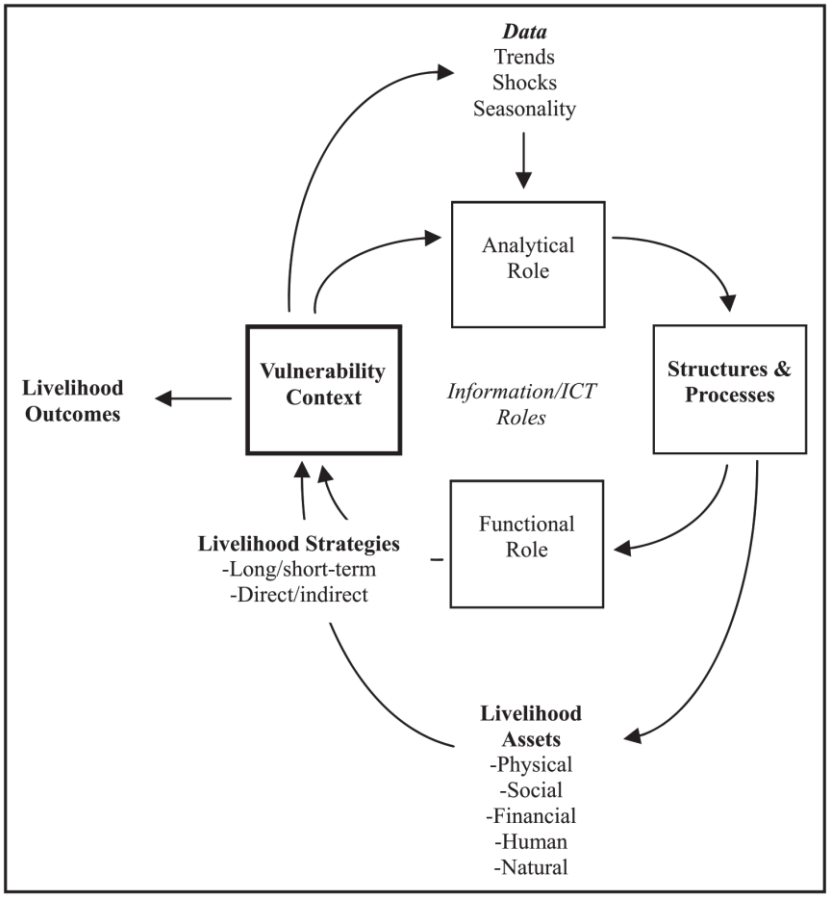
Women could harness the impact if only they have access to ICT through the increased transfer of technology and the delivery of ICT-based solution that fits their necessity (Huyer and Sikoska, 2003). Nevertheless, merely increasing access to ICT to obtain full potentials of ICT is insufficient; access to ICT could not guarantee the adoption of ICT. The example is the provision of telecenters, in which women still unlikely to be the primary users due to socio-cultural barriers (Gurumurthy, 2006). ICT is not gender-neutral as it lies upon the existing socio-technical context that embodies gender inequalities (Hafkin, 2002). Thus, a gender-sensitive lens in providing ICT-enabled solutions should be applied to overcome the current gap (Gillard, Howcroft, et al., 2008; Gurumurthy, 2004; Elnaggar, 2008).

2.5 ICT and livelihood restoration in resettlement

Being one of the researchers that connect livelihood and ICT4D, Duncombe (2006) developed a model to denote ICT within the livelihood framework. He emphasizes that "information" is necessary "for the poor to access broad range of assets: information about training/new knowledge, finance, technologies, and natural resources" (Duncombe, 2006, p.97); thus, the livelihood framework internally embeds information and communication.

The model of Duncombe as seen in Figure 2 below lays information/ICT on two roles: analytical role, in which information is used for assessment of vulnerability context, livelihood assets, and structures and processes, and functional role, in which ICT can be utilized as a part of livelihood strategies.

Figure 2: Model for understanding ICT with livelihood framework



Source: Duncombe, 2006

Research about resettlement and the use of ICT is mainly related to refugee and migrant resettlement (Felton, 2015; Alam and Imran, 2015; AbuJarour and Krasnova, 2017; Andrade and Doolin, 2018). Those researches show the positive impact of ICT application in various forms. Generally, ICT-enabled actions in resettlement could fall into three categories: open up new opportunities, provide services, and maintain connectivity (Alam and Imran, 2015).

During the early stage of migration, orienting in a new environment will be a challenge; thus, the refugees need to be well informed to be aware of new opportunities. The enactment of ICT is beneficial in understanding the new environment, staying informed about previous neighborhood and community, and learning about the new legislation. In this way, ICT might offer opportunities for education, employment, entrepreneurship, and entertainment through the new information provided for the refugees (Alam and Imran, 2015).

Once they have adapted to the new circumstances, some instruments to access services becomes more important. ICT is capable of serving useful functions in the provision of services (Sharma and Sturges, 2007). In the context of refugee, the e-services vary from government services, banking services, billing services, online shopping, mobility services, safety and emergency services, and health services (Alam and Imran, 2015; AbuJarour and Krasnova, 2017). It might also provide services for the business activities of the refugees as shown in the case of the refugees in Zambia where internet and mobile phone are used for communicating with customers and supplier, marketing, transferring money (Nyamazana, Koyi, et al., 2017)

All those functions are supported by the capacity of ICT to support connectivity through communication services. Communication services enable the refugees to interact with the

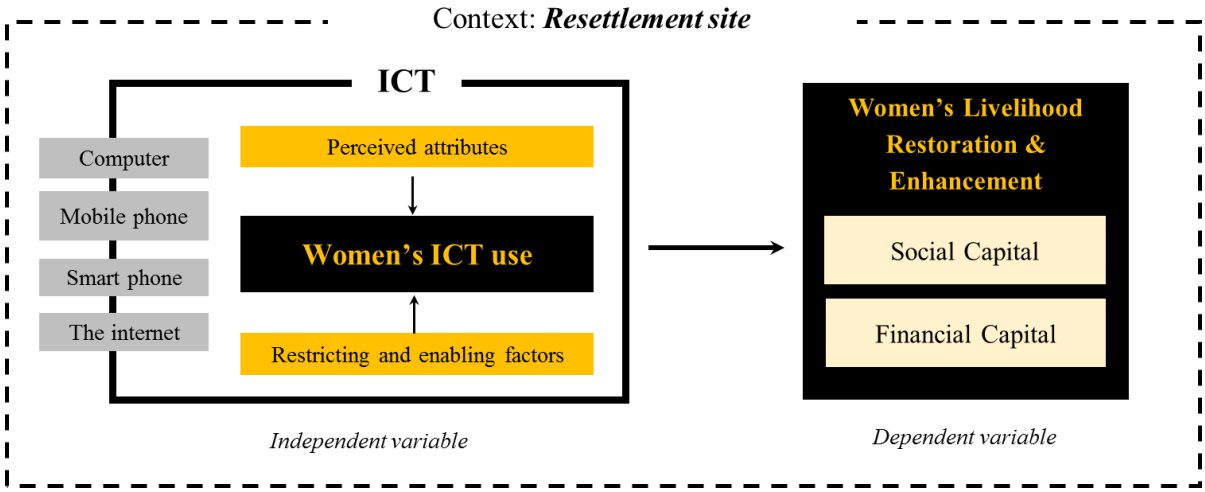
broader community, to socialize, to communicate with government agencies, to sustain support networks, to express their identity, and to practice crowdsourcing (Alam and Imran, 2015; AbuJarour and Krasnova, 2017; Andrade and Doolin, 2018).

Evidence from DIDR context of the impact of ICT application does not occur in the body of knowledge. However, according to Cernea (2000), resettlers and refugees might share considerably similar social and economic problems. Thus, those findings might still be relevant to be the point of departure of livelihood restoration through ICT use in the context of DIDR.

2.6 Conceptual Framework

From the understanding of resettlement, livelihood restoration, and ICT in the perspective of women, along with the comprehension of the relations, the conceptual framework of this research is illustrated in Figure 3 below. The researcher puts ICT as the independent variable, that shall influence the livelihood restoration of social and financial capital as the dependent variable. The researcher defines ICT from its use that has some influences from the perceived attributes and some restricting and enabling factors. The interplays of these variables happen in the context of resettlement from the perspective of women.

Figure 3. Conceptual Framework of the research



Source: Author, 2019

Chapter 3: Research Design and Methods

3.1 Introduction

This chapter presents the research design, which includes the research strategy, methods, and technique of data collection, and how the data will be analyzed. It will first explain the research strategy, followed by the operationalization of different concept into variables and indicators. Secondly, the researcher will explain the research methodology and sampling method. Later, this chapter will present data collection method followed by the data analysis method.

3.2 Revised Research Question

The main research question is –

How does ICT help in livelihood restoration and enhancement in terms of the social and financial capital of women in the resettlement site Kannagi Nagar?

The sub-questions of this research are as follow–

1. What is the current ICT use for women in Kannagi Nagar?
2. What is the perceived attributes of ICT for women in Kannagi Nagar, and how does it influence the ICT use?
3. What are the factors that enable or restrict ICT use for women in Kannagi Nagar?
4. What is the impact of ICT use in the restoration and enhancement of social and financial capital for women in Kannagi Nagar?

3.3 Research Strategy

This research adopts the case study as a research strategy by putting the resettlement site Kannagi Nagar in Chennai, India as the context. This research takes one case as "the subject of study" to be examined "in an everyday, real-life setting" (Van Thiel, 2014, p.88). The context or the applied nature of this research is crucial as it aims to provide future recommendations on how planners should deal with resettlement as well as how livelihood restoration should be improved in the resettlement site Kannagi Nagar. A case study is generally applied when the unit of study is limited while the variables are abundant. Thus, in this case, the units of study of this research will be restricted to the resettlement site Kannagi Nagar.

There is limited data in the context of ICT in DIDR; thus, primary data collection is necessary. Moreover, this research needs a certain depth to explain how ICT could play a significant role in livelihood restoration. Therefore, a large number of variables are necessary to draw the causal process of the subject of study. The research might not cover large units as it only needs one single case to illustrate the comparative study between the level of use of ICT and how it impacts the livelihood restoration and enhancement.

3.4 Operationalization of variables and Indicators

Table 1: Operationalization of variables and indicators
Source: Author, 2019

CONCEPTS	VARIABLES	SUB-VARIABLES	INDICATORS	SOURCES	SCALE	VALUE	METHOD
ICT Digital technology with specific characteristics and properties that enables certain functionalities (Thapa and Hatakka, 2017)	**ICT Use** The use of a computer, mobile phone, and the internet with regards to livelihoods as a specific development context (Sein and Harindranath, 2004; Duncombe, 2006; Best and Maier, 2007)	Hardware	Hardware use	Proenza, Jagun et al., 2015	Nominal	Computer; Mobile phone; None	Questionnaire, Interview
		Internet	Internet use	Best and Maier, 2007	Nominal	Yes/No	Questionnaire, Interview
			Internet use location	Proenza, Jagun et al., 2015	Nominal	Home; Work; Place of education; Other persons home; Community internet access facility; Commercial internet access facility; In mobility	Questionnaire, Interview
			Internet use frequency	Best and Maier, 2007	Ordinal	At least once a day; At least once a week, not daily; Less than once a week	Questionnaire, Interview
			Internet use type of activity	Felton, 2015; Alam and Imran, 2015; Fisher, Yefimova, et al., 2016; Andrade and Doolin, 2018; AbuJarour and Krasnova, 2017	Nominal	Get a new job; Start a new business; Sustain the previous job; Sustain business; Skill training; Manage savings/assets; Access government scheme; Communication; Education (self/children); Get support; Participate in organization; Safety	Questionnaire, Interview
		Expenditure	ICT expenditure	Duncombe, 2006	Ratio	(incl. purchases of hardware, purchases of telephone/internet services, hardware accessories, repair)	Questionnaire, Interview

CONCEPTS	VARIABLES	SUB-VARIABLES	INDICATORS	SOURCES	SCALE	VALUE	METHOD
ICT Digital technology with specific characteristics and properties that enables certain functionalities (Thapa and Hatakka, 2017).	**Perceived attributes of ICT** The perception of users of ICT that influence ICT adoption (Rogers, 1995).	Observability	Exposure to ICT	Rogers, 1983	Nominal	Ever seen; Never seen	Questionnaire, Interview
		Triability	Experience of using ICT	Rogers, 1983	Nominal	Ever used; never used	Questionnaire, Interview
		Complexity	Perception of ease of use	Rogers, 1983	Ordinal	(1)Very difficult; (2)Difficult; (3) Neutral; (4)Easy; (5) Very easy	Questionnaire, Interview
		Compatibility	Fulfillment of needs: Health service, Education, Electricity, Water, Social interaction, Business, Job	Rogers, 1983	Nominal	(0) Not important; (1) Important	Questionnaire, Interview
		Relative advantage	Perceived cost	Rogers, 1983	Ordinal	(1)Very expensive; (2)Expensive; (3) Neutral; (4)Cheap; (5) Very cheap	Questionnaire, Interview

CONCEPTS	VARIABLES	SUB-VARIABLES	INDICATORS	SOURCES	SCALE	VALUE	METHOD
ICT Digital technology with specific characteristics and properties that enables certain functionalities. (Thapa and Hatakka, 2017)	**Restricting and enabling factors** Key factors that constrain or enable individuals to use ICT, either because of infrastructure, education, affordability, or personal characteristics (Proenza, Jagun, et al., 2015, Chipidza and Leidner, 2019, Felton, 2015, Duncombe, 2006, Alam and Imran, 2015)	Infrastructure	Access to ICT infrastructure	Chipidza and Leidner, 2019	Nominal	Computer, mobile phone, smartphone, internet, electricity	Questionnaire, Interview
			Provision of public ICT Infrastructure	Proenza, Jagun, et.al.	Nominal	WiFi (Place of education, public spaces) Community internet access facility, Commercial internet access facility	Observation, Interview
		Affordability	Expenditure priority	Duncombe, 2006	Nominal	Housing; Food; Water; Communication; Transportation; Education; Health; Electricity; Repaying loans	Questionnaire, Interview
		Education	Literacy	Felton, 2015	Nominal	Yes/No	Questionnaire, Interview
			Language competency: English	Felton, 2015; Chipidza and Leidner, 2019	Nominal	Yes/No	Questionnaire, Interview
			Perceived ICT skills	Chipidza and Leidner, 2019	Nominal	No knowledge, Poor, Sufficient, Good, Excellent	Questionnaire, Interview
		Personal characteristics	Age	Alam and Imran, 2015; Francis, Ball, et al., 2019	Ratio		Questionnaire, Interview
			Gender issue	Alam and Imran, 2015			Questionnaire, Interview
			Education	Chipidza and Leidner, 2019	Ordinal	Primary; Secondary; Higher secondary; Undergraduate diploma; Undergraduate degree; Post-graduate; Vocational; None	Questionnaire, Interview
			Disability status	Dobransky and Hargittai, 2006	Nominal	None; Blindness/sight difficulty; Deafness/hearing difficulty; Limited walking ability; difficulty typing; difficulty leaving home; multiple disabilities	Questionnaire, Interview

CONCEPTS	VARIABLES	SUB-VARIABLES	INDICATORS	SOURCES	SCALE	VALUE	METHOD
LIVELIHOOD RESTORATION A process of restoring the abilities, capital, and activities as a means of living (DFID, 1999), after the deprivation caused by the impoverishment risks of resettlement (Cernea, 2000).	**Restoration of financial capital** The improvement of availability of cash or equivalent, and also income stability, and sufficiency through re-employment and income-based resettlement (Cernea, 2000, DFID, 1999, Boateng, 2013, Xiao, Liu, et al., 2018)	Re-employment	Better skills	Xiao, Liu, et.al., 2018	Ordinal	1-3	Questionnaire, Interview
			Better job	Fujikura and Nakayama, 2013; Randell, 2016; Xiao, Liu, et al., 2018	Ordinal	1-3	Questionnaire, Interview
		Income-based resettlement	Increased income	Souksavath and Nakayama, 2013; Perera, 2014; Ismail, Okazaki, et.al., 2017; Xiao, Liu, et.al., 2018	Ordinal	1-3	Questionnaire, Interview
			Increased savings	Xiao, Liu, et.al., 2018	Ordinal	1-3	Questionnaire, Interview
	Restoration of Social capital The improvement of networks, membership, and trust that enable collective action through social inclusion and community rebuilding (Cernea, 2000, DFID, 1999, DFID, 1999, Woolcock, 2001, Xiao, Liu, et al., 2018)	Social inclusion	Maintained relative contacts	Xiao, Liu et al., 2018	Ordinal	1-3	Questionnaire, Interview
			Expanding networks	Xiao, Liu et al., 2018	Ordinal	1-3	Questionnaire, Interview
		Community rebuilding	Increased membership and participation of community organization	Xiao, Liu et al., 2018	Ordinal	1-3	Questionnaire, Interview
			Increased support from neighbors and communities	Xiao, Liu et al., 2018	Ordinal	1-3	Questionnaire, Interview

3.5 Research Methodology

The research adopts a blend of quantitative and qualitative techniques to ensure credibility. The quantitative data provides a general understanding of all variables within the context. While the qualitative data will much more explain the causal relation of those variables. Other than the methods, the sources of information of this study vary to enrich the triangulation of data.

For the quantitative data, a survey was conducted through written questionnaires and some in-depth interviews. The respondents were the resettled women in Kannagi Nagar. Other than interviews with the resettled women, this research has some additional interviews with a community-based organization, non-governmental organization, and government officials. The interviews collected more qualitative data to enrich the narrative of the study.

3.6 Data collection methods

A close-ended questionnaire survey and in-depth semi-structured interviews are the data collection methods to the women in Kannagi Nagar. There are four main parts of the close-ended questionnaire, as seen in Annex 1. The first part comprised questions about demographic characteristics such as sex, age, education, occupation, marital status, and the number of family members. The second part covered the questions livelihood restoration of financial capital. The third part included questions related to ICT. The final section contains questions about social capital.

Semi-structured interviews among the women in Kannagi Nagar is a part of the data collection method to get additional insight into the relations between the quantitative datum.

Semi-structured interviews with some key informants were conducted to gain additional insights. The key informants include the Community-Based Organization (CBO), Non-Governmental Organization (NGO), government agencies related to ICT, and the resettlement site Kannagi Nagar. Observation will take place to evaluate the provision of ICT infrastructure in the area. The interviews with the stakeholders focused on the contribution of the stakeholders to eliminate the barriers of ICT use. The interview guides can be seen in Annex 3, while the observation guides can be seen in Annex 4.

3.7 Sample size and selection

Since including the whole population is quite impossible, a sample selection is necessary due to time constraint. Population in research is the group from which researchers derive their data. According to Van Thiel (2014), a sample is a selection from the total population (N) of possible units of study.

In the research, the challenge lies in the considerably large number of units of study, which is 15,656 tenements, with approximately 35% of women (HLRN, 2014), or 28,000 women in number. This study limits the population to more or less 500 women from around 250 households in the block of XII.FC in Kannagi Nagar, as seen in Figure 3 below. This block is the location of a school equipped with ICT and where NGO works with various activities. The researcher chooses simple random sampling since it enables to generalize findings to the whole population. As the minimum number for a sample is 20%, the absolute number of the samples are 100 respondents.

The interview used purposive sampling based on the result of the survey. There are 22 interviewees in total, which consists of 14 women in Kannagi Nagar and some key informants from community-based organization, non-governmental organization, government agencies, and key experts. List of the interviewees and key informants are available in Annex 2.

Figure 4. The selected area in Kannagi Nagar

Source: TNSCB, 2019. With some adjustment

3.8 Data analysis methods

The quantitative data from the questionnaire is intended to provide a basic understanding of the context. As the questions are closed-ended, all the responses were coded and further elaborated in descriptive analysis. Other than that, the data is analyzed by using the statistical tool. To examine the relationship between ICT use and perceived attributes of ICT, regression analysis is chosen since it might draw causal relationship between the independent and dependent variables. For the same reason, regression analysis is also used to analyze the relationship between ICT use and restricting or enabling factors. The impact of ICT use for livelihood restoration is explained through the use of t-Test to compare two groups: the one with ICT use for livelihood restoration and the one without it. The test gives the result of how the two differs.

The qualitative data from the interview was collected in text format and transcribed. The researcher will code every interview transcript according to the operationalization. The result will be analyzed so that the data answer the research questions.

3.9 Validity and reliability

This research pursues validity and reliability through triangulation by implementing mixed methods and sources are incorporated to increase the wealth of the study. As the data collections do not rely not only on the questionnaire but also interview, it tackles the issue of internal validity even though the number of units of study is small. Furthermore, as the sources of information include the resettled women, community-based organization, government agency, and a private company, the validity also increases.

This case study gathered abundant data in various forms; thus, keeping a database and logbook helped to increase the reliability. All interviews were recorded and immediately transcripted afterward.

Questionnaires also have some issue regarding validity and reliability. To overcome this, according to Van Thiel (2014), adequate operationalizations, decent questionnaire design, strategy for non-response should be addressed. In the operationalizations of the variables, the indicators are concrete enough to reduce the ambiguity that might occur in the questionnaires. Besides, a pilot survey was conducted to ensure all questions are clear, and the indicators are relevant in the local context. All respondents were encouraged to answer all questions within the questionnaires.

The interviews were conducted in a semi-structured manner to ensure a close relationship with the operationalization. Regarding the selection of respondents, they represent various backgrounds to contribute to triangulation.

Chapter 4: Research Findings

4.1 Introduction

This chapter presents the research findings. They come from the analysis of the data collected through the survey, interview, and observation. In the first place, this chapter explains the case study area and the context of resettlement of the case. The findings are supposed to answer the main research questions by answering the subsidiary research question. In the end, this chapter presents the analysis as a result of this research.

4.2 Description of the case

The study area of this research, 'Kannagi Nagar', is located on Old Mahabalipuram Road, in Okkiyum Thoraipakkam Town Panchayat, Kanchipuram District. The resettlers of this settlement came from various origins in a phased manner since 2000, when 3,000 tenements were relocated to this area. This resettlement site which is under the extended areas of the Corporation of Chennai, a part of Division 195 of Zone XV since 2011, has become one of the largest resettlement sites in India (HLRN, 2014). Currently Kannagi Nagar has grown from 3,000 houses in the area into 15,656 tenements, growing side by side with another resettlement site called Ezhil Nagar.

According to the report of Housing and Land Rights Network (2014), the process of resettlement in the case of Kannagi Nagar involved various human rights violation before, during, and after the relocation.

The size of the houses in Kannagi Nagar ranges from 195 square feet to 235 square feet for each family with just one room that is functioned as a multi-purpose hall. This size causes those who rely on home-based employment are unable to continue their previous work. The small flats in Kannagi Nagar do not provide any space to conduct such business. Moreover, this small-tenement-style does not allow any spillover of the core family; thus, the design also undermines the importance of support from the extended family.

Allotted a house from the government, each family must spend Rs 150 to Rs 250 to pay monthly installment for 20 years. Some family needs to spend more since they rent from a person who was allotted a house. In general, only 31% of the respondents mentioned that housing becomes one of the highest spendings of their monthly expenditure. However, this value of affordable housing rent needs to be exchanged with the locational aspect of the house. Even if they get lower housing cost compared to those who live in the city slums, with the fact that Kannagi Nagar is 15-25 km far from the city center, their livelihood is clearly disrupted.

According to the survey of Housing and Land Rights Network in 2014, 79.3% of the respondents lost their job immediately after the resettlement due to the issue of location since Kannagi Nagar is very far from their original place of habitation. The distance forced them to leave their job since they were unable to commute to the workplace.

Moreover, since women are concentrated in location-specific jobs like domestic workers, they are more vulnerable to this effect of relocation (Coelho, Venkat, et al., 2012). Previous research from Coelho, Venkat, et al., also revealed that even the area surrounding Kannagi Nagar had become "a buzzing site of economic activity", the people are trapped in the state of "working poverty" due to the characteristics of slum resettlement colony. Even if they get a company-based job, the job offers poor quality of working condition and low wage level. Especially for women, the unemployment rate is very high. Women kept asking about job opportunities, and the same question from them remained after 10 to 20 years since they were being resettled.

This challenge of livelihood pushed some families to move out of Kannagi Nagar. Some sold their house to a newcomer while some others let their house rented to a family. This development leads to a higher level of turnover within the people living in Kannagi Nagar. The frequent changes within the neighborhood cause a lower level of sense of community, threatening their social capital.

> *"In Kannagi (Nagar), the people that were resettled are not the same people who are staying here now, maybe only 20% are still around. This is* ***why there is no community aspect.****" (Vanessa Peter, 2019)*

4.3 General characteristics of the sample

This section describes the general characteristics of the respondents which are the women living in Kannagi Nagar, a resettlement site that has been developed since 19 years ago. The general characteristics described in this chapter include respondent age, employment, number of years living in Kannagi Nagar, personal and household monthly income, and household size.

The research finds out through the questionnaire survey that Kannagi Nagar as an "old" resettlement site has consolidated and grew to be a more settled neighborhood as families have developed their home here. As more and more people have been coming to the resettlement site, either through renting or illegally buying the allotted house, not all women in Kannagi Nagar experienced resettlement. Among all the respondents, only 62% were resettled before. The others have been coming to Kannagi Nagar for various reasons. This can be seen in Table 2 below.

Table 2. Reason for moving into Kannagi Nagar * Housing tenure crosstabulation

		Housing tenure			
		Rent	Buy	Allotted by the government	Total
Reason for moving in to Kannagi Nagar	Resettled	0	0	62	62
	Married	9	1	16	26
	Affordable housing	7	2	0	9
	Job purpose	2	1	0	3
Total		1	4	74	100

Most of the respondents came into Kannagi Nagar 16 – 20 years ago (51%) under a resettlement scheme. The second wave of resettlements happened during 11 – 15 years ago; that was when 26% of the respondents came to Kannagi Nagar. The rest came later within the latest 10 years. The data can be seen in Table 3 below.

Table 3. Number of years living in Kannagi Nagar

Serial	Number of years living in Kannagi Nagar	Frequency	Percentage
1	1 – 5 years	10	10 %
2	6 – 10 years	13	13 %
3	11 – 15 years	26	26 %
4	16 – 20 years	51	51 %
	Total	100	100 %

Most of the respondents are within the productive age, with the majority in the age of 20s and 30s, as seen in Table 4. In general, this research comprises all the age category within the community.

Table 4. Age of the respondents

Serial	Age	Frequency	Percentage
1	14 – 20 years old	9	9%
2	21 – 30 years old	32	32%
3	31 – 40 years old	32	32%
4	41 – 50 years old	16	16%
5	51 – 60 years old	8	8%
6	Above 60 years old	3	3%
	Total	100	100 %

As seen in Table 5 below, only 10% finished higher secondary school and continued to a higher degree, and 12% of respondents have not been enrolled in formal education. Most respondents only entered until secondary school.

Table 5. Education

Serial	Age	Frequency	Percentage
1	Primary	21	21%
2	Secondary	35	35%
3	Higher secondary	22	22%
4	Undergraduate diploma	1	1%
5	Undergraduate degree	7	7%
6	Post-graduate	2	2%
7	None	12	12%
	Total	100	100 %

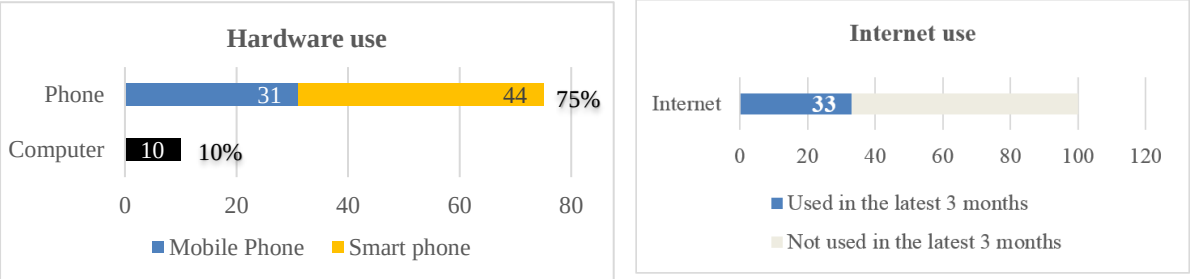
4.4 ICT use for women

This subchapter answers the first subsidiary research question, which was the current ICT use of women in Kannagi Nagar. The findings are from the field survey and interview about the hardware use, internet use, features and purposes in ICT use, and ICT expenditure.

4.4.1 Hardware and internet use

As seen in Graph 1 below (left), the use of ICT, especially a phone either it is a mobile phone or a smartphone, is prevalent in Kannagi Nagar. A number of 75 respondents used a phone in the latest three months for various purposes. Among the phone users, 31% of the respondents are using a mobile phone while 44% of the respondents are using a smartphone. However, the use of computer in Kannagi Nagar is still not common. Only 10% of the respondents used computer in the latest three months.

Graph 1. Hardware (left) and internet (right) use of women in Kannagi Nagar

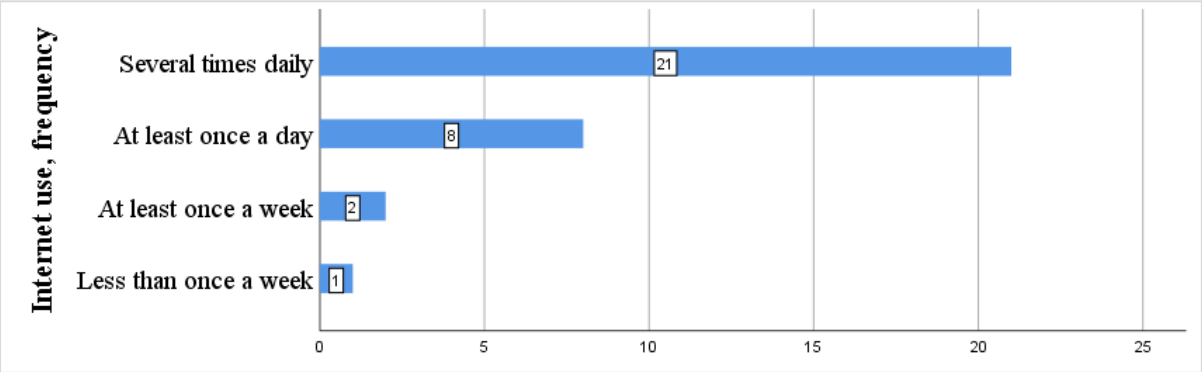


Different from the use of a phone in Kannagi Nagar, the use of the internet is not common yet in Kannagi Nagar. As seen in Graph 1 above (right), only 33 respondents accessed the internet in the latest three months, even though 44 respondents own a smartphone which is capable of getting connected to the internet. It means that not every smartphone owner has utilized the full potential of their phone. Thus, only 75% of smartphone owners get connected to the internet.

Even though the number of internet users is limited, most of those who access it do it frequently. There are 21 respondents (64% of internet users) who access the internet daily and

eight respondents (24% of internet users) who access it at least once a day. The frequency of internet use among internet users can be seen in Graph 2 below.

Graph 2. Frequency of internet use

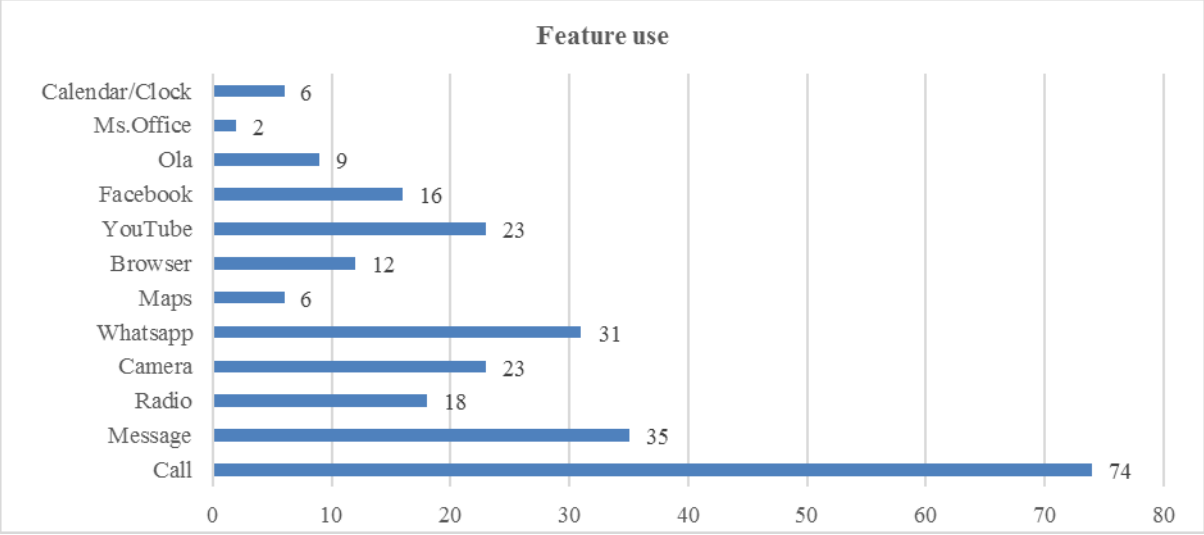


From the survey, it is found that most of the people access the internet either from home or anywhere through their mobile phone. There are 22 respondents (67% of the internet users) who access the internet through their mobile phone. The rest of them, 11 respondents (33% of the internet users) access internet from their home, through the phone of their family members. Accessing the internet in a public access venue is not very common to most of the women in Kannagi Nagar. This issue will further be elaborated in the subchapter 4.6.1 about infrastructure.

4.4.2 Features

According to the data of hardware use, there are many women (44% of the respondents) in Kannagi Nagar who use a smartphone, a device that is capable of doing various things through its application. However, as seen in Graph 3 below about the use of the features on the phone, most women only use their phone for calling while the use of other features is minimal. The limited use of the features is also related to the fact that internet users in Kannagi Nagar are only 75% of the smartphone users; which is 33% of the whole population.

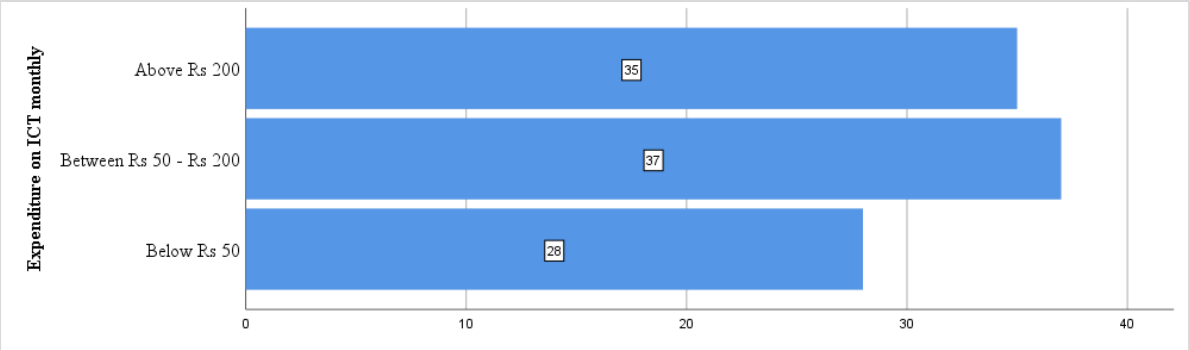
Graph 3. Feature use



4.4.3 ICT expenditure

For those who use ICT, the women in Kannagi Nagar have to spend some money from their monthly expenditure. As seen in Graph 4 below, most of them (37%) spend between Rs 50 and Rs 200, especially for those who are using the mobile phone.

Graph 4. ICT expenditure per month



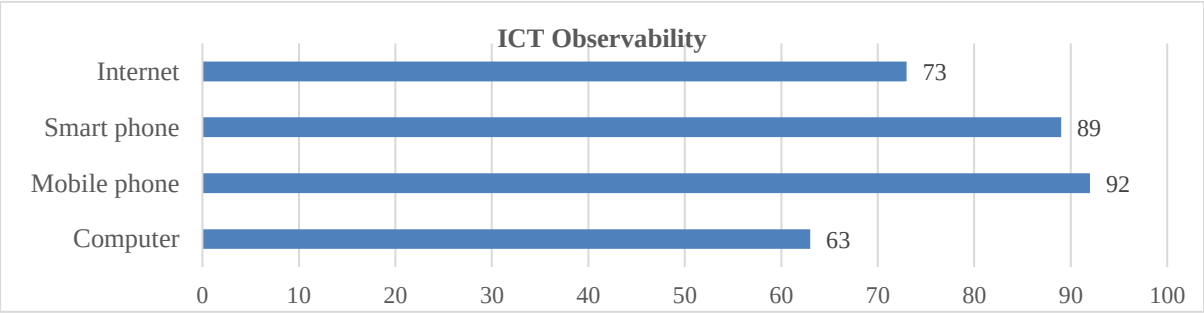
4.5 Perceived attributes of ICT use

Rogers (1995) argued that perceived attributes of innovation, which are the relative advantage compared to the existing technology, the compatibility to the users' necessity and context, the complexity of the technology, and the ease of triability and the observability; those aspects would influence the adoption of the innovation.

4.5.1 Observability

Among all the attributes, observability has a considerably higher value. As seen in Graph 5 below, 73% of the respondents have seen somebody else using the internet. Other than that, 89% of the respondents have seen a smartphone before, and 92% of the respondents have seen a mobile phone before. However, as a computer is considered expensive hardware so that only a limited number of households can afford it, the observability is quite low compared to the other hardware.

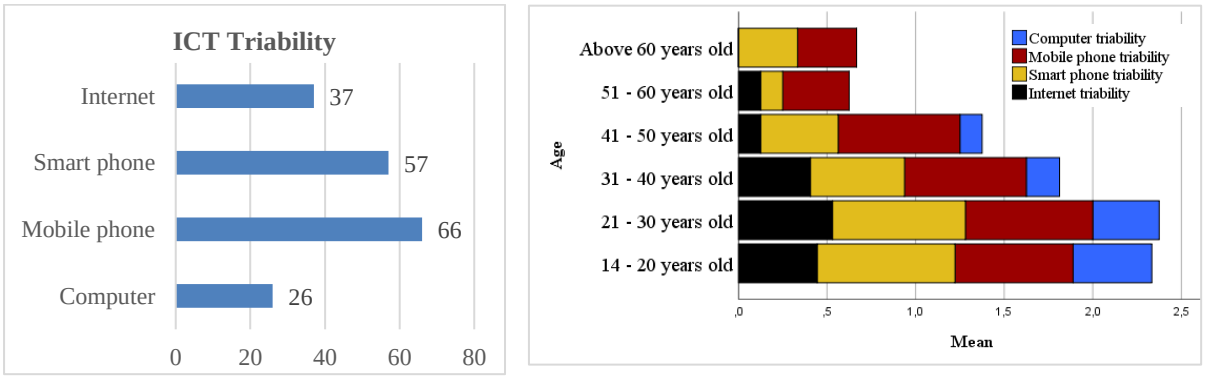
Graph 5. ICT observability for women in Kannagi Nagar



4.5.2 Triability

Although the observability of ICT is high for women in Kannagi Nagar, the triability is lower. As seen in Graph 6 below, only 37% of the respondents have tried using the internet. Among the respondents, 57% have tried using a smartphone and 66% have tried using a mobile phone. However, only 26% have tried using a computer before.

Graph 6. ICT triability for women in Kannagi Nagar (left), by age (right)



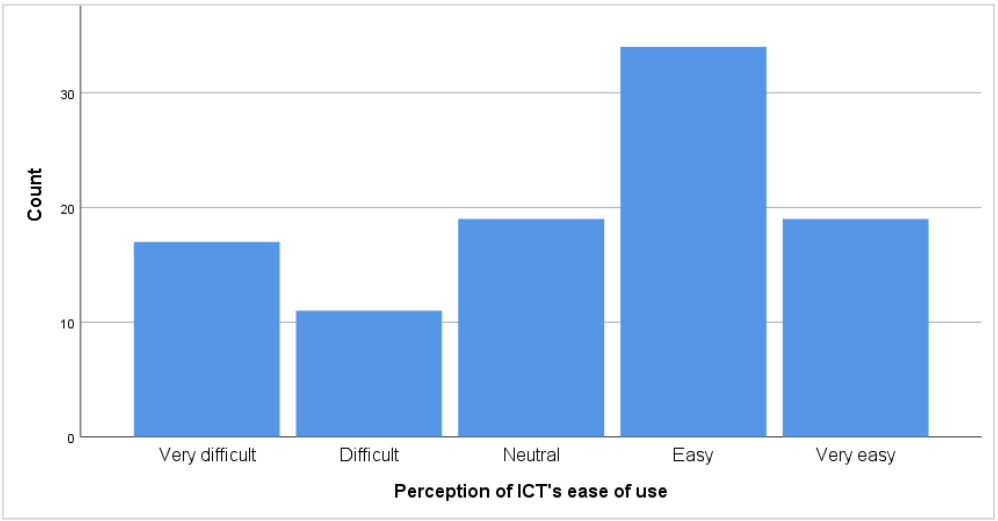
The triability is different when we look closely into the age groups. The younger generation tends to have higher triability compared to the older one. As seen in Graph 6 above (right), the women above 50 years old have not tried using a computer while it is more common for those under 50 years old. The internet triability is also higher among the women of a younger age.

4.5.3 Complexity

The complexity of using ICT, as perceived by women in Kannagi Nagar, as seen in Graph 7 below, is skewed to the right. It means that the use of ICT is considered pretty easy. If we look back into the triability and observability, these two attributes might also influence the perception of ICT use. Moreover, as technology is developed to be more user-friendly, it eases the process of ICT adoption in general. However, this result might be influenced by the fact that women in Kannagi Nagar only use limited features such as calls and messages which are not complex. Some interviewees mentioned the complexity of a phone,

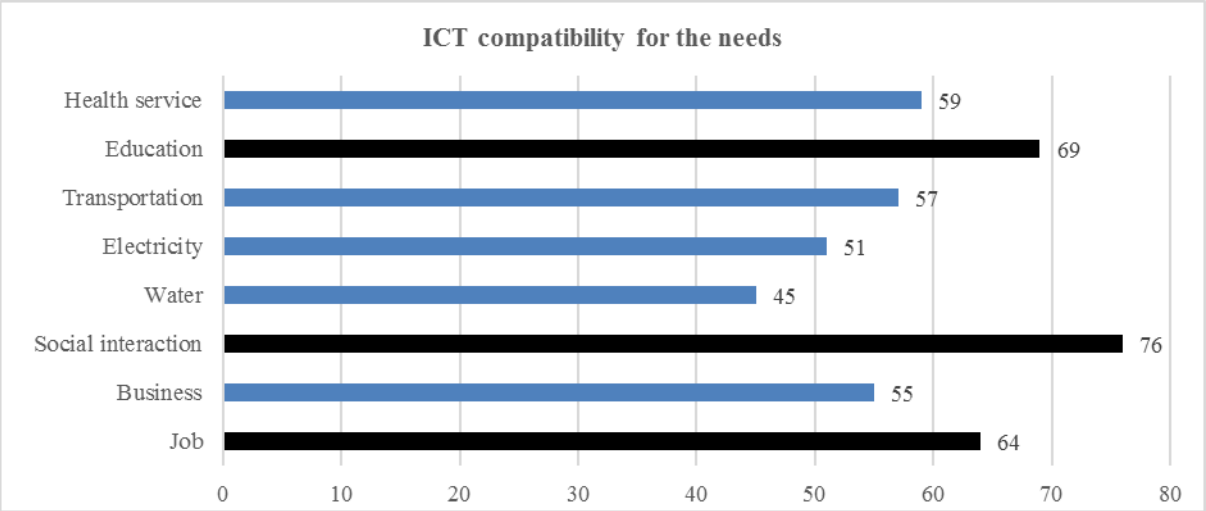
> ***"It is quite difficult for me to get used to it**. I never have any idea of using a phone before my daughter gave me one."*

Graph 7. The complexity of ICT use as perceived by the women



4.5.4 Compatibility

Graph 8. ICT compatibility for the needs of women in Kannagi Nagar

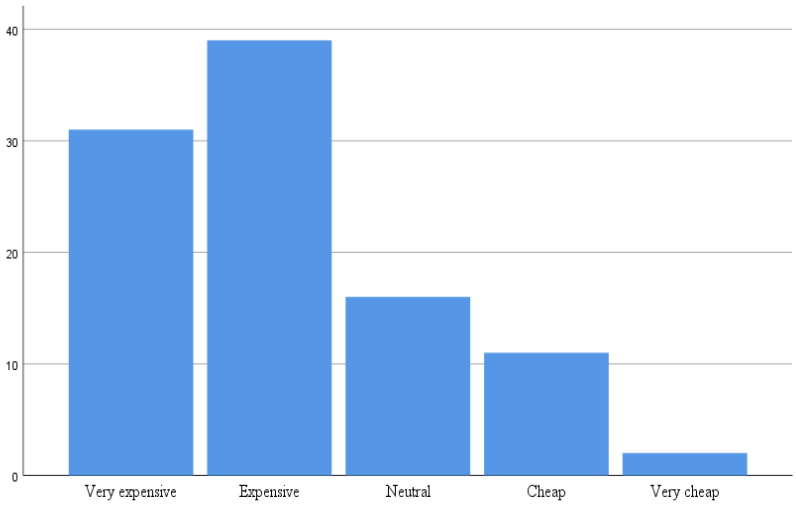


The use of ICT is considered compatible with the needs of the women in Kannagi Nagar. The fulfillment of needs might be in various forms, whether it is direct or indirect. Some respondents mentioned that they thought of using their phone to book an appointment with a doctor. In terms of transportation, they thought of using online application to book a vehicle or to check out the route. In terms of electricity, they will check the amount they have spent during the month. Among the needs above in Graph 8, ICT is acknowledged as very important as a channel of social interaction, either through calls, messages, or social media, as shown that 76% of the respondents answer this option. Most respondents said that they bought a phone to communicate with their family or relatives. Other than that, ICT is also considered important to get a job or sustain a job (64%). ICT is also considered important for education (69%), as they use it for communication with the teachers in school or help their children to access computer for school assignments.

4.5.5 Relative advantage

The perceived cost of ICT is rather skewed to the left, as seen in Graph 9 below, which means that the women in Kannagi Nagar considered ICT as an expensive tool.

Graph 9. The perceived cost of ICT



For some respondents, this is the reason why they do not own any ICT tool, as mentioned by this interviewee,

> *"I have not been working for 4 to 5 years. Thus, I do not have any income. I do not have a phone since I never asked my son to buy me one.* ***I think it is not affordable."***

4.5.6 The relation between the perceived attributes with ICT use

To analyze the relation of the perceived attributes of ICT (as independent variables) to the ICT use (as dependent variable), we need to combine the variables of computer use, phone use, and internet use as one variable of ICT use. Firstly, we need to make sure that those variables are reliable to be combined. The result of the reliability test is, as shown in Table 6 below. As the value of the Cronbach's Alpha is close to .6, it is considered reliable to combine those variables into one, as ICT use.

Table 6. Reliability test of ICT use variables: Computer use, Phone use, Internet use

Case Processing Summary

		N	%
Cases	Valid	100	100,0
	Excluded[a]	0	,0
	Total	100	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,596	3

The reliability test applies to the sub-variables in the observability, which are computer observability, mobile phone observability, smartphone observability, and internet observability. It also applies the sub-variables triability, which are computer triability, mobile phone triability, smartphone triability, and internet triability. Lastly, it applies to the variables of compatibility, which are compatibility for job purpose, business purpose, social interaction purpose, water purpose, electricity purpose, transportation purpose, education purpose, and health purpose. The result is as shown, respectively, in Table 7, Table 8, and Table 9.

Table 7. Reliability test of ICT observability

Case Processing Summary

		N	%
Cases	Valid	100	100,0
	Excluded[a]	0	,0
	Total	100	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,388	4

As seen in Table 7 above the value of the Cronbach's Alpha is close to .388, and it means that the reliability of these data is low to be combined. However, as it is an essential factor to be analyzed as one variable, the data is still computed altogether.

Table 8. Reliability test of ICT triability

Case Processing Summary

		N	%
Cases	Valid	100	100,0
	Excluded[a]	0	,0
	Total	100	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,659	4

As seen in Table 8 above, the value of the Cronbach's Alpha is .659; it is considered reliable to combine those variables (computer triability, mobile phone triability, smartphone triability, and internet triability) into one, as ICT triability.

Table 9. Reliability test of ICT compatibility for the fulfillment of needs

Case Processing Summary

		N	%
Cases	Valid	100	100,0
	Excluded[a]	0	,0
	Total	100	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,915	8

As seen in Table 9 above, the value of the Cronbach's Alpha is .915, it is considered reliable to combine those variables (job purpose, business purpose, social interaction purpose, water purpose, electricity purpose, transportation purpose, education purpose, and health purpose) into one, as ICT compatibility.

As all the important indicators have been aggregated, to analyze this study, the data has to be processed for normality and a Pearson Correlation test. A Normality test is applied to test normal distribution of the dependent variable; this is defined as the null hypothesis when the value $p>0.05$. In the opposite case, a normal distribution of data cannot be assumed as the $p<0.05$. The result of the normality test is as shown in Table 10 below. As seen in the table, the Shapiro-Wilk test presents p-value that is equal to 0. That result means the null hypothesis has to be accepted as $p<0.05$ and normality of the data cannot be assumed.

Table 10. Result of the normality test of ICT use

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ICT use in the latest three months	,238	100	,000	,866	100	,000

a. Lilliefors Significance Correction

A Pearson Correlation test is conducted to test whether the dependent and independent variables are related. If the value of the Pearson Correlation r is close to -1 or 1, there is a strong negative or positive relation. If the r-value is close to 0 there is a very weak relationship. The correlation is considered significant if the p-value is lower than 0.05 or 0.01. Table 11 shows that there is significant correlation between ICT triability and ICT complexity to the ICT use. A weaker correlation does exist in between ICT observability and ICT compatibility. However, the relative advantage of ICT shows insignificant correlation with ICT use.

Table 11. The result of Pearson Correlation test

		ICT use	ICT complexity	ICT observability	ICT triability	ICT compatibility	Relative advantage of ICT
ICT use	P.Correlation	1	,507**	,241*	,803**	,340**	,118
	Sig. (2-tailed)		,000	,016	,000	,001	,244
	N	100	100	100	100	100	100

Further analysis will include an inferential statistical analysis for testing the existence of a theoretically established relationship between two variables (Van Thiel, 2007). This analysis uses the regression analysis since it allows to compute a relation between two variables, the independent and dependent variables. In this case, the independent variables are the perceived attributes of ICT and the dependent variable is the ICT use. The regression analysis can produce

a line that describes the relationship between those two variables. The analysis produces this equation below:

$$y = c + x1*b1 + x2*b2 \text{ etc.}$$

In the function, c is constant when x = 0 and becomes the base score of all respondents, and b puts an effect of x on y.

The Regression Analysis (in Annex 6) only incorporates three independent variables which according to Pearson's correlation test shows a significant correlation with ICT use: ICT triability, ICT compatibility, and ICT complexity.

From the Regression Analysis, as seen in Annex 5, we got the conclusion that the value of R Squared is 0.680, which means that 68% of the variability of ICT use can be accounted for by a change in the ICT triability, ICT complexity, and ICT compatibility. Thus, the independent variables are considerably significant in influencing the dependent variable. This result is aligned with Pearson's correlation test.

Variable	N	R Squared	B	Constant	Coefficient Std. Error
ICT triability			0.684		0.064
ICT complexity	100	0.680	0.023	-0.012	0.016
ICT compatibility			0.025		0.051

The equation is:

ICT use = ICT_triability(0.684)+ICT_complexity*(0.023)+ICT_compatibility*(0.025)-0.012*

Variable	ICT observability	ICT triability	ICT compatibility	ICT complexity	Relative advantage of ICT
B		0.684	0.025	0.023	
Relation to ICT use	Not significant	Significant	Relatively significant	Relatively significant	Not signigicant

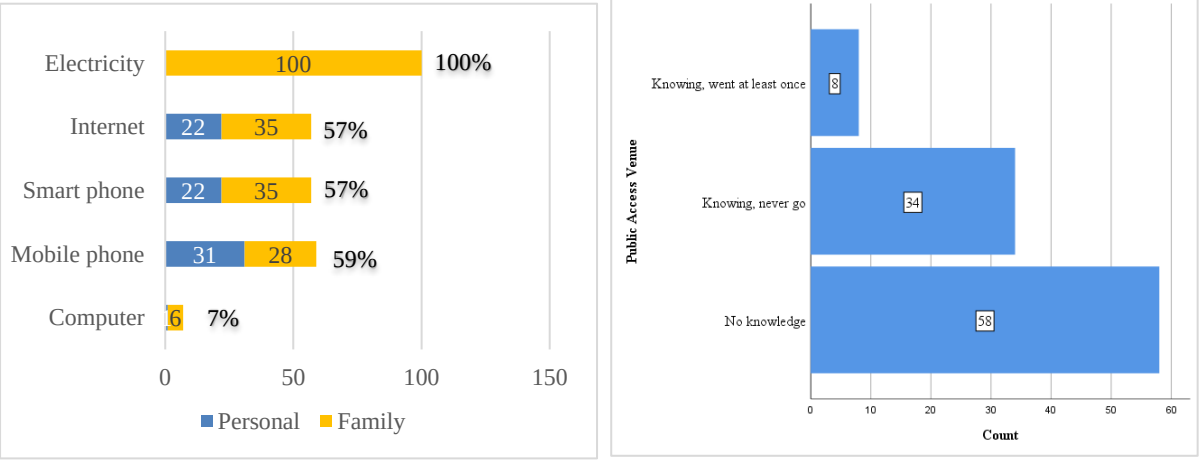
Based on the result of the regression analysis, it shows that ICT triability is the most significant variable in influencing the ICT use. The strong influence of triability explains why computer use in Kannagi Nagar is minimal. As the computer triability is low, the use is also lower compared to other tools. Thus, any penetration of ICT-based solution in the resettlement site should consider various ways to increase the triability. Other than that, compatibility and complexity also show significant impact on ICT use.

4.6 Restricting and enabling factors of ICT use

4.6.1 Infrastructure

One of the most important enabling factors of ICT use is infrastructure. Proenza, Jagun, et al. (2015) argued that a combination of privately owned hardware and public access ICT center would increase accessibility for people to use ICT. As seen in Graph 10 below, 100% of the respondent already has access to electricity even though that was not the case when the residents first came to Kannagi Nagar.

Graph 10. Access to ICT infrastructure in private (left) and public (right)



57% of the households own internet access and a smartphone, while 59% of the households own at least one mobile phone. Even if the rate of personal access/ownership of ICT is low, they can still access it using the hardware of the other family members. On the other hand, the rate of ownership of computer in Kannagi Nagar is very low; only 7% of the households own a computer.

ICT tool needs the support of a good network. In general, the network is good enough in Kannagi Nagar, either for calls, messages, and accessing the internet. However, there is some particular area where the mobile network is weaker inside the house, especially for the 2-story houses. As said by one of the interviewees living in the 2-story building about the network,

> *"**We have a network problem**. Sometimes we need to go outside to make it work"*

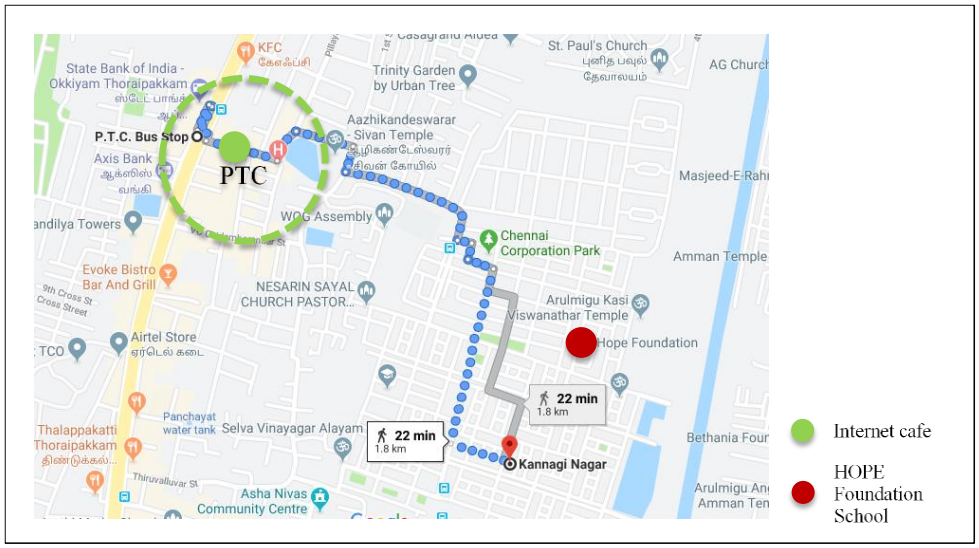
Those who live in the 3-story building do not have any complaint about the network as it is working very well.

> *"There is no problem with the phone. It is affordable, only Rs 1,500.* ***The network is also okay."***

The knowledge about the existence of public access venue for ICT is also limited among the women in Kannagi Nagar as seen in Graph 10 above. Only 8% of the respondents have gone to a public access venue to access ICT, such as the HOPE Foundation School or the internet cafe. There are 34% of the respondents who know the place but never went there even once. The rest of them (58%) do not know any public access venue for ICT.

In Kannagi Nagar, there is a limited space for women to access ICT publicly. According to our observation, Wi-Fi access does not exist in the area. Besides, commercial public access venues are only available in the PTC, an area where lots of shops are agglomerating. The distance from Kannagi Nagar to PTC is 1.8 km with 22 minutes walking time and around 10 minutes with a shared auto for Rs 20. There are five internet cafes there with limited number of computers. According to the owner, the internet cafe is commonly used for job and education purpose as entertainment is not allowed there.

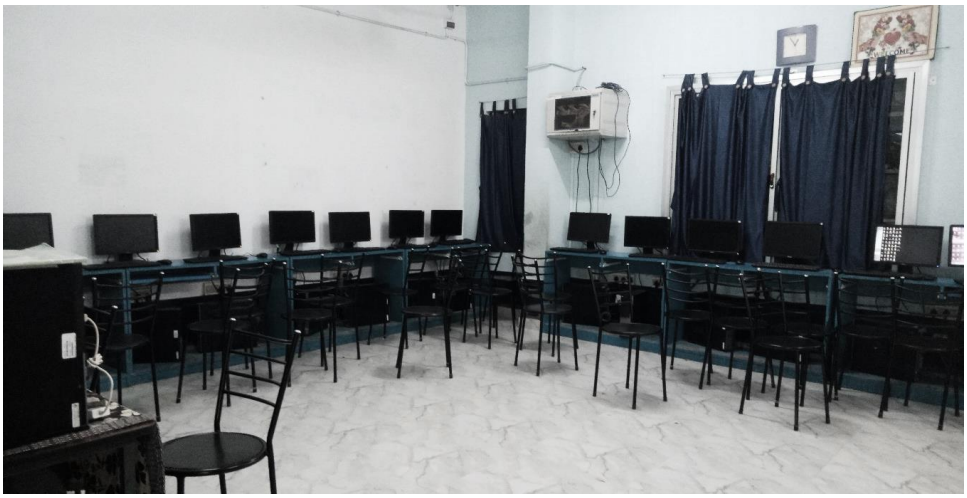
Figure 5. The map of public access venue for ICT



Source: Google Maps, 2019, with some adjustments

Figure 6. Public access venues for ICT inside or near Kannagi Nagar.

Internet cafe at PTC



Computer class in HOPE Foundation School

Source: Author, 2019

The other public access venue for ICT is the computer class of HOPE Foundation School. DELL, a tech company, funded the place as the company wanted to reach the children in the urban slums. The computer center in HOPE Foundation is also used as a part of the school curriculum. Other than for the computer class for HOPE foundation School's students, the class is also used for a community purpose after working hour, as explained by the school principal.

"In the morning, our computer lab, we utilize it for the school, from classes 1 to 10. And in the evening, after 3.30pm, we open it up till 7.00pm for the community."

They hold computer training for the women in Kannagi Nagar. However, the use is limited to the training only. Women cannot go there for simply browsing or learn something independently.

Kannagi Nagar has a minimal number of public access venue of ICT. With that being said, the government has no plan of developing this kind of venue nor developing any ICT-aided program. As told by the Chief Community Development of Tamil Nadu Slum Clearance Board,

"No, we don't have that kind of people because our people are not technologically very sound. We use it, but technological empowerment, we don't do it. We are not very rich to provide either. (In terms of) technological development, we see that people somehow get it, but for their daily living."

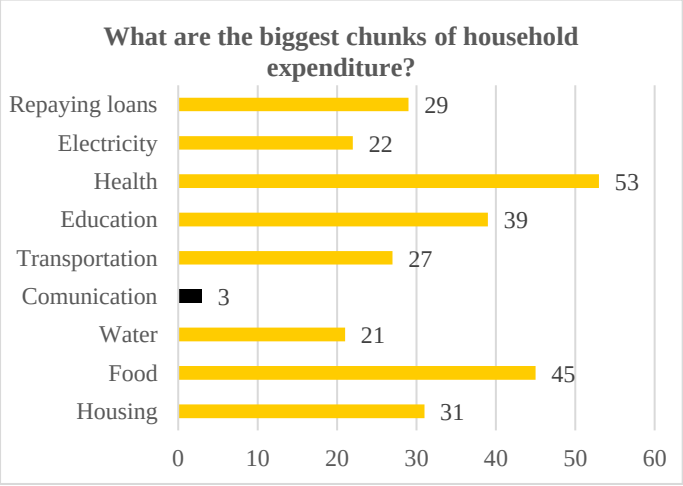
Moreover, NGO like HOPE Foundation has a limited fund to develop more ICT centers like what they already have.

"The demand is so huge. What we have here is only one drop in the ocean. We have 25,000 families, much more than that. We only have one computer center here. In the future, we might work with more partners for this."

4.6.2 Affordability

In general, ICT expenditure of the household in Kannagi Nagar only takes a small proportion of the monthly spending, which is only 1.37% of the monthly expenditure. However, it is not because the price of mobile recharge is high. India has the lowest price for mobile data in the world; 1GB costs just USD 0.26 in comparison to global average of about USD 8.43 (Roy, 2019).

Graph 11. Priority in household expenditure

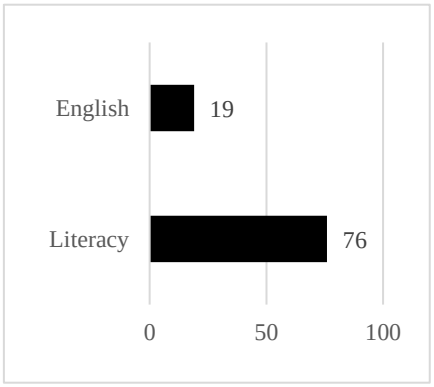


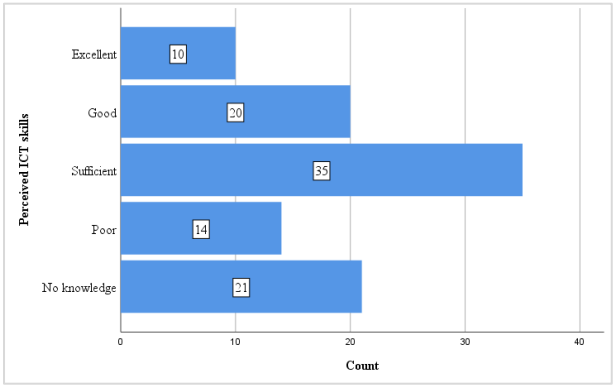
However, the reason lies more on the priority of household expenditure. Compared to other types of expenditure, communication/ICT expenditure is considerably the lowest among others, as seen in Graph 11. Health is the most frequently mentioned expenditure by the respondents (53%) as one of the biggest chunks in their household expenditure. The second and third most commonly mentioned is food (45%) and education (39%).

4.6.3 ICT Education

Literacy competency and English competency are two factors that might support ICT education. As the use of ICT will be limited if someone cannot read. Other than that, since lots of contents are available in English, the ability to understand English might also affect ICT use. According to the survey, as seen in Graph 12 below, 76% of the respondents can read in Tamil, the native language in Tamil Nadu. While 19% of the respondents can understand English.

Graph 12. Language competency to support ICT skills (left) and Perceived ICT skills (right)





In general, the women perceived themselves as having sufficient ICT skills (35%). Only 10% of the respondents are confident of having excellent ICT skills. There are 20% of the respondents who perceived themselves as having good ICT skills. The rest think of themselves as having poor ICT skills (14%) or even no knowledge of ICT (21%).

In general, ICT education is scarce for women in Kannagi Nagar. According to the community leader,

> *"They (re: the people in Kannagi Nagar) have just been given training that is related to non-ICT, beautician, driving, etc. ... Other than that, there is no ICT-specific kind of training. There is also organization called HOPE Foundation, they have given many computer training for this community."*

Among the respondents, only 8% has enrolled in ICT training, mostly from HOPE Foundation. HOPE Foundation School is the only institution that focused on improving the capability of the people in ICT use. Other than incorporating ICT-based learning in the class, they also run a short course for women and children as explained by the school principal.

> *"We run short courses for women and children in the summer holiday, in the 2 or 3 months holiday. Within that short period, they are taught (about) 2 or 3 aspects, and they will be given the certificate immediately.*

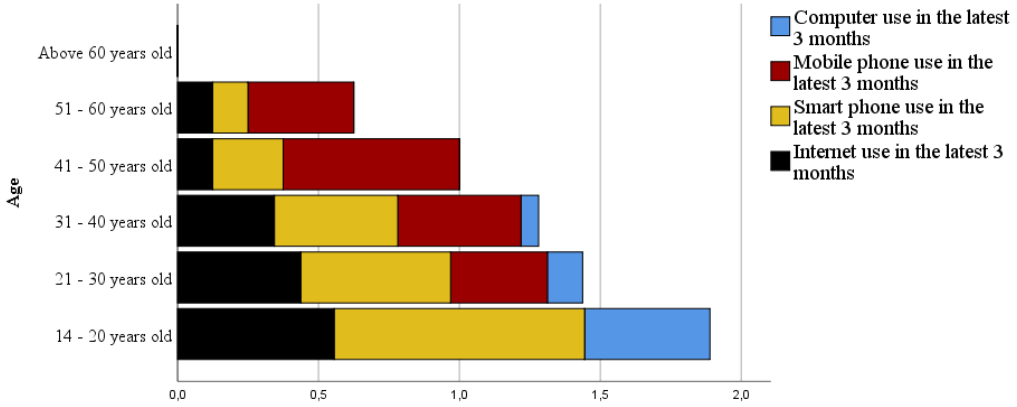
The basics that are taught include Ms. Office, and how to use the internet, including Google Drive, browsing through Google, and how to operate an e-mail. If the women are interested, they might take an additional course, such as Tally, to learn accounting. With what they got through the course, women might apply for job such as in supermarket for billing and data entry. However, no ICT-based entrepreneurship-related course is delivered through the training.

4.6.4 Personal characteristics

4.6.4.1 Age

Some personal characteristics might influence the use of ICT. Age is considerably one of them since as seen in Graph 13 below, the younger generation is more tech-savvy, mastering and using the smartphone and computer. Meanwhile, the older generation tends to use only mobile phone.

Graph 13. ICT use by age

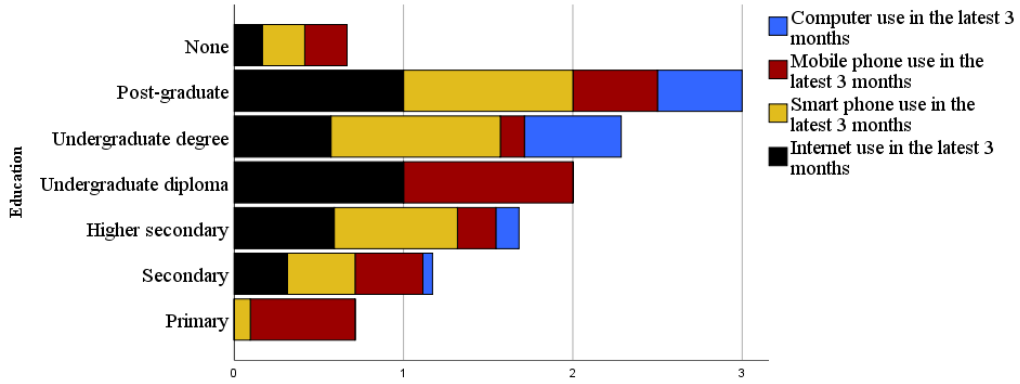


This data is also supported by the statement from the school principal of HOPE Foundation,

> *"I have seen that younger women are more inclined towards technology, and there is also eagerness to learn. For example in my generation, many people are like "I don't know this technology." But now the younger generation, there is definitely a rise in eagerness to learn to use a computer, to use different technology."*

4.6.4.2 Formal education level

Graph 14. ICT use by formal education level



Another factor that is considered important is formal education level. As seen in Graph 14 above, the higher the level is, the higher the use of ICT is. The one who obtained postgraduate and undergraduate degree tend to have more interaction with computer, smartphone, and the internet compared to those who obtained the lower level. Those who quit education at the primary level tend to have no interaction with the internet.

4.6.4.3 Disability status

According to the survey, there are 14% of the respondents who have disability issue or illness. The data can be seen in Table 12 below. However, in general these issues do not become an obstacle in using ICT. The sight difficulty is mostly related to the weak far sight; thus, the respondents can still see any near objects. The effect is more significant on their livelihoods instead.

Table 12. Disability issue/Health issue

Serial	Disability/Health issue	Frequency	Percentage
1	Blind/sight difficulty	6	42.9%
2	Limited walking ability	3	21.4%
3	Illness	5	35.7%
	Total	14	100 %

4.6.4.4 Gender issue

In terms of using ICT, gendered problems do not occur. Even though women in Kannagi Nagar usually have the responsibility of doing the house chores, as mentioned by 74% of the respondents, 94% of those explain that they still have free time. Even 53% of the respondents got help from the men in the house to do the house chores.

As shown in the ownership of phone in sub-chapter 4.6.1 about infrastructure, not every woman in Kannagi Nagar conquer the personal ownership of it. However, they can still access the phone through their husband's gadget, as said by one of the respondents:

> *"My husband let me use his phone to show our child videos from YouTube and to contact my parents."*

The problem related to gender occurs in ICT education, as told by the school principal of HOPE Foundation,

> *"So with the women, (the ICT short course) initially it was not very successful because they are more into **housework** or they **have small children,** or sometimes **they do not come regularly**. These are the challenges we face. But once we have this one group of successful women.*
>
> *One of the women, the **husband, did not want her to enter a computer class**. So he (the teacher from HOPE Foundation) talked to them, saying that how it would help her if she learned computer and after a repeated number of sessions, the husband started sending her. She completed the course, and now she's working in the bookstore."*

The problems related to gender occur more in the livelihood issue as women rarely get permission from their husbands either to go to work or to have additional income.

> *"**Husbands feel insecure** if the women learn, they will become empowered, and they will become very confident; and probably they have an insecurity that she will leave him." (Nalini Kagoo, School Principal of HOPE Foundation, Kannagi Nagar, 2019)*

4.6.5 The relation between the factors with ICT use

Several factors are considered significant to influence ICT use. Those factors are the independent variables in this analysis, while ICT use is the dependent variable. The independent variables are ICT infrastructure, ICT expenditure, ICT education (literacy competency, English competency, and perceived ICT skills), and personal characteristics (age, formal education level, and disability status)

Among the independent variables, some sub-variables need to be combined before being analyzed further, which is ICT infrastructure: computer ownership, phone ownership, internet access, and the knowledge of public access venues for ICT. First of all, we need to make sure that those variables are reliable to be combined. The result of the reliability test is as shown in Table 13 below. As the value of the Cronbach's Alpha is close to .6, it is considered reliable to combine those variables into one, as ICT infrastructure.

Table 13. Reliability test of ICT Infrastructure

Case Processing Summary

		N	%
Cases	Valid	100	100,0
	Excluded[a]	0	,0
	Total	100	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,500	4

Other than ICT infrastructure, we have some other independent that needs to be tested in terms of the correlation with ICT use. A Pearson Correlation test is conducted to check whether the

dependent and independent variables are related. If the value of the Pearson Correlation r is close to -1 or 1, there is a strong negative or positive relationships. If the r-value is close to 0 there is a very weak relationship. The correlation is considered significant if the p-value is lower than 0.05 or 0.01. Table 14 shows that there is significant positive correlation between ICT infrastructure and the ICT use. A weaker positive correlation does exist between literacy competency, English competency, Perceived ICT skills, and ICT use. The age of the users have negative correlation with the ICT use; it means that the younger the age is, the higher probability of the woman to use ICT as explain in the descriptive analysis. However, some factors have no significant correlation with ICT use, which are ICT expenditure, formal education level, and disability status.

Table 14. The result of Pearson's Correlation test

		ICT infra-structure	% ICT expenditure monthly	Age	Literacy competency	English competency	Perceived ICT skills	Formal education level	Disability status
ICT use	Pearson Correlation	,762**	,032	-,405**	,420**	,324**	,484**	,068	,175
	Sig. (2-tailed)	,000	,750	,000	,000	,001	,000	,504	,082
	N	100	100	100	100	100	100	100	100

The Regression Analysis (in Annex 6) conducts a model, where the ICT use is influenced by ICT infrastructure, Age, Literacy competency, English competency, and Perceived ICT skills.

The Regression Analysis results in the value of R Squared of 0.659, which means that 65.9% of the variability of ICT use can be accounted for by a change in those factors. Thus, this independent considerably significant in impacting on the dependent one. However, as the value of B is negative, the correlation between the two variables is negative too. It means the younger will tend to have higher level of ICT use. This result is aligned with Pearson's correlation test.

Variable	N	R Squared	B	Constant	Coefficient Std. Error
Perceived ICT skills	100	0.659	0.033	-0.005	0.017
Age			-0.003		0.002
ICT infrastructure			0.457		0.052
Literacy competency			0.081		0.047
English competency			0.095		0.050

The equation is:

ICT use = Perceived_ICT_skills(0.033)+Age*(-0.003) +ICT_infrastructure*(0.457)*

+Literacy_competency(0.081)+English_competency*(0.095)-0.005*

Variable	ICT infra-structure	% ICT expenditure monthly	Age	Literacy competency	English competency	Perceived ICT skills	Formal education level	Disabilit status
B	0.457		-0.003	0.081	0.095	0.033		
Relation to ICT use	Significant	Not signigicant	Relatively significant (Negative)	Relatively significant	Relatively significant	Relatively significant	Not signigicant	Not signigic

Based on the result of the regression analysis, it shows that ICT infrastructure is the most significant variable in influencing the ICT use. Thus, any penetration of ICT-based solution in the resettlement site should consider the provision of ICT infrastructure, both supporting the private and public infrastructure. Other means should be pursued like developing ICT skills which are supported by literacy and English competency. Penetration to the younger generation might be beneficial to as the younger generation tends to have higher ICT use according to analysis above.

4.7 The impact of ICT use on livelihood restoration and enhancement

This part of analysis will firstly elaborate on the vulnerability context of the livelihood restoration of women in Kannagi Nagar. It will describe the shocks that they faced after resettlement and the challenges they have to bear in the process of enhancing their livelihood afterward. The second part will further elaborate the application of ICT as livelihood strategies in the livelihood restoration for social and financial capital. The third part will explain the relationship between ICT use and livelihood restoration.

4.7.1 Assessing the vulnerability context in the livelihood of women

Livelihoods are the most prominent issue which is complained by almost all the respondents. This issue is also acknowledged by the community leader in Kannagi Nagar,

> ***The (biggest) problem here is about unemployment****, and the unemployment arises because of the area. When you say Kannagi Nagar, you weren't offered any job."*

Due to the locational aspect and the ghettoization, as mentioned above, the rate of unemployment is still tremendous, especially among women, which also experienced gender-related problems. As seen in Table 15, 51% of the respondents are unemployed. Among the women who are working, domestic servant (17%) is a major job, followed by those who are employed by a company for housekeeping job or cleaner/helper (12%), and the self-employed (11%) women who are tailoring or selling foods.

Table 15. Employment of women in Kannagi Nagar

Serial	Current employment	Frequency	Percentage
1	Public servant	2	2%
2	Self-employed	11	11%
3	Domestic servant	17	17%
4	Employed in contract based	3	3%
5	Employed by a company	12	12%
6	Unemployed	51	51%
7	Retired	1	1%
8	Student	3	3%
	Total	100	100 %

With insignificant development in their employment, the income of the family remains low. In 2014, according to the research of HLRN, the family income of 62% of the respondents is less than Rs 5,000 per month. This situation has been quite improving, as only 9% of the respondents got the family income below Rs 5,000 per month, as seen in Table 16 below. They predominantly (46%) get in between Rs 5,001 and Rs 10,000 as their family monthly income. However, if we look closely to the income of the women, 71% of the respondents get below Rs 5,001 as their personal monthly income.

Table 16. Monthly income (family and personal) of women in Kannagi Nagar

Serial	Monthly income	Family Income		Own income (women)	
		Frequency	Percentage	Frequency	Percentage
1	Below Rs. 5,001	9	9%	71	71%
2	Rs. 5,001 – Rs. 10,000	46	46%	22	22%
3	Rs. 10,001 – Rs. 15,000	27	27%	5	5%
4	Rs. 15,001 – Rs. 20,000	13	13%	1	1%
5	Above Rs. 20,000	5	5%	1	1%
	Total	100	100 %	100	100 %

In general, there are several major obstacles for women in their livelihoods: the gendered role they have to bear, conflicting with the permission from their husband and the responsibility to take care of their children; age limit, and health problems. As the jobs offered to them are mostly limited to the low-skilled job, they are trapped in the working poverty with low wage level and not a good working condition to suit their needs. Moreover, these obstacles are predominantly influenced by locational issues due to resettlement. The barriers faced by the women in Kannagi Nagar in their livelihoods can be seen in Annex 7 based on the interview result.

Other than the issues about, entrepreneurship activities are still limited in Kannagi Nagar. As seen in Table 17 below, among the respondents, only 26% have family business. The rate among the respondents (women) is even less, only 9%. In general, women prefer wage work rather than entrepreneurial activities (Coelho, Venkat, et al., 2012).

Table 17. The primary source of income for women and the household in Kannagi Nagar

	Business	Employment	Remittance	Pension	Rent	Transfer from the government
Family	21	77	0	0	0	2
Personal (respondent)	9	34	0	1	0	1

Entrepreneurial activities indeed need more effort in the initial stage. Most of the interviewees have thought about starting a business. However, there are lots of challenges that women in Kannagi Nagar need to face to start a business. The challenges include the initial capital (including for renting a space considering the house provided for them is too small to become a business space), the working partner, and also health issue (see Annex 7).

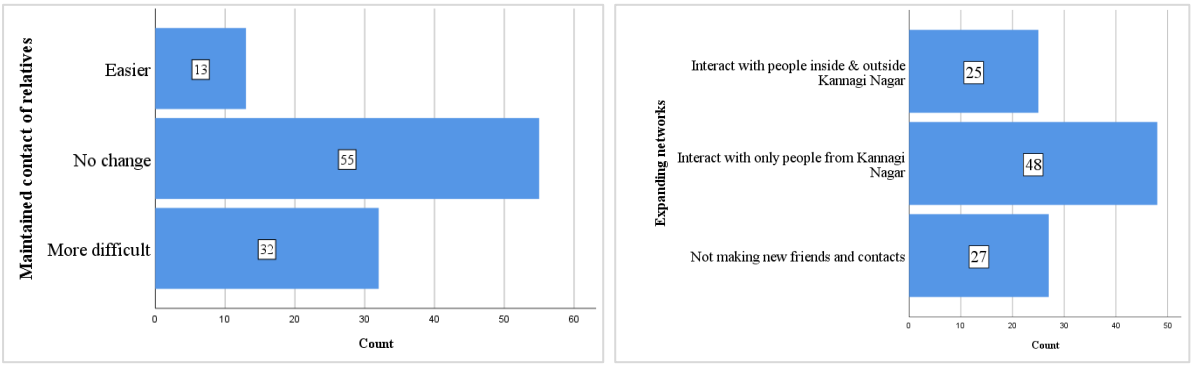
The government has tried to develop such self-employed activities by facilitating some training about tailoring, beautician, and bag-making. However, these activities are not very promising as there are limited women who finally succeed to make money out of it. Even the government are not very passionate in developing further agenda as said by the officials from the Corporation of Chennai,

> *"We are training the women by giving them materials like making these type of bags and educating them to stitch the clothes to be self-employed. We also fund the self-help group for women. We are also providing free tailor machines for them. These women are not approaching the programs we provide for them. Even before making any program, we always conduct an awareness camp. How can we have future plan for their livelihoods if the people do not support our program?"*

4.7.1.1 Livelihood restoration of social capital

There are four indicators of the livelihood restoration of social capital, which are maintained contact of relatives, expanding networks, participation in an organization, and increased support from the neighbors and community. This sub-chapter will elaborate the result of the survey regarding this topic.

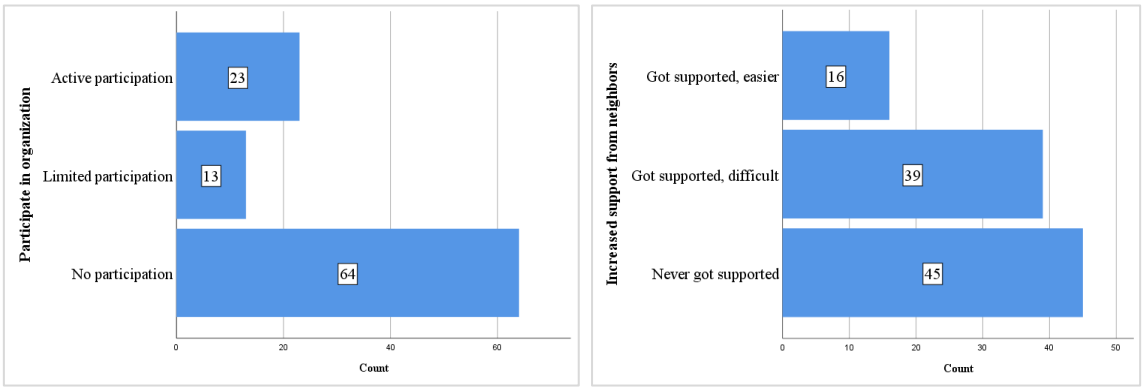
Graph 15. Maintained contact of relatives (left) and expanding networks (right)



Women in Kannagi Nagar tend to feel that it is more challenging to contact their relatives as seen in Graph 15 that the chart is slightly skewed to the bottom. As 56% of the respondents were not resettled or coming to Kannagi Nagar with their relatives, it is logical that they might not be able to communicate with them as easy as before.

From Graph 15, we can also conclude that most women in Kannagi Nagar have minimal network. As they only interact with people within Kannagi Nagar. With the fact that most women are unemployed and busy with the housework and childcare, they do not own the capacity to broaden the relations. Among the respondents, only 27% interact with people inside and outside Kannagi Nagar. Even 25% of them are not making any new contact since moving into the resettlement site.

Graph 16. Participation in an organization (left) and increased support from neighbors and community (right)



As seen in Graph 16 above, most women in Kannagi Nagar do not participate in the organization. Among the respondents, only 23% participate actively in any organization in Kannagi Nagar. The other 13% join the organization with limited participation. Women's group is the most popular organization for them, as 22 of the respondents are participating in it, in which they cooperate in savings and loans, or starting some small businesses.

The graph also explains that the women get decreasing support from the neighbors and community compared to before they moved into Kannagi Nagar. Among the respondents, 45% claimed that they never got relief from their neighbors. As most people living in Kannagi Nagar

have low wage, they do not feel like their neighbors can help them, as explained by the respondents,

> *"Our earning is not enough for the expenditure. However, we'd rather not borrow anything from anyone. Everyone is like us (having financial problems). How can we expect that they can help us."*

Even if they got supported, mostly the women said that it is more challenging to get support from others in Kannagi Nagar. The type of support that they usually need is financial support (47%) and childcare (20%).

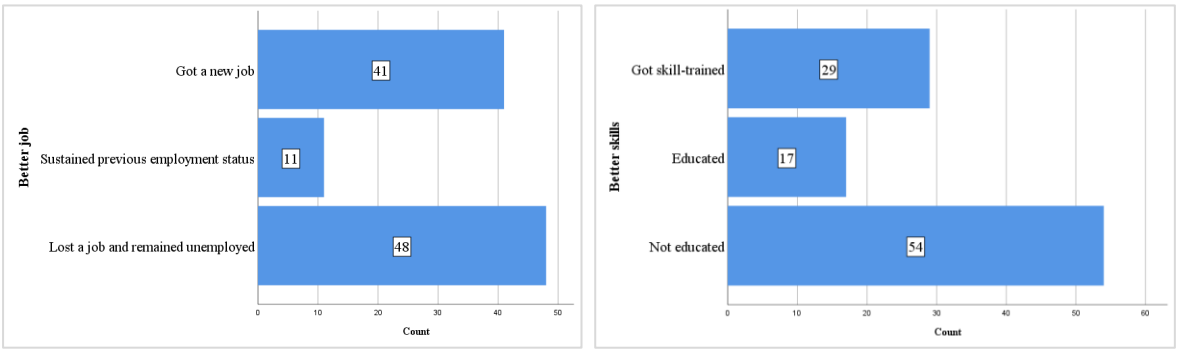
4.7.1.2 Livelihood restoration of financial capital

There are four indicators of the livelihood restoration of financial capital, which are a better job, better skills, increased savings, and increased income. This sub-chapter will elaborate the result of the survey regarding this topic. Graph 17 below will firstly show the result of the first two indicators.

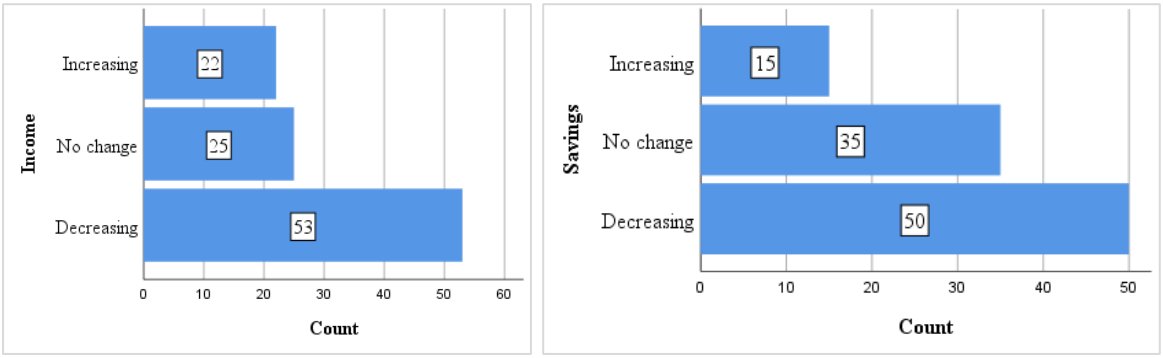
Regarding their job, 48% of the respondents claimed that they lost their job and remained unemployed. There are only 11% of them who successfully sustained their previous employment. Since they were coming to Kannagi Nagar, 41% got a new job. However, they are considerably trapped in the circumstances of "working poverty" with low wage level and heavy working condition.

From the graph, we can also conclude that the number of women who have joined skill training, from any organization is still minimal. Only 29% of the respondents have join skill training either before or after the resettlement. The data shows that the program from the government has not reached most of the women in Kannagi Nagar.

Graph 17. Better job (left) and better skills (right)



Graph 18. Increased income (left) and increased savings (right)



Most of the women got decreasing income and savings since they moved to Kannagi Nagar. As seen in Graph 18 above, 53% of the respondent obtained a decreasing income, and 50% got decreasing savings. Financially, they failed to rebuild their livelihoods as it is difficult to

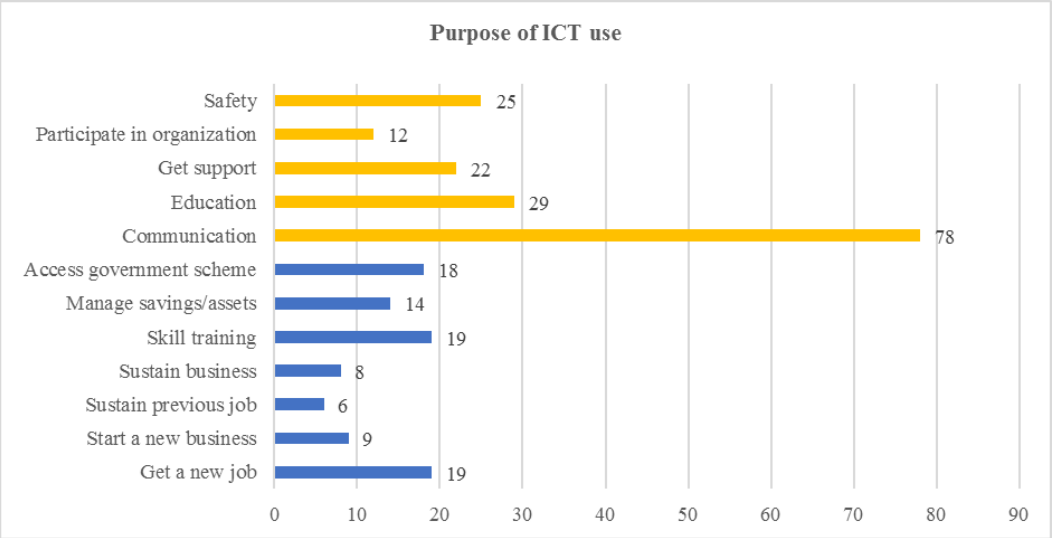
sustain their previous job and it is more difficult to find a job that suits women's condition. As women need to take care of the household, the husbands do not allow them to work anymore in Kannagi Nagar. The situation of low income also leads to a decrease of their savings, as they spend all the money on the monthly expenditure. Among the small number of those who own savings, jewelry and bank savings are the most common form of it.

4.7.2 Application of ICT in the livelihood restoration and enhancement

As explained in the previous part, 75 respondents used a phone in the latest three months for various purposes. The data shows the prevalence of ICT in Kannagi Nagar. However, concerning the livelihoods restoration and enhancement, the use of ICT is still limited. As said by the community leader,

> *"Currently per house estimatedly has smartphones, but the problem* ***is they haven't used the full potentials of the phones."***

Graph 19. The use of ICT in relation to livelihood restoration of social and financial capital



Graph 19 above might explain the purpose of ICT use for women in Kannagi Nagar in association with the livelihood restoration. In general, the use of ICT for social purposes are more popular. Most of the respondents (78) have used it for communication, either with friends, neighbors, or family. They also use it for education (29), such as calling the teachers in school or for their children's assignment. Besides, they also use ICT to deal with safety issue. Women in Kannagi Nagar might call their family whenever they feel unsafe.

Some of the respondents also use their ICT tool to communicate when they need some support (22), in emergency cases; and also to support their participation in organizations (12).

However, the use of ICT for financial capital is considerably limited. Only 19 respondents use their phone to get a job. Usually this happens when they ask for help to their contacts and tell them to inform any job vacancy through the phone. As explained by one of the interviewees,

> *"There are security guards in the flats. They will inform if there is a job vacancy.* ***The guards will call me*** *and then we will meet. It took 1-2 months until I got the job after asking for any job vacancy."*

Nineteen respondents use ICT for skill training, mostly through watching videos for learning about tailoring and beautician, as explained by one of the interviewees who work as a tailor,

> *"I do not have any smartphone. I only have a mobile phone. But in case I need to* ***learn a new style****, I will borrow my friend's phone and watch a video to* ***improve my skill****."*

Eighteen respondents use ICT to access government scheme. They said that they get the information from neighbors and relatives through the phone if there is any information about the ration shop. Other than that, none uses ICT. Even if the government has made a website about rations, there is a rare chance that the women look it up.

Other than that, 14 respondents answered that they use ICT to manage their savings/assets. Most of them have bank account and get some information through their phone.

> *"I also got the **message from the bank for loan purposes** and about the ration."*

Among the responses, there are also some limited answers about sustaining a job (6) and business(8). Some self-employed women use their phone to communicate with their client, mostly coming from Kannagi Nagar as well. The employees use their phone to communicate with their employer, as mentioned by the interviewees,

> *"I have a mobile phone to contact my employer and relatives. **If I do not inform my employer (in case of not coming to the job), they will scold me."***

Entrepreneurship activities are still minimal. Some women can utilize their phone and some applications to gain more income. However, they cannot adapt if some problems occur in their business as explained by one of the respondents,

> *"I started a new **clothing business with the help of ICT**, cloth reselling. I stopped when I have a baby. (I got the goods) from the manufacturers and sell it through Whatsapp. I sell it with an extra amount and forward it to all our contacts. So the extra amount is my profit."*

4.7.3 The relationship between social and financial capital

Livelihood assets interlink with each other. Thus, it is crucial to look closely on how the social capital and financial capital correlate with one another. Pearson's correlation test is conducted to gain this insight. The variables that are related include those that define the livelihood restoration of financial capital: better job, better skills, increased income, increase savings; and those that define livelihood restoration of social capital: maintained contact of relatives, expanding networks, participation in organization, and increased support from neighbors. The result can be seen in Table 18 below.

Table 18. Pearson's correlation between indicators of livelihood restoration of social capital and financial capital

Correlations

		Better job	Better skills	Increased income	Increased savings	Maintained contact of relatives	Expanding networks	Participation in organization	Increased support from neighbors
Better job	Pearson Correlation	1	,027	,129	-,094	,028	,042	,243*	,175
	Sig. (2-tailed)		,787	,200	,350	,785	,677	,015	,081
	N	100	100	100	100	100	100	100	100
Better skills	Pearson Correlation	,027	1	-,011	,161	-,084	,055	,037	,122
	Sig. (2-tailed)	,787		,917	,109	,404	,584	,711	,227
	N	100	100	100	100	100	100	100	100
Increased income	Pearson Correlation	,129	-,011	1	,241*	,252*	,212*	-,025	,256*
	Sig. (2-tailed)	,200	,917		,016	,011	,034	,803	,010
	N	100	100	100	100	100	100	100	100
Increased savings	Pearson Correlation	-,094	,161	,241*	1	,136	,025	-,187	-,231*
	Sig. (2-tailed)	,350	,109	,016		,178	,806	,063	,021
	N	100	100	100	100	100	100	100	100

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

As the p<0.05, the table shows that there is a significant positive correlation between:

a) Participation in an organization with a better job
b) Maintained contact with relatives with increased income
c) Expanding networks with increased income
d) Increased support from neighbors with increased income

Some interviewees also explained how they got the job through the utilization of their social capital, such as through their participation in an organization that helped them to start a business, as explained by one of the respondents,

> *"I am a part of Repco Foundation (a women group). We help women to get a loan from the government (Re: bank) and the loan will **help women to do some self-help group business**."*

Other respondent mentioned how their maintained contact with their relatives helped them to get a job,

> *"My **relatives** own the canteen. I think it is not difficult to find a job."*

Other interviewee used their expanded network to get a job,

> *"I found this job through the **help of a political party**. From that (ruling) party. There are lots of people who got the job in this way, like sewage, drainage, fogging"*

The relationship with the neighbors also helps in terms of their fulfillment of financial capital. If the earnings do not cover the expenditure, they will ask for help to neighbors or friends for additional income or loan. Some interviewees explain this situation,

> *"Our income of Rs 10,000 monthly is not enough. Thus, we **borrow money from neighbors** with some interest. If we borrow Rs 10,000 we need to give back an additional Rs 1,000 per month (10% interest)"*

This result shows that the restoration of social capital might lead to the betterment of financial capital as well. Expanded networks, maintained contact with relatives, and increased support from neighbors might lead to the increase of income; and participation in an organization might lead to a better job.

4.7.4 The impact of ICT use on livelihood restoration and enhancement of social capital

Analysis of the relationship between ICT use (as independent variables) and the livelihood restoration of social capital (as dependent variable) needs the aggregation of some variables, which are the ICT use related to social capital. Firstly, we need to make sure that those variables are reliable to be combined. The result of the reliability test is, as shown in Table 19 below. As the value of the Cronbach's Alpha is .723 or higher than .7, it is considered reliable to combine the variables (ICT use for communication, safety, education, getting support, and participating in an organization) into one, as ICT use for social capital.

Table 19. Reliability test of ICT use for social capital

Case Processing Summary

		N	%
Cases	Valid	100	100,0
	Excluded[a]	0	,0
	Total	100	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,723	5

Based on the ICT use for financial capital, the respondents will be clustered into two groups. Those who do not use ICT at all for social capital (ICT use for social capital = 0) will be classified in the Group 0, and those who use ICT for social capital (ICT use for financial capital > 0) either for communication, safety, education, getting support, and participating in an organization, will be classified in the Group 1.

Pearson Correlation test is conducted to test whether the dependent variables (livelihood restoration of social capital: maintained contact of relatives, expanding networks, participation in organization, increased support from neighbors) and independent variables (ICT use for social capital) are related. Table 20 shows that there is significant positive correlation between ICT use and increased support from neighbors and participation in organization as the $p<0.05$. The other dependent variables do not show significant correlation with ICT use.

Table 20. Correlation between ICT use for social capital and the livelihood restoration

Correlations

		ICT use for social capital	Maintained contact of relatives	Expanding networks	Participation in organization	Increased support from neighbors
ICT use for social capital	Pearson Correlation	1	-,020	,147	,228*	,324**
	Sig. (2-tailed)		,840	,145	,022	,001
	N	100	100	100	100	100

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

In addition to this, an Independent Samples T-Test was done between 'ICT use for social capital' and the indicators of livelihood restoration for social capital: 'Maintained contact of relatives', 'Expanding networks', 'Participation in an organization', and 'Increased support from neighbors'. Two hypotheses were assumed.

Null hypothesis: ICT use for financial capital has no contribution in either Increased support from neighbors, Expanding networks, Participation in an organization, or Increased support from neighbors

Alternative hypothesis: ICT use for financial capital has a contribution in either Increased support from neighbors, Expanding networks, Participation in organization, or Increased support from neighbors

The result in Table 21, as the value of p is less than 0.05, shows that there is a significant relationship between ICT use for financial capital and participation in organization, also increased support from neighbors ($p_{part\_organization} = 0.022$ and $p_{incr\_support}$ = i.e. $p< 0.05$) so null hypothesis is rejected for those two variables. From the result, it can be assumed statistically significant that ICT use for financial capital has contribution to the betterment of skills.

Table 21. The t-test between ICT use for financial capital and the livelihood restoration indicators

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Maintained contact of relatives	Equal variances assumed	,217	,643	,202	98	,840	,031	,152	-,271	,333
	Equal variances not assumed			,205	39,496	,839	,031	,150	-,273	,334
Expanding networks	Equal variances assumed	,069	,793	-1,469	98	,145	-,248	,169	-,582	,087
	Equal variances not assumed			-1,561	42,846	,126	-,248	,159	-,568	,072
Participation in organization	Equal variances assumed	21,298	,000	-2,319	98	,022	-,447	,193	-,830	-,064
	Equal variances not assumed			-2,797	55,970	,007	-,447	,160	-,768	-,127
Increased support from neighbors	Equal variances assumed	3,030	,085	-3,392	98	,001	-,550	,162	-,872	-,228
	Equal variances not assumed			-3,928	50,971	,000	-,550	,140	-,832	-,269

Variable	**Maintained contact of relatives**	**Expanding networks**	**Participation in organization**	**Increased support from neighbors**
Sig. (2-tailed)	0.840	0.145	0.022	0.001
Significance of difference in livelihood restoration	Not significant	Not significant	Significant	Significant

According to the data, ICT use in terms of social capital might support participation in an organization and increased support from neighbors. As explained previously, they used their phone to communicate with the organization members and used their phone to call the neighbors in case of emergency. ICT might help the ease of contacting relatives; however, they still consider that it was easier to contact their relatives before being resettled as they were living together nearby. ICT use has not helped the women to expand their network since the women tend to stay at home and their activities through the ICT is not very active for network expansion. Only 16% of the respondents use ICT for accessing social media.

4.7.5 The impact of ICT use on livelihood restoration and enhancement of financial capital

Analysis of the relationship between ICT use (as independent variables) and the livelihood restoration of financial capital (as dependent variable) needs the aggregation of some variables, which are the ICT use related to financial capital. Firstly, we need to make sure that those variables are reliable to be combined. The result of the reliability test is, as shown in Table 22 below. As the value of the Cronbach's Alpha is .788 or higher than .7, it is considered reliable to combine the variables (ICT use for: getting a new job, starting a business, sustaining a business, sustaining previous job, managing assets/savings, improving skills, and accessing government schemes) into one, as ICT use for financial capital.

Table 22. Reliability test of ICT use for financial capital

Case Processing Summary

		N	%
Cases	Valid	100	100,0
	Excluded[a]	0	,0
	Total	100	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,788	7

Based on the ICT use for financial capital, the respondents will be clustered into two groups. Those who do not use ICT at all for financial capital (ICT use for financial capital = 0) will be classified in Group 0. Those who use ICT for financial capital (ICT use for financial capital > 0) either for getting a new job, starting a business, sustaining a business, sustaining previous job, managing assets/savings, improving skills, or accessing government schemes, will be classified in the Group 1.

Pearson Correlation test is conducted to test whether the dependent variables (livelihood restoration of financial capital: better skills, better job, increased income, and increased savings) and independent variables (ICT use for financial capital) are related. Table 23 showed that there is a significant positive correlation between ICT use and better skills and increased income as the $p<0.05$. The other dependent variables do not show significant correlation with ICT use. However, the correlation with the income is negative, means the ICT use has not contributed positively either for the betterment of the income or instead gives negative impact.

Table 23. Correlation between ICT use for financial capital and the livelihood restoration

Correlations

		ICT use for financial capital Group	Better job	Better skills	Increased income	Increased savings
ICT use for financial capital	Pearson Correlation	1	,084	,493**	-,234*	-,046
	Sig. (2-tailed)		,408	,000	,019	,648
	N	100	100	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

In addition to this, an Independent Samples T-Test was done between 'ICT use for financial capital' and the indicators of livelihood restoration of financial capital: 'Better skills', 'Better job', 'Increased income', and 'Increased savings'. Two hypotheses were assumed.

Null hypothesis: ICT use for financial capital has no contribution to either Better skills, Better job, Increased income, or Increased savings.

Alternative hypothesis: ICT use for financial capital has a contribution in either Better skills, Better job, Increased income, or Increased savings.

The result in Table 24, as the value of 'p is less than 0.05, shows that there is a significant relationship between ICT use for financial capital and better skills, also increased income ($p_{better\_skills} = 0.000$ and $p_{increased\_income} = 0.019$ i.e. $p< 0.05$) so null hypothesis is rejected for those two variables. From the result, it can be assumed statistically significant that ICT use for financial capital has contribution to the betterment of skills and the increased income.

Table 24. T-test between ICT use for financial capital and the livelihood restoration indicators

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Better job	Equal variances assumed	3,032	,085	-,831	98	,408	-,160	,193	-,542	,222
	Equal variances not assumed			-,820	82,104	,415	-,160	,195	-,548	,228
Better skills	Equal variances assumed	13,655	,000	-5,612	98	,000	-,878	,157	-1,189	-,568
	Equal variances not assumed			-5,331	69,901	,000	-,878	,165	-1,207	-,550
Increased income	Equal variances assumed	6,881	,010	2,378	98	,019	,384	,161	,064	,705
	Equal variances not assumed			2,487	96,693	,015	,384	,154	,078	,691
Increased savings	Equal variances assumed	,398	,530	,458	98	,648	,068	,149	-,227	,364
	Equal variances not assumed			,464	89,841	,644	,068	,147	-,224	,361

ICT use for financial capital for women in Kannagi Nagar has not helped them to increase their income and savings nor to helped them to get a better job. The impact of ICT use in this context is limited to the improvement of skills. However, most women in Kannagi Nagar failed to transform the skills into income-generating activities.

Variable	**Better job**	**Better skills**	**Increased income**	**Increased savings**
Sig. (2-tailed)	0.408	0.000	0.019	0.648
Significance of difference in livelihood restoration	Not significant	Significant	Significant (Negative)	Not signigicant

ICT use has not been influencing the livelihood restoration for financial capital. ICT use only has not helped the people in Kannagi Nagar to get a better job. As mentioned by the community leader, there is social issue entailed to the resettlement site. Thus, ICT only is not enough to support them. They might need to use their social capital to assist them in this case. Moreover, ICT use is not significant in increasing their savings, as most women in Kannagi Nagar commonly do not own any savings. However, when they already have the savings in a bank, ICT use takes a role within.

Among all indicators of livelihood restoration of financial capital, only the betterment of skills is related significantly with ICT use. This situation might be explained with the fact that in most cases, women have enrolled in skills training but they failed to gain more income through it. One of the respondents (women) explained,

> *"I entered the training from the (HOPE Foundation) for one year, and they taught me the Ms. Office, Ms. Excel, Ms. Powerpoint, etc. I learned something,* ***but I did not use that to get any job****. I used it for my education. Now I ended up taking care of my children and helping my husband in his business."*

The failure in transforming skills into income-generating activities might explain the negative relationship between ICT use and increased income.

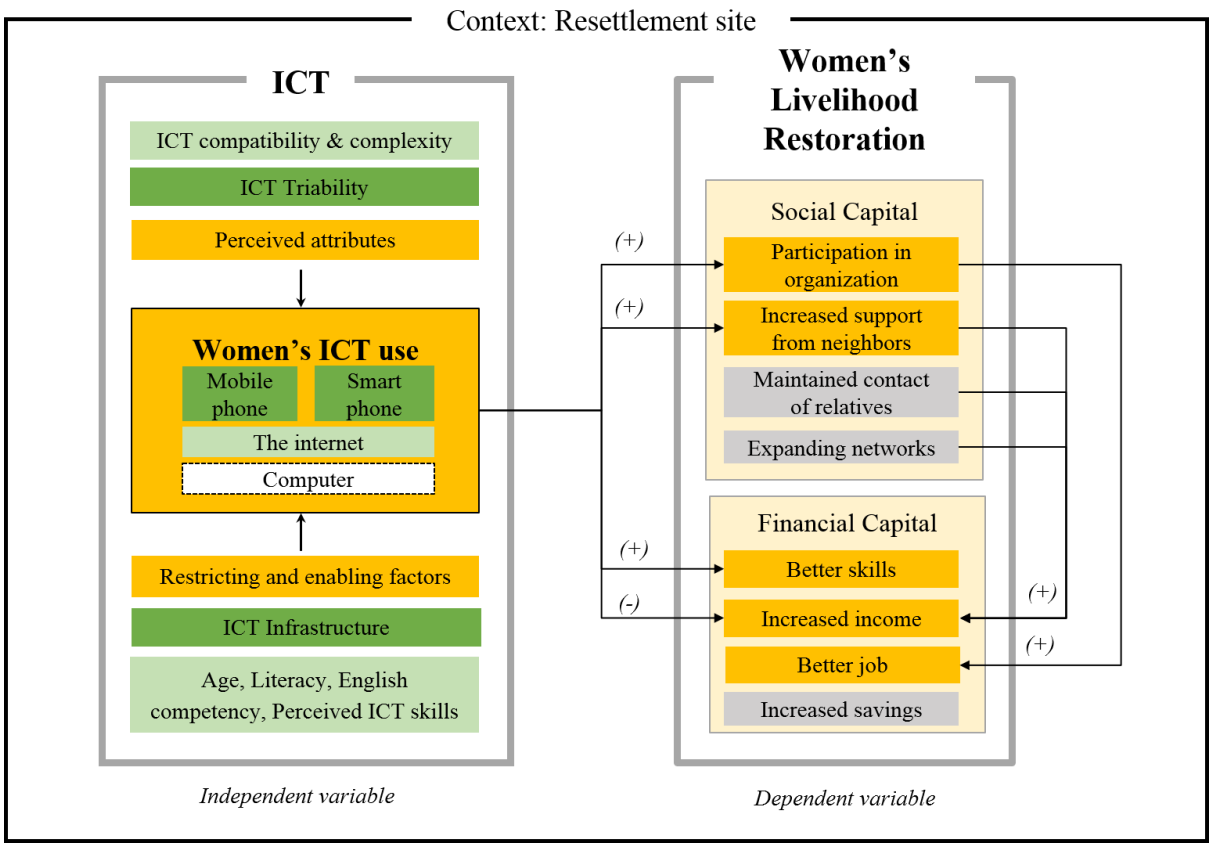
Chapter 5: Conclusions and recommendations

This last chapter presents the conclusion with respect to the literature review in Chapter 2. It also presents the recommendation with regards to the ICT use in relation to the livelihood restoration. As resettlement site is still growing in India, and livelihoods are still a huge issue, it can be expected that these findings might provide some further solutions in this context.

5.1 Conclusion

This study seeks the relationship between ICT use with livelihood restoration and enhancement of social and financial capital in the resettlement site Kannagi Nagar. Through a combination of qualitative (interview and observation) and quantitative data (close-ended questionnaire survey) as the data collection methods, the contribution of ICT use to the livelihood restoration is analyzed, along with the analysis of the factors that support the ICT use. A comparative analysis is done between 'with ICT use' and 'without ICT use' to provide an explanation of the contribution of ICT use in livelihood restoration. Figure 7 below will give a cumulative explanation of the research.

Figure 7. Summary of the study



Source: Author, 2019

5.1.1 ICT Use

In general, ICT use in Kannagi Nagar is prevalent, as 75% of the respondents use a phone, either a smartphone or a regular mobile phone, with a monthly expenditure for it around Rs 50 to Rs 200. However, the use of internet is still limited as it is used only by 33% of the respondents. The minimal use of the internet also explains why the used features are mainly limited to calls. We can also conclude that the use of computer is not common for people in Kannagi Nagar.

5.1.2 Perceived attributes of ICT

According to Rogers (1995) with his concept of "diffusion of innovations", there are five aspects that will influence the diffusion, which are observability, triability, compatibility, complexity, and relative advantage. In the case of Kannagi Nagar, the three of them are proven true, and two others are empirically not significant. The most significant aspect is the ICT triability. As we can see from the use of hardware, the triability positively correlates with each of the hardware. Other than triability, ICT compatibility is one of the significant variables. Considering ICT compatible with their social interaction, job, and education, the women in Kannagi Nagar adopt ICT in their daily life. This result shows the importance to demonstrate the purpose of any technology to the community. ICT complexity is also one of the significant variables. As it is considered easy, it also contributes to the higher level of ICT use. However, some aspects are considered not significant, including ICT observability. The low significance of observability shows that any ICT-based solution needs to be introduced with a higher level of interaction than mere observation. The community should be able to try it first. Besides, the relative advantage of ICT is also considered not significant, as the perceived cost do not influence the decision to use ICT or not.

5.1.3 Restricting and enabling factors of ICT use

Among all the factors, ICT infrastructure is the most significant enabling factors of ICT use, followed by ICT education, as suggested by Chipidza and Leidner (2019). In Kannagi Nagar, ICT is relatively available privately but relatively limited in public. There should be some more provisions of public access venues, as suggested by Proenza, Jagun, et.al., 2015 to make ICT infrastructure more accessible for the people. ICT education to improve ICT skills is also significantly influencing ICT use. Moreover, it should be supported by literacy competency and English competency. Even though local content is abundant, understanding English will help people to utilize more functions in the ICT tools. Age, as suggested by Alam and Imran, 2015, is indeed an important factor. For the younger generation, it is easy to adapt to new technology. However, for the older generation, it is more difficult. Thus, the younger generation can be an agent in the process of diffusion of a new ICT-based solution. However, in contrast to some previous literature, education level does not seem to have any significant relationship with ICT use. It means that women at any level of education can access ICT. It is also the case with women with different abilities. All of them can still access ICT as shown by the rate of ICT use. Affordability is also not a big issue. It might be influenced by the fact that the cost of communication in India is considerably affordable, as it is considered the cheapest in the world.

5.1.4 The impact of ICT use on livelihood restoration and enhancement

Duncombe (2006) suggest that the analysis of ICT and livelihoods include the analytical and functional part. In the analytical part, it should explain the vulnerability context, and in the functional part, it should explain how ICT might improve the livelihood strategies. Livelihoods restoration and enhancement are still a big problem in Kannagi Nagar. Women remained unemployed and keep asking about job opportunities to anyone who comes to the area even 19 years after the resettlement. Job opportunities are available. However, it is difficult for women to find any job that suits their condition. With the fact that they are responsible for taking care of the family, most jobs are not suitable for them since they require long working hour, quite far in the distance, and avoid them to do house chores or childcare. Besides, women are more inclined to wage work rather than business (Coelho, Venkat, et al., 2012). They thought of entrepreneurship activities as having more challenges to be executed, such as space, initial capital, and also the working partners. Self-employment or small business might suit more with their situation in Kannagi Nagar. The small business that the government facilitated is usually

stereotyped into tailoring, beautician, etc. with limited opportunities for improvement of scale. More opportunities of entrepreneurship should be introduced to the women in Kannagi Nagar.

From the study, we also found out that women in Kannagi Nagar has not fully optimized the full potentials of ICT. In terms of livelihood restoration, based on the classification from Alam and Imran (2015), ICT is used only for maintaining connectivity. There is still minimal use in terms of accessing provided services and accessing new opportunities.

From the analysis, we found out that ICT use supports the participation in an organization and the increase of support from neighbors. It happens due to the capacity of ICT, mostly through phone, to channel interaction between the women. The study also finds that participation in organization might lead to a better job since frequent communication might provide channels to job opportunities. Other than that, the increase support from neighbors has also correlation with increased income. It shows that the social capital of the women in Kannagi Nagar also supports the livelihoods restoration and enhancement of financial capital. In terms of the relation with financial capital, ICT use currently is only significant for the betterment of skills. There have not been ICT-based solutions that might directly help them to generate more income and help them to manage it to lead to more savings. Even if some opportunities are available, such as through some social media platforms, most women in Kannagi Nagar has not been introduced to it. In conclusion, ICT use has not been helping the women fully since it has not answered the whole vulnerability context that they faced.

5.2 Recommendation

5.2.1 Recommendation for ICT-based solution for livelihood restoration and enhancement in Kannagi Nagar

Livelihood restoration should be the focus of any resettlement project. With the rapid advancement of ICT, there are lots of opportunities to utilize it within the process of livelihood restoration. The findings of this study recommend that stakeholders should acknowledge these potentials in the programs they design for the community, especially for the women in Kannagi Nagar. Following some specific recommendations for women in the resettlement site, especially in Kannagi Nagar are derived from the findings:

- Stakeholders, including policymakers, planners, community-based organization, non-governmental organizations should recognize the potentials of ICT to help in the livelihood restoration and enhancement of women in Kannagi Nagar
- ICT-based solutions should seek the opportunities of livelihood enhancement through providing services such as government schemes and channeling the women to new opportunities, such as job, business, funding for starting a business, or diverse skill training programs.
- In terms of their livelihood, there need to be continuous programs after skill training as shown that most women failed to transform the skills into something valuable. In any resettlement case, government should provide channel to establish proper income-based resettlement and re-employment.
- Entrepreneurship activities should be improved, and the opportunities should not be stereotyped to only tailoring and beautician activities.
- Any ICT-based solution provided for the women should pay attention to the perceived attributes the women paste on them. First of all, it should consider triability. It means that some demonstration should be conducted so that they experience how to use it. The solution must be user-friendly so that it does not appear to be complicated. Moreover, there need to be some ways to educate the women on how it will be compatible with their needs

- More ICT infrastructure is necessary to be developed. Public access venues like telecenter or computer center are needed so that women can have better access to ICT. The design of the place should consider gender-related issues so that it is comfortable for women from any age to come in.
- As the younger generation is more inclined to ICT, they might be able to be the agent of any diffusion of ICT-based solution.
- More ICT education programs are necessary. It should also be supported by the improvement of literacy capacity and English competency.

5.2.2 Potentials for further study

The study is very context-specific as it adopts the case study as the research strategy. The characteristics of Kannagi Nagar might not reflect the features of other resettlement sites, even in Chennai or India. Moreover, Kannagi Nagar is considerably a more developed resettlement site. Thus, further study in another location might be necessary. Other than that, more in-depth research about one of the ICT tools, such as smartphone, might be needed so that the exploration of functions and solutions from the device can be derived from the research. Lastly, as this research has not incorporated the perspective of the private sector, further research might need to do that, such as the perspective from a tech start-up that is working with urban slums, so that more insights can be gained about this topic.

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Annex 1: Questionnaire

KANNAGI NAGAR WOMEN SURVEY QUESTIONNAIRE

Purpose of the survey: The purpose of this survey is to gather socio-economic data and the perception and use of ICT through responses from the women in Kannagi Nagar which will aid the students in the analysis of their respective research works for their master thesis. The result of this survey shall be used solely for academic purposes.

Interviewer shall confirm about confidentiality and anonymity

Interviewer shall ask for permission to record the conversation.

Translator: L □ / P □	House/Phone no.:	Resp. no.:

Livelihood Restoration Score *(fill in by the researcher)*

A1:	*A2:*	*A3:*	*A4:*	*B1:*	*B2:*	*B3:*	*B4:*

A. Respondent's profile

1. Age:

2. Language spoken:
   (1) English □
   (0) Tamil □
   Others:_____

5. Civil status:
   (1) Single □
   (2) Married □
   (3) Separated □
   (4) Widow/widower □
   (5) Living-in □
   Others: _____

3. Able to read and write:
   (0) No □ (1) Yes □

4. Do you have Adhar/ID card:
   (0) No □ (1) Yes □

6. Education:
   (1) Primary □
   (2) Secondary □
   (3) Higher secondary □
   (4) Undergraduate Diploma □
   (5) Undergraduate Degree □
   (6) Post-graduate □
   (7) Vocational □
   (8) None □

7.Are you suffering from a disability? (0) Yes □ (1) No □

If yes,
7a. What is it?
(1) Blindness/sight difficulty □
(2) Deafness/hearing difficulty □
(3) Limited walking ability □
(4) Difficulty typing □
(5) Multiple disabilities □

8. Number of years living in Kannagi Nagar:

8b. Coming from:

8a. Reason for moving in:
(1) Resettled □ (2) Married □ (3) More affordable □ Other:_____

9. Number of people living in the house:
(including house-helpers, extended family)

9a. Number of **"Immediate family members"** living in the house:
(including the respondent)

9b. Head of the house: (1) Respondent □ (2) Husband □ (3) Father/in law □ (4) Mother/in law □
(5) Child/Grandchild □ Other (specify): _____

10. Is the house that you are living in under the name of your family member?
(0) No □ (4) Yes □, under _____ name
If no, how do you get this house?
(1) Get it for free □ (2) Rent □ (3) Buy □

B. Income and Livelihood

11. Current employment: _____

(1) Public servant ☐
(2) Self-employed ☐
(3) Informal business ☐
(4) Formal business ☐
(5) Domestic servant ☐
(6) Employed in contract based ☐
(7) Employed by a company ☐
(8) Unemployed ☐
(9) Retired ☐
(10) Student ☐

12. How much is your personal estimated monthly income: Rs. _____

13. How much is your family's estimated monthly income: Rs. _____

12a. Your own sources of income:

(1) Business ☐, which is _____
(2) Employee ☐
(3) Remittance ☐
(4) Pension ☐
(5) Income from rent ☐
(6) Transfer from the government ☐
Others: _____

13a. Your family's sources of incomes:

(1) Business ☐, which is _____
(2) Employee ☐
(3) Remittance ☐
(4) Pension ☐
(5) Income from rent ☐
(6) Transfer from the government ☐
Others: _____

14. How much is your monthly expenditure? _____

14a. For which purpose do you spend the most? Please tick one option below

(1) Housing ☐
(2) Food ☐
(3) Water ☐
(4) Communication ☐
(5) Transportation ☐
(6) Education ☐
(7) Health ☐
(8) Electricity ☐
(9) Repaying loans ☐

15. Did you lose your job when you moved to Kannagi Nagar?

(0) Yes ☐ (1) No ☐

15a. What is your occupation before: _____

(1) Public servant ☐
(2) Self-employed ☐
(3) Informal business ☐
(4) Formal business ☐
(5) Domestic servant ☐
(6) Employed in contract based ☐
(7) Employed by a company ☐
(8) Unemployed ☐
(9) Retired ☐
(10) Student ☐

16. Have your individual income increased since you moved to Kannagi Nagar?

(1) Very much decreasing ☐ (2) Slightly decreasing ☐ (3) No change ☐
(4) Slightly increasing ☐ (5) Very much increasing ☐

17. Have you got skills training prior to moving to Kannagi Nagar?

(0) No ☐ (1) Yes ☐: _____

18. Have you got skills training since you moved to Kannagi Nagar?

(0) No ☐ (1) Yes ☐: _____

19. Among these types of savings/assets, which one do you own? *(Please tick as applicable)*

(1) Cash savings ☐
(2) Chit funds ☐
(3) Bank deposits ☐
(4) Livestock ☐
(5) Jewellery ☐
(6) Refrigerator ☐
(7) Television ☐
(8) Bicycle ☐
(9) Motorcycle ☐
(10) Auto ☐

19a. Are your savings/assets increasing since you moved to Kannagi Nagar?

(1) Very much decreasing ☐ (2) Slightly decreasing ☐ (3) No change ☐
(4) Slightly increasing ☐ (5) Very much increasing ☐

C. Social issues

20. Did you move to Kannagi Nagar together with your relatives?
(0) No □ (1) Yes □

21. How convenient is it to contact your relatives after you moved to Kannagi Nagar?
(1) Very difficult □ (2) Difficult □ (3) Neutral □ (4) Easy □ (5) Very easy □

21a. How convenient is it to contact your relatives in your previous neighborhood?
(1) Very difficult □ (2) Difficult □ (3) Neutral □ (4) Easy □ (5) Very easy □

22. Are you making new friends and contacts since moving to Kannagi Nagar?
(0) No □ (1) Yes □

If yes,

22a. Do you interact with the people living in the same block*?*
(0) No □ (1) Yes □

22b. Do you interact with the people living in the other blocks in Kannagi Nagar*?*
(0) No □ (1) Yes □

22c. Do you interact with the people outside Kannagi Nagar*?*
(0) No □ (1) Yes □

22d. Do you have contacts or networks related to business or jobs*?*
(0) No □ (1) Yes □

22e. Do you have contacts or networks with the government institutions/officials*?*
(0) No □ (1) Yes □

23. Did you get government schemes before you moved to Kannagi Nagar? (*e.g. rations)*
(0) No □ (1) Yes □, in form of: _____

24. Are you receiving government schemes regularly now?
(0) No □ (1) Yes □, in form of: _____

25. How many organizations/groups do you join as a member within Kannagi Nagar?
(0) None □ (1) in 1 □ (2) in 2 □ (3) in 3 □ (4) more than 3 □

If you join one of them,

25a. What kind of organizations are they: (Please tick as applicable)
(1) CBO □ (2) Saving group □ (3) Women group □ (4) Religious group □
(5) Political group □ (6) Environmental group □ (7) NGO □
(8) Others (specify): _____

25b. How often are you actively participating in those organizations/groups/NGOs?
(1) Not at all □ (2) Seldomly □ (3) Sometimes □ (4) Often □ (5) Very often □

26. How many organizations/groups did you join as a member before you moved to Kannagi Nagar?
(0) None □ (1) in 1 □ (2) in 2 □ (3) in 3 □ (4) more than 3 □

27. Do you seek help from relatives, friends or neighbors?
(0) No □ (1) Yes, but no getting any □ (2) Yes, and got the help □

If yes,

27a. What kind of help? (Please tick as applicable)

(1) Financial □ (2) House chores □ (3) Childcare □ (4) Getting job □

Others (specify): _____

27b. How often do you seek such kind of help

(1) Once a year □ (2) Once a month □ (3) Once a week □ (4) Frequently □

Others (specify): _____

28. How convenient is it to get support from neighbors in Kannagi Nagar?

(1) Very difficult □ (2) Difficult □ (3) Neutral □ (4) Easy □ (5) Very easy □

29. How convenient was it to get support from neighbors in your previous neighborhood?

(1) Very difficult □ (2) Difficult □ (3) Neutral □ (4) Easy □ (5) Very easy □

30. Do you usually do the house chores? (0) No □ (1) Yes □

If yes,

30a. How many hours do you usually spend for the house chores?

(0) More than 3 h □ (1) 3 h or less □

30b. Do you share the house chores with the men in your family?

(0) No □ (1) Yes □

30c. Do you usually have free time in your daily routine?

(0) No □ (1) Yes □

D. ICT: Phone, Computer, Internet

31. Among these ICT tools, which one do you use in the latest three months:

(Please tick as applicable)

(1) Computer □ (2) Mobile phone □ (3) Smart phone □ (4) None □

If yes,

31a. What features do you frequently use: (Please tick as applicable)

(1) Calls □
(2) Messages □
(3) Radio □
(4) Camera □
(5) Whatsapp □
(6) Maps □
(7) Browser/Google □
(8) YouTube □
(9) Facebook □
(10) Ola/Uber □
(11) Ms.Office □
(12) Calendar/Clock □

Others (specify):
_____
_____

32. Have you used the Internet in the last three months?

(0) No □ (1) Yes □

If no, proceed to no.33 immediately

If yes in no.32, answer these questions below, then, go to no.34

32a. How often did you use the Internet during the last three months?

(1) Less than once a week □ (2) At least once a week □ (3) Several times a week □

(4) At least once daily □ (5) Several times daily □

32b. Where do you use the Internet in the latest three month? (Please tick as applicable)

(1) Home □
(2) Work □
(3) Place of education □
(4) Other persons home □
(5) Community internet access facility □
(6) Commercial internet access facility □
(7) In mobility □
(8) Anywhere (using smart phone) □

If no in no.32, answer these question

33. Which ICT tool(s) you have ever tried to use before? *(Please tick as applicable)*

(1) Computer □ (2) Mobile phone □ (3) Smart phone □ (4) Internet □ (5) None □

If none in no. 33, answer these questions below

33a. Among these things below, have you ever seen them?(Please tick as applicable)

(1) Computer □ (2) Mobile phone □ (3) Smart phone □ (4) None □

33b. Have you ever seen someone using the internet?

(0) No □ (1) Yes □

33c. Does someone in your household know how to use any of those ICT tools?

(0) No □ (1) Yes □

34. Do you think that using ICT tools is easy/difficult?

(1) Very difficult □ (2) Difficult □ (3) Neutral □ (4) Easy □ (5) Very easy □

35. How well do you see your capability and skills to use ICT tools?

(1) No knowledge □ (2) Poor □ (3) Sufficient □ (4) Good □ (5) Excellent □

36. Do you have access to these ICT infrastructure? *(Please tick as applicable)*

Tool	(0) No	(1) Family access	(2) Personal ownership	Since (years ago)
Computer				
Mobile phone				
Smartphone				
Internet				
Electricity				

37. Do you think that ICT is affordable?

(1) Very expensive □ (2) Expensive □ (3) Neutral □ (4) Cheap □ (5) Very cheap □

37a. How much does usually your family spend monthly on communication/ICT?

(repaying gadget loans, mobile subscription, etc.)

(1) Below Rs.50 □ (2) Between Rs.50 – Rs.200 □ (3) Above Rs.200 □

38. Do you know that there is a computer/ICT center in Kannagi Nagar?

(0) No □ (1) Yes, never been there □ (2) Yes, been there □ : _____

39. Do you use ICT for this purpose?

Get a new job:	(0) No□ (1) Yes □	***Communication***	(0) No□ (1) Yes □
Start a new business:	(0) No□ (1) Yes □	***Education (self/children)***	(0) No□ (1) Yes □
Sustain previous job:	(0) No□ (1) Yes □	***Access government scheme***	(0) No□ (1) Yes □
Sustain business:	(0) No□ (1) Yes □	***Get support***	(0) No□ (1) Yes □
Skill training:	(0) No□ (1) Yes □	***Participate in organization***	(0) No□ (1) Yes □
Manage savings/assets:	(0) No□ (1) Yes □	***Safety***	(0) No□ (1) Yes □

40. Do you think ICT is important for you to help you for this purpose?

Job:	(0)No□ (1) Yes □	***Electricity:***	(0)No□ (1) Yes □
Business:	(0)No□ (1) Yes □	***Transportation:***	(0)No□ (1) Yes □
Social interaction:	(0)No□ (1) Yes □	***Education:***	(0)No□ (1) Yes □
Water:	(0)No□ (1) Yes □	***Health service:***	(0)No□ (1) Yes □
Sanitation:	(0)No□ (1) Yes □		

Annex 2: List of interviewees and key informants

List of interviewees (women)

Respondent	Age	Reason for moving in	Education	Occupation	ICT use
Respondent 1	31	Married	Higher secondary	Unemployed	Smartphone
Respondent 2	50	Affordable housing	None	Unemployed	None
Respondent 3	37	Affordable housing	Secondary	Employed in a contract based	Mobile phone
Respondent 4	50	Resettled	Primary	Unemployed	None
Respondent 5	30	Resettled	Primary	Employed in a contract based	Mobile phone
Respondent 6	43	Affordable housing	Secondary	Domestic servant	Mobile phone
Respondent 7	44	Affordable housing	Primary	Domestic servant	Mobile phone
Respondent 8	19	Job purpose	Undergraduate degree	Student	Smart phone
Respondent 9	48	Job purpose	Secondary	Unemployed	Mobile phone
Respondent 10	26	Married	Higher secondary	Unemployed	Smart phone
Respondent 11	27	Job purpose	Higher secondary	Unemployed	Mobile phone
Respondent 12	24	Resettled	Secondary	Self-employed	Mobile phone

List of key informants

No.	Name	Position	Institution	Type of informant
1.	Stephan Raj	Community Leader	Kannagi Nagar Residents' Welfare Association	Community-based organization (CBO)
2.	Nalini Kagoo	School Principal	HOPE Foundation	Non-governmental organization (NGO)
3.	Mathew Alexander	Program Director	Montford Community Development Society, Chennai	Non-governmental organization (NGO)
4.	T. Padmanabad	Executive Engineer	Corporation of Chennai, Zone 195	Government agency
5.	Mohamad Zafrullah	Chief Community Development Officer	Tamil Nadu Slum Clearance Board	Government agency
6.	Karen Coelho	Researcher	Madras Institute of Development Studies	Key expert
7.	Vanessa Peter	Researcher	Information and Resource Centre for the Deprived Urban Communities	Key expert

Annex 3: Interview Guides

Institute for Housing and Urban Development Studies (IHS) Erasmus University Rotterdam, the Netherlands	
Interview Form for Stakeholders	
Researcher:	Atika Almira
Research Topic:	Connecting the disconnected: The role of ICT in livelihood restoration for women in the resettlement site Kannagi Nagar in Chennai, India
Contact	+62 812 244 644 94; tika.almira@student.eur.nl
All information will be used solely for academic purposes	
Interviewee:	
Institution	
Position:	
Date and time:	
Questions	
1.	a. What is your opinion about ICT, especially computer, mobile phone, and the internet, to help the livelihoods of women? b. How important is that? c. How does it impact the livelihoods of women living in Kannagi Nagar? d. In your opinion, what are the most important pre-conditions for women in Kannagi Nagar to use ICT for their livelihoods?
2.	a. Have your institution provided support for women in Kannagi Nagar through ICT? b. In what form is that? • Education • Infrastructure • Aid c. From your experience, how is the impact of that support? d. What are the obstacles in the process of delivering that kind of support? e. Do you receive support from other institution?
3.	What are the potentials that can be attained through ICT to improve women's livelihoods in Kannagi Nagar?

Institute for Housing and Urban Development Studies (IHS) Erasmus University Rotterdam, the Netherlands	
Interview Form for Women in Kannagi Nagar	
Researcher:	Atika Almira
Research Topic:	Connecting the disconnected: The role of ICT in livelihood restoration for women in Kannagi Nagar in Chennai, India
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All information will be used solely for academic purposes	
Interviewee:	
Date and time:	

Questions	
1.	Could you tell me when did you come to Kannagi Nagar? Are you coming here under the resettlement scheme? And under what scheme specifically? If not, what was the reason of your moving to Kannagi Nagar? *(marriage, job, affordable housing)*
2.	Are you working now? What is your job now? How much time do you spend daily for your job? Where is the location of your job? What is the distance?
3.	Could you explain how you feel about your job right now?
4.	How do you find this job? Do you think it is difficult to find a job here? Why?
5.	Did you also work before coming to Kannagi Nagar? Did you change your job? How many times you changed your job since coming to Kannagi Nagar? Why? *a. Distance >> How far is that? How much do you have to spend?* *b. Working condition >> What is the problem?* *c. Have babies or children >> There is a childcare where you can have your children taken care of. Why not go there? No help from family/neighbors?* *d. My husband does not let me to work >> why?* *e. Illness/disability >> What kind of illness?* *f. Lack of skills >> What kind of skills that are usually required?* g. *Safety issue>> What is the problem?*
6.	In case you are not working, what is the reason? *(same as above)*
7.	Is your individual income increasing since the first time you moved to Kannagi Nagar? What about the household income? How many people are working in your household?
8.	Does your earning usually cover your monthly spending? If not, how do you usually cope with that? *a. Loan >> financial institution, chit groups, employers, friends, neighbors?* *b. Use savings* c. *Selling assets*
9.	Do you get the help from your family for financial issues? What about from friends and neighbors? How do they help you financially? Do you also get the help for childcare and doing house chores that enable you to go to work?
10.	Did the support you got here getting less since you moved to Kannagi Nagar?
11.	Do you get support from the government scheme such as rations, cash allowance, widow allowance? Why not? Did you get that before moving to Kannagi Nagar?
12.	Do you think that starting a business might help you to earn more money? Have you tried to do that? *a. If yes, is it working? How is your experience?* b. *If not, why?*

13.	Do you have a phone? How do you usually use it? For what purpose? Is it useful for your job? Do you think that your phone might help you to increase your income or help you in case of any problem?
14.	What about internet? Do you usually use it? How and for what purpose? Is it useful for your job? Do you think that the internet might help you to increase your income or help you in case of any problem?
15.	Do you have any problem in using your phone? What is that? *a. Is that about affordability? How expensive is that?* *b. Is that difficult for you to get used to it?* *c. Is it because there is no sufficient content in Tamil? (since mostly content are in English)* *d. Is it because of the network? How is your experience?* *e. Is there any cultural issue in using a phone?* f. *Is it because you do not have the free time?*
16.	In case you are not using a mobile phone, why? *(same probing as above)*
17.	Do you know that there is a place where you can use computer or access internet in Kannagi Nagar? Have you been there? *a. If yes, what did you do there? Do you think that the place gives you opportunity to earn more income? How?* b. *If no, why not?*
18.	Is there any training from any organization or NGO to utilize phone/computer/internet for you livelihood improvement? Did you join the training? How was your experience? Who gave the training? Where was it? Is it useful for job purposes? Are you using it now? Why not?

Annex 4: Observation Guides

Institute for Housing and Urban Development Studies (IHS) Erasmus University Rotterdam, the Netherlands						
Observation Guides						
Wi-Fi						
No Wi-Fi access found within the area						
Commercial Internet Access Facility						
No.	Location	Type	Users	User behavior	Owner/Authority	Price
Community Internet Access Facility (Free)						
No.	Location	Type	Users	User behavior	Owner/Authority	Funding

Annex 5: Livelihood restoration scoring

No	Indicators		1	2	3
A	**Financial capital**				
A.1	*Re-employment*	*Better jobs*	Lost a job or remained unemployed	Sustained previous job	Got a better job
A.2		*Better skills*	Not educated (lower than higher secondary)	Educated (min. higher secondary)	Got skill-trained (at least one training)
A.3	*Income-based resettlement*	*Increased income*	Decreasing	No change	Increasing
A.4		*Increased savings*	Decreasing	No change	Increasing
B	**Social capital**				
B.1	*Social inclusion*	*Maintained contacts with relatives*	More difficult	No change	Easier
B.2		*Expanding networks*	Not making new friends and contacts	Interact with only people from Kannagi Nagar	Interact with people inside & outside Kannagi Nagar
B.3	*Community re-building*	*Increased membership and participation of community organization*	No participation in any organization	Join at least 1 organization with limited participation	Join at least 1 organization with active participation
B.4		*Increased support from neighbors and communities*	Never got supported	Got support, more difficult	Got support, Easier

Annex 6: Regression Analysis

Regression analysis 1: Perceived attributes of ICT as a predictor of ICT use

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,824[a]	,680	,669	,17628

a. Predictors: (Constant), ICT compatibility, ICT triability, ICT complexity
b. Dependent Variable: ICT use

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6,196	3	2,065	66,459	,000[b]
	Residual	2,921	94	,031		
	Total	9,117	97			

a. Dependent Variable: ICT use
b. Predictors: (Constant), ICT compatibility, ICT triability, ICT complexity

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-,012	,048		-,248	,804
	ICT complexity	,023	,016	,100	1,420	,159
	ICT triability	,684	,064	,755	10,753	,000
	ICT compatibility	,025	,051	,031	,485	,628

a. Dependent Variable: ICT use

Table set 1. Regression analysis, perceived attributes of ICT as a predictor of ICT use

Regression analysis 2: Some factors (restricting or enabling) as a predictor of ICT use

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,812[a]	,659	,641	,18265

a. Predictors: (Constant), English competency, Age, Literacy competency, ICT infrastructure, Perceived ICT skills
b. Dependent Variable: ICT use

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6,060	5	1,212	36,330	,000[b]
	Residual	3,136	94	,033		
	Total	9,196	99			

a. Dependent Variable: ICT use
b. Predictors: (Constant), English competency, Age, Literacy competency, ICT infrastructure, Perceived ICT skills

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-,005	,101		-,054	,957
	Perceived ICT skills	,033	,017	,136	1,902	,060
	Age	-,003	,002	-,102	-1,489	,140
	ICT infrastructure	,457	,052	,609	8,749	,000
	Literacy competency	,081	,047	,114	1,721	,089
	English competency	,095	,050	,123	1,918	,058

a. Dependent Variable: ICT use

Table set 2. Regression analysis: Some factors as a predictor of ICT use

Annex 7: Interview results on livelihood issues

Issues in terms of livelihoods for women in Kannagi Nagar

Livelihoods issues	Quotation
Permission from husband	*"I did not work before coming to Kannagi Nagar. I have been unemployed for 10 years **since my husband does not allow me to work**. He will beat me if we talk about this. Then after he passed away, I worked as a housekeeper for a year and then changed to this job." (Woman respondent)*
	*"**My husband did not allow me to work** since he said his earning is enough." (Woman respondent)*
	*"**My husband does not allow me to work.** If he allows me, I want to work as a receptionist. Even doing business is not allowed by my husband. I think of making jewelery, baskets, etc. He told me to just take care of my children." (Woman respondent)*
Childcare	*"I was doing housekeeping for 1.5 years. **When I was pregnant, I stopped working**. It took me 4 years to take care of my children since my mother could not help me for the childcare. She's also working." (Woman respondent)*
Health	*"I have some **issues with my legs.** That is why my husband does not allow me to work." (Woman respondent)*
	*"Other than the distance, I cannot work amymore **since I suffer from the leg pain** since 2 years ago." (Woman respondent)*
Working condition	*"I left a job before since it was a job for one **whole day**." (Woman respondent)*
	*"I am cooking there and **the work is pretty heavy**. It is too hot. Sometimes I fell down and even broke my knee." (Woman respondent)*
Age limit	*"Women **above 30 like me have problems** in getting a job. No one wants to hire us."*
Distance	*"Before coming to Kannagi Nagar, I worked in nearby my previous neighborhood for 5-6 years. But since I moved here, **I could not work there anymore due to the distance.** I need to spend 1,5 hours for the trip and spend Rs 50 daily." (Woman respondent)*
Multiple issues	*"I want to go to job but **I do not have anyone who can take care of my children**. There is no childcare center around. However, **my husband** also told me that there is no bigger job than taking care of the children. Other than that, I have **an illness that avoid me to work so much.** Other than the pain in my legs, it is even so hard to comb my daughter's hair. Previously, I worked as a beauty parlor for three years in Mandawalee, but **it is too far**, working hour is too much and the salary is too low." (Woman respondent)*

Issues in terms of entrepreneurship for women in Kannagi Nagar

Entrepreneurship issues	Quotation
Initial capital	*"I can do a business like detergent shop. People will buy it because they need it. But **I have no capital to start it."(**Woman respondent)*
	*"I think of opening up a small shop. But, people will not help to give me such a **big amount to start it off.** I also need to **rent a space** since it is very small here (the house)." (Woman respondent)*
Working partner	*"I had a plan. However**, I am not that much healthy**. I have an issue with the sugar pressure. Even if I worked with friends, I think the team work will not be good enough. We will push our own individual preferences and interests." (Woman respondent)*
	*"If you ask why not starting business together with **friends, I believe that it will not work.** Everyone has priority on their own household, and there will also be commitment issue." (Woman respondent)*
	*"I once had a business of selling detergent. I stopped when my daughter got married since no one watched the shop. **I did not trust any friend to work there**. As no one in the shop, the customer is getting lower." (Woman respondent)*
Health	*"I never thought of starting a business. Because **I am not very healthy.** I once underwent surgery and my womb was taken." (Woman respondent)*
Multiple issues	*"I thought of starting a business such as a fast food truck. However, I thought no one in this family is ready to work on that. **I once tried asking friends to start this business but they did not respond very well.** For starting a business with friends, I guess the relation between us is not very strong. Now I want to be a single person in this business. But the challenge is the **finance problem**. I do not have enough funding to start it. Moreover, for now **no one will take care of the children**.." (Woman respondent)*

Annex 8: Research time schedule

RESEARCH TIME SCHEDULE												
No	Process	Jun	Jul				Aug					Sep
		IV	I	II	III	IV	I	II	III	IV	V	I
1	Pilot survey											
2	Survey											
3	Interview											
	Data inspection and preparation											
4	Data analysis											
5	Thesis writing											
LOCATION		INDIA					THE NETHERLANDS					

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