Interplay of ICTs and social capital in building and scaling peace networks within contexts of violent ethnic conflicts: a study from Kenya

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Abbreviations

ACC	Assistant County Commissioner
ACLED	Armed Conflict Location and Event Data Project
ACM	Association for Computing Machinery.
CBO	Community-Based Organizations
CEWARN	Conflict Early Warning and Response Network
CEWERU	Conflict Early Warning Response Units
CEWRS	Conflict Early Warning Response System
CIPEV	Commission for Post-Election Violence
CJPC	Catholic Justice and Peace Commission
CSOs	Civil Society Organizations
DCC	Deputy County Commissioner
DHIS2	District Hospital Information System
DPC	District Peace Committees
DvPCs	Divisional Peace Committees
EAK	Evangelical Alliance of Kenya
ECIS	European Conference on Information Systems
EWERS	Early Warning and Early Response System
FBO	Faith Based Organisation
FBO	Faith Based Organizations
FGD	Focus Group Discussion
FPFK	Free Pentecostal Fellowship in Kenya
GIS	Geographical Information Systems
GSM	Global System for Mobile communication
GSU	General Service Unit
HI	Humanity and Inclusion
HIPSIR	Hekima Institute of Peace Studies and International Relations
HISP	Health Information Systems Program
ICT	Information Communication and Technology

ICT4COP	Information and Communication Technology for Community Policing
ICT4D	Information and Communication Technology for Development
ICT4P	Information and Communication Technology for Peace
IDPs	Internally Displaced Persons
IGAD	Inter-Governmental Authority of Development
IJRRSSH	International Journal of Recent Research in Social Sciences and Humanities
KIIs	Key Informant Interviews
LMICs	Low and Middle-Income Countries
LPCs	Location Peace Committees
MPA	Mabanga Peace Agreement
NCCK	National Council of Churches of Kenya
NCIC	National Cohesion and Integration Commission
NSC	National Steering Committee
PABT	Participatory Approach to Bible translation
PEACENET	Peace and Development Network Trust
PEDP	Pokot Education and Development Programme
POP3	Post Office Protocol
PPF	Provincial Peace Forum
SALW	Small Arms and Light Weapons
SDG	Sustainable Development Goal
SLDF	Sabaot Land Defense Forces
SMTP	Simple Mail Transfer Protocol
SOP	Standard Operating Procedures
TJRC	Truth Justice and Reconciliation Commission
TPPL	Turkana-Pokot Peace Livelihood
UiO	University of Oslo
USB/COM	Universal Serial Bus / Component Object Model
VAWG	Violence Against Women and Girls

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Abstract

Violent ethnic conflicts are a widespread problem in Low- and Middle-Income Countries, particularly in Africa, where they have had and continue to have devastating effects on human security through loss of life, livelihoods, and large-scale displacement of populations. Such violence has been attributed to various reasons including the historical ramifications of colonial legacies, unresolved land and boundary grievances, poverty, proliferation of small arms and light weapons, socio-economic exclusion, climate change, politicization of ethnic relations, and the spill over effects from conflict torn geopolitical regions. Information and Communication Technologies (ICTs) are increasingly being deployed for conflict mitigation efforts, with small scale successes, but lacking systematic research evidence of, how and why ICTs mitigate or not conflict situations.

This thesis explores the processes around the design and application of ICTs to mitigate violent ethnic conflicts in Kenya. The research draws upon a socio-technical perspective to examine this relationship, grounded in three key sets of theoretical concepts. The first draws up Castells (2011) notion of network society, which promotes the argument that to break historically embedded conditions of marginalization, it is crucial to engage with the logics of the network society or running the risk of getting increasingly and more systematically marginalized. The second concerns the notion of social capital (Putnam, 2000), which can provide the glue to bring the actors in the network to work towards a uniform cause of mitigating violence. The thesis takes a granular perspective on social capital by examining processes of bonding, bridging and linking, and the role of ICTs in shaping each of them. The third concerns the notion of scaling of ICT-enabled peace network. Peace and conflict resolution organizations, networks, and movements around the world have expressed growing concerns that their approaches are limited in scale, short-lived, leading to little lasting impact (Ross et al., 2019). Scaling provided a valuable organizing framework for strengthening, expanding, and overcoming piecemeal, one-off, and non-strategic efforts in mitigating violence. Together, these concepts provided an analytical framework to investigate the phenomenon.

The empirical settings were provided by three regional clusters of violence in Kenya. These included: Mt. Elgon, Muhoroni and Turkana/Pokot. This study was undertaken within the framework of the peace building work of the Free Pentecostal Fellowship in Kenya (FPFK), where the author of this thesis has had more than a decade of practical engagement prior to commencing this doctoral work. Guided by an interpretive paradigm and adopting a longitudinal case study design, the study utilized firstly a retrospective approach for the 2009-2018 period to interpretively reconstruct the events which took place in the initiation of the peace network in the Mt. Elgon conflict system. The second (2017-2018) and third (2019-2021) phases involved research through practical engagement and data collection through interviews, focus group discussion, observations and study of large amounts of archival data. The second phase focused on Muhoroni conflict system and the third on Turkana/Pokot, which helped to gain rich insights into the process of scaling of the peace networks.

The study results indicated that ICTs played key roles in mitigating violence in five key areas. First, the ICT-enabled peace network contributed peace through robust justice manifested through recovery of and reduction in livestock theft. Second, the minority persons and communities gained representation in decision making processes and leadership. Third, business liberty was achieved within and between ethnic communities in which closed

markets were markets were reopened and more inter-ethnic business networks emerged. Fourth, there was positive peace through improved governance through enhanced trust and accountability between the community members and leaders contributing to effective handling of threats to peace. Finally, positive peace was realized through reduction of gender-based violence by uncovering highly secretive cases of child marriage and child defilement within the family bonded relationships and enabled naming of criminals leading to their arrest.

Theoretically, the thesis contributes to first, Walsham's concern as to whether ICTs are making a better world by arguing that a better world is a peaceful world and reframes the question to, *"is the world becoming more peaceful with ICTs?"* The thesis argues that ICTs can contribute to making the world more peaceful by being embedded in social structures where they draw on social resources for building counter networks to violence endorsing systems. Second, The thesis contributes to IS literature by arguing that ICTs contribute to making the world more peaceful by enabling strong linking social relationships between community members and groups with government authorities. The thesis concludes that scaling to new areas involves carefully designed contextual cyclic stakeholder, technological, outcome and content adaptations. Third, The thesis contributes to key debates in the field of peace-building by addressing questions such as can we use ICTs to improve the situation in context of violence? Does increased ICT ability and use really mean progress and reduced loss of life? What opportunities do ICTs provide in responding to violence and prepare communities for violence related disasters? Can ICTs facilitate the management of conflicts and post conflict situations? This thesis discusses some of these issues in contexts of violence enhancing activities, such as cattle rustling, gunrunning, militianism ethnic intolerance, and criminality. Peace-building practitioners would benefit from this thesis through the model for building functional ICT-enabled peace networks and the framework for scaling them.

1. INTRODUCTION

1.1 Problem Context

State of ethnic conflicts internationally and in Kenya

This research seeks to understand the process of building and scaling ICT-enabled peace networks aimed at mitigating violent ethnic conflicts in low and middle-income countries (LMICs). Ethnic conflicts remain one of the most significant challenges to human security, with major territorial, environmental, social, and economic ramifications (Eriksen, 2019). Cordell and Wolf (2016) identify 275 ethnic or communal groups in 116 countries containing more than one billion people — 17.4% of the world's population that is politically, socially, and poor. The extreme diversity of this population group is reflected in approximately 6000 languages being spoken across 900 to 1600 major cultural groupings (Williams, 1994). Resurgent ethnic movements have been reported in many of these countries, contributing to violent ethnic conflicts (Williams, 1994). Sites of such violence include Burma, Kashmir, Palestine, Chechnya, and many others (Kordell & Wolf, 2016). Africa not only has the highest ethnic diversity but also the highest incidences of ethnic violence. Rwanda, Burundi, Angola, Liberia, Congo-Kinshasa, South Sudan, Ethiopia, Somalia, and Kenya have witnessed some extreme ethnic conflicts (Osinubi & Osinubi, 2006).

Kenya, the empirical focus of this research, is reported to experience high levels of ethnic violence in Africa (Dowd & Raleigh, 2013). The wave of conflicts in Rift Valley, Nyanza, and western parts of coastal regions is the worst hit since independence in 1964. In Rift Valley, clashes took place between non-Kalenjin/non-Maasai communities (Kikuyu and Luo, the Kisii, Luhya, and Kamba) and the Kalenjins from1991 to 2008 (TSA, 2014). In the coastal region, there were clashes between the Miji-kenda and other ethnic groups such as the Kamba, Luo, Luhya, and Kikuyu in 1997. The most violent one in 2007-2008 affected mostly the Eldoret, Naivasha, Nakuru, Nairobi, Mombasa, and Kisumu regions. The heavily congested western region and other areas of the Rift Valley such as Molo, Kuresoi, and Mt. Elgon (Musau, 2009) were also badly hurt.

The underlying causes of these conflicts are complex as they are deeply rooted in the socio-cultural beliefs of the society and the historical ramifications of the colonial legacy. The British strategy of 'divide and rule' polarized ethnic communities in Kenya (Juma & Simiyu, 2019; Nnoli, 1998; Nyukuri, 1997) and also other countries. The early groups that resisted colonial establishments were distinct ethnic unions which later transformed into ethnically aligned political parties. This resulted in electoral competition and malpractices which contributed to ethnic violence since the 1990s (Wambua, 2017; Wamwere, 2008). Other contributing factors include unresolved land grievances (Musau, 2009), poverty, social, economic, and political exclusion (Brown, 2018; Wamwere, 2008; Kruger, 1993), and the spill-over effects from conflict-torn geopolitical regions like the Horn of Africa, East Africa, and the Great Lakes Region (Juma & Simiyu, 2019; Musau, 2009; Cocodia, 2008).

Given the complexity and multi-dimensional nature of ethnic conflicts and the multiplicity of underlying causes, it becomes important to define the key concepts used in this thesis. Ethnicity is one of those. I adopt Eriksen's (2019) conceptualization of ethnicity as a mechanism for social boundary maintenance (and transcendence), representing properties of

social formation and cross-cultural interaction. He argues that ethnicity leads to the categorization of people as ethnic groups, representing a community of people with a common identity and fate based on origin, kinship, ties, traditions, cultural uniqueness, a shared history, and possibly a shared language (Eriksen, 2019). This social pluralism leads to multiple differences, eventually resulting in ethnic conflict, described as a situation in which two or more ethnic groups pursue goals that are incompatible but perceived individually as just. The goals of at least one party are defined exclusively in ethnic terms, and the primary fault line of confrontation is one of the ethnic distinctions (Cordell & Wolff, 2016). I conceptualize violence and peace from Galtung's (1969) perspective of violence as both indirect and direct, and peace as both positive and negative. Indirect violence is the cause of the difference between the potential and the actual, between what could have been and what is, while in direct violence the means of realization is not withheld, but directly destroyed. He views negative peace as the absence of violence while positive peace as involving the restoration of relationships, and the creation of social systems that serve the needs of the whole population and has conditions for the constructive resolution of conflicts. My thesis focuses on the processes of building positive peace.

Global, Regional, and National responses to ethnic violence

Reducing violence in all its forms and at all levels has emerged as a global area of development policy and programming after it was made a standalone goal in the Sustainable Development Goals (SDG 16) (Lind, Mitchell & Rohwerder, 2016). As a result, global interventions have been initiated including international and regional peacekeeping efforts; political reforms and institutionalization of rights at the national level; political settlements and sub-national dialogue and mediation; locally negotiated agreements that national governments agree to respect; securing livelihoods and building the resilience of communities to combat violence (Lind, Mitchell & Rohwerder, 2016; Assembly, 2015; Von & et al., 2015; World Bank, 2013). Regionally, the African Union, New Partnership for Africa's Development, Inter-Governmental Authority on Development, and the East African Community have identified early warnings and coordinated responses such as the in-state Conflict Early Warning Response Units (CEWERUs) and the National Focal Points on Small Arms and Light Weapons (SALW) (Babaud & Ndung'u, 2012).

Kenya has responded to ethnic violence by instituting several structural reforms reflected in the promulgation of the new constitution aimed at reducing corruption, unequal distribution of resources, and the politicization of ethnicity. It also looks at eliminating impunity, increasing efficiency in land administration systems, achieving good governance, creating fair and transparent electoral systems, strengthening the judiciary, and increasing accountability of the police force (Babaud & Ndung'u, 2012). Other measures include the establishment of the Truth, Justice, and Reconciliation Commission, the creation of the Commission of Inquiry into Post-Election Violence, disarmament operations, the creation of the National Steering Committee on Peacebuilding and Conflict Management (Akpedonu, Lumsdaine & Sow, 2013; Ryan, 2012). There are also NGOs and faith-based organizations that mobilized communities to foster early warning and response and build long-term resilience to combat violence (Ryan, 2012).

ICT-enabled responses to ethnic violence

Information and Communication Technologies (ICTs) are being increasingly integrated into strategies for mitigating violent conflicts. ICTs are defined as a diverse set of tools used to create, disseminate and manage information. They include all digital/computational forms of technology (hardware and software) including mobile phone hardware devices and SMS texting, web-based social networking sites, and the Internet itself.

Mobile phone subscriptions as of November 2021 stood at more than 90% of the global population (ITU, 2021). This unprecedented global adoption rate of ICTs is rapidly changing individual and institutional responses to conflict, development, and humanitarian aid in fragile socio-political contexts (Welch, Halford & Weal, 2015). The common perception that ICTs are majorly used in advancing violence such as terrorism, cyber-terrorism, crime, and war propaganda, overlooks the valuable potential role of ICTs in reducing violence (Kelly, 2019; Matveeva, 2013; Pierskalla & Hollenbach, 2013). During the 2007-2008 election-related unrest in Kenya, new technologies were mobilized for propaganda and to fuel ethnic tensions, such as the use of the Mashada bulletin board for hostile and ethnically divisive messaging (Maina, 2015). However, in response to the misuse of mobile phones to incite violence, several organizations set out to use the same technology to challenge social perceptions in their communities (Welch et al., 2015). They identify generating data, its management or mobilization, and information sharing, by creating alternative spaces to empower people to participate in peacebuilding. While little research has been undertaken on how these initiatives are formed and scaled (Gaskell & et al., 2016; Mancini & O'Reilly, 2013), peace-building projects using ICTs have proliferated over the past few years in wide-ranging ways. Northern Ireland, Kenya, Cyprus, the Central African Republic, Georgia, Somalia, and Libya offer good examples of these initiatives (Young & Young, 2015).

In Northern Ireland, the Elva digital platform was applied to mapping race, homophobic, and religion-based hate crimes (Young & Young, 2015). In post-conflict Cyprus, the Mahallae platform has been used for increasing civic engagement. In the Central African Republic, there is a platform that helps humanitarian actors map relevant incidents and needs of conflict-affected and displaced people. In Georgia, a project to monitor and address security incidents in conflict-affected communities using SMS and smartphone apps was established. In Somalia, a platform that allows local organizations to carry out SMS-based polls on democratization issues amongst the general population was established. In Libya, a local organization prevented conflict using a mobile-based reporting platform. Peace.Facebook (peace.facebook.com) is a joint project between Facebook and the Persuasive Technology Lab at Stanford University trying to bring together opposing sides in some of the most bitterly divided areas of the planet. For example, it is being used to encourage online friendships between Israel and the Palestinian Territory, Pakistan-India, and Ukraine-Russia (Young &Young, 2015). The Online Infocrim system is used for tracking homicidal violence through surveillance and intelligence gathering in Sao Paolo, Brazil. It has been credited for reducing homicide rates from 12,800 to 7,200 within 5 years (Mancini & O'Reilly, 2013).

Kenya is a global frontrunner in the innovative use of ICTs for peace-building (Singh, 2013). Several platforms have been developed to track hate speech following the 2008 and 2013 post-election violence. The platform Ushahidi uses the concept of crowdsourcing for social activism and public accountability and has achieved satisfactory results in preventing mass violence

(Morrow et al., 2011; Okolloh, 2009). The platform Uwiano, meaning "connection" or "correlation" in Swahili, crowd-sourced its information using text messages with updates on hate speech and possible locations of violence. The warnings then facilitated response to situations of possible conflict by engaging different actors at multiple levels. The platform has prevented approximately 250 incidents of potential violence (Kumar & De la Haye, 2012; Wynn-Pope, 2011). The National Cohesion and Integration Commission established a similar initiative in the 2013 election period, in which there was a toll-free number that citizens could text to for reporting hate speech. Sisi ni Amani (which means "we are peace") sought to enhance civic engagement and provide alternative avenues by which the aggrieved could seek justice (Maina, 2015). The Umati (meaning "crowd" in Swahili) platform was established to track inflammatory speech posted online and to counter them with positive messaging (Sambuli, Morara & Mahihu, 2013). Uchaguzi (meaning "election") was initiated to monitor election activities. Citizens could use it to report community tensions and issues related to voting (Crandall & Omenya, 2015).

1.2 Thesis Motivation and Research Questions

The trends in increasing global interconnectivity, particularly through the use of mobile phones, and the generation of an unprecedented quantity of data, does not match with the inadequate attention paid to strengthening how ICTs can contribute to conflict mitigation in LMICs. This thesis is motivated to address this research gap within the context of Kenya.

Many ICT-related peace-building initiatives are limited to early warning and early response systems that are mainly regional, like the Conflict Early Warning and Response Network (CEWARN). Such regional or national-level systems have challenges related to the effective response to local conflict issues due to their top-down structure (Mancini &O'Reilly, 2013) and limited focus on prevention response. While much time has been utilized for data-gathering, documentation, reporting, and conflict analysis, there is still much to be done in terms of bringing the information back to the communities to support local responses (Haider, 2014; Arnado, 2012). Lack of scale is another enduring problem in ICT4P initiatives in many LMICs as the focus remains confined to short-term crises such as criminal violence, election-related violence, and armed conflict crises (Mancini and O'Reilly, 2013). Meier and Leaning (2009) studied the use of ICTs to demobilize child soldiers in the Democratic Republic of Congo and Baguma (2014) identified how ICTs were designed to promote citizens' democratic advocacy in Uganda. In Burma, ICTs have been applied in redressing the balance of power between citizens and elected officials through nonviolent grassroots movements (Danitz &Strobel, 1999). Addressing these issues at scale is an existing limitation.

Tellidis and Kapple (2016) have argued that ICT platforms have the potential to be used at the same time by a broad range of actors to monitor and respond to diverse issues instead of developing isolated platforms for each issue. This potential of ICTs has not been exploited in such multi-faceted violence mitigation processes. With this in mind, the research questions this thesis seeks to answer are:

> *How can existing social networks be influenced by ICTs in mitigating ethnic violent conflicts in the study area?*
>
> *What is the interplay of ICTs and social capital mechanisms in building community-driven peace networks in ethnic violence settings?*

How can ICT-enabled peace networks be scaled in mitigating ethnic violent conflicts?

1.3 Theoretical Approach

The core theoretical concepts guiding this thesis include ICT-enabled counter networks for peace, social capital, and scaling. These are introduced here and further detailed in chapter 2.

ICT- enabled peace networks as counter networks

ICTs and their applications in social contexts are the major focus of this study. ICTs for peace tend to be limited to the use of mobile phones and relevant computer software and hardware. Mobile phones are ubiquitous across LMICs with significant use in tracking insurgent groups, surveying risks, and empowering ordinary citizens (Kelly, 2019; Berman, Felter & Shapiro, 2018; Perera, 2017). To develop the analytical framework for ICT-enabled peace networks, the thesis brings Castells's theory of networks (Castells, 1996, Castells et al., 2009) into focus. Castells (1996) has provided a modern perspective on networks as informational networks (network society). He describes the informational networks as forms of contemporary novel social structure, which results from the interactions among the social organization, social change, and a technological paradigm constituted around ICTs. These informational networks provide the capability to introduce new actors and ways of working, with relative independence from centralized power centres (Castells, 2004). Efficiencies in networking come through the flexibility, scalability, and survivability that accrue from the new technology. Flexibility because networks can reconfigure according to changing environments, keeping their goals while changing their components. Scalability as they can expand or shrink in size with little disruption. Survivability because they have no centre, can operate in a wide range of configurations, and resist attacks to a central power centre which puts to risk the whole network at.

I draw upon Castells' formulation of the network society for the following reasons. One, he has argued that groups and geographical regions who are marginalized and neglected can seek to embrace the informational logic and change their status by becoming included in the network society. Further, by not engaging with these networks, they run the risk of continued systematic marginalization. This underlies his argument that networks cooperate or compete with each other (Castells, 2004). He develops the notion of network competition by arguing that competition arises because each network has its power system depending on its programmed goals (Castells, 2011). It is characteristic of the network society that both the dynamics of domination and resistance to domination rely on network formation and network strategies of offense and defense. I consider the power relationships constructed to sustain conflict as violence-endorsing social networks, while those that exercise counter-power to mitigate violence as the peace networks. There are different forms of violence endorsing networks like militia groups, criminal gangs, gunrunning and drug-trafficking collectives, cartels, mercenaries, and livestock rustlers. Members of these violence-endorsing networks include business elites, government officials, police, arms dealers, intermediaries, and combatants (Austin, 2019). There were examples of such violence-endorsing networks in my study area, as detailed in the next chapter. For example, in Mt. Elgon, there are militia groups like Sabaot Land Defence forces (SLDF), Moorland forces, and Forty-Two Brothers that champion their land interests. In Muhoroni and Turkana/Pokot conflict systems, there are groups like Morans,

warriors, etc., that focus on livestock raiding. The thesis explores how the counter networks (peace networks) are formed to outperform these violence-endorsing networks for peace-building.

Two, Castells situates ICTs and their informational logic at the center of how these networks operate. This resonates with my case under study, where the Conflict Early Warning and Response System (CEWRS) is at the centre of the peace-building efforts. The thesis considers resistance networks powered by ICTs (Castells, 2011), which are formed to oppose violence-endorsing networks. Such networks resist the normal and create a counter process, which is a potential available in the network society (Castells, 2011). This helps in forming opposing networks to violence-endorsing networks, which this thesis conceptualizes as peace networks.

In practice, not all can easily become members of the network society, for reasons of access to ICTs, limited prior experience, and other forms of social and political discrimination. Including those marginalized groups in "counter networks" was exemplified by Mosse and Sahay (2005) in their study of the role of communication practices in strengthening counter networks within the primary healthcare sector in the deprived region of Niassa in northern Mozambique. They emphasized the long-term and sustained efforts required to deal with the existing constraints through the power of ICTs. The absence of adequate visibility of information weakens advocacy efforts resulting in the continued and systematic marginalization of these disadvantaged groups. Building informational capacity, both at the structural and personal levels, becomes key in mobilizing these counter networks for strengthening advocacy for peace.

Social capital in ICT-enabled peace networks

The theoretical approach for this study is further guided by the need to understand how ICTs can be sensitively integrated into social contexts of use. ICTs must be supported by the community's social capital including shared norms, values, identity, and desire to engage in peace-building efforts. This thesis builds upon the notion of "social capital" to understand these community-based social networks and processes of peace-building. Social capital is viewed as resources or assets rooted in an individual's or a group's network of social relations (Lin, 1999; Kelly, 1998; Putnam, 1994; Coleman, 1988; Bourdieu, 1986). Such resources support the building of reciprocity, trust, and identity/solidarity and provide conditions for enabling action in social networks. These social resources form the glue that binds community-based social networks together.

Social capital is considered a resource for enabling community collective action which can lead to either violent conflict or peaceful coexistence. For collective action to bring desired results to the community, members need to effectively participate collectively in social networks. When experiencing a conflict, the affected people can understand solutions in terms of available network resources, conceptualized as social capital. They seek help from someone they trust who understands the different sides and is suitably anchored in the social setting (Ledarach, 1997). Ledarach further notes that in conflicts where the governments are key actors either as an instigator or as partisan bystanders, local communities tend to view the local administration with fear, suspicion, and hostility, making it necessary to draw upon social capital-based resources.

A key contribution of Putnam's work (2000) is distinguishing bonding, bridging, and linking social capital. Bonding is described by Narayan (1999) as connections within a group or community characterized by high levels of similarity in demographic characteristics, attitudes, available information, and resources. Bridging social capital describes social relationships of exchange, often of associations between people with shared interests or goals but with contrasting social identities (Pillai, Hodgkinson, Kalyanaram & Nair, 2017). Linking social capital describes norms of respect and networks of trusting relationships between people interacting across explicit, formal, or institutionalized power or authority gradients in society (Putnam, 2001). The thesis argues that social capital is one homogeneous concept that plays out uniformly across different conflict situations, but aspects of bridging, bonding, and linking create varying consequences in peace-building efforts.

I use the concept of social capital in contexts of conflicts cautiously, on whether it contributes or not to peace (Avdeenko & Gilligan, 2015; De Luca & Verpoorten, 2015; Cassar et al., 2013; Blattman & Miguel, 2010; Ostrom & Ahn, 2009; Lederman et al., 2002; Sampson & Raudenbush, 1999; Brehm & Rahn, 1997) or whether it enhances conflicts (McDoom, 2014; Sambanis & Shayo, 2013; Grootaert et al., 2003; Szreter & Woolcock, 2004; Colletta, 2000; Narayan, 1999; Lemarchand, 1996). Dillahunt (2014) found that ICTs provide networking infrastructure that encourages the formation of social capital. ICTs are stores for social resources that can be accessed by members through social networks even in anonymized ways (Pigg &Crank, 2004; Norris, 2003). ICTs facilitate access and mobilization of resources for action towards the achievement of a given goal and enable reciprocities of transactions by offering platforms through which solicitations and offers are exchanged (Urquhart, Liyanage & Kah, 2008; Miranda & Saunders, 2003).

IS researchers (e.g., Ahmed and Alzahrani 2017, Urquhart et al 2008, and Yang et al 2009) have argued that community-based social networks can play a significant role in mitigating ethnic violent conflicts. However, research on how this can be achieved remains under-explored. It has further been noted that often ICTs are not well contextualized within the historical and sociocultural conditions of use (Haider, 2014; Yang et al., 2009;), including the available social resources in the network (Ledarach, 1996). The exploration of this relationship is an important motivation for the use of social capital concept in my analysis, to understand the values and beliefs that motivate individuals to join or form networks that champion peace efforts.

Scaling of ICT-enabled peace networks

Scaling provides a valuable organizing framework for strengthening, expanding, and overcoming piecemeal, one-off, and non-strategic efforts in mitigating violence (Bhatt & Altinay, 2013). From the information system perspective, Braa, Monteiro, and Sahay (2004) have argued that scaling interventions is a prerequisite, not a luxury, for sustainable interventions. Peace and conflict resolution organizations, networks, and movements around the world have expressed growing concerns that their approaches are limited in scale, short-lived, and therefore have a little lasting impact (Ross et al., 2019). For example, there are reports of successful ICT-based interventions for peacebuilding in Kenya, which tend to be at a project level, finite in time and geography, and not addressing the challenge of scale (Barker et. al., 2015). This points to an urgent need to better understand how such initiatives can be scaled to have a more large-scale impact (Gündel, Hancock & Anderson, 2001).

Therefore, this study is not only concerned with the building of ICT-enabled peace networks but also with how to replicate and scale up so that the impact is felt on a wider scale. Scaling has been conceptualized in many ways (Ross et al., 2019; Barker & et al., 2015; Wigboldus et al., 2016; Foster & Heeks, 2013; Mangham & Hanson, 2010; Hartmann & Linn, 2008; Sahay & Walsham, 2006; Braa, et al., 2004; Franzel et al., 2004; Osborne et al., 1999; Uvin, 1995). For this study, I adopt Uvin's (1995) definition of scaling as increasing the impact of grassroots organizations and their programs to move beyond "actions on the margins" to tackling large-scale issues. From his definition, Uvin identified quantitative, functional, political, and organizational dimensions of scaling which I use to guide my analysis.

I analyze the scaling of ICT-enabled peace networks by examining, first, the quantitative scaling which involves the expansion of size in the form of membership, budget size, and geographical scope. Secondly, I assess the functional scaling up to determine how the peace network has expanded the number and type of activities. Thirdly, political scaling up involves an analysis of how ICT-enabled peace networks contribute to empowerment and change to engage against the structural causes of violent ethnic conflicts. Finally, I analyze organizational scaling up to ascertain how ICTs have increased their organizational strength in terms of new partnerships, technological upgrades, knowledge and skills enhancement, and financial sustainability.

1.4 Analytical framework

Fig 1.1 Describes the analytical framework that guided the study.

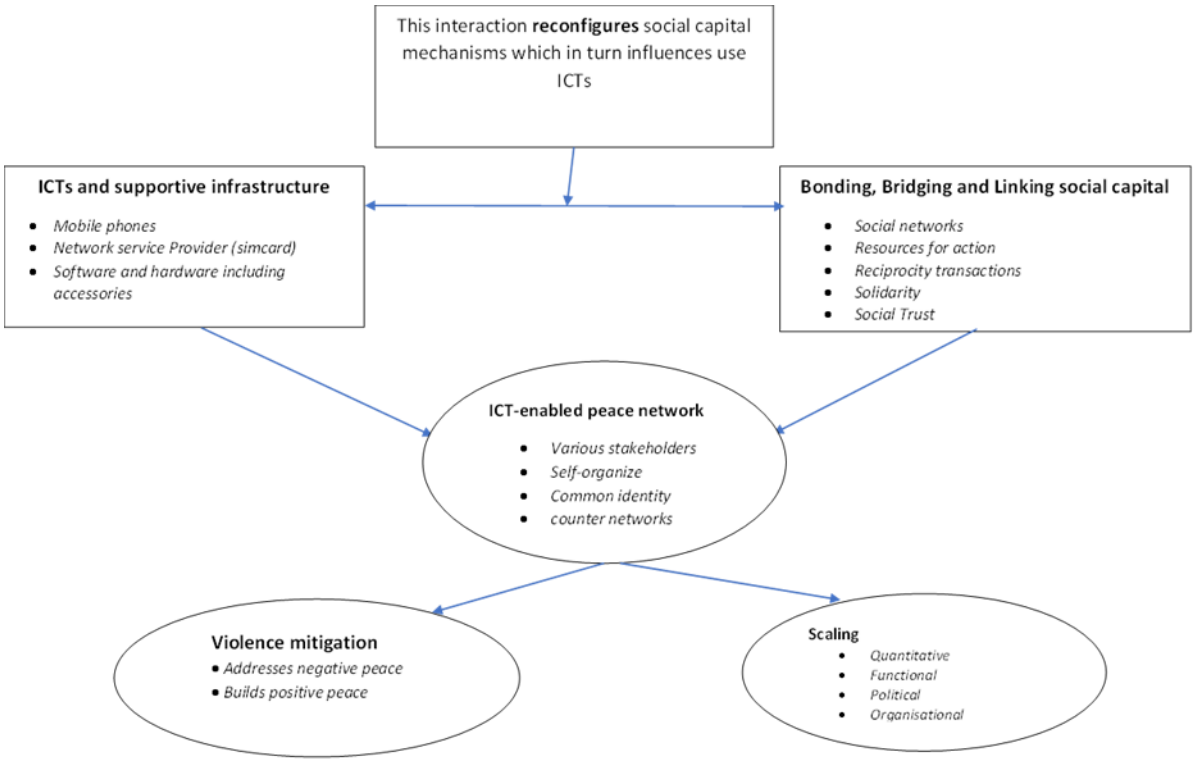

Figure 1. 1 The Analytical Framework shows relationships among the main concepts. The circles are used where the sequence of processes keeps the system in the same state despite the changing conditions.

The analytical framework is comprised of 5 conceptual boxes and their interconnections. At the center is the ICT-enabled peace network, which is shaped by the other boxes. ICT-enabled peace networks are the agency for violence mitigation as they represent the driving force in opposing the existing violence networks.

ICTs are a key resource in the establishment and evolution of the peace network by building necessary social capital. The spread of ICTs creates a networking infrastructure, which encourages the formation or expansion of social relations and by extension creates new social resources needed for the peace network. In this regard, ICTs can strengthen the interaction and therefore help create and expand the social capital mechanisms needed to sustain the peace networks.

The notion of social capital and its mechanisms of bonding, bridging, and linking structure the peace networks to support the function of violence mitigation. The mechanisms and social resources can be expanded and sustained by continuous interaction within the networks. Social capital concerns social resources of trust, reciprocity, and solidarity that members of a network use to engage in peace activities. For peace networks to function sustainably, they need to be anchored in community social structures, values, and norms.

Violence mitigation is the key focus of this study, and it involves addressing negative peace while building positive peace.

Scaling involves spreading the benefits of the ICT-enabled peace network to reach a critical mass of other beneficiaries through quantitative, functional, political, and organizational dimensions. Scaling is important as it ensures greater developmental impact for innovations.

While peace networks guided me in understanding the key stakeholders involved, their interests, and how they were engaged in mitigating violence, social capital guided me to understand the nature of the social resources and how they are used in building and maintaining peace networks. Scaling provided the organizing framework for expanding the peace network in quantitative, functional, political, and organizational dimensions.

1.5 Empirical settings and Research Methodology

Study location: The empirical settings for this study are the following counties in Kenya: Bungoma, Trans Nzoia, Kisumu, Nandi, Kericho, West Pokot, and Turkana. The communities under study were the Kalenjins (Kipsigis and Nandi) in Kericho and Nandi counties and the Luo in Kisumu. These formed one axis of inter-ethnic violent conflict that is referred to as the *Muhoroni conflict system*. While the Bukusu, the Sabaot, and the Iteso in Trans Nzoia and Bungoma formed another conflict axis referred to as the *Mt. Elgon conflict system*. In this axis, there are also the Kikuyu, Pokot, and Nandi communities. Communities in Trans Nzoia and Bungoma have been embroiled in violence since 1963. It was stated that Mt. Elgon covering both Trans-Nzoia and Bungoma counties, encountered several phases of violent conflict in 1963,1968, 1991-1992, and 2005-2007. The causes of all these conflicts were issues of colonial legacy, political dominance, land and boundary disputes, the proliferation of Small Arms and Light Weapons, and large-scale cattle theft. The existence of ethnic-based militia groups was blamed for radicalizing youths, thus, becoming a threat to security.

About FPFK: My empirical case is in the context of the work of the Free Pentecostal Fellowship in Kenya (FPFK) which has peace initiatives in the aforementioned counties. FPFK

is an evangelical church registered in 1977 as a society. It operates in 31 regions and has over 2000 local churches with a combined membership of over 300,000. FPFK undertakes social projects in the areas of education, health, economic empowerment, peacebuilding, conflict transformation, humanitarian assistance, gender equity, and economic empowerment of the youth and children's work. Through many peace projects, it runs an ICT-enabled Early Warning and Early Response System (EWERS) as a key tool for mitigating violence through sending, receiving, and processing of anonymized SMSs. The FPFK EWERS was introduced in 2013 in the Mt. Elgon conflict system to facilitate the prevention of intra and inter-ethnic violence and has been scaled to Muhoroni and Turkana/Pokot conflict areas. This provides a good case study for answering the research objectives.

My role before the Ph.D. program: Before joining the Ph.D. program, I worked with FPFK in various positions starting as a social worker and rising to the position of Centre Leader for the children's program based in the larger Mt. Elgon region. I interacted with children left homeless because of ethnic conflicts in the region that covered Mt. Elgon and Turkana /Pokot areas. The children were living on the streets of Kitale town. The more children we took from the streets, the newer ones replaced them. The 2006-2008 bloody violence caused massive displacement of people, with some seeking refuge in the center that I oversaw. During this time, I doubled my roles to include the coordination of a humanitarian response that supplied food and non-food items to displaced families. FPFK also undertook counseling of the victims, especially women, children, and some of the youths who had escaped from the combat battles. This exposed me to children with painful experiences, women with deep wounds both in the flesh and hearts, and young people with emotional wounds and great despair. The experiences formed the basis for my life mission of peace and dignity for every human.

Building on all these experiences, FPFK and its mission partner — the Norwegian Pentecostal Mission — jointly worked on the plan to intervene beyond the humanitarian response to address the root causes of violence in the Mt. Elgon conflict system. We developed the plans in 2008 after the violence had ceased through military operations. The plans materialized in 2009 after the peace and human rights project was launched. I switched roles to become the head of this peace project. I took part in conducting community peace dialogues that resulted in peace agreements, rehabilitation, and reintegration of the former militia young men. I also took part in efforts to strengthen human rights by helping various community-based groups to develop an ability to manage conflicts and support the vulnerable with livelihood assets. We addressed peace through education where scholarships were offered to orphans and constructed six schools. It is also during this time that we started and implemented an ICT-enabled peace network with a strong focus on early warning and response. I engaged in the mobilization of community groups and state actors towards the formation of the peace networks including their strengthening. I worked closely with software developers during the design of EWERS and interacted with the indicator monitors, the community peace representatives, and security agencies through continuous review meetings and discussions. I also analyzed the system reports and shared the information with relevant stakeholders. This work continued until the end of 2016 when I switched to coordinating projects. This history of diverse experience gives me a rich understanding of the dynamics of building and sustaining an ICT-enabled peace network.

Research design: The Ph.D. research is a longitudinal research design, involving multi-stakeholder analysis based on qualitative data in a case study setting. The study applies the

multi-stakeholder analysis approach in identifying, classifying, and investigating the relationships between stakeholders that formed the peace network. It also reflects on the process and actions and results of the network. Using this design, I was able to generate the distinct roles and the corresponding stakeholders that were divided into three levels: i) The indicator monitors commonly known as field agents who collect intelligent reports from the field and share the data for enabling response; ii) System developers and analysts involved in building the response system; iii) Responders who mainly comprised of end-users, the government authorities, and the other non-state actors.

The longitudinal research design was chosen to develop a process perspective toward the mitigation of ethnic violence and the role ICTs played. The process stretched from 2009-2021. Since the period 2009-2018 was outside the Ph.D. program, I did a retrospective study to answer the research question on building peace networks. During the study period of 2018-2021, I visited the research area multiple times and interacted with key stakeholders. I visited each of the sites at least quarterly until the end of December 2019 for meetings, dialogues, and discussions with the state and the project team. Email and phone contacts were maintained continuously. The indicator monitors, the community peace representatives and security agencies were observed periodically through review meetings. The system reports were also examined at intervals to see the change in indicators, for example, cattle theft, domestic violence, the prevalence of small arms, drugs, and substance abuse, among others.

Timeline of study:

August-December 2018	Admission to Ph.D. program Developed the study proposal and approved by the University and supervisors
January-May 2019	Retrospective study of the Mt. Elgon peace-building process covering the period 2009-2016 Studied the historical data and system information to understand the process of building the ICT-enabled peace network Retrospective study of the Muhoroni peace-building process for the period 2017-2018 Studied the historical data and system information to understand the process of scaling the ICT-enabled peace network
June 2019-October 2020	Data collection, analysis, data analysis, comprehensive review of the literature and drafting some papers and paper writing and course component
October 2020-December 2021	Authoring papers, conference presentations, and synthesizing papers into Kappa
2021-2022	Authoring papers and Kappa

Data collection strategy: Sources of data collection are varied, and most of the informal nature such as meetings, training sessions, community dialogue sessions, and discussions with other non-state actors. There has also been the use of formal methods of data collection during the implementation of the pilot project from 2019-2021, such as participatory conflict analysis, indicator mapping, and project documentation, which are fundamental requirements in the design and development of the early warning system. Conducting system analysis and design

included capacity-building efforts such as creating resource materials, providing training, handholding, and troubleshooting. In summary, there has been a rich, ongoing, and intensive process of data collection involving various means and including different actors. Also, an important data source was mentoring and coaching those proactive users of the system who wanted to learn more. For example, university graduate volunteers who wanted to learn how to apply technology in peacebuilding. There have been formal presentations made to both the community and my research colleagues at the University of Oslo.

Data analysis strategy: Data analysis was broadly interpretive, including the identification of key themes relating to ICTs, social capital, scaling, and their inter-relationships. For example, when presentations were made to the community, the feedback obtained helped me reflect on my understanding of the situation and make revisions as required. There have been various discussions, meetings, and presentations to my colleagues and supervisors at the University of Oslo which were used to develop iteratively the theoretical learning from the case study.

1.6 Key Findings

As indicated in section 1.2 this study was guided by three research questions stated below.

1. *How can existing social networks be influenced by ICTs in mitigating ethnic violent conflicts in the study area?*
2. *What is the interplay of ICTs and social capital mechanisms in building community-driven peace networks mitigating ethnic violence?*
3. *How can ICT-enabled peace networks be scaled in mitigating ethnic violent conflicts?*

The findings or responses to each question are found in papers 1-5 discussed in chapter 6. The findings are, however, summarized below.

How can existing social networks be influenced by ICTs in mitigating ethnic violent conflicts in the study area?

All five papers directly or indirectly identify various existing violence-endorsing social networks across all three study conflict systems of Mt. Elgon, Muhoroni, and Turkana/Pokot.

Militia groups: Papers 1, 2, and 4 describe how ethnic nationalism, the politicization, and polarization of identities, coupled with ethnic mobilization contributed to the emergence of armed militia groups in Mt. Elgon, Muhoroni, and Turkana/Pokot areas. Examples given in the papers include Sabaot Land Défense Force (SLDF), the Moorland Force, 7 Brothers, 42 Brothers, Chebarakachi Social Force, 24 Brothers, and the Brokers. When ICTs were implemented, security agencies were in the spotlight on how they responded to and address militia gangs because some of them were colluding with the militia groups. The anonymized reporting enabled by ICTs led to reporting of such security agencies to their supervisors.

Livestock rustling cartels are discussed in papers 1, 2, and 4 as the major cause of violent ethnic conflict among the Kalenjin, Luo, Sabaot, Iteso, Turkana, Pokot, and Luhya communities. Cattle rustling refers to acts of stealing livestock across communities and regions. Livestock rustling cartels were formed based on shared cultural values associated with traditional social structures and belief systems of pastoralist societies, which also served as drivers of violence. The practice has been commercialized with the increasing demand for beef consumption locally and internationally. The introduction of ICTs facilitated the timely

reporting of incidents of cattle theft and gunrunning, which encouraged timely response that contributed to the increased recovery of stolen animals, especially in the Muhoroni conflict cluster.

Small Arms and Light Weapons cartels (gunrunning cartels): these are identified and discussed in papers 1-4 as the key driver of ethnic violent conflicts, particularly in Mt. Elgon and Turkana/Pokot conflict systems. Well-connected networks spanning communities, counties, and neighboring countries (Uganda and South Sudan) brought in Kenya firearms, which was a lucrative economic activity. They are used for commercial purposes where they are trafficked across the country but more, so they arm the militia groups and livestock theft cartels. The introduction of ICTs facilitated the timely reporting of incidents of cattle theft and gunrunning, which encouraged timely response that contributed to the increased recovery of stolen animals, especially in the Muhoroni conflict cluster.

Political clientelism, and cronyism: In papers 1-4, political clientelism represented the transactions between politicians and citizens whereby material favors, goods, or services are promised in return for political support at the polls. Voting was based on particularised loyalties defined by kinship and ethnic ties and the extent to which benefits accrued to their groups. This contributed to exclusion of minority community members from political and resource allocation benefits. The introduction of ICTs created a medium through which minority groups could raise their voices and be better included in decision-making processes, by facilitating the flow of information, such as related to discriminatory actions, which helped to challenge the deeply entrenched power structures

Land grabbing networks: Paper 1 discusses the land question as the main cause of the violence and the reason for the formation and sustenance of militia groups in the area. For example, in Mt. Elgon, some people had illegally occupied forest land owned by the government and had subsequently been evicted. The group formed strong social bonds, internal solidarity, and collective efficacy to perform acts promoting their interests. The government allowed them to practice the "shamba system," where they could stay on the land till they took care of the planted trees and would then move out. But the members started uprooting trees secretly so that they continue to grow crops on the forest land.

Cultural intolerance by cultural leaders: Papers 1-4 mention intolerance of cultural practices, particularly circumcision. In Mt. Elgon, while the Bukusu and Sabaot circumcise their male children, the Iteso do not have this practice. In Muhoroni, the Kalenjin circumcise but the Luo do not and in Turkana/Pokot conflict system, whereas the Pokot circumcise both male and female children, the Turkana do not circumcise any of their children. This cultural variance has contributed to the exclusion of the 'others' who do not ascribe to circumcision leading to ethnic violence. The integration of ICTs in violence prevention led to enhancing the visibility of otherwise hidden cultural and behavioral prejudices. This motivated community leaders to regularly meet and conduct dialogue over such messages which promoted social contracts that prohibited such attitudes.

Gender-based violence gangs: Paper 5 highlights the prevalence of gender-based violence in the form of rape, defilement, child pregnancy/marriage, and domestic violence across Mt. Elgon, Muhoroni, and Turkana/Pokot conflict systems. Chebarakachi Social Force was notoriously identified for raping and killing women in Mt. Elgon. The integration of ICTs in violence prevention led to enhancing the visibility of otherwise hidden cultural and behavioral

prejudices. This motivated community leaders to regularly meet and conduct dialogue over such messages which promoted social contracts that prohibited such attitudes.

What is the interplay of ICTs and social capital mechanisms in building community-driven peace networks mitigating ethnic violence?

Generally, papers 1,2,3, and 5 attempt to respond to this question. Paper 1 makes visible social relationships in which resources are embedded and utilized for building the peace network. In line with this, the paper identifies key stakeholders that use the ICTs in the peace network and their respective interests. These stakeholders included the victims of violence, the members of community-based groups, non-governmental organizations, faith actors, traditional institutions, and the state agencies mainly the local administration and the security agencies. All these stakeholders were connected through an SMS platform that enabled them to share and exchange information that helped them to prevent and respond to the factors perpetuating ethnic violence. The paper further elaborates on the different processes that were vital in the creation and cultivation of the peace network and sketches out the role of ICTs and information in the formation and functioning of the peace network.

Paper 2 notes that ICTs help increase social capital in the peace network by connecting members at the same time thereby making them prepared for responding to indicators of violence across the divide. The ICT platform broadcasted alert messages to all the relevant stakeholders at the same time and in real time. This enabled members to stay prepared for response at any given time and increased collaboration among different peace actors. Partnerships in the network are characterized by high levels of reciprocity that strengthen trust, which contributes to building strong relationships. ICTs encourage reciprocity by enabling network members to share indicators of violence. Sharing indicators among network members stimulate regular dialogues among them leading to social contracts that sustain peace. This process of self-organizing helps to build independent internal capacities to take decisions and actions rapidly. Effective communication enabled by ICTs contributes to enhanced self-organizing of the peace network.

Paper 3 builds on paper 2 to highlight the expansion of trust and reciprocity in different forms like the inclusion of the minority, strengthening of economic cooperation, enhanced tolerance of diversity, and commitment towards reconciliation efforts. ICT-enabled peace network promoted inclusivity and amplified the voices of minorities. The use of ICTs helped unlock some of the existing bonds of community members and build trusting relationships through inter-ethnic economic partnerships, with the simultaneous weakening of bonding relationships. ICTs enabled redefining of social capital mechanisms which contribute to peacebuilding. Violence was mitigated by strengthening the social connections among different actors across ethnic entities through the use of ICTs. For example, bridging economic relationships was created when markets opened up to accommodate members from across ethnic divides denied such access previously. Within the bonding framework, individuals and communities had restricted freedom in terms of interactions with other community members because of their norms, values, and cultural practices. However, this was overcome through the introduction of an anonymized ICT reporting system. ICTs enabled reciprocity in reporting and responding to conflict-escalating concerns like cattle theft, land grabbing, gender-based violence, smuggling and trading in illicit arms, drug and alcohol abuse, and armed robbery.

I am cognizant that other researchers found bonding social capital to increase with the rising use of ICTs, especially social media. However, in this study context, increasing bridging social capital contributed to the reduction of bonding social capital. This is because the violence affected nearly in equal measure both ethnic divides. This led to having more victims regardless of their ethnic orientation join the peace network with a view of ending the violence endorsing networks.

Paper 5 discusses key concepts of violence against women and girls (VAWG) through the lens of social capital and how ICTs are applied in their mitigation toward achieving ethnic peace. The paper notes that social capital can play both an expanding and mitigating role in efforts to combat gender-based violence. The paper argues that ICTs if appropriately designed and managed, can make visible these unjust acts of violence, which previously were invisible and not acted upon. Information was the key resource created, shared, and acted upon as a basis to enable networked action to mitigate violence. ICTs further strengthened the accountability of actions that need to take place, based on the visibility of violent actions. The accountability of leaders, especially security officers, was enhanced through information resources. ICTs supported a networked pattern of social interaction amongst various stakeholder groups (administrators, security agencies, community peace representatives, and community-based organizations), playing different roles, all oriented towards mitigating incidents of gender-based violence. Through the anonymized feature of the ICT system, some of the cases that were kept secret like incest, defilement, wife battering, etc. were reported and broadcast to various actors that responded.

How can ICT-enabled peace networks be scaled in mitigating ethnic violent conflicts?

Paper 4 describes the different components or sub-processes of the overall scaling process, anchored in the theoretical concepts of social capital and drawing upon theoretical insights on scaling from the ICT4D literature. The paper identifies four steps for scaling an ICT-enabled peace network. The first step is about building content for peacebuilding activities (conflict analysis, hotspot mapping, and indicator identification). It is followed by mapping and enrolling key stakeholders such as security agents, community groups, NGOs, CBOs, Local government leaders, traditional leadership, Religious leaders, and service providers. The third step involves establishing ICT infrastructure (Computer hardware, software, and accessories). Finally, it concerns establishing, repairing, and evolving peace network operations (coordination platforms, data gathering, and analysis). The paper further highlights some practical and conceptual challenges experienced in scaling processes.

Though the role of ICTs in scaling the peace network was not highlighted in this paper, the thesis concludes that quantitative, functional, political, and organizational considerations are relevant measures to consider for scaling peace initiatives. ICTs contributed to quantitative scaling through mobilization for collective action by connecting peace network members with other actors in the same field leading to increased numbers of peace actors and geographical coverage. ICTs also increased the number of people reached by accessing new resources, creating more synergies and networks. In terms of functional scaling, the flexibility and ubiquity of ICTs used in the peace network enabled the expansion of functions beyond those designed for peace to include health, business, and gender-based violence. Politically, ICTs enabled the inclusion of minorities and marginalized groups into the peace network, thereby

enhancing their participation and contribution to the peace process. ICTs contributed to increasing the visibility of FPFK through the fight against violence against women and girls during the Covid-19 pandemic. The model of the peace network has now attracted other actors like Humanity and Inclusion (HI) to partner with FPFK in implementing a community safety-related project addressing small arms and light weapons. The ICT innovation also led to institutional partnerships with academic institutions like the University of Oslo, Norway, and the Hekima Institute of Peace Studies and International Relations, Kenya.

Based on these findings, I outline the theoretical and practical contributions of the thesis, highlighted in section 1.7.

1.7 Research Contributions

Key contributions include:

1.7.1 Theoretical contributions

First, the thesis contributes to formulating an analytical understanding of how the interlaced relationship between ICTs and social capital contributes to the building and scaling of the ICT-enabled peace network to help mitigate violent ethnic conflicts. There are debates about whether social capital can potentially help to minimize the risk of crime and violence or has undesirable outcomes like creating larger networks of perpetrators of violence. It has further been argued that there is a negative relationship between ICT usage and social capital where the use of technology can lead to a decline in the level of social capital. Others have countered that ICTs contribute to the creation of bonding, bridging, and linking mechanisms that help assuage ethnic conflicts. The thesis contributes to these discussions by developing our understanding at a more granular level of the roles of bonding, linking, and bridging social capital in peace-building efforts.

Secondly, the thesis contributes to debates and unanswered nascent questions in the field of peacebuilding. The unanswered questions include, can we use ICTs to improve the situation in the context of violence? Do increased ICT ability and use mean progress and reduced loss of life? What opportunities do ICTs provide in responding to violence and preparing communities for violence-related disasters? How do ICTs facilitate the management of conflicts and post-conflict situations?

Finally, there are still gaps in our understanding of the benefits or rewards and difficulties connected to quantitative, functional, political, and organizational dimensions of scaling ICT-enabled peace initiatives. Many scholars agree that these dimensions are relevant for scaling interventions at the grassroots levels. However, since their studies were in specific contexts, they do not conclude for general consumption the benefits derived or the difficulties associated with these dimensions. This means there is little unanimity or knowledge about the real implications of scaling. This study contributes to filling this gap by making a substantive analysis of the rewards and dangers of these different dimensions as applied in violent ethnic settings.

1.7.2 Practical Contributions

An ICT-enabled peace network model: The thesis contributes by formulating a model that utilizes local resources like simple mobile phones, and social resources and whose key actors are people engaged with peace-building efforts. According to Haider (2014) and Arnado (2012), existing interventions for ethnic violent conflicts in Kenya have not fully utilized the

potential of ICTs at the community level to monitor the occurrence of these incidents. They argue that while data gathering, documentation, reporting, and conflict analysis have used much time and focus, there is still a lot to be done in terms of bringing the information back to the communities that may be in the position to generate the desired response to a particular threat of violence. They further note that the initiatives have not fully involved the key actors, with a limited engagement of community networks in peace-building efforts, leading to inadequate systematic preventive responses aimed at achieving positive peace. The ICT-enabled peace network model that this thesis formulates addresses these gaps.

Knowledge, skills, and methods: The study contributes by building knowledge, skills, and methods for improving or building scalable ICT-enabled peace networks. Some researchers (Baguma, 2014; Mancini & O'Reilly, 2013; Meier & Leaning, 2009; Danitz & Strobel, 1999) have voiced concerns over ICT4P initiatives designed for specific purposes in contexts with multiple and interconnected needs that require multi-faceted approaches to offer sustainable solutions. Scaling of these networks becomes an important challenge, which this study will directly contribute towards.

Contributing to designing and evolving the early warning and early response system (EWERS): The thesis contributes towards understanding the process of designing and evolving the EWERS systems with the capability to address local and national level violence.

1.8 Thesis Organization

The rest of the thesis is organized as follows:

- Chapter 2: Presents a detailed review of relevant literature and the development of the analytical framework to guide this thesis
- Chapter 3: The context in which the study was conducted is described
- Chapter 4: Discusses the research methodology including the research design, data collection, and analysis techniques
- Chapter 5: The case findings are presented
- Chapter 6: provides the synthesis of findings
- Chapter 7: Contains discussions and contributions
- Chapter 8: Conclusions and recommendations for future research are described

2. RELEVANT LITERATURE AND ANALYTICAL FRAMEWORK

This chapter outlines an overview of the literature relevant to the theoretical concepts used for analysis in this thesis. In section 2.1, I discuss relevant literature relating to peace and violence and the role of ICTs in mediating them. In section 2.2, I discuss ideas around networks and how they apply to peace-building efforts, enabled through ICTs. Section 2.3 discusses ideas around social capital and the role it plays in building and scaling peace networks. In section 2.4, I discuss the concept of scaling and how it is applied in peace initiatives. Finally, I bring together these concepts in formulating the analytical framework which has guided my thesis.

2.1 Understanding Concepts of Violence and Peace

In this thesis, 'peace' and 'violence' are of central focus, and the process of building a world that is peaceful or free from violence (Grewal, 2003). I draw upon Galtung's (1969, 1990) classification of violence as direct/personal, structural and cultural, and peace as being negative and positive. As much as Coady (2007) criticizes Galtung's categorization on the difficulties of operationalizing these terms in practice, and that the boundary between personal and structural violence is ambiguous, I argue for its relevance in the context of this study.

Galtung (1969) describes violence as to result of the difference between the potential and the actual, between what could have been and what is. Violence increases the distance between the potential and the actual, preventing the mitigation of this distance. Violence represents avoidable insults to four sets of basic human needs: i) Survival (negation: death, mortality); ii) Well-being (negation: misery, morbidity); iii) Identity and meaning (negation: alienation); iv) Freedom (negation: repression). Direct violence, in physical and psychological forms, refers to visible forms of violence like beating or sexual abuse, threats, and verbal insults exerted in public or more discretely. Structural violence concerns social structures in society that prevent people from realizing their full potential or from enjoying their human rights, usually, due to being members of certain groups. This violence is built into the structure and is expressed as unequal power relations and consequently, as unequal life chances. Cultural violence represents cultural aspects like religion, language, and ideology, which can be used to justify or legitimize direct or structural violence and inhibit or suppress the response of victims. It does not directly kill or deprive of rights, yet it is harmful because it normalizes violence by making it acceptable (Galtung, 1977).

Galtung (1969) argues that peace and violence are two sides of the same coin. Peace is the absence of direct/personal, structural, and cultural violence which results in negative and positive peace. He views positive peace as a condition in which there is relatively robust justice, equality, liberty, and relatively little violence and misery in society. On the other hand, he considers negative peace to be where there may be an overt absence of war and other widespread violence in a particular culture, society, or nation-state, but there is also pervasive injustice, inequality, personal discord, and dissatisfaction (Galtung, 2008). In my thesis, I seek to understand how ICTs-enabled peace networks can help reduce the distance between the potential and actual, by mitigating the violence-creating and perpetuating conditions.

2.2 ICTs in Violence Mitigation

Much hope is placed on ICTs to mitigate conditions of violence by reducing the gap between the actual and the realized potential of individuals to achieve their aspirations (Gaskell, 2019; Himelfarb, 2009). ICTs provide enabling affordances, which potentially can be leveraged for the mitigation of violence. How can this potential be effectively enabled is the focus of this thesis.

While peace research has emphasized the empowerment of people to participate in localized conflict management efforts, they have not considered the role ICTs can play, and the new opportunities they can potentially enable (Gaskell, 2019; Welch et al., 2014; Mancini & Reilly, 2013). Empowerment concerns the ability to share one's voice or opinion as well as to take part in existing peace-building processes (Gaskell, 2019), which is enabled through generating, sharing, and acting on data (Kahl & Larrauri, 2013). This includes the processes of information sharing or communication (Welch et al., 2014), management and mobilization (Mancini & Reilly, 2013), and providing alternative spaces for participation (Gaskell, 2019; Welch et al., 2015; Turner, 2008).

Empowerment involves generating data, both in specific locations as in early warning projects, and for specific purposes like perception surveys (Kahl & Larrauri, 2013). Availability of data is used for conflict analysis and changing narratives that drive violent conflicts (Mancini & Perry, 2014). Enabling these processes is challenged by uneven access to technologies, limited capacities for gathering and analyzing data, and weak regulations to protect sensitive data (Letouzé et al., 2013; Mancini, 2013; Muggah & Diniz, 2013; Musila, 2013). Another counterforce is that ICTs can and are also used for violence-endorsing networks. The widespread reach of ICTs has been a major challenge to security, peace, and peacebuilding since it has been used to incite hatred and mobilize violence (Matamoros-Fernández & Farkas, 2021; Tellidis & Kappler, 2016; Daniels, 2008). The case of post-election violence in Kenya, Egypt, Turkey, Ukraine, and Sudan offer pertinent examples of technology's role in facilitating mass mobilization that promote violence. My thesis acknowledges this risk and argues that enabling conditions need to be established to reduce this potential for violence and promote peace-building. Understanding what these conditions are and how they can be materialized in practice is a focus of this thesis.

Communicating or sharing facts or stories from various perspectives, bringing new voices into the peace-building process, and presenting alternative narratives to those that are dominant, for example, violent perpetrating can potentially enable empowerment towards building violence mitigating efforts (Gaskell, 2019). Some ICT-enabled peace-building projects share conflict stories to promote healing and reconciliation such as Interpeace's 'Mobile Audio-Visual Unit' in Somalia (Welch et al., 2015). ICTs can help revitalize stagnant dialogues and support complex, processes of conflict transformation by providing the spaces for sustained dialogue (Hattotuwa, 2004). Much as information sharing through ICTs can empower populations for peace-building, they need to be applied with caution as they can equally exacerbate existing tensions and lead to renewed or further conflict (Brown, 2014; Letouze et al., 2013; Matveeva, 2013; Krause, Muggah, & Gilgen, 2011).

ICTs can be used as mobilization tools to build solidarity networks and enable the construction of collective identities and goals (Blagojević & Scekic, 2021). For example, MEET is an

innovative educational program bringing together young Israeli and Palestinian leaders to pave the way for positive economic, social, and political changes in their local communities (Gaskell, 2019). While mobile phones were used to spread rumors and organize violence in the 2007-08 conflict, Sisi ni Amani Kenya utilized a combination of traditional and innovative communication and dialogue approaches to increase civic education and engagement to prevent violence (Shah & Brown, 2014). ICTs can increase management capabilities by potentially increasing efficiency for those engaged in peace-building activities and in mitigating threats to stability (Boyd et al., 2015; Pierskalla & Hollenbach, 2013; Boege et al., 2009; Nussbaum et al., 2012; Zuckerman & Leujeune, 2014).

ICTs offer alternative physical, geographical, and online spaces inhabited by the victims and perpetrators of violence, that allow information to be spread and shared independently from the physical sphere (Welch et al., 2015). Hattotuwa (2014) opines that more people these days are being empowered through ICTs to share their voices, stories, and opinions across multiple levels. This helps in creating networks and channels of communication that allow for a greater degree of participation, accountability, and transparency. An example where the web provided spaces for the 'unspeakable' to be expressed is Burundi (Turner, 2008). "Friend me for Peace" was another Facebook initiative, where people from both sides of the Israeli-Palestinian conflict could sign up to the page and ask the 'other' side to befriend them and encourage enhanced interactions (Gaskell, 2019; Welch et al., 2015). Murphy (2015) views ICTs as enhancing the freedom of choice for individuals and intensifying peer-to-peer bottom-up relations. However, ICTs can also lead to the diffusion of knowledge and power and strengthen the agency of actors engaged in championing violence (Mancini and Perry 2014). In this thesis, I analyze how this notion of ICTs used for violence promotion can be countered and under what conditions.

2.3. ICT-Enabled Peace Networks as Counter Networks

Networks can serve as novel organizational arrangements that enable necessary tools to tackle a range of policy and collective action problems (Siciliano et al., 2021). Networks are a structural phenomenon comprised of a set of actors and their inter-relationships. Network theories, for example of social networks (Berardo & Scholz, 2010; Burger & Buskens, 2009), provide insights into how ties between actors are formed or dissolved, leading to the creation or decay of certain network structures. Berardo and Scholz (2010) note the important role of risk and uncertainty in shaping collective action that enables network building or breaking processes. Burger and Buskens (2009) highlight the role of context in influencing the formation of social networks since incentives that motivate their formation or not differ across social contexts. Social networks can be formed in contexts where individuals who were previously not connected can now become connected.

Aldrich and Kim (2007) argued that because of grouping, people in one group may be unlikely to encounter people in other groups. People's peer groups often actively discourage contact with dissimilar others, and settlement patterns create geographic separation that provides hurdles to overcome. Such restrictions strengthen individuals to become habituated to seeking out similar others and make them uncomfortable with dissimilar others. Similarly, McPherson, Smith-Lovin, and Cook (2001) argue that similarity breeds connection, which structures network ties such as in marriage, friendships, work, and other forms of social exchange. Such similarities favor the creation of homogeneous groups and friction with dissimilar groups.

In recent times, Castells (1996) has provided a modern perspective on networks as informational networks (network society). He describes the informational networks as forms of contemporary novel social structure, which results from the interactions among the social organization, social change, and a technological paradigm constituted around ICTs. These informational networks provide the capability to introduce new actors and ways of working, with relative independence from centralized power centres (Castells, 2004). Efficiencies in networking come through the flexibility, scalability, and survivability that accrue from the new technology. Flexibility because networks can reconfigure according to changing environments, keeping their goals while changing their components. Scalability as they can expand or shrink in size with little disruption. Survivability because they have no center, can operate in a wide range of configurations, and resist attacks to a central power center which put to risk the whole network.

I draw upon Castells' formulation of the network society for the following reasons. One, he has argued that groups and geographical regions who are marginalized and neglected can seek to embrace the informational logic and change their status by becoming included in the network society. Further, by not engaging with these networks, they run the risk of continued systematic marginalization. This underlies his argument that networks cooperate or compete with each other (Castells, 2004). He develops the notion of network competition by arguing that competition arises because each network has its power system depending on its programmed goals (Castells, 2011). It is characteristic of the network society that both the dynamics of domination and resistance to domination rely on network formation and network strategies of offense and defense. I consider the power relationships constructed to sustain conflict as violence-endorsing social networks, while those that exercise counter-power to mitigate violence as the peace networks. There are different forms of violence endorsing networks like militia groups, criminal gangs, gunrunning and drug-trafficking collectives, cartels, mercenaries, and livestock rustlers. Members of these violence-endorsing networks include business elites, government officials, police, arms dealers, intermediaries, and combatants (Austin, 2019). There were examples of such violence-endorsing networks in my study area, as detailed in the next chapter. For example, in Mt. Elgon, there are militia groups like Sabaot Land Defence forces (SLDF), Moorland forces, and Forty-Two Brothers that champion their land interests. In Muhoroni and Turkana/Pokot conflict systems, there are groups like Morans, warriors, etc., that focus on livestock raiding. The thesis explores how the counter networks (peace networks) are formed to outperform these violence-endorsing networks for peace-building.

Two, Castells situates ICTs and their informational logic at the center of how these networks operate. This resonates with my case under study, where the Conflict Early Warning and Response System (CEWRS) is at the center of the peace-building efforts. The thesis considers resistance networks powered by ICTs (Castells, 2011), which are formed to oppose violence-endorsing networks. ICTs enable networks to self-organize and distribute information to create flexible network structures (Castells, 2004; Cilliers, 2001). These networks typically comprise community-based organizations (CBOs), NGOs, informal or formal community policing groups, faith-based organizations, local leaders, security agencies, and individuals. Mobilizing, evolving, and coordinating these network members is a non-trivial challenge, given the multiplicity of interests involved. ICTs can potentially remove some of the hindrances of participation by affording an avenue for members to involve themselves proactively in the

network (Castells, 2004). For example, peace lovers who may want to report a security threat may not physically be able but through ICTs, they can relay information to other actors. Members in the network can increase their connections, which allows more people to take part in the interventions thereby changing power imbalances. Such sharing attracts like-minded people in terms of community activities to engage in collective action. ICTs lead to improved communication by availing information in real-time to many actors t increasing transparency and trust-building, which in turn may facilitate negotiations by building pressure from the bottom up. ICTs can help include actors that had previously been excluded from formal politics or other decision-making platforms by providing alternative spaces of interaction and enabling anonymized reporting as some had feared victimization At the same time, ICTs can serve as a platform on which hegemony is promoted and existing power imbalances reinforced shifting the balance towards powerful institutions if the latter can strategically use ICTs as legitimating tools as noted by Tellidis and Kappler (2016). This can shift the balance towards powerful institutions, as they often have greater access to ICT resources. Such usage of ICTs has contributed to mushrooming of violence-endorsing networks engaged in livestock theft, gunrunning, militia political clientelism, and land-grabbing cartels. A key focus of this thesis is to understand the nature of these networks and the strategies used in mitigating violent conflicts. While Castells theorization helps me to understand the structural elements and modes of working of the peace network, the concept of social capital help to analyze how these networks are socially embedded.

2.4 Social Capital in ICT-enabled Peace Networks

Social capital is generally viewed by various scholars (Kelly &Kelly, 1998; Lin, 1999; Putnam, 1995; Coleman, 1988; Bourdieu, 1986) as individual or group investment in social relations with expected returns. Social relations, in this case, are patterned human interactions that encompass relationships among individuals, informally and formally organized groups, including the state (Kelly, 2019). They are connections between people who have recurring interactions that provide both personal and group meanings. This includes relationships between family members, friends, neighbors, co-workers, and other associates but excludes social contacts and interactions that are fleeting, incidental, or perceived to have limited significance (August & Rook, 2013). Coleman (1988) sees social capital as resources or assets rooted in an individual's or a group's network of social relations, which individuals draw upon to obtain better outcomes. Bourdieu (1986) describes social capital as the cumulative actual or potential resources in a network of institutionalized relationships that enhance collective action for mutual benefit. Putnam (1995) describes social capital as a feature of social organizations such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit.

Putnam (2000) sees social capital as having the dimensions of bridging, bonding, and linking. Bonding social capital describes connections within a group or community characterized by high levels of similarity in demographic characteristics, attitudes, and available information and resources. Examples include family members, close friends, and neighbors (Putnam, 2000; Narayan, 1999). Bridging social capital describes connections that link people across a cleavage that typically divides society (ethnicity, class, or religion) (Nahapiet & Ghoshal, 1998; Pelling & High, 2005). Linking social capital describes norms of respect and networks of trusting relationships between people who are interacting across explicit, formal, or

institutionalized power or authority gradients in society. Linking social capital involves networks and ties of a community with the state or other agencies. (Putnam, 2004).

Generally, two perspectives of social capital can be identified relative to whether its benefit is accrued for the group or the individuals. From one perspective, the focus is on the use of social capital by individuals i.e., how individuals access and use resources embedded in social networks to gain returns in instrumental actions (e.g., finding better jobs) or preserve gains in expressive actions. The focal points for analysis in this perspective are (1) how individuals invest in social relations, and (2) how individuals capture the embedded resources in the relations to generate a return (Lin, 1999; Burt, 2000; Flap, 1991; Portes & Sensenbrenner, 1993; Coleman, 1990; Marsden & Hurlbert, 1988; Bourdieu (1986). Another perspective focuses on social capital at the group level, with discussions dwelling on (1) how certain groups develop and maintain more or less social capital as a collective asset, and (2) how such a collective asset enhances group members' life chances (Putnam, 1995; Coleman, 1990; Bourdieu, 1986). While acknowledging the essentiality of individuals interacting and networking in developing payoffs of social capital, the central interest of this perspective is to explore the elements and processes in the production and maintenance of collective assets

Although Bourdieu, Coleman, and Putnam share similar perspectives of social capital as a collective asset, they have different theoretical positions. For Bourdieu (1986), social capital represents a process by which individuals in the dominating class, by mutual recognition and acknowledgment, reinforce and reproduce a privileged group that holds various capital (economic, cultural, and symbolic) resources. Nobility and titles characterize such groups and their members. Thus, social capital is another way of maintaining and reproducing the dominant class. Coleman (1990), while defining social capital as consisting of social-structural features or resources that are useful to individuals for specific actions, stresses social capital as a public good available to all members of the group. Because social capital is a public good, it depends on the goodwill of the individual members to make such efforts and not to be free riders, making norms, trust, sanctions, and authority important mechanisms in sustaining social capital (Lin, 2017). Putnam's concept of social capital has three components: moral obligations and norms, social values (especially trust), and social networks (especially voluntary associations). Putnam's central thesis is that if a region has a well-functioning economic system and a high level of political integration, will result in the successful accumulation of social capital (Putnam,1993).

Examining these perspectives of social capital in the context of ethnic conflicts and peacebuilding, I align most with Putnam's (1993) theoretical position. I find the arguments by scholars seeing social capital as benefitting individuals (Lin, 1999; Burt, 1998; Marsden & Hurlbert, 1988; Flap, 1991; Portes & Sensenbrenner, 1993; Coleman, 1990; Bourdieu,1986) being narrow, and which can be subsumed within collective assets. Whereas Bourdieu's theoretical tenets can be applied in a conflict context, it is relevant for analyzing class conflicts such as between the rich and the poor. Coleman's perspective of social capital is applicable in contexts where there is a general need for the fulfilment of public goods which may not necessarily be in conflict contexts.

Putman's notions of community, voluntary association, and, generalized trust are relevant to my case, as they relate to mechanisms of bonding, bridging, and linking. His notion of civic community is relevant for the analysis of peace networks reliant on cooperation and citizen

participation, particularly of those victims of violence. Putnam's (2000) mechanisms of bonding, bridging, and linking are particularly relevant to my analysis as they help build an analytical framework for understanding relational dynamics within communities (bonding), between communities (bridging), and relations with authorities (linking) in conflict contexts. The bonding mechanism provides insights into factors escalating violence within communities and how members can influence internal relations toward peace. Bridging social capital helps to understand how social trust and reciprocity are grown amongst otherwise adversarial communities. The role of mobile telephone technology in expanding such mechanism is relevant to understand how ICTs can help peace actors to break constraining factors, and can ICTs strengthen the ability of members to gather new relevant information, gain access to power and better recognize novel opportunities. Linking social capital provides conceptual means to understand the brokerage role of CBOs, NGOs, and other CSOs in peace-building efforts, such as how trusting relationships can develop between community groups and security agencies. A key analytical question this thesis will explore is how ICTs can contribute or not to the development of the trusting relationship and influence the level of accountability of government leaders.

However, an appropriate balance of all types of social capital is necessary for building peace. Linking, bonding, or bridging social capital, on their own may not be effective in peace-building (Flora, 1998). Onyx et al (2007) noted that communities with higher levels of all forms of social capital are more able to mobilize in the face of adversity and less likely to have negative outcomes. If there is an absence of other forms of control and accountability, linking social capital can quickly become nepotistic or a mechanism for insider trading and political favoritism (Grootaert, 2003). Other authors have also found connections between high levels of linking social capital and nepotism, corruption, and suppression (Szreter & Woolcock, 2004). However, the role of ICTs in enabling or restricting different forms of social capital has been under-researched, and my thesis will examine, five themes: social networks, resources for action, reciprocity transactions, identity/solidarity, and social trust.

Social networks: Peace networks are founded on a social fabric that creates a willingness amongst actors to cooperate in the development of physical capital. The social fabric provides the medium through which communication is achieved by enhancing the likelihood that individuals will become engaged (La Due Lake & Huckfeldt, 1998). While actors do not inherently possess the ability to make peace, they have an agency that is embedded within networks from where they draw social authority, as a function of social capital (Hafner-Burton et al., 2009). A social network can take the form of bonding, bridging, or linking, and acts differently on processes of pluralism, democracy, and peacebuilding (Yilmaz, 2010). Putnam (1993) emphasizes that strong civil societies increase the socioeconomic development of communities and nations which can lead to positive peace. However, other scholars (Villalonga-Olives & Kawachi, 2017; Hansen-Nord et al., 2014; Sen, 2004;) have argued that networks with excessive levels of bonding social capital tend to breed bias and racism, creating out-groups and exclusion leading to violent conflicts. Typical examples are ethnic groups or institutions that compete with other social groups and gain privileges at their expense (Villalonga-Olives & Kawachi, 2017). Such bonding often escalates polarization between communities, increasing their vulnerability to violence.

Social capital can also be conflict-promoting as it encourages exclusionary behavior, leading to the emergence of militant activity, cartels, restricted freedom and intolerance, and the erosion

of social cohesion norms (Hansen-Nord et al., 2014). They argue that social organizations can foster certain types of criminal activity in disadvantaged neighborhoods characterized by high levels of poverty and unemployment. My thesis will examine how ICTs can, and in what conditions, contribute to building a social fabric that incentivizes individuals and groups to engage in peace network building. I will explore how ICTs help in neutralizing violence (Dillahunt, 2014) and help promote peace (Pigg and Crank, 2004). The thesis will examine the role of ICTs in encouraging or discouraging interactions and exchanges within peace networks and the building of ideologically inspired networks (Widén-Wulff et al., 2008; Norris, 2003; Narayan, 1999).

Resources for action: These represent resources embedded in social networks that can be accessed and mobilized through network ties to achieve purposive actions (Lin, 1999). Embedded resources in social networks enhance the outcome of actions by facilitating the flow of information. Social ties located in hierarchical (linking), and horizontal (bridging) positions can provide an individual or group with useful information about opportunities and choices otherwise not available. Social relations reinforce a sense of belonging, emotional support, and public acknowledgment of one's claim to certain resources (Lin, 1999). This thesis explores how ICTs can or cannot facilitate access and mobilization of the resources for action toward the mitigation of ethnic violence. Questions on whether ICTs can act as stores from which people in a network can access social resources will be examined. Important questions concern how ICTs can or cannot increase the ability of peace network members to gather relevant information, gain access to power, and better recognize new opportunities for peace-building.

Platforms for reciprocal transactions: Norms of reciprocity are useful for social support exchange because they create expectations that anyone who receives a favor should reciprocate to the sources or someone else (Pan, Shen & Feng, 2017). In a social group, members are more likely to help those who have provided them benefits in the past. Reciprocity is structured across different forms of exchange with profound effects on the emergence of integrative bonds of trust and solidarity (Molm, 2010). This notion helps me in understanding how social trust is built across ethnic divides through reciprocal actions and determine whether ICTs have a role in such. I explore whether ICTs enable reciprocity transactions by offering platforms through which solicitations or offers for exchanges are made when physical contacts are not possible (Miranda and Saunders 2003). I will seek to understand whether increased online connectivity may sacrifice everyday contact with people living nearby (Blanchard 2004, Mignone and Henley, 2009), with the risk of enhancing violence.

Identity/solidarity for collective action: Identity is a resource for action against threats from external sources, as it is characterized by a shared sense of belonging. The binding factors may be common interests, ethnicity, history, religion or culture, or anything else unique to a social group. It has frequently been associated with social movements of resistance or opposition to power as it provides the sense of "being in this together" rather than facing threats or risks alone (Miller, 2017). This component of social capital solidifies connections between people who belong and makes it clear who does not (Sensenbrenner & Portes, 2018). I will seek to understand how ethnic communities exploit this resource against other communities (Sen, 2004) and how community-centered thinking can be both positive for intra-community relations and negative by sustaining exclusionary tendencies. I will assess whether ICTs can support solidarity or identity formation by enhancing communication among network members.

Trust in peace networks: Trust is a set of expectations held by one party that others will accept appropriately when it comes to a specific issue (Farrell & Knight, 2003). Trust is enhanced by factors such as willingness to take responsibility, reliability, and dependability in similar situations as acknowledged by trusted affiliates. Other factors include personal relationships, altruism, the degree to which the other person expresses care or concern about one's situation, and the expression of reciprocity (Yilmaz, 2010; Pigg & Crank, 2004; Varshney & Vetter, 2002; Peck, 1998; Crocker & Hampson, 1996). In this thesis, I will explore how ICTs enable trust building through the mutual conveyance of sensitive information and support financial transactions of the network members (Pavlou & Gefen 2004, Steinmüller, 2004). I will analyze how the integration of ICTs in the violence mitigation process contributes to building trusting relationships between government entities and community members.

Table 2. 1 Summary of applicable social capital concepts

Elements/mechanisms of social capital	**Bonding**	**Bridging**	**Linking**
Social networks	Social networks existing within a homogenous group or community e.g., clan or family	Social connections that link people across different ethnic groups	Social networks interacting across explicit, formal, or institutionalized power or authority gradients
	ICTs provide networking infrastructure, Keep social resources and enhance interaction	ICTs bring contact with socially diverse but ideologically similar groups.	ICTs enable sharing and exchanging of information, ideas, and innovations
Resources for action	Resources in bonded social ties include norms, trust, information, and emotional support needed for collective action	Social support, information channels, social credentials, skills, and knowledge, shared across the ethnic divide	Social resources embedded in state, NGOs, voluntary organizations, or business actors accessed by communities
	ICTs facilitate access and mobilization of the resources for action	ICTs facilitate access and mobilization of the resources for action	ICTs facilitate access and mobilization of the resources for action
Reciprocal transactions	Exchange of favors and goods within homogenous groups	Exchange of favors and goods between different ethnic groups	Involves exchanges between communities and those in authorities
	ICTs form platforms for exchanges ICTs enable confidential transactions like sharing information	ICTs form platforms for exchanges ICTs enable confidential transactions like sharing information	ICTs form platforms for exchanges ICTs enable confidential transactions like sharing information
Identity/solidarity for collective action	Identity is a resource for action by a group against threats from external sources. Has a strong shared sense of belonging	Social resources for rallying members from across the divide toward a common cause	Social resources for enabling bringing on board authorities to support collective action
	ICTs support the function of communication among members	ICTs support the function of communication among members	ICTs support the function of communication among members
Trust in peace networks	Responsibility, reliability, and dependability within homogenous groups	Responsibility, reliability, and dependability between	Responsibility, reliability, and dependability between

		heterogeneous groups	communities and authorities
	ICTs store and convey information that is sensitive and in an anonymized way	ICTs store and convey information that is sensitive and in an anonymized way	ICTs store and convey information that is sensitive and in an anonymized way

2.5. Scaling of ICT-enabled Peace Networks

Scaling has been defined in different ways by scholars and researchers. The World Health Organization (WHO, 2010) defined scaling up as efforts to increase the impact of a technical solution successfully tested in pilot or experimental projects to benefit more people on a long-term basis. The World Bank (2012) defines scaling as the process of efficiently increasing the socioeconomic impact from a small to a large scale of coverage. Commonly understood, scaling is the process of expanding, replicating, adapting, and sustaining successful policies, programs, or projects in a geographic space and over time reaching a greater number of people. Other scholars (Rolland & Monteiro, 2002) have argued that scaling is not just physical replication, but also a functional expansion, overall leading to an expansion of complexity. Puri and Sahay (2003) noted that in designing and implementing a shared infrastructure or scaling an intervention, local needs must always be weighed against larger global needs, that encompass different communities of practice, technologies, and diverging interests and population groups. Effective scaling implies, that every intervention need not start from scratch and learnings and resources built in earlier efforts can feed into new processes.

Scaling is particularly relevant to ICT4D projects, as developmental concerns are widespread, and typically resources and time are not available to start from scratch every time. Many development projects start small and even when successful, they remain rather small, especially when compared to the scale of the challenges they seek to address. In the absence of mechanisms for scaling, successful initiatives remain little more than islands of excellence in a wider economic and institutional environment (Uvin, Jain & Brown, 2000). As a result, understanding how the expansion of the impact of such initiatives beyond the local level can be enabled has become an important issue among practitioners, donor agencies, and researchers (Hartmann et al., 2013). Peace and conflict resolution organizations, networks, and movements around the world have growing concerns that their approaches are limited in scale, short-lived, with limited cumulative learning, and with little lasting impact (Ross et al., 2019; Barker et al., 2015). This points to a recognized need for more innovative and demand-driven scaling-up strategies to accelerate the impact of interventions (Gündel, Hancock & Anderson, 2001). This need has led to critical questions of how to scale up successful models within ICT4D contexts where there are limited resources and typically, the need is for urgency in action (Sahay & Walsham, 2006). Braa, Monteiro, and Sahay (2004) have argued that scaling (i.e., spreading) digital health interventions is a prerequisite, not a luxury, for sustainable action research. The need for effective strategies of scaling is even more critical in violent conflict settings, where learning from similar experiences to speed up the agility of response is urgent. Therefore, scaling provides a valuable organizing framework for strengthening, expanding, and overcoming the piecemeal, one-off, and non-strategic efforts in mitigating violence (Bhatt & Altinay, 2013). In response to the increased focus on scaling, this study is not only concerned

with building ICT-enabled peace networks but attempts to determine *what* and *how* to scale so that their impact is felt on a wider level.

Conceptualizing scaling in ICT-enabled peace network

Scholars across multiple fields offer some common perspectives on scaling, but they also differ in the content (what) and the dimensions (how). Lakey (1973) viewed scaling as a linear process running from internal consciousness-raising (cultural preparation) to creating parallel institutions to transfer power through internal, tactical, and institutional dimensions. McAdam, Tarrow, and Tilly (2001) and Tilly (2005) regarded scaling as an upward (outward dissemination) and downward (toward lower levels) process happening through coordination, brokerage of new relationships, theorization (spreading core movement ideas through generalizable frames), and changes in the targets of action and nature of claims. Dees, Anderson, and Wei-Skillern (2004) focus on mechanisms for scaling with an emphasis on affiliations that expand networks. Bradach (2010) and Bradach & Grindle (2014) viewed scaling as oriented towards internal strengthening and external expansion. They note that scaling involves strengthening an organization through the dissemination of assistance to others and branching to new sites. Ross, Burnett, Raschupkina, and Kew (2019) proposed a conceptual model of scaling up described as elements contributing to the internal strengthening and external expansion of peacebuilding, nonviolence, and social justice initiatives that broaden both their intended and unintended impacts. Castells (2004) emphasizes the importance of scaling networks. Networks can expand or shrink in size with little disruption. He argues that networks are self-expanding processing and communicating capacities in terms of volume, complexity, and speed (Castells, 2004). Uvin (1995) and Uvin, Jain, & Brown (2000) consider scaling as the broadening impact of intervention through diversification, policy influence, the transmission of best practices, and spin-offs and handoffs to other civil society groups leading to civil society diversity.

This study adopts Uvin's (1995) conceptualization of scaling which he defines as increasing the impact of grassroots organizations and their programs to move beyond being "actions on the margins" to tackling large-scale issues. Uvin identified quantitative, functional, political, and organizational dimensions of scaling, also highlighting the support for diversification of activities, for example from peace-building to gender-based violence and various others. Furthermore, Uvin's model of scaling provides explanations of how growing civil societies represents the aspect of scaling, including their intellectual diversity and social capital which can support their action in other settings. Uvin emphasizes the role of policy influence, which is a crucial element of peace-building efforts.

Uvin's notions of scaling include quantitative, functional, political, and organizational dimensions. Quantitative scaling is where a program or an organization expands its size, by increasing its membership base or its constituency or budgets (Uvin, 1995, Menter et al., 2004). Spreading interventions geographically can help reach and include marginalized groups that otherwise could remain isolated and prone to repression and poverty. In this study, I explore how ICTs can or cannot contribute to quantitative scaling through mobilization and collective action by connecting with other actors and networks (Nthane et al. 2020).

Functional scaling is where a community-based program or a grassroots organization expands the number and the type of its activities to its operational range. This implies going beyond one

function (for example, health or education) to include others. According to Sahay and Walsham (2006), scaling of technological systems involves making the system accessible to more users by increasing its functionalities, involving substantial reworking of technologies and work practices (Wigboldus et al., 2016). For example, fishers in Abalobi diversified the species they offered to their local markets through collaboration with other fishing communities that had different species of fish. This thesis will assess how ICTs influence relationships among organizations and their beneficiaries to multiply the effects of action (Fisac-Garcia et al 2013).

Political scaling refers to the extent to which participatory organizations move beyond service delivery toward empowerment and change to address the structural causes of violence. This will involve building active political involvement and relations with the state (Uvin, 1995). It involves building fairer markets, mobilizing actions on environmental and social issues, and creating social capital, for example, the Grameen Telecom in Bangladesh (Lawson & Meyenn, 2000). A similar study conducted by Jeffers et al. (2019) indicated that mobile phones have broadly enhanced participatory data collection initiatives leading to empowered communities to manage their resources, and processes which were greatly enhanced by the use of ICTs. Political scaling can help inform the assessment of how ICT-enabled peace networks contribute to empowerment and change and in addressing the structural causes of violent ethnic conflicts, and how ICTs can help in this process is a matter of analytical focus.

Organizational scaling is where community-based programs or grassroots organizations increase their organizational strength to improve the effectiveness, efficiency, and sustainability of their activities. It can be done financially, by diversifying their sources and increasing the degree of self-financing (Bradach & Grindle, 2014; Uvin, 1995). It can also be done institutionally, by networking across sectors especially valuable for focused collaboration, resource-pooling, extending the organization's sphere of influence, and developing unusual alliances (Moore, Riddell & Vocisano, 2015; Bradach & Grindle, 2014). It also involves improving the internal management capacity of the staff (such as through training or personnel development), allowing the organization and its programs to grow and learn from its mistakes. It can be achieved through building affiliations, involving the creation of formalized agreements for multiple entities to be part of a network as a mechanism for scaling up. New partnerships, technological upgrading, and increasing knowledge and skills are other strategies for organizational scaling (Hartmann & Linn, 2008; Uvin, Jain & Brown, 2000). I will analyze how ICTs can influence organizational scaling by developing new access channels for beneficiaries (Fisac-Garcia et al., 2013; Heeks, 2010), and expanding the value propositions of a program or action.

Scaling has many challenges, political, technical, organizational, and others. How can ICT-enabled peace networks scale, what components can be scaled, and what cannot represent important theoretical puzzles which my thesis examines.

2.6. The Analytical Lens Guiding this Thesis

My analytical lens is formed based on the inter-relationship of ICTs, peace networks, social capital, and scaling and their relevance to understanding the dynamics of ICT-enabled peace-building efforts. This is schematically depicted in Figure 2.1.

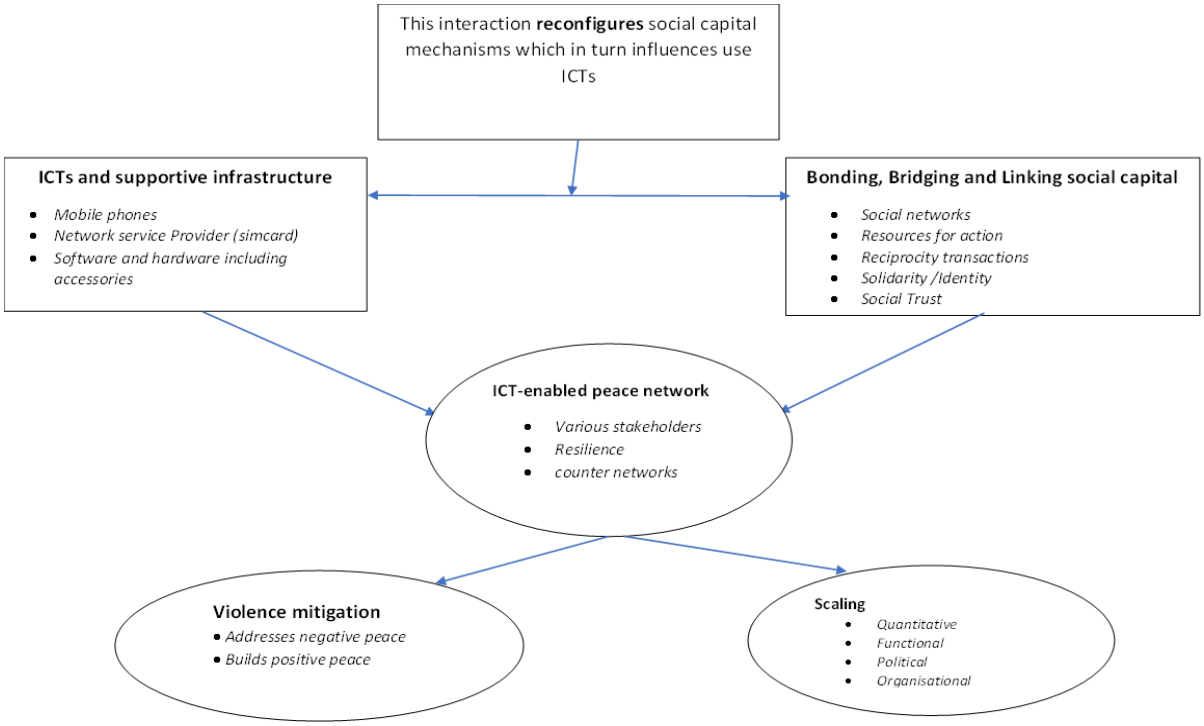

Figure 2. 1 The interplay of ICTs, peace networks, social capital, and scaling

ICTs and supportive infrastructure can potentially play a critical role in building necessary peace networks and enabling social capital. The spread of ICTs creates a networking infrastructure through which new social relations are formed or expanded leading to new social resources needed for the peace network (Clark & Douglas, 2011; Pierce & Lovrich Jr., 2003). ICTs can contribute to increasing trust, identity, or solidarity, through bonding, bridging, and linking networks. These social resources can increase through social interaction among individuals and groups within a social unit (peace network). ICTs facilitate this process by enabling access to information that could not be accessed without them (Portes, 1998; Putnam, 2000; Woolcock & Narayan, 2000). It helps strengthen bonds within the peace network and maintain contact with distant friends, and relatives, and negotiate with external bodies such as local authorities (Gaved & Anderson, 2006). ICTs can enhance existing relationships as they add to existing means of communication, increasing the overall volume of contact by providing new ways to communicate with existing social ties (Adam & Urquhart, 2009). ICTs, such as mobile phones, can facilitate collective mobilization, by augmenting civic engagement within and beyond communities and facilitating learning and the acquisition of skills that contribute to the creation of social capital. Learning is a social process and social networks, and communities of practices are indispensable spaces for informal learning promoting tolerance in the end.

The notion of social capital and its mechanisms of bonding, bridging, and linking helps structure the peace networks to support the function of violence mitigation. This helps in conceptualizing the nature of linkages needed within ethnic communities (bonding social capital), between them (bridging social capital), and between communities and authorities (linking social capital). These linkages determine the nature of peace networks in existence and their daily operations to fulfil their mandates. I analyze the level of social trust and reciprocity within the linkages because they are the key ingredients of resilience. Social capital can be created through repeated exchange and face-to-face contact, which is facilitated by geographic

proximity and ICTs**.** The development of social capital requires the active and willing engagement of citizens within a participative community organized in form of networks.

ICT-enabled peace networks form the nerve of violence mitigation as they are the driving force in opposing the existing violence networks. For the peace networks to exist and function sustainably, they need to be anchored in community social structures and values, and norms. This is where peace networks need social capital mechanisms such as bonding, bridging, and linking oiled by values of solidarity, resources of action, social trust, and reciprocity. The mechanisms and values of reciprocity and social trust can be expanded and sustained by continuous interaction within the networks. The more the interaction, potentially the greater the trust among social entities. In this regard, ICTs can strengthen the interaction and therefore the creation and expansion of social capital mechanisms thereby sustaining the peace networks. However, given that the context is defined by violence, it is notoriously challenging to use ICTs in creating the social capital needed for peace networks to effectively engage in mitigating violent conflicts due to vulnerable conditions created by conflict entrepreneurs.

The scaling of the peace network is important as it spreads benefits to reach a critical mass. This is also emphasized by Foster and Heeks (2013) that scaling is important as it ensures greater developmental impact for innovations. They argue that ICT innovations have network effects where the greater the scale, the greater the benefits to users. In this thesis, I examine the role of ICTs in scaling the peace networks and how this is linked to social capital mechanisms of bonding, bridging, and linking. The analytical framework focuses on structures and processes involved in building and scaling peace networks, how these processes of scaling are enabled or constrained, and understanding the role that ICTs play in mediating processes of social capital in the context of scaling these networks.

Using this framework, I sought to understand the features of ICTs in the study area. These features include the availability and access to ICTs by the communities in conflict, their resilience or sustainability, and their use with a specific focus on violence mitigation. Some of the characteristics to measure during data collection and analysis are the scalability of the ICT system, self-organizing, and replaceability. The structure and functionalities of the ICT system will be examined. On social capital, the study will measure and analyze the social-relational elements such as social trust, reciprocity, and social contracting both horizontally and vertically. Social trust between the communities and the security systems will be analyzed. Concerning peace networks, I will use this framework to understand the key actors, their characteristics, their interaction, and how they use ICT to build peace in their communities. The final framework will capture these components with corresponding relationships.

3. RESEARCH CONTEXT

This section describes the research context of the study. 3.1 describes the country context and 3.2 FPFK, the organization that hosted me and their work on peace-building in Kenya. I then describe the context of the specific empirical cases in 3.3. I conclude this chapter by providing a summary of how social capital contributed to the formation and sustenance of violence-endorsing networks in the conflict areas in 3.3.4

3.1 Country Context – Kenya

3.1.1 Geography and socioeconomic situation

Since the focus of the study is on ethnic conflicts, understanding the geography and economic situation of the country is relevant to understand how they drive ethnic conflicts. Ethnic communities occupy different geographical and economic zones, considered ethnic boundaries which are highly disputed. This study was conducted in seven of the 47 counties in Kenya which include Bungoma, Trans Nzoia, Kisumu, Kericho, Nandi, West Pokot, and Turkana as shown in Fig. 3.1.

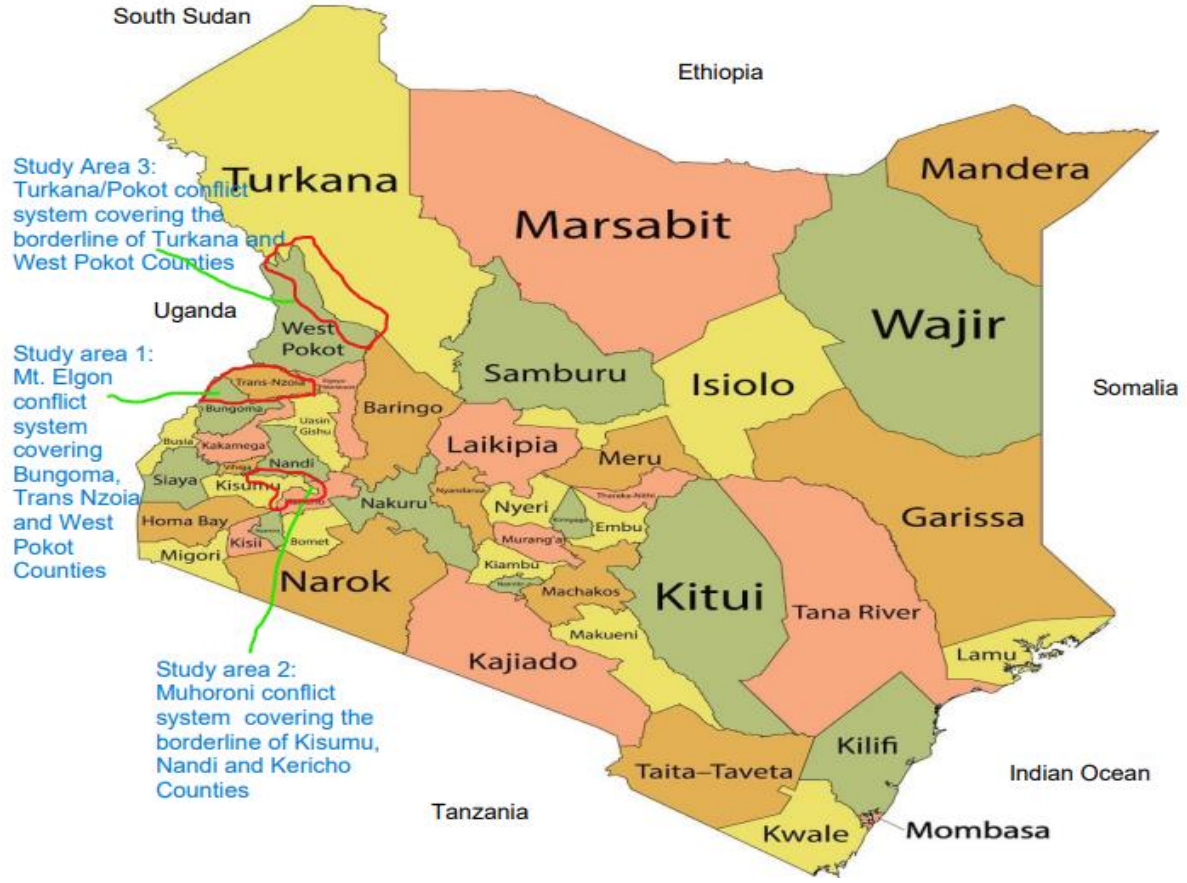

Figure 3. 1 The Counties of Kenya with study areas (Source: modified from Mapsofworld, 2022)

The geography of Kenya is diverse, varying across its 47 counties. Kenya has a coastline on the Indian Ocean, which contains swamps of East African mangroves, with the inland comprising

plains and hills. Kenya is divided into the Lake Victoria basin which is predominantly occupied by the Luo, Gusii, and Luhya ethnic communities, the Rift Valley and associated highlands that are settled by the Kalenjin, some pockets of the Kikuyu, the eastern plateau forelands which are occupied by the Kamba, the semiarid and arid areas of the north and south are occupied by the Turkana and Maasai respectively, and the coast which is settled predominantly by the Mijikenda. Kenya is a large multi-ethnic country, with over 40 different ethnic groups with a total population of 47.5 million (Census report, 2019). These communities vary in population sizes, which is a key factor that determines who wields and who is subjected to political influence, contributing to regular election-related ethnic violence. The largest ethnic group is the Kikuyu, which makes up about 17 percent of the population (8,148,668). Other large ethnic groups include the Luhya (6,823,842), Kalenjin (6,358,113), Luo (5,066,966), Kamba (4,663,910), Kenyan Somali (2,780,502), Kisii (2,703,235), Mijikenda (2,488,691), Meru (1,975,869), Maasai (1,189,522) and Teso (417,670). These are distributed across the country as shown in Fig.3.2.

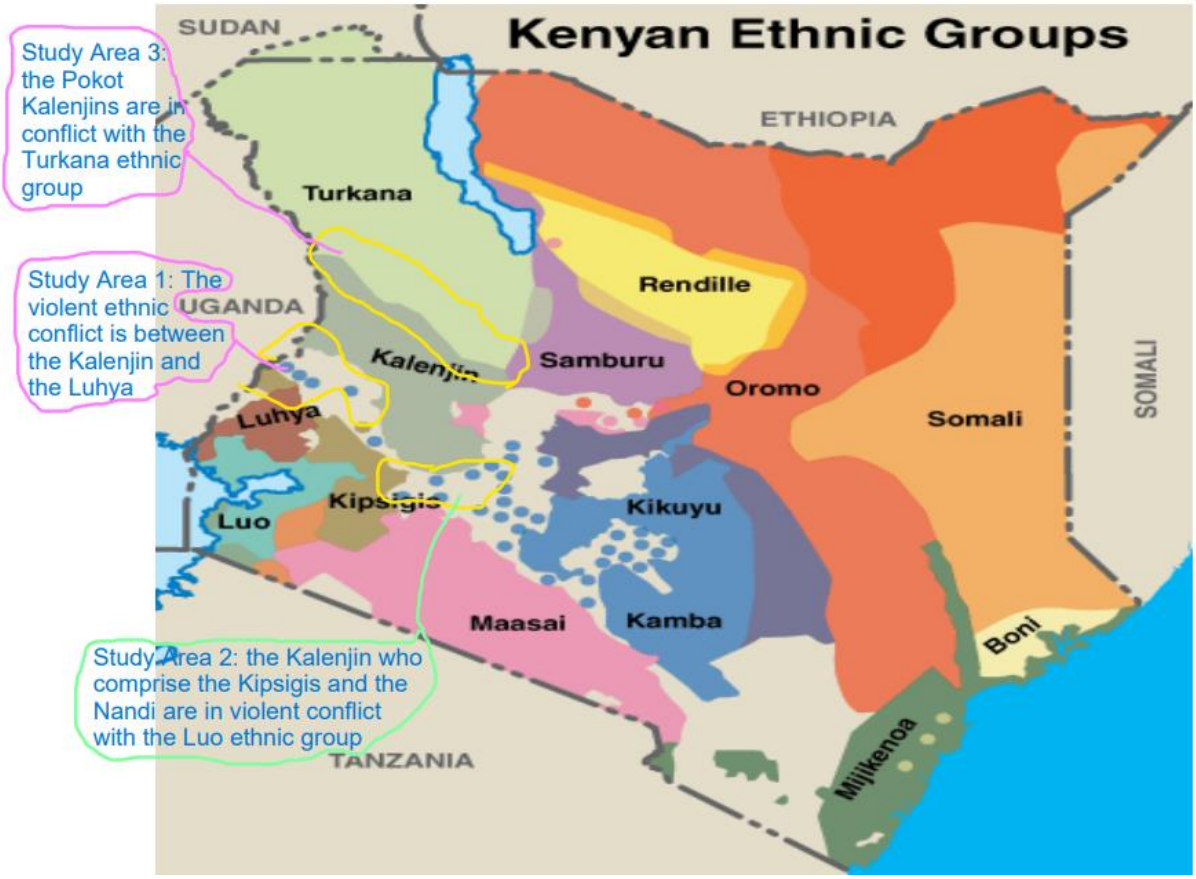

Figure 3. 2 Distribution of ethnic communities in Kenya (Source: modified from Mapsofworld, 2022)

From Fig. 3.2, it can be observed that ethnic communities live in clearly defined geographical territories, where the exact ethnic border demarcations are unclear or there are overlapping claims. This has shaped land claims that contribute to ethnic violence.

3.1.2 Ethnic conflicts in Kenya

Manifestations of ethnic violence

Kenya is the seventh most violent country in the world identified by the ACLED (Armed Conflict Location and Event Data Project) dataset, with just over 3,500 recorded politically violent events between 1997 and September 2013 (Haider, 2020; Rohwerder, 2015). Since 1989, by conservative estimates, ethnic conflicts have directly killed at least 4,433 people and displaced over 1.8 million (Halakhe, 2013). For example, around the first multiparty elections, held in 1992, there were clashes in the Rift Valley between Kalenjin and Maasai militias and other politically relevant ethnic groups – Kikuyu, Kisii, Luo, and Luhya. Another wave of election-related ethnic violence followed in connection to the 1997 elections, this time also including clashes between "Indigenous" groups and "Newcomers" on the coast (Wasike, 2021). In Tana River, violence between the Pokomo and the Orma and Wardei led to hundreds of deaths, and large-scale displacement of people. In Mount Elgon, the conflict between local communities over the legitimate claim to local land and authority pitted the Sabaot against Luhya groups and more recently, Sabaot subgroups against each other following controversy over government resettlement schemes (Dowd, 2019; Raleigh& Dowd, 2018; Lynch, 2011).

In the 2007/2008 violence, 1,133 Kenyans were killed and over 600,000 were driven from their homes while more than 110,000 private properties were destroyed in fighting between ethnic Kikuyus, Luos, and Kalenjins in the Rift Valley, Mombasa, and urban informal settlements (Halakhe, 2013). The Central Isiolo region has been a hotspot for ethnic violence (Sharamo, 2014). There were ethnic clashes in 2012 in Tana River (Cox et al., 2014). In 2014, there were clashes in Marsabit County in Northern Kenya and ethno-religious riots in Mombasa (Cox et al., 2014). Juma and Simiyu (2019) found that in the Muhoroni conflict system, there were recurrent violent conflicts attributed to cattle rustling, political incitement, and retaliatory attacks. The key perpetrators of the conflicts were politicians, youths, and cattle rustlers. The most violent ethnic conflicts in Kenya have involved pastoralist communities in Turkana and Pokot over cattle, rooted in historical pastoralist customs, where cattle raids also served as a rite of passage in acquiring bride wealth (Okumu et al., 2017; Schilling et al., 2015; Greiner, 2013; Mkutu, 2008).

Causes of ethnic violence

The underlying causes of ethnic conflicts are complex as they are deeply rooted in the sociocultural beliefs of society (Juma & Simiyu, 2019). One of the long-term causes of the clashes in Kenya is attributed to the colonial legacy, which is essentially historical but with ramifications in the post-independence era (Nnoli, 1998; Nyukuri, 1997). The British colonial divide-and-rule strategy polarized various ethnic groups in Kenya. Political parties that championed the nationalist struggle against colonial establishments were distinct ethnic unions that continued with unhealthy political competition (Wambua, 2017; Wamwere, 2008). Unresolved land grievances are another root cause of ethnic violence in Kenya (Musau, 2009). The political salience of land that is primarily communal rather than privately owned, implied that land conflict often takes on an ethnic dimension. In many locations, exact border demarcations are unclear or there are overlapping claims, which shape land claims and affect local political power and authority (Menkhaus, 2015).

Electoral competition and fraud have contributed to ethnic violence since the 1990s. In the ethnic clashes that occurred in the Rift Valley and Coast regions in the 1990s, ethnic groups were mobilized and set against each other (Wambua, 2017; Rohwerder, 2015). The Majimbo rhetoric or regional federalism based on ethnicity re-emerged at the reintroduction of multiparty elections in Kenya in the 1990s and has been a major driving force of ethnic conflicts (Musau, 2009). Fear of domination by immigrant groups has mainly been voiced in the Rift Valley and the Coast regions. Kalenjin communities were angered by the renaming of their areas with Kikuyu names as they saw it to be cultural domination and a loss of identity (Wambua, 2017; Cocodia, 2008).

Poverty, social, economic, and political exclusion form a strong basis for manipulation for political gain. Exclusion renders people vulnerable to propaganda and sentiments against neighbors by masking them as the causes of one's fate. Groups that have suffered exclusion and marginalization have largely been the targets of manipulation (Brown, 2018; Wamwere, 2008; Kruger, 1993). There have been spill-over effects from conflict-torn regions like in the Horn of Africa, East Africa, and by extension the Great Lakes Region. Her neighbors including Ethiopia, Somalia, Sudan, and Uganda have experienced long periods of unrest and armed conflict since the 1970s (Juma & Simiyu, 2019), which have enhanced the easy availability of small arms and light weapons in Kenya (Musau, 2009).

A weak security system that can generally not be trusted has also contributed to ethnic violence in Kenya. Security forces are active stakeholders in conflict and violence and this sector has been criticized for failing to prevent attacks because of weak coordination and poor relations between intelligence and policing departments (Lind, Mutahi& Oosterom, 2015). The impression that security services are weak and thus lack credibility encourages the emergence of local militias that mobilize violence and present their activities as legitimate (Halakhe, 2013).

State and non-state responses

The government has responded to the high levels of communal violence through disarmament campaigns in affected areas (Dowd & Raleigh, 2013). However, there has been a lack of coordination and collaboration in peace and security between the local and national levels (Gibbons, 2014). International support has enabled the Kenyan government to put in place multiple bureaucracies, such as the Provincial Peace Forum (PPF), District Peace Committees (DPC), Divisional Peace Committees (DvPCs), and Location Peace Committees (LPCs), to better manage conflict inducing social cleavages (Halakhe, 2013). The conflict prevention efforts are coordinated by the National Steering Committee (NSC) on Peacebuilding and Conflict Management and involve large investments in new technology, early warning systems, and capacity-building programs for the country's peace infrastructure (Cox et al., 2014). The National Cohesion and Integration Commission (NCIC) has also 'emerged as the principal formal bureaucratic institution at the helm of nationwide efforts to change inter-ethnic group attitudes in Kenya and construct a more cohesive, peaceful national identity' (Cox et al., 2014).

Local civil society organizations and interreligious groups have long been working to limit violence, although their work is negatively affected by divisive politics at the local level and the lack of donor support (Cox et al., 2014). Since the 1990s a mix of local leaders, ordinary citizens, NGOs, and members of the executive have come up with formal peace declarations, which are local political settlements drawing on a long-established system of customary and

civilian governance (Kilungya, 2019). Despite being flawed and limited, these agreements have often been more successful in creating peace and a sense of justice than modern state law. One example is the 2008 Maikona–Walda Declaration that effectively ended active hostilities between the Borana and Gabra (Okumu, 2013).

3.2 Free Pentecostal Fellowship in Kenya and My Role

3.2.1 Free Pentecostal Fellowship in Kenya

My empirical case is in the context of the work of Free Pentecostal Fellowship in Kenya (FPFK), an evangelical church registered in 1977 as a society under certificate number 4110. It operates in 31 regions in Kenya and has over 2000 local churches with a combined membership of over 300,000. The church is governed at three levels. The National level is managed by the National Board comprising 10 elected members chaired by the Presiding Bishop and administrated by the General Secretary. The team is elected after every five years with eligibility for re-election once. The Regional level has a similar format where the leaders are also elected after five years and are led by Regional Bishops and pastors of local churches. The main decision-making organ is the Annual General Meeting (AGM) comprising delegates from each local church.

FPFK plays an important role in civil society and is an active member of the Evangelical Alliance of Kenya (EAK), an umbrella body for Pentecostal churches in Kenya. Recently, the church also joined the National Council of Churches of Kenya (NCCK) increasing her space for influence on national issues of importance. FPFK's evangelical and social work continues to expand across the country reaching and transforming the lives of many people spiritually and materially. FPFK undertakes social projects in the areas of education, health, economic empowerment, peace-building and conflict transformation, humanitarian and emergency relief, gender equity, and economic empowerment of the youth and children's work. The church has good relationships with both the county and national governments of Kenya exemplified by the collaborative efforts between the two in most of the projects that are being implemented. It has a central office in Nairobi with satellite offices in the regions. It has the basic infrastructure necessary for project management. FPFK, through its many peace projects, runs an ICT-enabled Early Warning and Early Response System (EWERS) as a key tool for mitigating violence through sending, receiving, and processing anonymized SMS. The FPFK EWERS was first introduced in 2013 in Mt Elgon to facilitate the prevention of intra and inter-ethnic violence and has subsequently been scaled to Muhoroni and Turkana/Pokot conflict areas.

3.2.2 My role before joining the Ph.D. program

I earlier worked with FPFK in various positions starting as a social worker and rising to the position of Centre leader for a children's program based in the larger Mt. Elgon region. While undertaking this role, I interacted with children left homeless because of violent ethnic conflicts in the region that covered the Mt. Elgon and Turkana /Pokot areas. The children were living on the streets of Kitale town. The more children we took from the streets, the newer ones replaced them. During 2006-2008, bloody ethnic violence erupted, causing massive displacement of people with some seeking refuge in the center that I oversaw. During this time,

I doubled my roles to include the coordination of a humanitarian response that supplied both food and non-food items to the displaced families. FPFK also undertook to counsel the victims especially women, children, and some of the youths that had escaped from the combat battles. This work exposed me to children with painful experiences, women with deep wounds both in the flesh and hearts, and young people with emotional wounds and great despair. The experiences formed the basis for my life mission of building peace and dignity for every human.

Building on all these experiences, FPFK and her mission partner — the Norwegian Pentecostal Mission — jointly worked on the plan to intervene beyond the humanitarian response to address the root causes of the ethnic conflict in Mt. Elgon. We developed the plans in 2008 after the violence had ceased through the military operation described earlier. The plans became actualized in 2009 when the peace and human rights project was launched. I switched roles to become the project lead for this peace project, engaged in conducting community peace dialogues that resulted in peace agreements, rehabilitation and reintegration of the former militia young men, building the capacity of various community-based groups on conflict management, supporting the vulnerable members of the communities with livelihood assets and working for the rights of indigenous communities. We addressed peace through education where scholarships were offered to the orphans and constructed six schools. It is also during this time that we initiated and implemented an ICT-enabled peace network with a focus on early warning and early response. I engaged in the mobilization of community groups and state actors toward the formation and strengthening of the peace networks. I worked very closely with software developers during the design of the ICT-enabled systems and interacted with the indicator monitors, the community peace representatives, and security agencies. I held review meetings periodically to make sense of the discussions. I also analyzed the system reports and shared them with relevant stakeholders. This work continued until the end of 2016 when I switched responsibility to the coordination of projects.

In early 2017, my role in FPFK changed to the head of projects related to peace. My basic roles here involved initiating new projects, partnership development, networking, following up on the quality of project implementation, compliance with project agreements, internal policies and procedures, and government regulations. My responsibility entailed visiting each project every quarter and holding meetings with beneficiaries, related stakeholders, and staff. My Ph.D. program started in 2018 while in this role and continues to date. Since my research focuses on peace projects with ICT-related intervention, I visited each of the sites at least quarterly for meetings, dialogues, and discussions with both the state and the project teams. I participated in report writing and in drafting the terms of reference for evaluations of the projects. Email and phone contacts were maintained continuously with the staff. I have thus been an active participant in the peace-building process with FPFK since 2009, which helped me develop a fair understanding of the context of the conflict and peace environment and the historical processes of change. This has helped me develop a process perspective toward the prevention of ethnic violence. This work inspired me to seek more understanding of how ICTs can be applied in the mitigation of violence not only in limited contexts but across the globe. This inspiration coupled with the opportunity provided by the ICT4COP research project[1],

[1]A European Commission Horizon 2020 Research & Innovation Project (https://www.communitypolicing.eu/media/pdfs/ict4cop-brochure.pdf).

availed me the opportunity to undertake Ph.D. studies, as an involved researcher (Walsham, 2006) trying to make a better world in which we live. The three sites of my empirical work are now described.

3.2.3 FPFK in Mt. Elgon conflict system

One of the most committed religious actors in peace-building in Mt Elgon has been the FPFK. After years of lobbying, advocacy, and networking with cultural leaders, FPFK helped design and oversee the signing of the Mabanga Peace Accord (MPA), which has seen communities live harmoniously, which was not the case before. FPFK initiated a peace and human rights project in Mt. Elgon in January 2009, aimed at restoring trust, human dignity, and peaceful co-existence amongst affected communities. Their primary work focused on promoting peace through dialogue and mediation, rehabilitation and empowerment of militia groups and women, and promotion of indigenous people's rights. This also included psychosocial rehabilitation of victims of violence including women, children, and displaced persons.

FPFK was also engaged with the rehabilitation and reintegration of members of over 600 militia groups with their spouses and contributed to the restoration of the mental health and economic status of over *170* widows. They formed social support groups in the form of community-based organizations (CBOs) to keep championing the causes of peace and social justice in the area. Noting that many issues needed advocacy, FPFK facilitated the formation of groups for women, youths, and elders and mobilized the victims and perpetrators of violence into groups between 2009 and 2011 as a way of strengthening civil society. They were trained in lobbying and conducting advocacy for peace, and conflict management with strong components of indicator mapping and monitoring and good governance. These members were registered with the government as legal entities and provided with badges to identify them as community advocates and champions for peace.

FPFK further conducted intra and intercommunity peace dialogues that led to the signing of a peace agreement famously known as the *Mabanga Peace Agreement (MPA)* that was witnessed by the then Vice President of the Republic of Kenya His Excellency Hon. Kalonzo Musyoka. The Agreement continues to guide the players including the government in managing conflicts in the region. To address some of the structural violence meted out to the indigenous people, FPFK supported the construction of six schools attended by the Ogiek children. Through lobbying and advocacy, the government has recognized and taken over the schools and posted teachers coupled with the appointment of their members in senior government positions like County executive officers. The community's infrastructure like roads was improved and threats of eviction from their ancestral land were halted.

3.2.4 FPFK in Muhoroni conflict system

FPFK entered this area in 2017 to contribute towards building sustainable peace by increasing their knowledge and skills and facilitating the Nandi, the Kipsigis, and the Luo communities to form functional peace structures. FPFK focused on addressing root causes of conflict with community members taking lead in finding possible sustainable solutions. Strategic community groups were established, and capacity was built to enable them to address causes and factors of conflict. The committees of Land and Boundary, Leadership and Governance, Cattle Theft

Prevention and Displaced Persons Advocacy, reconciliation facilitators, and the inter-religious dialogue teams have been used strategically to promote peace and cohesion.

FPFK conducts inclusive intra and inter-ethnic dialogues to promote understanding and tolerance on conflict issues like land and boundaries. The members get safe spaces to openly discuss and develop a common understanding of the disputed issues. Further, FPFK facilitates training in Land Laws and facilitates the Land and Boundary Committee in advocating and addressing land and boundary-related issues. Building the capacity of the committee to directly engage with the state agencies provides an alternative to violent means and helps in addressing the underlying issues in communities. FPFK also sensitizes youths, women, and elders about laws and policies regarding land and boundaries and encourages them to embrace alternative methods of resolving issues instead of violence. Sensitization helps in countering the narratives that sustain violence within ethnic groups. FPFK is also facilitating various community groups to undertake learning visits to areas where similar interventions were taking place, to enhance the processes of self-learning.

3.2.5 FPFK in Turkana/ Pokot conflict system

FPFK extended her work to this area to facilitate an enabling environment for communities to exist peacefully and be empowered to attain inclusive development. FPFK is reaching out to the militia groups in the two counties by offering alternative sources of livelihood such as irrigated farming for horticulture, breeding exotic goats for milk, milling, and supporting local transport businesses. FPFK also builds the capacities of community youth and women groups in lobbying and advocacy so that they engage in issues that the government and other duty-bearers have responsibility for. FPFK further conducts dialogues between the two communities on commonly identified challenges with a view of building understanding and developing non-violent means of resolving issues. FPFK trains faith leaders on the process of trauma healing and providing psychosocial support. What is unique to this area with FPFK intervention is of working with children for peace to establish peace clubs in schools to counter the narratives and myths that perpetuate violence. These efforts have yielded some results that need sustenance, for which the FPFK scaled the Conflict Early Warning and Early Response System to avert a possible repeat of conflict and violence incidents.

3.2.6 How FPFK is applying the technology in peace processes

Central to this study is the adoption of ICT based early warning and early response (EWER) system in peace-building and conflict management in pastoralist areas. This system links the peace and conflict monitors in the hotspot areas with the government security and disaster actors who are in this case called responders. Such responders include all units of police operating in the project area as well as at the national level, such as the Inspector General of Police; humanitarian agencies such as the Red Cross, and National Disaster Management Authority; the county governments departments for disaster, peace and conflict management; and civil society actors such as the World Vision, among others. The monitors send the messages to the system's SMS code, which in turn relays the messages to the responders without divulging the identity of the monitors. The responders then move in to prevent the conflict just before the violence occurs. The process is summarized in Fig 3.3.

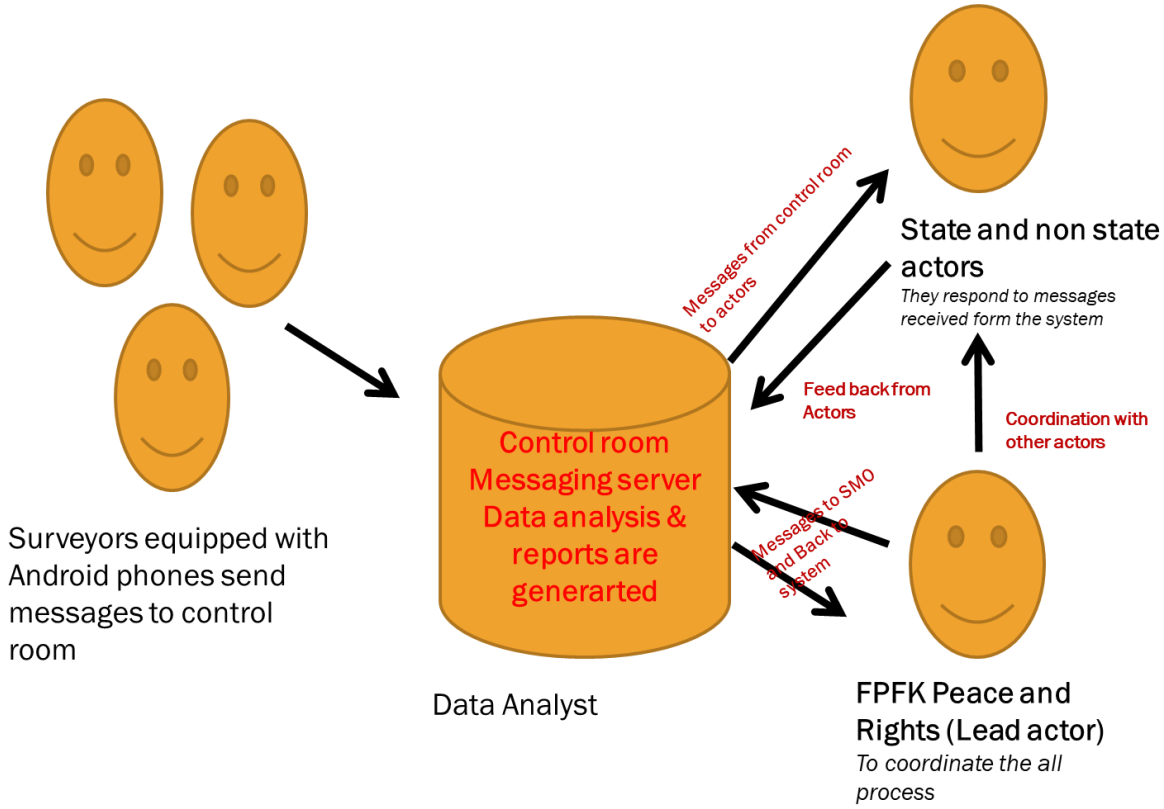

Figure 3. 3 ICT – enabled Early Warning and Early Response

FPFK has mapped out key areas where the conflict is particularly volatile. Each area has two conflict early warning monitors whose work complements and strengthens the work of the security agencies and other non-state and peace actors in the region. The system is particularly significant in safeguarding the monitor's identity, restoring trust between the community and the security agencies, and enhancing timely response to conflicts before these situations are translated into violent conflicts. The system further promotes analysis trends by bringing together security actors, community peace actors, peace champions, and county government representatives.

3.3 Conflict Context in Study Research Areas

The research was undertaken in seven counties clustered in Mt. Elgon, Muhoroni, and Turkana/Pokot conflict systems.

3.3.1 Context of Mt. Elgon Conflict System

Location and Geography

Mt. Elgon area covers the Mt. Elgon sub-county in Bungoma County and Trans Nzoia County, which is together described as the "Mt. Elgon conflict system" (Figure 3.4).

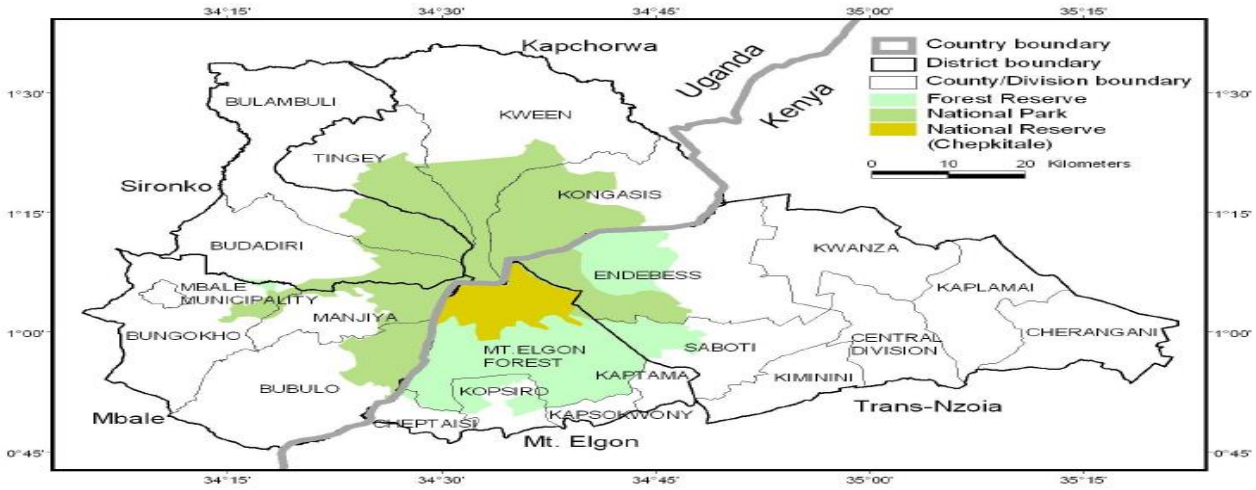

Figure 3. 4 Mt. Elgon Conflict system Area (Source: author)

The mountain rises to 4,321 meters above sea level in the north, and its western part extends into Uganda. Most of the population lives in the southern part, which is more fertile, compared to the northern part which is higher in altitude and covered by forests. The Kenyan side is divided into three geographical zones: the foothills, a government-protected forest belt, and Chepkitale — a cold and barren moorland area situated at the mountain's peak.

People and culture of Mt. Elgon Conflict system

The total population in the Mt. Elgon conflict system was 529,067 (Census, 2019), which is multi-ethnic yet dominated by the Sabaot who account for 60% of the population (Figure 3.5). The Sabaot are a sub-tribe of the Kalenjin and are comprised of the Bok, Someek, Bongomek, Ogiek, Sabiny, and Koony sub-dialects/tribes. According to Achoka and Okoth (2008), the two sub-tribes stem culturally from one community but are geographically separated, which over time has led to diverging lifestyles due to different environmental living conditions. The Ogiek, who account for about 20% of the Sabaot, occupies the northern and higher part of the sub-county and engage in herding and foraging in the forest, while the rest (making up 80%) have settled on the lower slopes in the south of the sub-county and are agro-pastoralists.

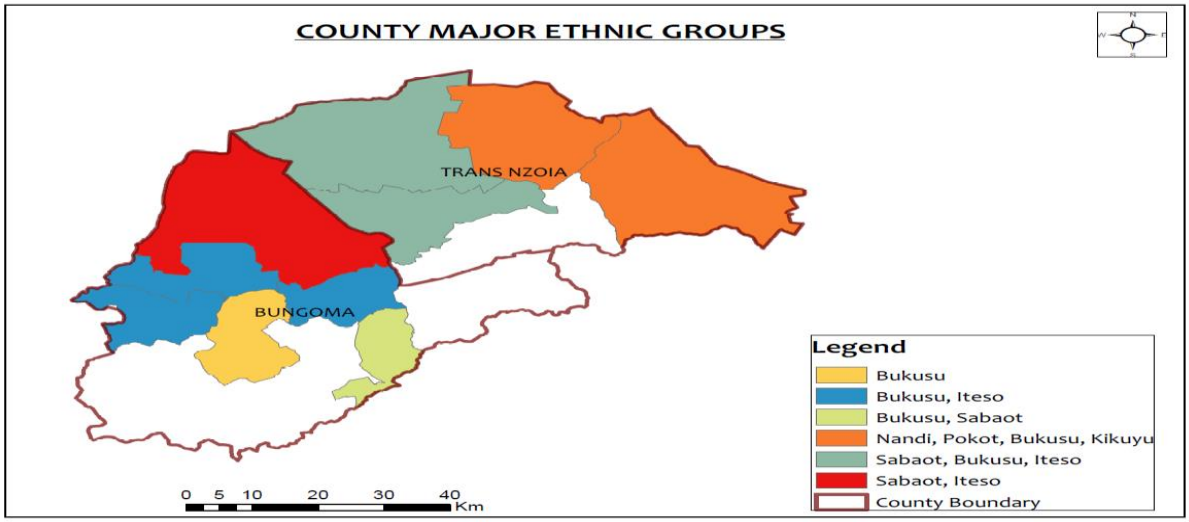

Figure 3. 5 Major ethnic entities in Mt. Elgon Conflict System (source: author)

The Sabaot ethnic group is part of the Kalenjin-speaking communities of the Rift valley and western Kenya. According to the unpublished Mabanga peace conference report (2011), they originated in Egypt. The primordial ancestor of the Sabaot *Koong'iin* moved with his family southward from Egypt through Ethiopia where they settled for a short while before making their way to the Kubteber region in the Rift Valley, then to Cherangany Hills before finally settling on the slopes of Mt. Elgon. This history is disputed by the Bukusu and Iteso who claim to be the original inhabitants of the area. Traditionally, the Sabaot have spiritual leaders (Laibons) who are chief diviners and are also traditional leaders. They determine whether the community is to go to war or not. Economically, the Sabaot are originally pastoralists, although they now practice mixed farming, which has been catalyzed by factors such as the scarcity of grazing lands which remains the main source of violent conflict. The only group that practices pastoralism is Ndorobo/Ogiek/ Mosoobiisyek who live on the moorland of Mt. Elgon. This practice makes other communities suspect them of livestock theft. The rites of passage such as birth, circumcision, and marriage are important aspects of the Sabaot culture and traditions. Circumcision is used to discriminate and undermine the Iteso men who do not undergo the practice (Chemorion, 2008).

According to myths, the Iteso originated in Egypt and migrated southwards reaching South Sudan by around AD1500 and continued reaching Uganda and eventually settling in Kenya with some members settling on the slopes of Mt. Elgon (Karp& Karp, 2012). The community was led by a spiritual leader called *Emuroni,* who was believed to have divine powers and could make rain and was the chief traditional healer who was also the key to peace or violence. The Emuroni presided over a council of elders that worked to resolve conflicts and settle disputes among members of the Iteso community (Borona& Ndiema, 2014). Unlike the Sabaot and Bukusu, the Iteso did not practice male circumcision — a factor that created conflict with other communities. Economically, the Iteso practiced both farming and livestock herding, with the latter being more prominent.

The Bukusu community is part of the larger Luhya community enlisting 18 subtribes. Currently, the Bukusu inhabit Bungoma, Trans-Nzoia, Uasin Gishu, Kakamega, and Busia counties in western Kenya. The Bukusu believe that their descendants came from Egypt and migrated southwards following River Nile into central Uganda and to their present-day area of occupation including Mt. Elgon (Wandibba, 1997). The Bukusu practice a circumcision ceremony for boys which functions as their 'rites of passage.' A Bukusu boy could not be a man if he did not pass through the customary ritual. The "uncultured" boy was always sidelined and regarded as a coward (Chikati, 2014; Mbachi& Likoko, 2013). This belief was normally forced on other men and boys from communities that did not circumcise. *Economically*, the Bukusu practiced both livestock and agricultural farming (Fig.3.6), which always put them in conflict with other communities (Wanzala et al., 2012; Lynch, 2011).

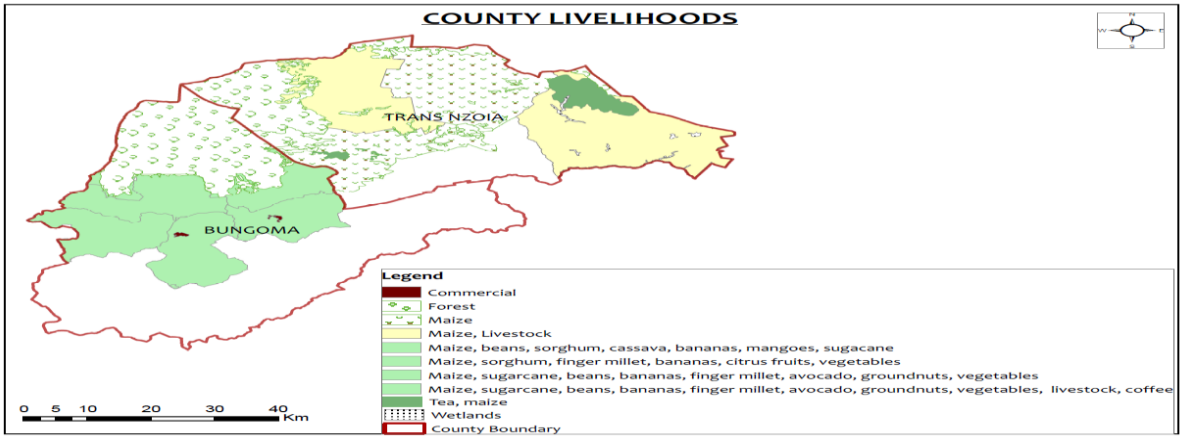

Figure 3. 6 The livelihoods of the Mt. Elgon conflict system (source: author)

Context of ethnic conflict in Mt. Elgon

Analysis of the ethnic conflicts in Mt. Elgon has taken place in several waves. The first wave was in 1958, which was a result of competing claims on land access as opposed to land ownership. Such claims also played out in the 1963 violence which again revolved around claims to land and associated resources (Namunyu, 2019; Kakai, 2000). The second wave emerged between 1963 and 1968 when the Sabaot attacked the Bukusu immigrants in Trans-Nzoia intending to reclaim 'their' stolen land (Hornsby, 2012). The third wave of violence occurred after independence when the Sabaot remained suspicious of the Bukusu whom they accused of not only occupying large chunks of their land but also dominating politics in the area where they were 'autochthones' (Namunyu, 2019; Lynch, 2011; Klopp, 2001; Kakai, 2000).

The 2006/8 violence and the emergence of the Sabaot Land Defence Force *(SLDF)* were due to historical land grievances linked to land settlement schemes that were created in three phases namely, Chepyuk phase I, Chepyuk phase II and Chepyuk phase III. This particular conflict received a lot of scholarly attention (Wafula, 2019; Opong'o & Mumma-Martinon, 2018; Lynch, 2011; Médard, 2008; Malewa, 2003) because of the involvement of the militia and military operations. Chepyuk phase I settlement scheme was established in Chepyuk in 1971 to relocate Mosop from Chepkitale land (Malewa, 2003). Despite the process initially targeting the Mosop, other communities such as the Soy, Bukusu, and Iteso also put in claims for resettling at Chepyuk arguing that they had lost their land to the colonial regime. This caused problems among the communities prompting the government to establish a committee to verify claims and identify families to whom land was to be allocated. The result of this confusion was the introduction of Chepyuk phase II and the eventual genesis of the 2006/8 violence (Wafula, 2019; Boone, 2009). When Chepyuk phase II was created as a response to the demand for more land, the process was mismanaged by the state and became more chaotic leading to discontent among the political and cultural leaders as some members were evicted (Kamoet, 2007; Simiyu, 2008). According to a report by the Truth Justice and Reconciliation Commission (2013), many of the evictees drifted to towns such as Kitale, Bungoma, and Webuye (Truth, 2013). This enraged the Soy communities, and the local politicians petitioned the government to create the Chepyuk phase III settlement scheme to resettle evictees and other landless Sabaot members (Wafula, 2019 (Opong'o & Mumma-Martinon, 2018). The 2006/8 conflict emerged out of feelings of deprivation by the Sabaot as the Chepyuk Settlement Scheme phase II did not

adequately address their land grievances. Soy politicians petitioned the government to create phase III to allow those left out during phase II to be considered for land allocation (Wafula, 2019; Truth, 2013). The Chepyuk settlement Scheme phase III was established, but this was like the earlier schemes, characterized by controversy in land allocation (Wafula, 2019).

Causes of ethnic violence in Mt. Elgon

Before colonization, the Sabaot who were pastoralists claimed to have roamed the whole of the Mt. Elgon region. At the onset of colonialism, the white settlers displaced them. Bukusu and Iteso communities began to move in to work on the white farms and later bought the land after independence in 1963. Since their return, the Sabaot have been fighting for their land. (Wamalwa, 2021; Lynch, 2011). Marginalization is another factor. The Sabaot complain that there has not been enough government investment in local schools, which they felt contributed to the political marginalization of the people of the area. The residents had strong feelings that the area was particularly underdeveloped (Magotsi, 2009; Wasike, 2009). Autochthony, which is the politics of 'who belongs', was another cause of conflict. The Sabaot believed that Mt. Elgon was their territory by ancestry while the Bukusu claimed to belong through purchase. These narratives are shared through social media and SMS platforms among professionals especially youths. While the Kalenjin and the Bukusu practiced circumcision as an initiation rite, the Iteso removed two lower teeth as their initiation. These differences have been the source of ridicule and even denial of leadership positions (Wamalwa, 2021; Otunga, Jaluo& Mubichakani, 2019; Mercy, 2018; Lynch, 2011). These prejudices and hate speech have been advanced through online platforms as was the case in 2008 and 2013 violence when digital platforms and mass media were used to spread hatred among ethnic communities. Other factors included scarcity of land (Imbuye, 2016; Nyambasi, 2011), politics, borders, boundaries (Wamalwa, 2021; Namunyu, 2019; Magotsi, 2009), the proliferation of SALWs (Wafula, 2019; Simiyu, 2008; Mkutu, 2007; Pius, 2000), cattle rustling (Médard, 2009; Fukui & Turton, 1979), natural resource sharing (Ongugo et al., 2008) and the violation of Ogiek indigenous rights (FPFK Final Report, 2013 unpublished). Cattle rustling and gunrunning were founded and operated through cartelism that was characterized by ICTs as tools of communication.

Responses to ethnic conflict in Mt. Elgon

The *state's response* to the conflict was localized to the chiefs who were tasked with the responsibility of ensuring peace in their areas of authority. Subsequently, curfews were put in place, to be enforced by the chiefs and the police. In addition, several police patrol bases and posts were opened to beef up security in the area. The state also deployed more security personnel, including special units such as the Rapid Deployment Unit, Anti-Stock Theft Unit, and the paramilitary General Service Unit. However, these approaches failed and the SLDF continued to spread terror and commit atrocities in Mt. Elgon and parts of the Trans-Nzoia District (Truth, 2013; Simiyu, 2008; Wepundi et al. 2011). The escalation of the conflict forced the state to deploy the military in March 2008 to deal with the SLDF menace (Osodo, Kibirige & Mung'ou, 2014). The Truth, Justice, and Reconciliation Commission (TJRC) visited Mt. Elgon and organized truth hearing sessions for victims and perpetrators of violence. The commission provided victims, perpetrators, and the public with a platform for non-retributive truth-telling aimed at bringing justice to the victims (Truth, 2013).

Non-state actors included the Kenya Red Cross, Catholic Justice and Peace Commission (CJPC), National Council of Churches of Kenya (NCCK), MSF, Action Aid, World Vision,

Saferworld, Human Rights Watch, Peace Tree Network, PEACENET Kenya, Maendeleo Ya Wanawake, Rural Women Peacelink, Western Human Rights Watch, Mwatikho, Reformed Church, Anglican Church of Kenya, FPFK and Seventh Day Adventist Church, among others. Non-state interventions have ranged from the provision of psycho-social trauma counseling, lobbying, advocacy, and humanitarian assistance. The dialogue sessions helped in the provision of psychological healing, as women were able to not only voice their experiences but also develop ways of coping with the stress (Osodo, Kibirige& Mung'ou, 2014). They helped in lobbying national and local authorities to hasten dialogue between and among the warring communities. They also investigated military involvement in committing crimes against locals, offering humanitarian assistance. The church and religious leaders were at the forefront of aiding those affected by the clashes.

3.3.2 Context of Muhoroni Conflict System

This conflict system covers the borderline of three counties with each occupied by a different ethnic entity. The Luo community occupies Kisumu County, while the Kalenjin communities of Nandi and Kipsigis occupy the Nandi and Kericho Counties (Fig. 3.7).

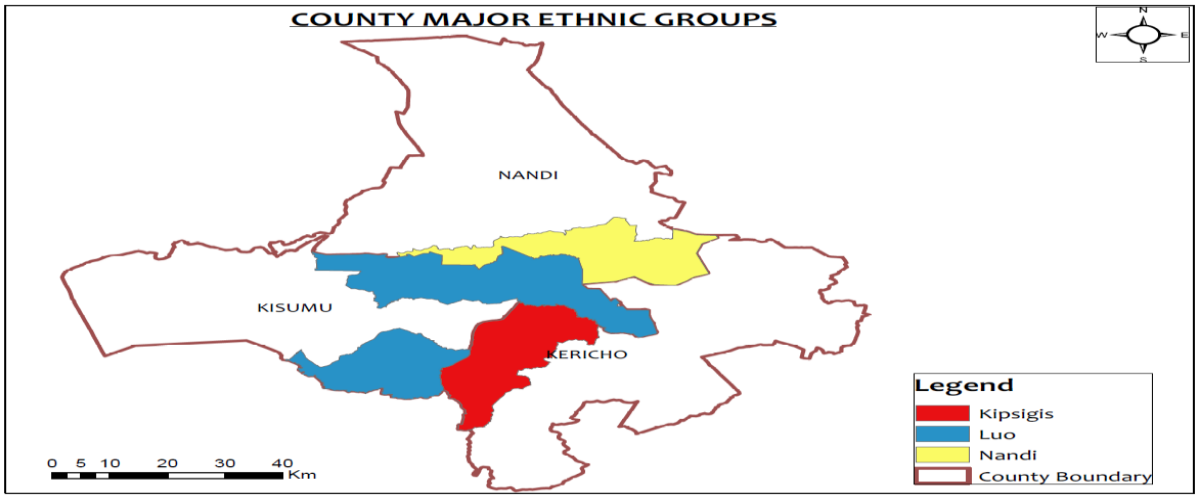

Figure 3. 7 Muhoroni conflict system with corresponding ethnic entities (source: author**)**

***Economic factors of conflict*:** According to the unpublished FPFK conflict analysis report of 2015, the majority of households depend on farming and livestock keeping. They grow both subsistence and cash crops and are similar across the three counties as shown in Fig. 3.4. However, the Luo community practice fishing which is unique to them. The source of income is an important pointer to the demand for livelihood resources like land which are often the sources of violent conflicts. There are general land tenure problems in the entire borderline of the three counties. The majority of residents have no legal documents to guarantee the security of land ownership. Since land is a major source of livelihood (Fig 3.8) and it is limited, there have been cases of land invasion and illegal grazing leading to endless violence.

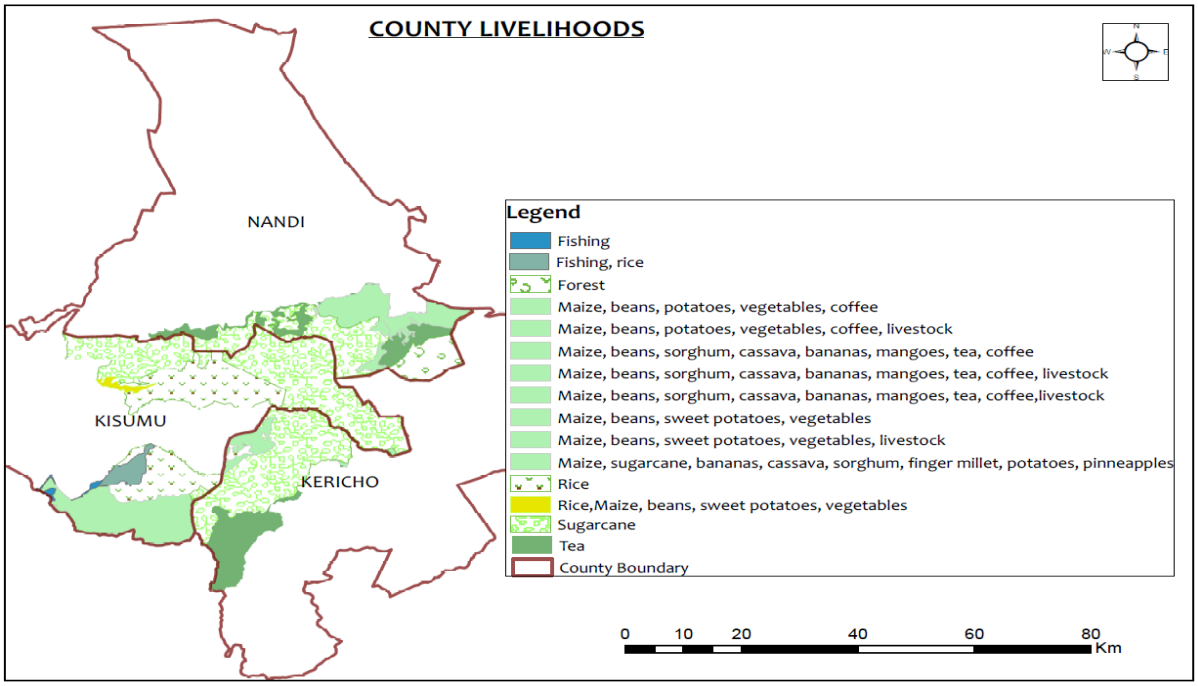

Figure 3. 8 Major sources of livelihood in the Muhoroni conflict system

Apart from agriculture, business was an important economic activity in the area. The Sondu market was an important marketplace that connected people from Kericho, Kisumu, and Kisii counties for trade and other businesses (Juma, Iteyo& Simiyu, 2018). There were historical land factors and the Kalenjin claimed that they were displaced by the colonialists who took over their fertile land. Most of them were forced to work in the colonial farms while others ran away to look after their animals going as far as Tanzania. The Luo community believed that they are the rightful owners of the land around Muhoroni and Chemelil (Juma, Iteyo& Simiyu, 2018).

Cultural factors of conflict: The Kalenjin (Nandi and Kipsigis) are distinct from the Luo community though they geographically neighbor each other. The Kalenjins practice circumcision as an initiation rite that is accompanied by elaborate ceremonies (Mietzner, 2019; Ochieng, 2017). Luo on the other hand practiced teeth extraction as their form of initiation into adulthood. They remove six lower teeth (Pinchi et al., 2015). These differences in cultural initiation rites have formed the basis for ridicule and feelings of heroism contributing to polarized relations among them. ***Beliefs and values:*** The Kalenjin attach a lot of value to the ownership of land and animals to an extent that one is seen as an outcast if he had nothing to show. These strong beliefs passed on from one generation to another through the initiation rites of passage like circumcision are the driving force among the Kalenjin in the fight for land and the increased cattle theft. The culture associated with livestock rustling/theft was common as noted by various scholars (Dutta et al., 2021; Juma & Simiyu, 2019; Juma, Iteyo & Simiyu, 2018 & Ochieng, 2017).

Fig. 3.7. Some of the livelihood assets in the study area

Figure 3. 9 Some of the livelihood assets in the study area

Governance factors of conflict: There are overlaps in the administration of ethnic communities on the borderlines of Kericho and Kisumu, Nandi, and Kisumu Counties. For example, the Sondu market is administratively in Kericho County, but the dominant ethnic community is the Luo, specifically Koguta in Koitaburot. This has contributed to conflicts because taxes are collected and sent to Kisumu and some local leaders report to Kisumu instead of Kericho. Nyangore Sub Location in Chemelil, which is in Nandi County, reports to the Chief in Kisumu County. Songhor around the land of Ms. Abura is in Kisumu, but their leaders reported to Nandi County (Juma & Simiyu, 2019; Nyongesa, Wakhungu & Maragia, 2016). It was observed that traders on Sondu market from the Kalenjin side had formed a WhatsApp group where they discussed everyday experiences with other communities on the market. Some messages shared through this group undermined and prejudiced other traders. Poor governance was also seen through the inequitable distribution of resources in the area. It was also manifested by discrimination in the supply of services based on ethnic identification (Ochieng, 2017).

Figure 3. 10 Disputed ethnic land boundary in the Muhoroni conflict system

Responses to ethnic conflict in Muhoroni

The government had been actively involved in responding to the conflicts using police and community policing. Community policing entailed efforts by the police to collaborate with local communities to ensure durable peace in the study area. However, as stated by Juma (2019), the approach has not worked due to mistrust between the police and the community. The locals fear reporting to the police as it may land them in trouble by becoming lead suspects. Juma further added that the government has attempted to curb cattle rustling through the establishment of the Anti-Stock Theft Police Unit in the region, which has not yielded much in stopping the menace (Juma, 2019). Government institutions like National Peace Secretariat and National Cohesion and Integration Commission have also been working with NGOs and local CSOs and communities through District Peace Committees to monitor the election process, collect and share early warning information as well as respond to conflict risks (Onyango et al., 2011; Njuguna, Ndung'u & Achilles, 2015). Chiefs held barazas every week in their offices to talk to the local communities about the importance of living peacefully with their neighbors (Njuguna, Ndung'u & Achilles, 2015).

The NGOs including Red Cross and World Vision all stated that they supported various peace initiatives in the area. These two NGOs provided humanitarian support to people displaced by the conflict and supported activities that were aimed at the restoration of peace in the study area through workshops, dialogues, and conferences. Community-based organizations including Kericho Youth Bunge, Nyakach Elders Development Group, and Uhai Lake Forum as well as faith-based organizations including Catholic Justice and Peace Commission, National Council of Churches of Kenya as well as churches including the Anglican Church, the Catholic Church, and the Seventh Day Adventist Church all indicated that they were involved in activities for fostering peace in the study area (Juma, 2019; Njuguna, Ndung'u& Achilles, 2015). Some of these efforts helped in averting potential conflicts. For instance, before and during the 2013 general elections, the Safer World in collaboration with Local Capacities for Peace International assisted in the formation of the Peace and Security Task Team which helped avert the looming conflict in the area during that time (Njuguna, Ndung'u & Achilles, 2015).

3.3.3 Context of Turkana /West Pokot Conflict System

The study was conducted along the borderline of Turkana and West Pokot Counties in Kenya (refer to Figs 3.1 and 3.2). The choice of this area is informed by the fact that it is the third area that FPFK scaled with the ICT-enabled early warning system after initiating it in Mt. Elgon. It was then scaled to Muhoroni and then to Turkana and West Pokot conflict systems. It also offers a unique kind of conflict between the pastoralist communities and in semi-arid and arid conditions.

***Turkana context*:** Turkana County is in the Turkana Basin at the northern end of Kenya (Johannes, Zulu& Kalipeni, 2015). Turkana's climate is arid/semi-arid and drought-prone with desert-like vegetation and scattered grasslands. The unfriendly climate has always posed a major challenge to food security with pastoralism (cattle, some camels, sheep, and goats) as the main source of livelihood supporting approximately one million people (Census, 2019). Resources are scarce and conflicts over the scarce resources are frequent, usually in the form of

violent cross-border cattle raids from Pokot, Uganda, Sudan, and Ethiopia as pastoralist groups vie for pasture, water, and livestock (Ngugi, 2016; Johannes, Zulu& Kalipeni, 2015)**.**

Turkana County and the surrounding counties of Baringo, Laikipia, Marsabit, Samburu, and West Pokot historically suffer from violent conflicts, including cattle raids (Noonan& Kevlihan, 2018). For Turkana County, these conflicts include clan or ethnic-based conflicts, international cross-border conflicts, and intra-communal conflicts such as those between two Turkana communities (Krätli & Swift, 2003). For defense purposes, enforcement is granted to village warriors and their age-mates (Mathew & Boyd, 2014; Triche, 2014).

West Pokot context**:** West Pokot is classified as a semi-arid and arid county that borders the Republic of Uganda to the West and the Trans-Nzoia to the South, Elgeyo Marakwet and Baringo to the South East, and Turkana to the North and North East. According to the 2019 Census, the county has a population of 621,241, with most of them residing in rural areas and depending on pastoralism as the main source of livelihood. The main disasters facing West Pokot Communities include cyclical conflicts over dwindling natural resources, increasing drought episodes, frequent outbreaks of livestock diseases, lightning strikes, floods, and landslides (Huho, 2012). They are pastoralists like the Turkana community and thus rely heavily on livestock and migratory patterns (Triche, 2014). West Pokot conflicts have resulted in the displacement of people, loss of lives and livelihoods, and contributed to the persistent inter-ethnic hostility amongst the Pokot and Turkana communities (Schilling, Opiyo& Scheffran, 2012).

The conflict context: Turkana and Pokot have been raiding each other since 1910 (Bollig, 1990). The state of war between the two pastoral nomadic groups is characterized by mutual raiding. Raiding parties consist of several hundred men setting out after some weeks of careful preparation. They wage far into enemy territory and try to capture as many livestock as possible. Though killing enemies is not a primary aim, frequent raids result in several deaths (Schilling, Opiyo& Scheffran, 2012). As pastoralism revolves around livestock, the conflicts are about livestock and related productive assets like water, land, and pasture. These resources closely tie conflicts to the violent theft of livestock, referred to as raiding. On one hand, raiding leads to distrust between communities which is a prerequisite of conflict. On the other hand, communities use raiding to articulate their hostility toward enemy communities (Schilling, Opiyo& Scheffran, 2012)**.** Turkana and Pokot communities use raiding as a cultural practice for the restocking of herds, especially after periods of drought or outbreaks of diseases. However, according to scholars, due to the proliferation of modern small arms, commercialization of livestock raiding, dispute over land tenure rights, banditry, and predation, the cultural practice has become a widespread, sophisticated, more violent, and destructive activity among pastoral communities in northern Kenya (Noonan & Kevlihan, 2018; Triche, 2014; Huho, 2012; Nganga, 2012**;** Schilling, Opiyo& Scheffran, 2012**;** Bollig, 1990).

The causes of ethnic conflicts in the Turkana/Pokot conflict system

The culture of livestock rustling is a key factor in ethnic conflict (Nganga, 2012). Livestock rustling is a cultural aspect of the Pokot founded on their myth of origin and a belief that all cattle belong to them. This means any of their neighboring communities that keep cattle have stolen them from the Pokot. The groups jostle for access to limited natural resources such as pasture land and watering holes that are available to their livestock. Restocking is another factor that drives livestock rustling. It is practiced especially after severe drought and famine in

which lots of animals die or are sold off to reduce the impact of drought. Young men raid to increase their prestige and respect within the community, attract girls and be able to afford marriage (Cheserek, Odenyo & Omondi, 2012). The influx of modern weaponry from border areas of Uganda, Ethiopia, and Somalia is another factor (Triche, 2014; Opiyo et al., 2012). The instrumental use of conflict in political elections seems to increase in frequency and intensity before elections. Within the context of a clan or ethnic-based politics, attacks can be timed so that the voters of the opposing ethnic group flee the constituency before the election, leaving only their supporters to vote (Greiner, 2013; Hendrickson, Armon & Mearns,1998). Political mobilization was achieved through digital platforms formed and operated by closed groups where sensitive and classified messages were shared. This led to an increase in myths and narratives as ICTs were used to spread them to different groups of people with a common interest. For example, the eviction of people I Chepchoina scheme in 2017s as a result of a politician's hate statements aired on local radio stations in vernacular language. The same message was circulated through Facebook pages and YouTube.

Interventions to the ethnic conflicts in Turkana/Pokot conflict

Government intervention: The Kenyan government had on several occasions-initiated peace-building processes through disarmament programs in 2006, 2009-2010, establishing the Nasolot game reserves in 1979 to act as a boundary between the rival Pokot and Turkana communities and enhancing security through sending soldiers to areas affected by conflicts. It also established more police posts in remote areas. For instance, after the November 1995 raids and counter-raids between the Pokot and the Turkana, the government deployed security forces, the General Service Unit, regular Kenya Police, and Administrative Police to control the situation. In addition, the Kenyan government also attempted to disarm the Turkana, Pokot, and Marakwet (Nangulu, 2001).

Indigenous Peace Building Initiatives: Inter-community meetings and negotiations were conducted especially during the dry season as grazing areas are often located in the territory of other communities. Huho further observed that elders from the conflicting communities made treaties on peacekeeping (Huho, 2012). However, after the brokering of the peace pact through the council of elders, sometimes conflicts flared up depending on the intensity of the socio-economic hardship the communities were facing (Devine, 2016; Triche, 2014).

Non-state actors' response*:* The World Vision, Kenya, and the Kenya Red Cross Society had established peace-building initiatives in the county. For instance, the World Vision peace initiative began its operations in 1997 to educate the rival communities on the advantages of peaceful coexistence, providing formal education, providing water through drilling boreholes and water piping from highlands to lowlands, and providing drought-resilient Sahiwal cattle breed. The Pokot Education and Development Programme (PEDP) undertook various community development initiatives that dealt with conflict resolution among other issues. PEDP organized inter-community peace dialogues between the warring communities. Other NGOs that were involved in conflict resolution were Daima Initiative for Peace and Development and Women Peace Crusader. The focus of these NGOs was the participatory collective approach to the attainment of peace and non-violent coexistence (Devine, 2016).

In conclusion, it is noted from this context analysis that ethnic violence remains a challenge to socio-economic development of the affected communities. Despite many interventions being initiated to address the challenge, there is still a need for more innovative and inclusive

approaches that can bring sustainable solutions. It is observed that there is limited collaboration among actors, and apart from FPFK, no other actors including the government are harnessing the potential of ICTs in addressing this ethnic menace. Therefore, it is time to contribute an analytical framework that not only harnesses the potential of ICTs but is also inclusive, and collaborative and has the victims of violence as the primary actors to guarantee the sustainability of the interventions.

3.3.4 *Role of Social Capital on ethnic Violence in Mt. Elgon, Muhoroni, and Turkana/West Pokot conflict systems*

In Table 3.1 I summarize how social capital mechanisms of bonding, bridging, and linking played out in causing and sustaining ethnic conflicts and offer detailed discussions at the end of the table.

Table 3. 1Summary of the role of social capital in shaping ethnic conflicts in the study areas

Conflict system/social capital mechanism	**Bonding social capital**	**Bridging social capital**	**Linking social capital**
Mt. Elgon conflict system	• Family and kinship relationships were exploited to conceal gender-based violence • Ethnic identities exploited to: o form ethnic militia like SLDF o discriminate and exclude others o form gunrunning (SALW) networks o sustain political dominance over minorities o cattle theft networks • Cultural identities/practices like circumcision applied to ridicule, prejudice, and exclude others • Geographical proximity promoting autochthony	• Livestock cartels: Criminals spanning ethnic communities organize livestock theft using armed violence • Gunrunning cartels: Well-connected networks of individuals spanning communities trade in firearms (gunrunning) • Ethnic brokers promoted political clientelism	• Political clientelism. Minorities like Iteso and Sabaot are not included in leadership and decision making • Corruption cartels where leaders failed to administer justice, especially on land cases • NGOs/CBOs brokering peace efforts • Security agencies with the responsibility to protect failing to respond to desperate calls from the communities
Muhoroni Conflict system	• Family and kinship relationships were exploited to conceal gender-based violence • Cultural identities/practices like circumcision applied to	• Livestock cartels: Criminals spanning ethnic communities organize livestock theft using armed violence	• Minorities not included in leadership and decision-making in counties with the majority • Corruption cartels

	ridicule, prejudice, and exclude others • Ethnic identities exploited to: o discriminate and exclude others o sustain political dominance over minorities o cattle theft networks • Geographical proximity promoting autochthony	• Ethnic brokers promoted political clientelism	where leaders failed to administer justice, especially on land cases • NGOs/CBOs brokering peace efforts • Security agencies with the responsibility to protect failing to respond to desperate calls from community members
Turkana /Pokot Conflict system	• Geographical proximity apart from promoting autochthony, also led to fights over pasture and water points • Family and kinship relationships were exploited to conceal gender-based violence • Cultural identities/practices like circumcision applied to ridicule, prejudice, and exclude others • Ethnic identities exploited to: o form gunrunning (SALW) networks o livestock rustling networks o form ethnic warriors	• Livestock cartels: Criminals spanning ethnic communities organize livestock theft using armed violence • Gunrunning cartels: criminals spanning ethnic communities exchange small arms and light weapons	• Corruption cartels where leaders failed to administer justice, especially on livestock theft, water point sharing, and pasture-related cases • NGOs/CBOs brokering peace efforts • Security agencies with the responsibility to protect failing to respond to desperate calls from community members

The implication of social capital on exclusion, militia networks, cultural tolerance, and cartelism

Social capital and their exclusionary tendencies

Social exclusion is generated by social capital and is a key contributor to ethnic violence. Exclusion limits opportunities to effectively participate in political and decision-making processes. People belonging to a different ethnic group can be treated like "others" and become victims of stereotypes and prejudice, leading to social exclusion. The lack of political representation led to the denial of power and enhanced a sense of insecurity among the communities. In Mt. Elgon, for example, the Sabaot felt marginalized in terms of political

representation in Bungoma County. The Bukusu community exploited their ethnic identities, drawing upon bonding social capital, to elect their own regardless of their competence. The Bukusu elected leaders deliberately excluded the Sabaot during the allocation of resources. The Sabaot, on the other hand, exploited their geographical advantage to deny the Bukusu community access to water resources, by vandalizing pipes and blocking access to water tanks which led to ethnic violence. In the Muhoroni conflict system, while the Luo community members living in Kericho County (predominantly occupied by the Kalenjins) were denied access to essential services like health care and education for their children, the Kalenjin living in Kisumu county (predominantly occupied by the Luo) were denied employment and other essential services.

Social capital and the emergence of militia networks in the study areas

Social capital based on strong social identities contributed to the formation of militia networks in Mt. Elgon, Muhoroni, and Turkana/Pokot conflict systems. Ethnic nationalism, politicization, and polarization of identities, coupled with ethnic mobilization contributed to the emergence of armed militia groups in Mt. Elgon. Ethnicity, shared identity, and ideology (bonding social capital) provided the basis for recruitment into armed groups. Examples of militia in Mt. Elgon were Sabaot Land Défense Force (SLDF) that were in combat with the government (linking social capital). Others were the Moorland Force, 7 Brothers, 42 Brothers, Chebarakachi Social Force, 24 Brothers, and the Brokers. In Muhoroni and Turkana conflict systems, bonding social capital was exploited in organizing livestock raiding groups.

Social capital and cultural intolerance

Bonding social capital is the source of ethnic intolerance contributing to the exclusion of the 'others' who do not ascribe to certain cultural practices, which fuels violence in the study areas. A major contributing factor to ethnic violence in Mt. Elgon was the practice of forced circumcision of men and women in some communities. While the Bukusu practice male circumcision, the Sabaot practice both male and female circumcision, and the Iteso do not have any of these practices. Among the Bukusu and Sabaot, undergoing the rite of circumcision was a form of heroism and manhood, supra-ethnic masculinity, which ostracised the uncircumcised. When an Iteso man marries a Bukusu or Sabaot woman, they force him to be circumcised to be respected as an in-law. The political and ethnic significance of forced male circumcision makes it much more than just circumcision, as it serves to diminish the cultural identity of the communities that do not circumcise, and violence is exercised against them. These prejudicial tendencies towards the uncircumcised have restricted their freedom of choice in marriage and political participation, causing deep-rooted social conflict. In the Muhoroni conflict system, circumcision is also a key factor in ethnic violence. The Kalenjins undermine the Luo that does not practice it. They do not recognize them and respect their opinions as they are perceived to be 'children' who should not say anything before the elders. This cultural intolerance has perpetuated ethnic conflicts in these areas. In the Turkana/Pokot conflict system, the pattern is the same.

Social capital and cartel networks in the study areas

Several cartels were identified in the study area, including livestock rustling and arms trafficking. Livestock rustling cartelism was a major cause of violent ethnic conflict among the Kalenjin, Luo, Sabaot, Iteso, Turkana, Pokot, and Luhya communities in Muhoroni, Mt. Elgon,

and Turkana/ Pokot. Livestock rustling cartels were formed based on shared cultural values associated with traditional social structures and belief systems of pastoralist societies, which also served as drivers of violence. Raids were driven by ideals of male prestige, high bride prices, and the influx of modern arms, representing a form of organized and economically lucrative crime. For example, a member of the Mosop community steals animals, hands them over to a member of the soy community, and a Soy member hands them to a member of the Bukusu community who sells and distributes the income. Criminals were able to organize livestock theft using armed violence and make such illicit activities appear akin to traditional practice. Small Arms and Light Weapons (SALW) cartelism was another key driver of ethnic violent conflicts. Well-connected networks spanning across communities, counties, and neighboring countries (Uganda and South Sudan) brought in Kenya firearms, which was a lucrative economic activity. This illegal transaction was conducted between closed groups having high levels of trust and reciprocity, characterizing bonding and bridging social capital.

Social capital and ethnic clientelism, cronyism, and moral deficiency in the study areas

Social capital contributed to the breeding of ethnic clientelism, cronyism, and moral deficiency leading to intractable ethnic disharmony. Clientelism represented the transactions between politicians and citizens whereby material favors, goods, or services are promised in return for political support at the polls. Voting was based on particularised loyalties defined by kinship and ethnic ties and the extent to which benefits accrued to their groups. Ethnically based political parties tended to redistribute benefits to their ethnic groups rather than provide public goods for the benefit of citizens at large. Promises were sometimes made to other ethnic groups to win their votes, leading to declining political competition and increased instability. For instance in Kiguta area, the Kalenjin are the majority, and the Luo are the minority. During elections, the Kalenjin politicians promised the Luo minorities equitable sharing of resources to secure their votes. They would however renege on their promises after winning the elections, which led to dissatisfaction and ethnic violence between the majority and minority groups.

Studying the role of ICTs and how they mediate these implications of social capital

This study sought to understand the role of ICTs in countering the implications of social capital in the formation and sustenance of militia groups across the three conflict systems. Some of the questions explored included, to what extent do ICTs help strengthen the relationship between the community members and the state agencies (administration and security) in countering the influence of militia groups in the study areas? Does the introduction of ICTs in these areas improve the collaboration among community members in neutralizing militia groups?

On the livestock rustling and gunrunning cartelism, gender-based violence, and cultural intolerance, the study aimed at unraveling the influence of ICTs on the cooperation of various stakeholders within (bonding) and across (bridging) the communities including their corresponding state agencies (linking) in countering the vices.

Good governance is a critical component of peace-building. Therefore, this study sought to explore the influence of ICTs on systems and values of governance like justice, accountability, transparency, participation, and inclusion. Does the introduction of ICTs in the peace-building process add any value to the participation and inclusion of minorities in the study areas?

These and many more questions form the basis of investigation in this thesis.

4. RESEARCH METHODOLOGY AND DESIGN

The purpose of this chapter is to discuss my research methodology and the overall research design. The first section considers the research philosophy, the second examines the research design, the third looks at the data collection methods, the fourth presents the analysis of data, and the final section describes the ethical considerations. The areas of focus are schematically depicted as engaged scholarship in Fig. 4.1.

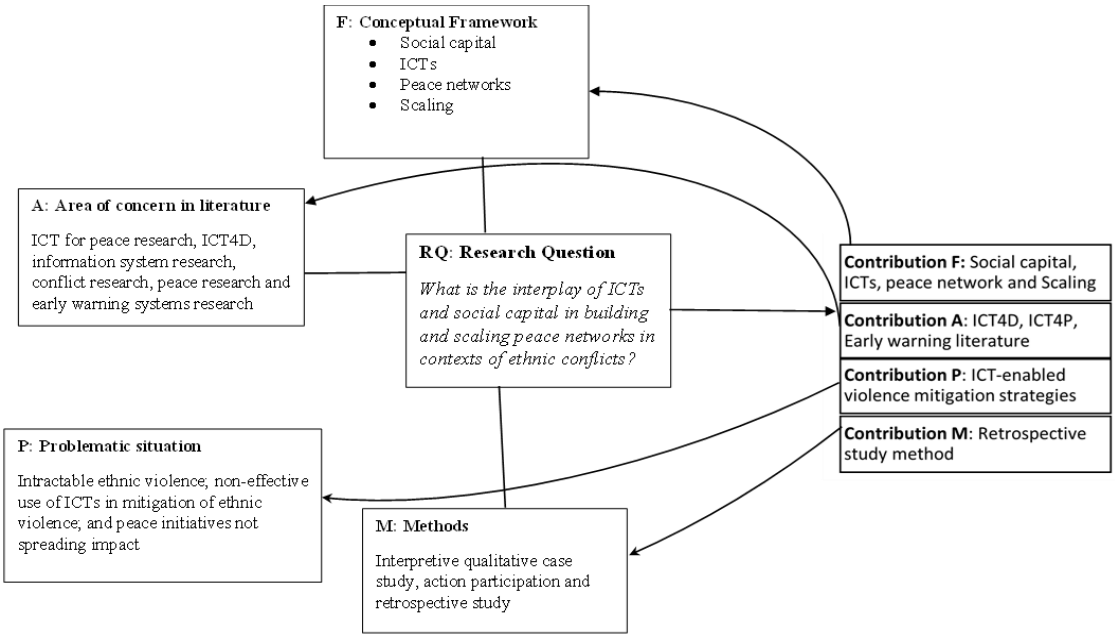

Figure 4. 1 The overall research design (adapted from, (Mathiassen, 2017)

4.1 Research Philosophy

Five major research philosophies relevant to IS and social sciences research include positivism, critical realism, interpretivism, postmodernism, and pragmatism. These philosophies are differentiated on their ontological (assumptions about the nature of reality), epistemological (assumptions about knowledge, what constitutes acceptable, valid, and legitimate knowledge, and how it is accessed and communicated to others), and axiological (the role of values and ethics within the research process) assumptions (Duberley, Johnson & Cassell, 2012).

In this thesis, I position my research within an interpretivist philosophy which contends that only through subjective interpretations of different actors experiencing a phenomenon can reality be interpretively understood more holistically (Saunders &et al., 2009). Overall, an interpretivist philosophy is relevant for this research, i.e., the understanding of how ICTs are applied by various stakeholders in mitigating ethnic violent conflicts. The study of the phenomena in their natural environment is intrinsic to this philosophy, together with the acknowledgment that researchers cannot avoid influencing the phenomena they study. The choice of this approach is informed by the condition that the data I collect is majorly based on accounts of the interpretations made by the different stakeholders in the peace network and my interpretations of their understandings, leaving open spaces for alternative interpretations.

To address my research aim, of understanding how the interlaced relationship of social capital and ICTs contribute to building and scaling peace networks, I sought to understand the diverse

perspectives of the multiple stakeholders involved in peace interventions. Furthermore, to measure how communities can improve their peace engagement with the support of ICTs, I also analyzed numeric data over time, reflecting the incidence of events of violence. The principle of contextualization (Auer, 2009) required building a critical understanding of the social and historical aspects of the conflicts and the communities under investigation. This approach helped me understand people's everyday experiences in their natural context of violence and efforts to mitigate it. This required understanding what people said, extending into the past and the future, and studying their observable behavior. Data collection methods extended beyond detailed action participation to include interviews, focused group discussions, observations, and the study of relevant secondary data and making meanings of this data within their wider social context.

Despite these benefits associated with the interpretivist approach, there are some inherent challenges. Data collection is intensive and time-consuming. For example, I had to visit my empirical sites, which were geographically widely distributed, multiple times to study the different processes and how they unfolded over time. Extensive engagement over time and space was required to develop a deeper understanding of the interpretations of the stakeholders in context while being conscious of my own biases and assumptions, which are natural as an involved researcher.

4.2 Research Approach

In this thesis, I used an inductive approach (Thomas, 2006) for purposes of data collection and theoretical development. My research started with collecting data on the initiation and evolution of the peace network, with a key focus on the role ICTs. I collected different types of data to help identify themes, explain patterns, and create a conceptual framework, which was incrementally revised with the unfolding of the research. This process could be described broadly as being "bottom-up and inductive," emerging from the data I was collecting and building on the cumulative conceptual and empirical experiences. I adopted different data collection methods, which are described in 4.4.

4.3 Research design

The research design is described across three key dimensions: i) longitudinal nature; ii) comparative case studies; and iii) multi-stakeholder analysis.

4.3.1 Longitudinal design

The study is based on three longitudinal case studies of Mt. Elgon, Muhoroni, and Turkana/Pokot. The longitudinal design helped me develop a process perspective on initiating a peace network from its initiation to its operationalization and then scaling. The design was relevant in tracing how actors in the study areas applied ICTs in building the peace network to mitigate ethnic violence over a decade, which is described over three phases: i) first, (2009-2018), consisting of a retrospective analysis of the initiation and evolution of the ICT-enabled peace network in the Mt. Elgon conflict system; ii) second, (2017-2018) comprising of both a retrospective and prospective analysis. The retrospective study analyzed the process of scaling the system to the Muhoroni conflict area in 2017 while the prospective study assessed the feasibility of scaling the system to the Turkana/Pokot area; and iii) third, (2019-2021) where

the system was scaled to the Turkana/Pokot conflict system first through a piloting process. The longitudinal research process is summarized in Figure 4.2.

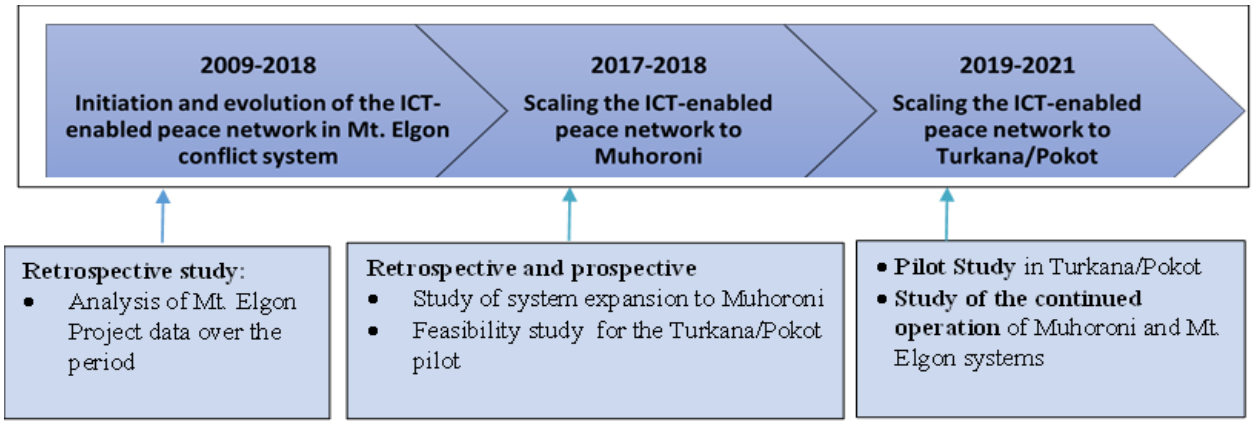

Figure 4. 2 Timelines and components of the longitudinal study

First Phase: Retrospective analysis of the initiation and evolution of the ICT-enabled peace network in Mt. Elgon (2009-2018)

Since the process of building the ICT-enabled peace network had long been done before this research, a retrospective study (Vassar & Matthew, 2013) was necessary in reconstructing the steps for its initiation and evolution. This process involved scanning through the existing recorded data, like evaluation reports, project reports, peace agreements, project plans, baselines, agreements, etc. It also involved reviewing data records from the EWERS. The historical data included in the conflict context before the FPFK intervention, conditions that necessitated the initiation of the EWERS, the steps followed to initiate and operationalize the system, and the results achieved. Apart from this, notes and materials used for training, guidelines for conducting dialogues, advocacy notes, and minutes from the coordination meetings were revisited. This data helped answer questions like who were the stakeholders? How were they mapped and recruited? How were monitors identified and recruited? Who were the responders and how were they organized? What was the thinking behind the design and operationalization of the EWERS? And overall, how was the peace *Muhoroni* network organized?

Second Phase: Retrospective study of the scaling process for ICT-enabled peace network to Muhoroni

The Muhoroni project started three years before the Ph.D. research. Therefore, to align the existing data like the conflict analysis, understanding the stakeholders, the indicator mapping process, and recruitment of indicator monitors and responders to the study, a retrospective study covering the period 2017-2018 was conducted. This involved extraction of data from the project baseline reports, EWERS activity reports, project plans, reports from the review meetings, and EWERS data. I also drew heavily from the memories of my own experiences as I had been actively involved as a member of FPFK in the entire process described in chapter three. During my involvement, I trained communities on peace-building and conflict management strategies, conducted dialogues, facilitated the signing of peace agreements, facilitated coordination and response forums, conducted advocacy forums, and worked together with system developers to design and develop the EWERS. I also examined system reports at

intervals to see the change in indicators. For example, cattle theft, domestic violence, the prevalence of small arms, drugs, and substance abuse, among others. The purpose was to develop scenarios of existing conflicts and their trends over time.

Third Phase: Engagement with processes of scaling the ICT-enabled peace network in Turkana/Pokot conflict system

A mixed-method study was adopted during this phase as the process was ongoing. The qualitative study was used to gain an in-depth understanding of the processes of initiating and operationalizing the ICT-enabled peace network. The quantitative study was conducted through examination of the system data presented through histograms, pie charts, and figures. Action-oriented participation through conducting training, dialogues, conflict analyses, mapping hotspots, and identification of the indicators of ethnic violence characterized the scaling process in this particular study area. Focussed group discussions with specific groups like warriors, women victims, and cultural leaders including key informant interviews with security leaders and local government leaders were among the data collection techniques. Understanding the scaling process also involved retrieval and analysis of data from the system on a monthly and quarterly basis to monitor the occurrences of indicators and corresponding processes of response.

4.3.2 Comparative case analysis

The three cases were chosen because all were being implemented by FPFK, with whom I had strong roots, enabling intimate analysis of the processes. This comparative case study (Bartlett & Vavrus, 2017) helped in tracing how actors such as village elders, community peace representatives, the local administration, women, and youths in Mt. Elgon, Muhoroni, and Turkana/Pokot areas experienced changes in the levels of ethnic violence and what did they attribute these changes too. The relationship between the community members and the authorities was examined across different geographical settings. The comparative case study approach was relevant because of the multi-sited fieldwork, which encouraged simultaneous and overlapping attention on how ICT-enabled violence mitigation interventions unfolded, with similarities and differences, in the three study areas. Through the retrospective process, the research involved an in-depth analysis of the implementation process of the Mt. Elgon ICT-enabled peace network, including the application of the EWERS. This was then replicated in the Muhoroni conflict system where the main factor driving the conflict was cattle rustling and in West Pokot/Turkana counties.

The multiple case study approach enabled me to gain a broader understanding of the building and scaling processes of the EWERS. There are some similarities and differences across the cases, and I was curious to understand their implications on the challenges and approaches towards scaling. While all the cases were broadly concerned with the application of ICTs to reduce violence and improve human security, they were developed and run differently. In Mt. Elgon, the SMS-based EWERS targeted individual responders, while the Muhoroni case operated primarily through committees addressing specific root causes of the conflict. The three cases presented displayed some similar approaches to ICT integration in violence mitigation and also important differences, which form the focus of my analysis.

4.3.3 Multi-stakeholder analysis

The study applied a multi-stakeholder analysis approach to the idea that building sustainable peace networks requires building synergies of collective action across diverse stakeholder groups and managing emerging tensions (Galuppo et al., 2014; Brugha & Varvasovszky, 2000). The multi-stakeholder analysis approach was applied in identifying stakeholders, classifying them, investigating their inter-relationships, and reflecting on the process and actions, and results in the three case study sites.

The stakeholder groups were classified into three levels. The first level was the indicator monitors also commonly known as field agents who collected intelligence reports from the field and shared the data with the second category of stakeholders — the system developers and analysts who verified the data before configuring the software to relay the messages to the responders. The final stakeholder group was the responders comprising end-users, government authorities, and other non-state actors. Each of these three levels was examined in the three study areas, through multiple data collection and analysis methods.

4.4 Data collection

The collection of both primary and secondary data took place between December 2018 and October 2021. The process was in three phases reflecting the three case study sites. The first phase retrospectively reviewed existing data for the Mt. Elgon conflict system covering the period 2009-2018. The second phase applied retrospective approaches to obtain and review data for the Muhoroni conflict system for the period 2017-2018. During the same period, I collected data needed for informing the initiation of the new Turkana/Pokot pilot project. The third and final phase involved collecting data from the Turkana/Pokot conflict system during the pilot project period of 2019-2021. The data collection methods used during the third phase included action participation and qualitative methods, to conduct conflict analyses, indicator and stakeholder mapping, training, dialogues, and review forums, among others. Qualitative data collection methods included key informant interviews (KIIs) or in-depth interviews, focus group discussions (FGDs), and analysis of data from the EWERS.

The KIIs and FGDs were important data sources since they enabled me to step back and examine the interpretations of my fellow participants in some detail (Kelly et al., 2010). As an involved researcher, I was able to get an insider view and accessed confidential or sensitive information that I would not have accessed if I came from outside. However, I was cognizant of being perceived as having a direct personal stake in various activities based on my relationship with FPFK. To overcome this challenge, I collected data from multiple sources and also triangulated across them.

4.4.1 Data collection for Mt. Elgon conflict system

The data collected in the Mt. Elgon conflict system was done through two approaches. One was a retrospective analysis of the historical process of building the peace network including the integration of ICTs. Two, involved the collection of primary qualitative data through

interviews to help understand the current system operations. These are briefly described in Table 4.1.

Table 4. 1 Source of data for retrospective study in Mt. Elgon conflict system

Source of Data for Retrospective analysis	**Number of pages**	**Purpose**
Peace and rights project document 2009-2013	91 pages	Understand the project activities and strategies, the contextual factors of conflict, and identify the main stakeholders
Mid-term evaluation report 2010	18 pages	Trace the project progress including the key beneficiaries involved and the changes. Determine how the stakeholders were organized to respond
Intra-Sabaot dialogue report 2010	153 pages	Understand the conflict dynamics, the main issues, the main actors, and the mitigation measures. Understand the role of bonding social capital in conflicts and violence and conflict management
Inter-Sabaot Peace Conference report, April 2011	99 pages	Capture the causes of conflict, and the role of various actors. Understand how both bonding and bridging relationships play out to build a peace network
Peace and rights mid-term evaluation 2011	61 pages	Capture the main results of the project, the functioning of the peace network particularly the role of the administration
Mabanga intercommunity peace conference	287 pages	Understand ethnic conflicts — their causes, dynamics, actors, and the role of the government. Understand bonding, bridging, and linking social capital
Annual reports for 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017 and 2018	Approximatel y 330 pages	Traced progress towards the formation, and operationalization of the peace network including integration of ICTs
Final project evaluation report for peace and rights project 2013	79 pages	Traced progress towards the formation, and operationalization of the peace network including integration of ICTs
Evaluation report of armed violence reduction project 2013	54 pages	Studied initiation and operationalization of ICTs in peace networks and the results
Peace and Rights program final report 2015	72 pages	Understand ethnic conflicts — their causes, dynamics, actors, and the role of the government. Understand bonding, bridging, and linking social capital and integration of ICTs
Mt. Elgon conflict analysis report 2015	69 pages	Extracted data on the level of improvements in the conditions of peace attributed to the EWERS

***Qualitative data collection*:** Since the EWERS was operational before this research, it was necessary to interview those involved in its operations and also get new data on how the system was performing. Eight KIIs were conducted with administrators, the police, women group leaders, system analysts, and project managers and 3 FGDs were held with community groups. These data collection methods aimed to build an understanding of the different perspectives on the brokerage role of FPFK and other CSOs, particularly concerning the value of the EWERS. The FGDs with women sought to understand the role of women in the functioning of the EWERS. These are summarized in Tables 4.2 and 4.3.

Table 4. 2 Focus Group Discussions and Action Participation in Mt. Elgon conflict system

Group interviewed	**Function**	**Venue/date/time of Interview**	**Purpose of interview**
8 Indicator monitors in Trans Nzoia	They monitor and report violence indicators using ICT system	Kipsongo Training Centre 30th May 2019 10:23 to 13:15 ?? what is this	Understand the conflict dynamics in the area. Determine how they were recruited into the network and their motivation for involvement. Understand how (if they utilize social connections) they collect information for sharing with responders. Understand their perspective on the brokerage role of FPFK in peacebuilding. Confirm how the indicators were identified. Understand how they perceive the role of security agencies in peace. Determine the achievements and challenges of the ICT system
9 Community	Community	Kipsongo Training	Understand the conflict dynamics in the area. Determine

Peace Advocates for Trans Nzoia and Bungoma	response team. They act on the indicators of violence	Centre 31st May 2019 11:49 – 3:45 pm	how they were recruited into the network and their motivation for involvement. Understand how (if they utilize social connections) they act on the information they receive. Understand their perspective on the brokerage role of FPFK in peace-building. Confirm how the indicators were identified. Understand how they perceive the role of security agencies in peace. Determine the achievements and challenges of the ICT system
11 District Peace Committee for Bungoma County	Chairperson responsible for promoting peace	Mt. Crest Hotel, Kimilili in Bungoma 27th July 2019 11:03 am – 14:17	Understand the conflict dynamics in the area. Determine their motivation for involvement. Understand how (if they utilize social connections) they act on the information they receive. Understand their perspective on the brokerage role of FPFK in peace building. Confirm how the indicators were identified. Understand how they perceive the role of security agencies in peace. Determine the achievements and challenges of the ICT system.
Action Participation			
Monthly review meetings	indicator monitors and responders	Quarterly between December 2018 – October 2021	Understand the process of monitoring indicators, responding to the indicators, and the corresponding including how they are mitigated. assess the successes of the EWERS
Quarterly management meetings	System analysts, project leaders	Quarterly between December 2018 – October 2021	Understand how the decisions are made and the role of the system analysts, access data from the system, and clarify the roles of various stakeholders
Community peace dialogues	Bukusu, Sabaot, and Iteso communities	Once per year between 2019 and 2021	Determine the changes in attitudes and perceptions of the community leaders towards the conflict and the role the ICT system plays
Review of the Mabanga peace agreement	Professionals, elders, religious leaders	2020	Understand the social contracting process, achievements, and challenges

Table 4. 3 Key Informant Interviews Mt. Elgon conflict system

Person interviewed	**Designation**	**Venue/date/time of Interview**	**Purpose of interview**
Edwin Kilong & Ndamwe Wanyonyi	County Peace Monitors	Kipsongo, Kitale 30th May 2019 17:09- 20:37	Understand the state and history of the conflict. Capture interventions that they know. Understand the role of government in conflict and peace. Understand their perspective on the brokerage role of FPFK in peace building. Confirm how the indicators were identified. Understand how they perceive the role of security agencies in peace. Determine the achievements and challenges of the ICT system.
Everlyne Nekesa Wasike	Courageous women group CBO leader	Kipsongo, Kitale 31st May 2019 9:03 – 11:24	Understand the state and history of the conflict. Capture interventions that they know as a CBO. Understand the role of women in ICT-based early warning and early response. Understand the role of government in conflict and peace. Understand their perspective on the brokerage role of FPFK in peace building. Confirm how the indicators were identified. Understand how they perceive the role of security agencies in peace. Determine the achievements and challenges of the ICT system.
Kevin Magero David Naibei	ICT System developers and analysts	Kipsongo, Kitale 31st May 2019 18:05– 22:30	Capture the historical processes of system development for Mt. Elgon. Understand the key components and functions of the system. Harvest the system's achievements and challenges. Gain insights on the differences between the system in Mt. Elgon and the one used in Muhoroni. Understand the connection between the system analysts and the government authorities. Determine the resilience of the system.
Alfred Mogere	Sub county Police Commander, Trans Nzoia	The Cradle Hotel, Lodwar 6th July 2019 19:48– 20:35	Understand the state and history of the conflict. Capture interventions that they know as security agencies. Understand the role of Police in ICT-based early warning and early response. Understand their perspective on the brokerage role of FPFK in peace building. Confirm the violence indicators. Understand how they perceive the role of security agencies in peace. Determine the

			achievements and challenges of the ICT system. Understanding how the system enables security agencies to prevent crime/ violence
Sarah Chelimo	Project Manager, Mt. Elgon Peace Project	Kipsongo training 8th July 2019 9 am – 11 am	Understanding the current operations of early warning and early response system; capture the brokerage role of FPFK in peace processes. Capture how FPFK works with the security system. Determine the achievements and weaknesses of the ICT system and its sustainability. Get documents related to the project for review
Julius Juma Mukhwana	Chief, Kinyoro Location	Kipsongo, Kitale 8.7.2019 17:16- 20:33	Understand the national government's perspective of the conflict in the Mt. Elgon area, its response, and its challenges. Understand their collaborative relationships with communities, non-state actors and other government agencies in responding to ethnic violence in the area. Understand the policy and legal environment for the application of ICTs

4.4.2 Phase 2: Data collection for the Muhoroni conflict system

This involved extraction of data from the project baseline reports, EWERS activity reports, the project plans, reports from the review meetings, and the EWERS data as shown in Table 4.4.

Table 4. 4 Sources of data for retrospective study in the Muhoroni conflict system

Source of Data for Retrospective Analysis	**Number of pages**	**Purpose**
Peace and Rights Project Document 2016-2020	115 pages	Understand the project activities and strategies, the contextual factors of conflict, and identify the main stakeholders
Muhoroni conflict analysis report 2015	154 pages	Extracted data on conflict dynamics, actors, and interventions
Mid-term evaluation report 2018	17 pages	Trace the project progress including the key beneficiaries involved and the changes. Determine how the stakeholders were organized to respond to ethnic violence
Intra-community dialogue report reports	67 pages	Understand the conflict dynamics, the main issues, the main actors, and the mitigation measures. Understand the role of bonding social capital in conflicts and violence and conflict management
Inter-community dialogue reports	81 pages	Capture the causes of conflict, and the role of various actors. Understand how both bonding and bridging relationships play out to build a peace network
Annual reports for 2017 and 2018	Approximatel y 78 pages	Traced progress towards the formation, and operationalization of the peace network including integration of ICTs.

Qualitative data for the current system: To get an understanding of the continued impact of the EWERS, there was a need to collect current data for the period 2018-2021. This data was obtained from the ICT system every quarter where reports were generated by the system analyst. In addition, three FGDs with women, men, and other peace champions were conducted. Further, nine KIIs were held with security agencies like the anti-stock-theft police, police commanders, administration, systems managers, community leaders, and CSOs leaders. These are summarized in Tables 4.5 and 4.6

Table 4. 5 Focus Group Discussions and Action Participation in the Muhoroni conflict system

Groups interviewed	**Function**	**Venue/time of Interview**	**Purpose of interview**
Women Peace Champions in Muhoroni	Peace committee members working to promote peace through indicator monitoring and reporting	Thessalia Mission Centre, Muhoroni 10th July 2019 10 am To12 pm	Get to understand the networks that sustain violence in the area. Understanding the motivation for being involved, how they were recruited, their role, and how they get sensitive information for warning. What networks do they use? Determine how social resources are utilized in their work. How they use ICTs in the work and the challenges. Capture the achievements of the ICT
Male Peace	these were male peace	Thessalia Mission	Get to understand the networks that sustain violence in

Ambassadors	actors with the responsibility to respond to indications of violence	10th July 2019 2 pm-4 pm and 4 pm-6 pm	the area. Understanding the motivation for being involved, how they were recruited, their role, and how they get sensitive information for warning. What networks do they use? Determine how social resources are utilized in their work. How they use ICTs in the work and the challenges
Response Committee Chairpersons and Advisory Committee	EWERS responders	Julan Hotel, Kericho 11th July 20112 pm0am-12 pm	Understanding how they were enrolled in the system, what is their motivation, and what are their social networks. How do they work with authorities? How do they use the ICTs in their work and what are the results and challenges
Action Participation			
Quarterly review meetings	indicator monitors and responders	Quarterly between December 2018 – October 2021	Understand the process of monitoring indicators, responding to the indicators, and the corresponding including how they are mitigated. assess the successes of the EWERS
Quarterly management meetings	System analysts, project leaders	Quarterly between December 2018 – October 2021	Understand how the decisions are made and the role of the system analysts, access data from the system, and clarify the roles of various stakeholders
Community peace dialogues	Kalenjin and Luo	Once per year between 2019 and 2021	Determine the changes in attitudes and perceptions of the community leaders towards the conflict and the role the ICT system plays

Table 4. 6 Key informant interviews in Muhoroni Conflict System

Person interviewed	**Designation**	**Venue/date of Interview**	**Purpose of interview**
Kevin Magero David Naibei	FPFK System analysts	Kipsongo Training 31st May 2019	Capture the historical processes of system development for Muhoroni. Understand the key components and functions of the system. Harvest the system's achievements and challenges. Gain insights on the differences between the system in Mt. Elgon and the one used in Muhoroni. Understand the connection between the system analysts and the government authorities. Determine the resilience of the system
Gordon Obado	Director Of KEDHAP Foundation	Songhor in KEDHAP office 11.7. 2019	Understanding how NGOs are engaged in early warning and early response. How do they collaborate with FPFK? What is their perspective of the conflict and what their role
Mourice Opiyo	Chief Of Chemelil Location	Chemelil centre 11.7. 2019	Understand the national government's perspective of the conflict in the Muhoroni area, its response, and challenges. Understand their collaborative relationships with communities, non-state actors and other government agencies in responding to ethnic violence in the area. Understand the policy and legal environment for application of ICTs
Mr. Cornelius Sangura	DCC Nyakach Subcounty	Nyakach DCC office 12.7. 2019	Understand the national government's perspective of the conflict in Nyakach area, their response, and challenges. Understand their collaborative relationships with communities, non-state actors, and other government agencies in responding to ethnic violence in the area. Understand the policy and legal environment for application of ICTs
Mr. Cyrus Mavuru	The Inspector of the Anti-Stock Theft Unit	Katitu Centre 12.7. 2019	Understand the state and history of the conflict. Capture interventions that they know as security agencies. Understand the role of Police in ICT-based early warning and early response. Understand their perspective on the brokerage role of FPFK in peace building. Confirm the violence indicators. Understand how they perceive the role of security agencies in peace. Determine the achievements and challenges of the ICT system. Understanding how the system enables security agencies in the prevention of crime/ violence
Mr. Ezekiel Matingwony	Chief Of Tabaitha Location	Sondu Market 12.7. 2019	Understand the national government's perspective of the conflict in Sondu area, their response, and challenges. Understand their collaborative relationships with communities, non-state actors and other government agencies in responding to ethnic violence in the area. Understand the policy and legal environment for application of ICTs

Ms. Munala Kola	Tinderet Subcounty Police Commander	Songhor Office Tinderet 12.7, 2019	Understand the state and history of the conflict. Capture interventions that they know as security agencies. Understand the role of Police in ICT-based early warning and early response. Understand their perspective on the brokerage role of FPFK in peace building. Confirm the violence indicators. Understand how they perceive the role of security agencies in peace. Determine the achievements and challenges of the ICT system. Understanding how the system enables security agencies in the prevention of crime/ violence
Richard Lusweti	FPFK EWS Manager	Julan Hotel, Kericho, 13.7. 2019	Understanding the current operations of early warning and early response system; capture the brokerage role of FPFK in peace processes. Capture how FPFK works with the security system. Determine the achievements and weaknesses of the ICT system and its sustainability. Get documents related to the project for review

4.4.3 Phase 3: Data collection in Turkana/Pokot conflict system

The Turkana/Pokot conflict system was the second site for scaling area after Muhoroni. Data collection was enabled through action participation and qualitative data collection within the framework of the Information and Communication Technology for Community-oriented Policing (ICT4COP[2]) EU pilot project that was jointly implemented by FPFK and the University of Oslo, Informatics department**.**

Action participation

Action participation involved processes of mapping hot spot areas, violence situation analysis, identification of violence indicators, recruitment of peace monitors, community peace representatives, and state responders; and development and testing of an updated EWERS built on an open source DHIS2 [3] digital platform. The action participation further involved training 20 community peace responders on the process of receiving and acting on the messages from the EWERS including setting up a referral system for violence against women and girls (VAWG). It also involved training 32 indicator monitors on the identification and reporting of identified indicators. For the rest of the activities like the development and testing of the revised EWERS, which was done by the University of Oslo partner, HISP India, I had multiple discussions with them to enable the system development and design and also through review meetings with monitors and responders.

Qualitative data collection

During the mapping of the violence hotspots, conflict analysis and indicator identification processes, FGDs, KIIs, and observation methods were applied to collect qualitative primary data. The data collection process involved intensive note-taking (Figure 4.3) as recordings were mostly not allowed due to the sensitive issues being discussed. Photos were taken strictly only with permission.

[2] ICT4COP is a European Commission Horizon 2020 Research & Innovation Project for Community-Based Policing and Post-Conflict Police Reform. https://www.communitypolicing.eu/about-the-project/

[3] DHIS2 is a tool for collection, validation, analysis, and presentation of aggregate and patient-based statistical data, tailored (but not limited) to integrated health information management activities. It is a generic tool rather than a pre-configured database application, with an open meta-data model and a flexible user interface that allows the user to design the contents of a specific information system without the need for programming.

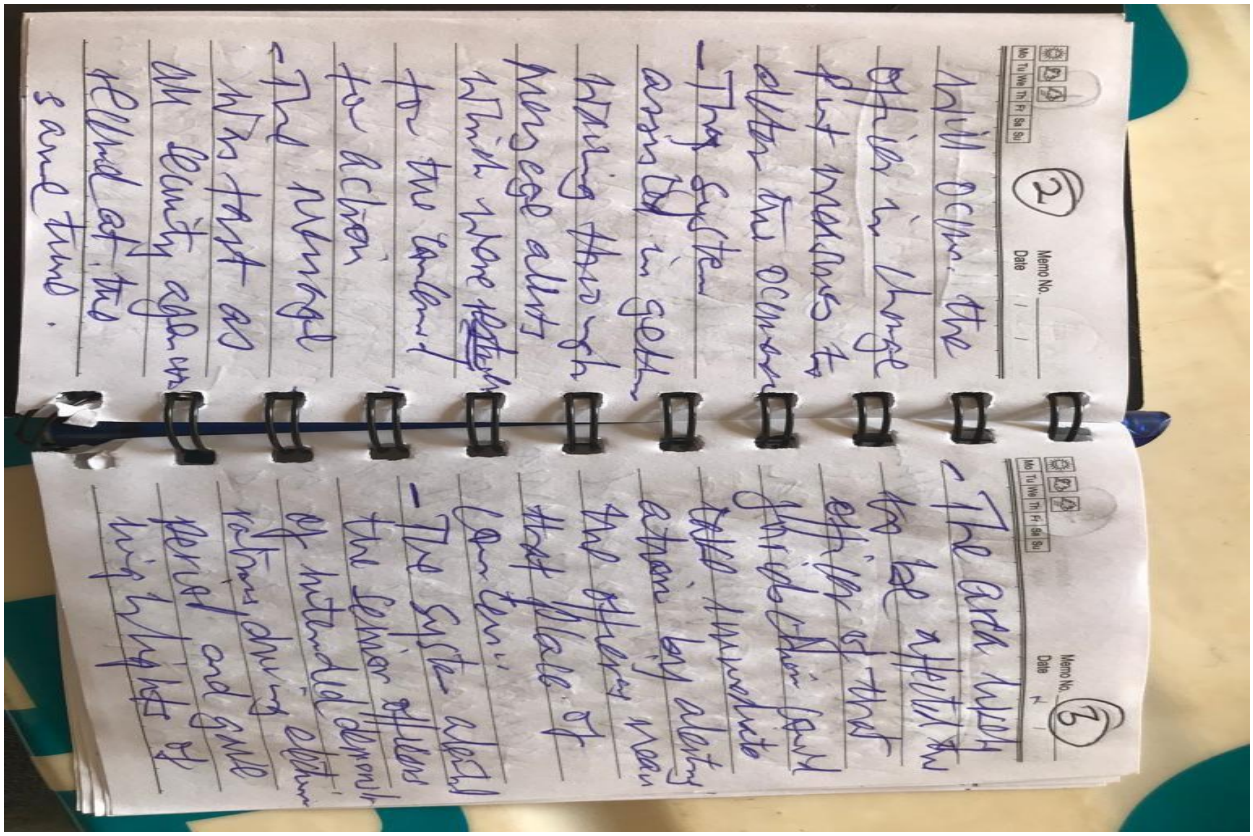

Figure 4. 3 Sample notes taken during data collection.

Four FGDs with a total of 41 participants were organized. Both Turkana and Pokot had two FGDs each, where one was for the warriors and the other for the women. Separating the groups provided safe spaces for free expression, particularly on sensitive issues like the possession of small arms, which was illegal. To ensure quality (Flick, 2008), data were collected from individuals engaged in system management, those reporting the cases and responding to alerts. I further chose the respondents who knew and could recall details and were able to respond precisely to questions asked to avoid inaccurate or insufficient data (Mays & Pope, 2000). I chose respondents who were active in the peace network, with whom there were existing trust-based relationships. Frequent interactions with them allowed the respondents to open up and share confidential data (Long & Godfrey, 2004). Some of the FGDs were held out in the bush to guarantee privacy as shown in Fig. 4.4 and 4.5. The respondents were assured of the confidentiality of information. The detailed list of respondents and the purpose of the interviews are summarized in Table 4.7.

Figure 4. 4 Warriors demonstrating how footprints are an indicator of a potential raid in Turkana

Figure 4. 5 Women victims of violence sharing their experiences in Sigor, West Pokot

Table 4. 7 FGDs conducted

FGDs	Function	Venue/time of Interview	Purpose of interview
10 Reformed Warriors drawn from various groups	They are youths who used to raid but they are reformed and champion peace	Akiriamet in Masol, Pokot 25th Sept 2019 12pm-2pm	Get their perspectives on the state of conflict, understand their motivation and role in conflict and peace, understand the process of identifying violence indicators and stakeholders, and understand their cooperation with the state agencies and non-state actors. Assess their capability to use ICTs (mobile phones). Get their gender perspectives in the conflict
8 women drawn from Masol, Marich Dungdung, and Runo groups	They are former victims of violence that are now working for peace	Sigor, Pokot 25th Sept 2019: 3pm-5pm	Get their perspectives on the state of conflict, understand their motivation and role in conflict and peace, understand the process of identifying violence indicators and stakeholders, and understand their cooperation with the state agencies and non-state actors. Assess their capability to use ICTs (mobile phones). Get their gender perspectives in the conflict
13 Warriors *(Ngo'oroko)* from Nariamao	Youths who were still raiding and protecting their animals	Turkana County Nariamao 27 Sept 2019 10 am-12 pm	Understand their motivation for engagement in violence through raids, how they are organized, their networks, and their relationships with the state. Determine whether they use phones in their operations
10 Kaptir Women Group	Champion for peace	Kaptir Reformed church 27 Sept 2019 2 pm -4 pm	Get their perspectives on the state of conflict, understand their motivation and role in conflict and peace, understand the process of identifying violence indicators and stakeholders, and understand their cooperation with the state agencies and non-state actors. Assess their capability to use ICTs (mobile phones). Get their gender perspectives in the conflict

A total of 12 KIIs were conducted both in Turkana and West Pokot areas, where I was sensitive to the need to balance between excessive passivity and over-direction. I allowed the interviewees to express their views except in responses to questions that were tightly controlled. I was also careful not to be too passive by prompting questions that were relevant to my research. Details of the KIIs are summarized in Table 4.8.

Table 4. 8 KIIs conducted in Turkana/Pokot conflict system

Interviewee	Function	Venue/time of Interview	Purpose of interview
4 Prospective Field Monitors	Community members with a potential role of monitoring and reporting violence indicators	ACK Church Runo, Pokot 25th Sept 2019 6pm- 8p	Assess their motivation to participate in the peace process their and capability to use the ICTs for the task. Understand the process of recruiting the monitors and related challenges
Sub-County Admin - Pokot Central	Implement county government policies and programs	Sigor ward office 26th Sept 2019 8:30 -9: 30 am	The county government is key in ensuring equitable distribution of resources and so promote social justice. I needed to know how they are balancing the resources and reaching out to the vulnerable populations
2 members of Pokot Council of Elders	Custodians of culture and negotiate for peace for the community	26th Sept 2019 Sigor Centre 10am-11:30am	Gain insights on the cultural perspectives of the conflict from the elders, their role in conflict and peace-building, and their collaboration with the government and other non-state actors
The Assistant County Commissioner, Chesegon Division	Government official in charge of a division. Maintain security, implement national programs	Sigor Ward Office, Pokot 26th Sept 2019 12pm1 pm	Understand the national government's perspective of the conflict in Pokot area, their response and challenges. Understand their collaborative relationships with communities, non-state actors and other government agencies in responding to ethnic violence in the area. Understand the policy and legal environment for application of ICTs
Officer-In-Charge of Police Station (OCS)	Maintain security and manage criminal cases	Kainuk police station, Turkana 26th Sept 2019 3 pm 4 pm	Understand the types and prevalence of crimes experienced in the area, and the security perspective of the conflict. Understand the police relations with community members, non-state actors in security management

The Assistant County Commissioner, Kainuk Division	Government official in charge of a division. Maintain security, implement national programs	5:30 pm	Understand the national government's perspective of the conflict in Turkana area, their response and challenges. Understand their collaborative relationships with communities, non-state actors and other government agencies in responding to ethnic violence in the area. Understand the policy and legal environment for application of ICTs
Senior chief of Kainuk Location,	Government official in charge of a location. Maintain security, implement national programs	Kainuk Center 26th Sept 2019 6:30 -7:30 pm	Understand the national government's perspective of the conflict in Turkana area, their response and challenges. Understand their collaborative relationships with communities, non-state actors and other government agencies in responding to ethnic violence in the area. Understand the policy and legal environment for application of ICTs
Chief, Kaptir Location,	Government official in charge of a location. Maintain security, implement	Reformed church, Kaptir 27th Sept 2019 4 pm5 pm	Understand the national government's perspective of the conflict in Turkana area, their response and challenges. Understand their collaborative relationships with communities, non-state actors and other government agencies in responding to ethnic violence in the area. Understand the policy and legal environment for application of ICTs

Summary of data collection methods

These are given in Table 4.9 below.

Table 4. 9 Summary of Data Collection methods and number of people/pages/groups involved

Source of data	**Unit**	**Total**	**Purpose**
Total pages read from document analysis	Pages	1825	Traced progress towards the formation, and operationalization of the peace network including integration of ICTs.
Total FGDs conducted	Groups	10	Understanding how they were enrolled in the system, what is their motivation, and what are their social networks. How do they work with authorities? How do they use the ICTs in their work and what the results and challenges
Total KIIs conducted	People	29	Understand the state and history of the conflict. Capture interventions that they know as security agencies. Understand the role of Police in ICT-based early warning and early response. Understand their perspective on the brokerage role of FPFK in peace building. Confirm the violence indicators. Understand how they perceive the role of security agencies in peace. Determine the achievements and challenges of the ICT system. Understanding how the system enables the security agencies in the prevention of crime/ violence
Action Participation forums	Forums/ activities	36	Understand the process of monitoring indicators, responding to the indicators, and the corresponding including how they are mitigated. assess the successes of the EWERS

4.5 Data analysis

A primary aim of the analysis process was to inductively identify research themes from the data collected (Kiger & Varpio, 2020; Gale et al., 2013; Braun & Clarke, 2012) across the three study areas. The development of themes was guided by the theoretical concepts of social capital, counter networks, and scaling. The quotes selected to develop these themes were guided by these theoretical concepts. The process is summarized in Figure 4.6 and discussed below

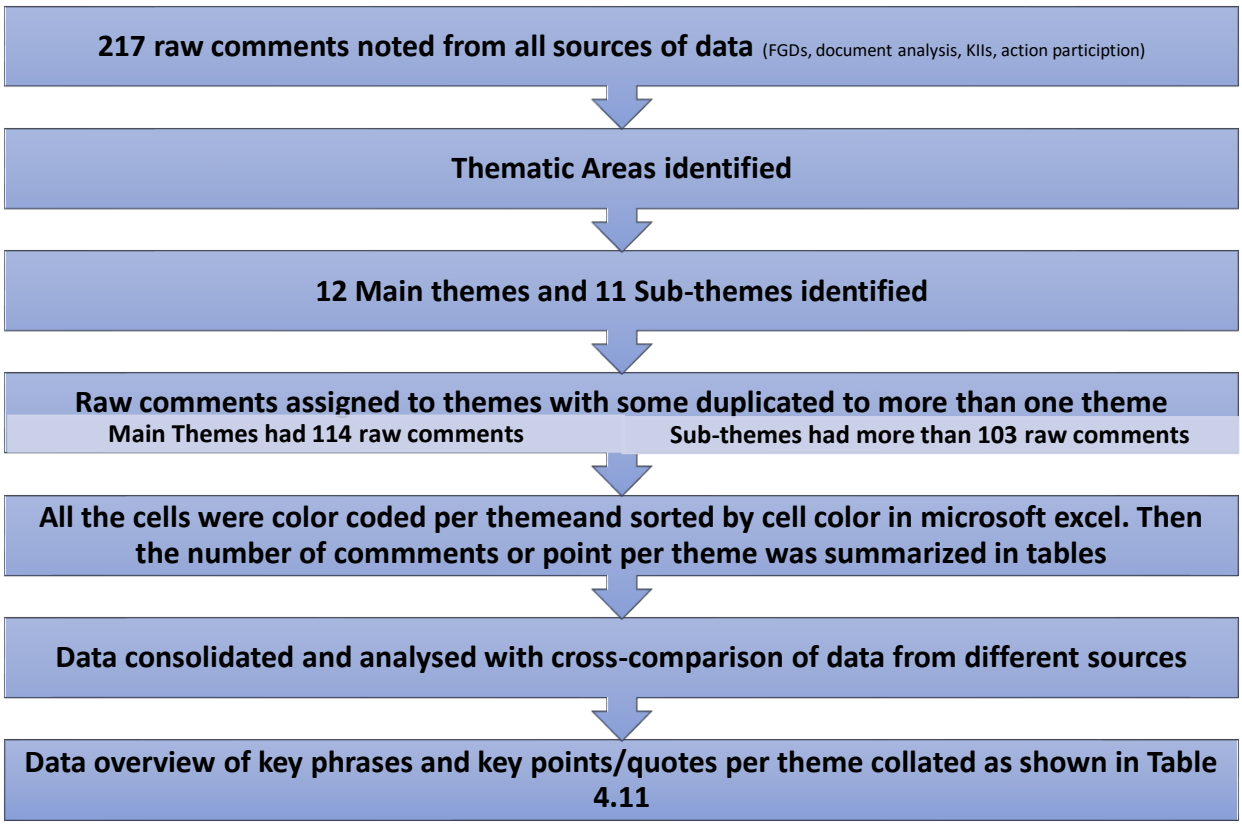

Figure 4. 6 The process of thematic analysis (adopted from Bree & Gallagher, 2016)

Digitizing and collating the data collected

Digitizing involved the conversion of handwritten, hard copy materials and voice-recorded data into soft copies for ease of collation. Handwritten transcripts from focus groups, KIIs, facilitation notes, etc., were transcribed into electronic format using Microsoft Office 365 suite. The transcripts were organized by questions informed by the different sources of data collection. Following this, all the data was migrated to a Microsoft Excel worksheet, generating a table consisting of all comments from different sources. The data was then reviewed to remove duplicate entries. Transcription and familiarization of data from the interviews were needed because I had a good quality audio recording, especially for Mt. Elgon and Muhoroni study areas. The process of transcribing allowed me to get immersed in the data collected and guided my selection of relevant quotes to build my analysis. Fig. 4.7 shows one of the drawings I made while re-listening to the audio recordings during the stakeholder analysis sessions. The data was then analyzed to assign

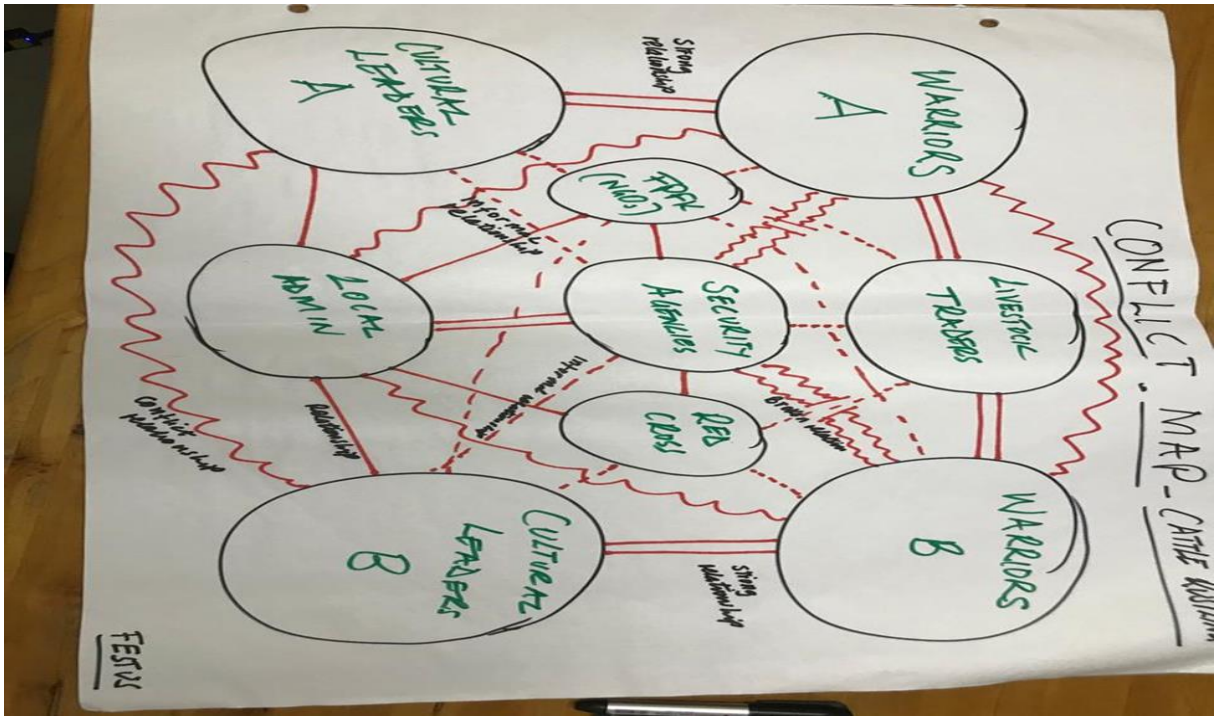

Figure 4. 7 Analytical drawing developed while listening to the audio for actor analysis

After digitizing, I started the processes of coding and collating the data. This started with reading and taking notes of the entire data set to identify potential data items relevant to the research questions and the connections between the data items. I also marked extracts of texts that I felt were potentially rich for analysis, which was then highlighted and appropriately labeled about my research questions. Examples of codes generated are given in Table 4.10.

Table 4. 10 Example of coded transcripts

Transcript	Codes
"It is funny how this phone thing is working; I can report any matter to the police without physically going there…heheh! Imagine even my wife will not know when am reporting an issue to the police!" (FGD, Kapua)	• The phone as an enabler of information sharing • Confidentiality/anonymity • Alternative space

Reading through the entire data set, I identified extracts of data to code. In most cases, I coded a portion of data with more than one code as shown in the example above. Three broad code categories that guided the coding process included ICT-enabled peace network (counter networks); social capital (bonding, bridging, and linking); and scaling (quantitative, functional, political, and organizational).

The next step was to arrange all the coded transcripts logically i.e., *collating*, which involved assembling coded data from various sources of data collected. I organized the data in a chart format which permitted the viewing of a full data set in one location and systematically arranged it to answer the research questions. This method of organizing and displaying the data allowed me to look at the responses to each topic and specific questions individually, to make it easier to identify concepts, themes, and subthemes. This collating led me to the next step of identifying the first order themes.

Reading the data to identify first order themes

I then carefully read the transcripts line by line, applying a paraphrase or label (coding) that described important pieces of text. I undertook open coding so that I could pick out relevant issues as viewed from different perspectives. Some of the labelled or coded statements included particular behaviors (giving support to people across ethnic divide), incidents (timely response by the police or administrators to an issue), or structures of relationships pointing to the use of social resources, values that underpinned statements of faith in the EWERS or to emotions of sorrow, remorse, forgiveness, and love, relevant in reconciliation dialogues. The codes were aligned to the themes that had already been identified — like trust, social networking, and solidarity — in chapter two. These are summarized in Table 4.11.

Table 4. 11 Main themes and the corresponding number of raw comments

Main themes	**Number of raw comments**
Stakeholders	10
Resilience	13
ICTs	15
Social networks	13
Trusting relationships	11
Reciprocal transactions	7
Identity/Solidarity	9
Resources for action	4
Quantitative scaling	12
Functional scaling	6
Political scaling	5
Organizational scaling	9
Total raw comments	**114**

Comparing and contrasting the themes to develop higher order themes

I then worked to find meanings in the themes to develop higher order themes. For example, to the community members, recovery of stolen animals meant trust. I made deliberate efforts to ask the interviewee to clarify or verify the meanings of particular words or expressions, paying close attention to stories because many events, themes, and meanings came out of the local stories. Each of the response categories had one or more associated themes that give a deeper meaning to the data. I also re-examined the data repeatedly, by replaying the audio and video recordings to reverify the coherence of the concepts identified. The longitudinal nature of the research project, and the repeated field trips and interactions with the same informants over several years, allowed me to continue confirming and refining the themes. Table 4.12 shows the subthemes that emerged from the process of interpretation and search for meanings.

Table 4. 12 Sub-themes and the corresponding number of raw comments

Sub-themes	Number of Raw comments
Self-organization for peace	12
Communicating or sharing facts	5
Mobilization	7
Alternative spaces	4
Geographical scaling	9
From peace only to peace and business	9
Scaling to include gender-based violence	11
Community inclusion	14
Widows claiming their rights	5
Community members fighting corruption	9
Partnerships and networking	18
Total number of raw comments	**103**

Relating the higher order themes to theoretical concepts

Regular interactions with the research participants enabled me to understand how the social, cultural, and structural contexts of violence influenced individual experiences whose meanings are socially constructed. I sought to develop common or shared meanings of various concepts related to themes to determine their relationships to the theoretical concepts. I strove to understand how members of the network interpreted the experiences during social interactions. For example, the underlying meaning for livestock recovery, or reporting planned attacks meant trust between community members and between the community members and security/administration.

Translating these theoretical understandings in the context of research papers developed for my thesis.

I then created a definition and narrative description of each theme, including why it was relevant to answering the specific research questions. I ensured that the names of themes to be included in the final report are brief and adequately descriptive. I also looked for areas of overlap between themes leading to the development of papers on subjects like scaling, social capital, ICTs, resilience, violence against women and girls, and others. Table 4.13 gives examples of the concepts, themes, and sub-themes developed through the analysis process.

Table 4. 13 Examples of data analyzed thematically according to key concepts

Concepts	Themes	Sample evidence/quotes
ICT-enabled Peace networks	Stakeholders	*"Village elders have much influence in our community than any other local leadership structure hence they are the most relied on by the community to address issues." (Tapekwang, Marich)*
		"We should target the Laibons as well because they incite and give wrong information when they interpret the intestines of a slaughtered goat. They conduct ceremonies for protecting youths when they go to raid." (FGD, Kamunai)
		"Elders sat and passed a social contract, so, whenever issues come up through ICTs, they solve peacefully." (FGD, Kimilili)

	Resilience	**Self-organization for peace:** "*On 27th June 2019, some heads of cattle were stolen from Jimo East and were headed to Kaplelartet in Kericho County. The case was reported to the system which relayed the information to the response team (community elders, youths, chiefs, assistant chiefs, police and anti-stock theft unit) who swiftly and collaboratively responded intercepting the thieves and all the stolen cattle were recovered." (Peres, FGD).*
	ICTs	**Communicating or sharing facts**: **"***During the eviction of farmers from Kiboroa forest who had been given land under the shamba system, the evictees wanted to use force to stop the government from evicting them and probably own the pieces of land permanently. The evictees would intentionally uproot the trees planted by the government to prevent reforestation. This issue was reported to the system and through the response mechanisms put in place, the local administration was informed, through the rule of law the government was able to deal with the culprits" (*FGD, Kapsekei)
		Mobilization: "*Animals had been stolen from the neighboring Cherengany Sub County. The case was reported through the ICT system. The chief of Kesogon market, the police from Centre Kwanza and the community peace representatives mobilized one another and pursued the thieves, recovering all the animals and the culprits were arrested" (FGD, Chemining'wa)*
		Alternative spaces: *"It is funny how this phone thing is working; I can report any matter to the police without physically going there…heheh! Imagine even my wife will not know when am reporting an issue to the police!" (FGD, Kapua)*
	Social networks	*"Here in Kakong, the politicians were collaborating with warriors, chiefs, and the police to steal livestock…that is why he is saying there was a network….hiyo ilikwisha wakati system ilianzizwa." (that ended when the system was introduced) (FGD, Chichi)* ***"****The Sabaot in Kaptama had been threatened by a militia group and they moved to lower regions occupied by the Iteso and Bukusu to seek refuge. The Sabaot then shared with the occupants of the lower region what was being planned by the militia group. The occupants of the lower region utilized the EWS to update the security team who responded effectively leading to the killing of some of the criminals and some of them being arrested in Kamukuywa area. This increased networking and collaboration among the Sabaot, Bukusu and Iteso on the fight against crimes and social vices in the area."(Patrick, FGD)* *"There are numerous self-help groups that have been formed with membership across the divide and this has helped to strengthen their unity." (Mukhwana, KII)*
Bonding, Bridging, and Linking social capital	Trusting relationships	*"Given the achievement of cattle recovery, there is an improved relationship between the security agencies and members of the communities across the divide. The team spirit for purposes of harmonious coexistence is being witnessed along border lines with members of the community willing to share information related to security and give the names of suspected perpetrators to security team." (Mavuru – KII)* *"Due to many insecurity messages to the system from Geta, the security team established a police post there. The security teams posted there are now relying very much on the information from the community through the EWS. This has further created a good security network between the community of Geta and Kachibora police officers." (Florence, KII)*
		"The response by security is swift and fast nowadays" (women FGD, Kaptir) *"The system helped to improve the image of the police as we sat together and shared challenges with the community and leaders."(Mogere, KII)*
	Reciprocal transactions	*"We agreed that if we the Kikuyu community found a strange animal within our lands; we will return that animal to either the Kalenjins or the Luhyas and vice versa." (Mwangi, KII)*

	Identity/Solidarity	*"In Endebess a Turkana woman saw a group of some Pokot youths crossing the border from Uganda to attack the Bukusu and take away their animals and smuggle in weapons. She sent the message to the system warning that the Bukusu farms will be attacked shortly. The police in collaboration with community leaders responded quickly before the culprits could carry out the attack."* (Everline, KII).
	Resources for action	*"A Teso family had sold many bags of maize and had gotten a lot of money. A group of Sabaot youths had noted this and were planning to attack this family at night. It was also an opportunity to evict them from their land which the Sabaot had believed was theirs. A Sabaot who got a hint of the possible attack anonymously sent a message to the EWS. The Teso family got the alert and moved away that night. The security agencies kept vigil at the home and arrested the youths who had come to attack."*
Analysis of scaling for Muhoroni and Turkana/Pokot		
Scaling	Quantitative scaling	**Geographical scaling:** *"In 2014-2016 through partnership, a new project called Armed Violence Reduction project using same approaches of EWS was introduced. The project covered more areas in Trans-Nzoia, West Pokot and some sections of Turkana and mainly focused on SALW based on the research by Handicap indicating that SALW is quite high in the aforementioned areas." (Richard, KII)* *"With these achievements, Peace and Rights mainstreamed the EWS in its operations expanding the scope to Muhoroni to address land, boundary, and livestock theft issues." (Richard, KII)*
	Functional scaling	**From peace only to Peace and business**, *"Let me tell you, during the allocation of stalls on the market, the traders do not want to sit next to each other based on the communities they come from, they want to be mixed up so that they can interact and learn business ideas from each other. This interaction has given birth to chama of business people and the bodaboda operators." (Josephine, KII)* *"We were brought together by EWERS to regularly respond to alert messages from the system. But with time we decided to also engage in joint business that has now become a SACCO whose membership is drawn from all communities living in Saboti." (Joseph, FGD Member).*
		Scaling to include gender-based violence*: "Because of anonymity of the whole process of relaying messages, the brewers of illicit brew have been exposed by their real names thus reducing the rate at which this alcohol is being manufactured. In Songhor, there was one notorious woman who used to brew and sell alcohol (waragi), the drinkers would arrive as early as 8:00 am and would stay as late as midnight. The woman would even offer herself together with her daughters to the drunkards for commercial sex. In an area referred to by the locals as 'Mitinidawa' in Koru, the drunkards would arrive in the morning, drink, and be given mats to sleep on the whole day, the scenario was very shameful since women would even share same mats and what followed was despicable. These two cases were reported to the system and the information was relayed to the concerned chiefs who responded by arresting the people responsible. The DCC also responded by visiting Koru to ascertain the problem and progress made by the police and local administration." (Peris, women FGD)* "*There was a class eight girl by the name of Jerotich who had eloped with a neighbor and was presumed to be married. The parent had reported the case to the police, but no action was being taken. She shared her experience with the women's group. The women's group reported the matter to the EWS, which was forwarded to the local administration. The DCC gave a directive to rescue the girl and take her back to school. This directive was obeyed, and the girl was rescued through concerted efforts among the administration, the security, and the community member. The girl is back to school." (Everline, KII)* *"A security tip was issued of two girls aged 13 and 11 years, respectively, who were to be circumcised in Komarok. The women's group reported the matter to the system which informed the security personnel and quick action was taken by the local*

		administration who collaborated with the community to rescue the girls. The girls were rescued before they could be circumcised and were taken to a rescue center. In this instance, the EWS proved to be a very vital tool in the fight against FGM." (Jennifer, KII)
	Political scaling	**Community inclusion:** *"The initial committee and membership of the association was made up of people from one ethnic community – the Sabaot. Messages complaining about this were sent to EWERS. The membership of the forest association was reviewed, and the committee leaders elected afresh factoring in the ethnic diversity." (Joseph, FGD).*
		Widows claiming their rights *"Salome a widow with two girls to raise had been dispossessed of her land by the in-laws after the death of her husband who had left the land behind for her. The case had been reported to the chief and had taken too long. The group reported the matter through the system, and in collaboration with the local administration, the group ensured that the widow reclaimed land ownership. The widow reclaimed her land and has made much progress by putting up a permanent house, she is educating her daughters and venturing into business." (Grace, FGD)* **Community members fighting corruption** *"In Cherubai primary school, the head teacher misappropriated the examination fee and failed to register 12 pupils who were to sit for their mock exam. The group members reported the issue through the system and the community peace representatives physically presented themselves to the education office after getting the alert. The headteacher was forced to pay back KES 100,000 and the pupils were registered and sat for their KCPE exams."*
	Organizational scaling	*"Once an administrator logs in, he/she can add as many groups/institutions as possible and even assign the required information they are interested in. For example, state security agencies will receive criminal cases while the red cross will receive emergency cases like floods, accidents, etc., thus able to accommodate other networks or institutions."* ***(Kevin, KII)*** **Partnerships and networking** *"As we implemented these, we partnered with other organizations like Local Capacity for Peace Project (LCPP) and NCCK which were focusing on Early Warning and Early Response (EWER), and together we realized both success and challenges on equal measures." (Richard, KII)*

Different papers were developed related to the themes developed (see Chapter 6 for a summary of papers).

4.6 Ethical Considerations

Various ethical standards were observed throughout the research process. **Research license**: The research was approved by the National Science and Research Council of Kenya and relevant county government departments before data collection process. I committed to sharing a copy of the final thesis for their consumption of the results.

Figure 4. 8 Research license issued by the National Research Council of Kenya

Informed consent and confidentiality: All necessary measures were taken to secure informed consent and assent of the respondents. I explained to the study respondents the objectives of the study, the kind of information required, their intended use, and above all, provided reasons for choosing them as respondents. The respondents gave assent during all stages of the assessment through written consent where applicable, keeping anonymity and confidentiality in mind. The study protocol was followed to identify the individual participants, which ensured no potential harm would accrue to the respondents. To ensure adherence to required ethical standards, I made sure that informants were clear on the nature of the research, why I was there, what I was studying, and how I will use the data. I took responsibility to inform participants so that they have a complete understanding of the purpose and methods to be used in the study, the risks involved, and the demands placed upon them. Data was collected in all cases, only after due consent was obtained and participants were assured that they had the right to withdraw from the study at any time.

Respect for research participants: I was careful during data collection to use language that would not expose the respondents to any form of embarrassment and without infringing on their privacy. Monthly review and learning forums provided a platform for continuous reflection about potential ethical dilemmas related to culture, language, and my interpretation of data.

Privacy and safety including anonymization of data: To ensure privacy and safety, research participants were given fair, clear, honest explanations of what will be done with the data gathered and how the confidentiality of records will be maintained. Informed consent was ensured, and no data collected and reported could be traced back to individuals.

Responsibility for study participants: To protect participants from psychosocial harm, I ensured that they were adequately made aware of the study's purpose and objectives, and how they could contact me to express grievances and clarifications. All necessary steps were taken to ensure that nothing would happen to introduce or reinforce any form of social prejudice against the respondents.

Data protection: I adhered to the provisions of the Kenya Data Protection Act 2019, Part IV, which outlines the principles and obligations of personal data protection. The University's data protection policies and procedures were adhered to. All measures concerning sensitive information, including Standard Operating Procedure (SOP) regarding multiple-step rights access verification, password protection, and data encryption during transmission, archiving, storage, and retrieval were implemented to safeguard research data.

Integrating gender considerations in the research process: I took into consideration existing socio-cultural contexts that may promote gender inequality during the design and execution of the research. The analysis was done taking into consideration the views of both men and women. Data analysis considered gender sensitivity and examined the views of the different groups including persons with disabilities.

Acknowledgment obligation: I have made every effort to ensure the contributions of different people, respondents, policymakers, and co-authors were duly acknowledged.

Ethical dilemmas: By being both a researcher and an FPFK peace and development practitioner, I experienced several ethical dilemmas:

First, as the head of programs with FPFK and a technical backstopping for the peace program, I acknowledge that there would be difficulties in trying to present data without making any personal interpretations. These ethical dilemmas and my accountability to different groups had to be considered continuously throughout the study to ensure a balanced description and analysis. Since the research was being conducted for a Ph.D. degree and was therefore supervised by university professors outside of FPFK, this ensured addressing my personal biases My supervisor also visited some of the research sites and studied my transcripts and data from the EWERS. He could then help develop me develop coherent interpretations from my data.

The second area which caused me some difficulties, as a researcher within my organization, was whether confidentiality and anonymity could be assured for the participants in the study. Despite my assurances, I found this to be difficult because dialogues, FGDs, training sessions, and review forums were conducted openly in seminar halls, where other FPFK staff would also

participate. I held an honest and open discussion with the participants on this matter and explained to them the risks involved. We, therefore, reached a compromise that reports, which would be widely disseminated, would only include general information with no reference to individual participants.

As an insider researcher, I made every effort to emphasize the values of openness and shared critical responsibility. However, participants often found these values to be difficult to accept. I tried to assuage these fears by adopting a more informal and friendly approach to collecting data.

Whilst there are many advantages of being a practitioner-researcher, one of the biggest disadvantages was in balancing the research activities alongside a full-time job. No one else could be employed to release me from some work commitments, which often resulted in my family's suffering as I spent long periods away from them. This problem of time also influenced the quality of the research since much time was spent on traveling for work compromising my time on research. I tried to compensate for this time by using my weekends for writing, which compressed my social and family time.

5. CASE STUDY FINDINGS

This chapter presents the consolidated findings from the three case studies. Section 5.1 describes the pre-existing violence-endorsing networks and how they were mitigated by the ICT-enabled peace network. Section 5.2 presents the various steps of building the ICT-enabled peace network. 5.3 presents findings on scaling the ICT-enabled peace network while 5.4 enumerates the role of social capital in building and scaling the peace network. The chapter ends with 5.5 in which challenges and lessons learned from building and scaling the peace network are consolidated.

Finding 5.1: The peace network and how it opposed existing violent ethnic conflicts

This subsection presents findings to the research question (RQ1) of determining *the existing social networks that can be influenced by ICTs in mitigating violent ethnic conflicts.* In all three empirical areas, there existed violence-endorsing networks promoting cattle rustling, gunrunning, militia groups, political clientelism, and cartels heightening cultural intolerance cartels and social exclusions. The networks were complex and rooted in social structures of the affected communities that acted to disenfranchise them of their livelihoods and perpetuated and sustain violence against women and girls (VAWG).

Exclusionary networks manifested in the form of marginalization and discrimination of some communities in allocating resources and employment opportunities, leading to inequitable access to education and health facilities. Lack of political representation led to the denial of power, thereby enhancing a sense of insecurity among some members. For example, one of the key informants said,

> *"We the Sabaot feel marginalized in terms of political representation in Bungoma County. The Bukusu elect their own regardless of their competence and deliberately exclude us."*

The initiation of ICT-enabled peace networks created a medium through which existing minority and excluded groups could raise their voices and be better included in governance and political representation processes. ICTs facilitated the flow of information and empowered minorities to challenge the deeply entrenched power structures by being able to report on such discriminatory actions. For example, a woman in one of the FGDs said,

> *"When appointing the Assistant Chief in my area, the Nandi community which is dominant, noted that somebody from a different community was going to be appointed instead of their own. They started sending threats and complaints through the ICT system. When we saw the message, we mobilized and lobbied until the woman from the Kisii minority community got the appointment."*

This ability of the ICTs to provide a voice to the marginalized provided them avenues to build self-confidence and gradually grow into leadership positions.

The existence of militia networks was visible in the study areas and was exploited for the recruitment and sustenance of militia entities, especially in Mt. Elgon. In 2005, the government embarked on the redistribution of land in Mt. Elgon which resulted in the eruption of clashes

because residents were unhappy with this process. The Sabaot mobilized themselves into an ethnic militia group known as the Sabaot Land Défense Force (SLDF) to resist the flawed government land allocation process. Other militia groups included the Moorland Force, 7 Brothers, 42 Brothers, Chebarakachi Social Force, and 24 Brothers. As the FPFK with their partners started processes to initiate the ICT-enabled peace network, it offered a platform to community members who were adversely affected by the activities of militia groups, to anonymously report their activities to the security agencies, leading to the arrest of many of the militia members.

Livestock rustling cartelism was found to be a major cause of violent ethnic conflict among the Kalenjin, Luo, Sabaot, Iteso, Turkana, Pokot, and Luhya communities. Criminals organized livestock theft using armed violence and made such illicit activities appear as traditional practices based on local cultures. The proliferation of small arms and light weapons was another key driver of ethnic conflicts. Well-connected networks in local counties and neighboring countries (Uganda and South Sudan) brought firearms into Kenya, making it a lucrative economic activity. Livestock rustling cartels were formed based on shared cultural values associated with traditional social structures and belief systems of pastoralist societies, which also served as drivers of violence. For example, according to a key informant,

> *"A member of the Mosop community steals animals, hands it over to a member of the Soy community and a Soy member hands it to a member of the Bukusu community who sells and distributes the income."*

The integration of ICTs in the peace network facilitated the timely reporting of incidents of cattle theft and gunrunning, leading in many cases to prompt response and recovery of stolen animals. Regular message alerts from the ICT system about stolen animals, motivated community members from across ethnic divides to meet and initiate response actions. Frequent meetings were held to enable dialogues on emerging issues, as one key informant highlighted how new social contracts were developed:

> *"Yes! Due to frequent alerts about cattle theft through the ICT system, we have held several conversations that culminated in the signing of an agreement. One of the things mentioned in this agreement is that no cattle, sheep nor goat would be slaughtered before 7:00 am and representatives of communities and the public should be there to witness before the animal is slaughtered and skinned." (Mwangi, KII)*

Communities living along the borderlines of Kisumu and Kericho started to collaborate to recover stolen animals and return them to their rightful owners. Apart from enabling the formation of social contracts, ICTs continuously provide the medium through which community members and security agencies, especially the police, interacted which often led to arrests of those trading illicit arms. One of the chiefs said:

> *"In my location, I used to lose 3-4 animals per week, but from the time we formed the peace network that uses the SMS, only one animal has been stolen and we recovered it within one hour."*

Contributing to the existing violence was the non-responsive character of the security agencies, their weak coordination with government entities, and their widespread culture of mistrust. Community members who reported criminals and other unpleasant events were subjected to unending litigation processes and threats, which prevented people from raising their voices and

allowed the violence-endorsing networks to thrive. The strategies for addressing these challenges were largely traditional such as forced disarmament and arbitrary arrests of young people involved in the crimes. The technology used at the time was managed from Ethiopia by the Intergovernmental Authority on Development (IGAD) and focused on regional-level conflicts rather than micro-level inter-communal violence. This could not address local challenges that required local solutions. Further, there was little involvement of community members in foiling criminal networks and the effective use of technology had not been yet exploited.

These existing conditions promoting violence contributed to FPFK's effort to initiate the ICT-enabled *peace network* to counter this violence.

Table 5. 1 The conditions perpetuating the violence in the existing social networks

Violence – endorsing networks	**Examples of negative consequences**	**How ICT-enabled peace network helped mitigate**
Exclusionary network	• Exclusion and discrimination of women and minority ethnic groups in leadership	• ICT-enabled peace network promoted inclusivity and amplified the voices of minorities
The emergence of militia networks	• Communities formed ethnic-based militia groups e.g., the Sabaot land defense force	• ICT-enabled peace network contributed to better relationships between community members and security officers further promoting community policing
Cartel Networks	• Criminals formed livestock theft, gun running, and political elitism networks	• The ICT-enabled peace network increased the recovery of livestock through strong collaborative relations between the community members and the security agencies. It also enhanced transparency and accountability in the delivery of services
Violence against women and girls	• family and kinship ties became grounds for hiding those who defiled children	• ICT-enabled peace network penetrated through these ties and brought to the fore the hidden actions leading to justice for the victims

Finding 5.2: The process of building the ICT-enabled peace network

The study identified four steps in building the peace network: building content; enrolling stakeholders; establishing and maintaining ICT infrastructure, and establishing, repairing, and evolving the operations of the peace network. These steps are summarized in Figure 5.1 and briefly discussed below.

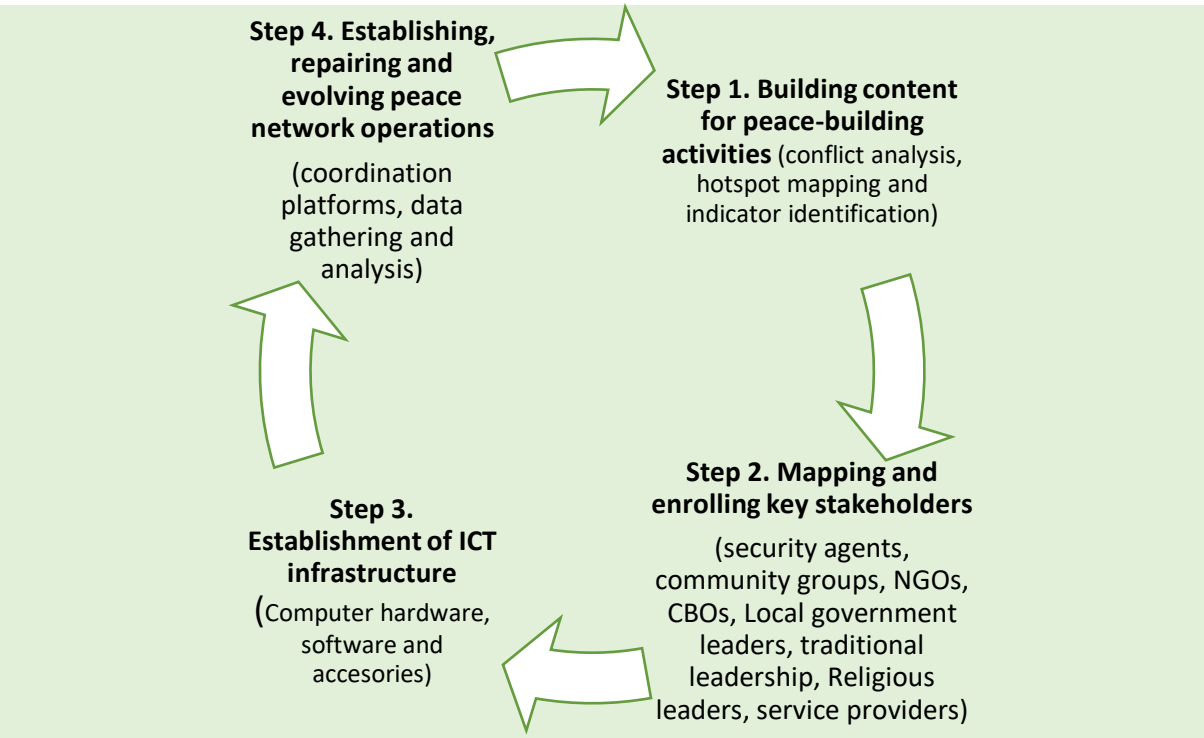

Figure 5. 1 The process of building the ICT-enabled peace network

Finding 5.2.1 Building content for peace-building

This involved conducting conflict analysis, mapping violence hotspots, and identification of early warning violence indicators for reporting. The data for setting up these processes was obtained through FGDs, review meetings, KIIs, and my understanding and experience of the context These processes helped to gain a deeper understanding of the precise nature of conflicts in the Mt. Elgon region and which indicators best represented the conflict situation. Strong participatory processes were employed for *conflict analysis which* mapped the conflicts and their underlying causes. This helped to identify the existing structures and power relationships. The conflict analysis was accompanied by the *mapping of violent hotspot areas,* which helped to identify the main battlegrounds, routes for arms trafficking, livestock theft escape routes, and hideouts for attackers.

Mapping violent hotspots led to the next step of *identifying early warning indicators of violence*, which represented a short description of a given incident. For example, "*youths disappearing from their homes"* could be an indicator for potentially developing acts of *"cattle theft" or "murder".* Indicators were developed by interviewing the community members from that conflict area and conducting KIIs with separate groups like women, youths, and elders, to gain multiple perspectives on the problems and means to address them. Examples of the early warning violence indicators identified through these processes are summarized in Figure 5.2.

1. Domestic violence
2. Leaflets
3. Robbery
4. Threats
5. Murder
6. Hate speech
7. Drug and substance abuse
8. Increase livestock theft
9. Burning Of Houses/sugar Cane
10. Social groupings
11. Lynching
12. Night watching in fear of attack
13. Local curfews
14. Land and boundary dispute
15. Murmuring
16. Increase in purchase of pangas and other sharp objects/arms
17. Assault
18. Tribalism
19. Political assassinations
20. Secret meetings
21. Strange people in the area
22. Food shortage/increase in food pricing
23. Early closing of businesses
24. Early stocking of food stuffs
25. Murmuring
26. Community polarization
27. Change of language(coded language)
28. Transfer of property
29. Severing trade Links
30. Disappearance of youths
31. Village elders calling for too many meetings
32. Social complaints
33. Increase In Level Of Family Conflict And Disagreements
34. Professionals asking for transfers and moving children from the current schools
35. Heavy presence of security personnel
36. Individuals relocating families

Figure 5. 2 Sample indicators of violence in the Mt. Elgon conflict system

Understanding the conflict context, mapping the violence hotspots, and identifying early warning indicators laid the ground for the next step in building the peace network, which focussed on enrolling the key stakeholders in this network.

Finding 5.2.2 Enrolling stakeholders into the peace network and defining their functional roles

This was a long-term process, coordinated by FPFK. At the heart of the network were community groups for women, youths, and elders who were both the victims and perpetrators of violence, all with an important stake in violence mitigation efforts. FPFK, which played the default coordinating role in the network, got various non-state actors (such as Kenya Red Cross, Handicap International, Mercy Corps, and Human Rights Watch) and state actors (such as Ministry of Interior and Coordination, Departments of Health, Child and Women Welfare, security agencies including police, military and county government) to join the network, to better integrate components of monitoring, response, and action functions required in peace-building. The stakeholders mapping is shown in Figure 5.3

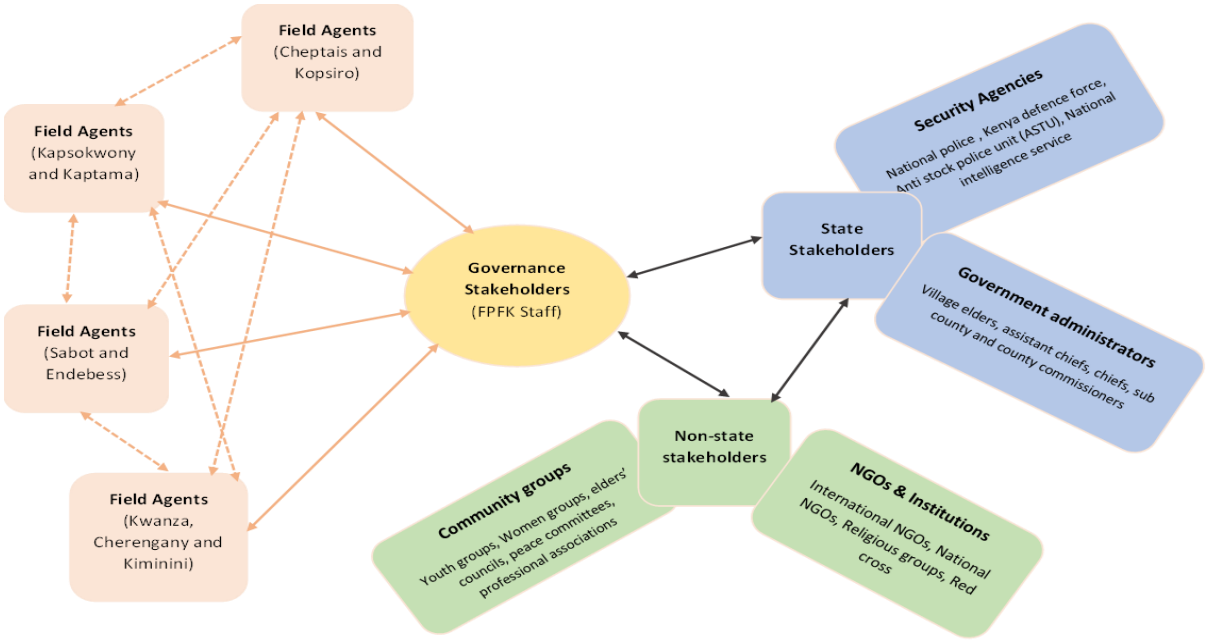

Figure 5. 3 Key stakeholders enrolled during the building of the peace network (

- The field agents were drawn from different communities living in the identified violence hotspot areas, which for the Mt. Elgon conflict system, included Kiminini, Cherengany, Kwanza, Endebess, Sabot, Kaptama, Kapsokwony, Kopsiro, and Cheptais. Forty-five field agents were selected from the Sabaot, Bukusu, and Iteso and trained on how to detect and report on the conflict/early warning indicators in their areas. The selection process was highly confidential to ensure the privacy and security of the field agents, who were passionate about bringing peace to their communities. They were referred to as peace ambassadors to cover their identity.
- The governance stakeholders comprised the FPFK staff, who was responsible for the operations of the early warning and response processes. The FPFK teams coordinated with the field agents, state stakeholders, and non-state actors, managed the technical aspects of the system and followed up to ensure that the alert messages are acted upon. They received in confidence the coded data, processed it into meaningful information, and relayed it to the state and non-state actors.
- The state stakeholders comprised the state security agencies and administration, including the regular police, general service unit (GSU), rapid deployment unit, and anti-stock theft unit. They were responsible for responding to various acts of reported violence such as murder, rape, robbery, and cattle theft. The local administrators were the village elders, chiefs, and commissioners. They held community-based accountability meetings to deal with the social challenges of family conflicts, violence against women, alcoholism, and village crimes. The Red Cross handled relief and psychosocial support to victims of violence.
- The state agencies worked closely with the non-state actors including NGOs, FBOs, business communities, and community groups to address concerns of child abuse, domestic violence, and corruption by promoting dialogue and advocacy. They supported processes of psychosocial counseling and the rehabilitation of victims, in some cases, also supplying relief food.

The FPFK sought to enable solid interaction amongst the different actors in the stakeholder network. Key interaction processes which were furthered include i. between field agents to share intelligence reports.

There was partial interaction (dotted lines in the figure) among the field agents as they exchanged intelligence reports. Sharing of these reports was occasioned by violence-endorsing groups forming networks that spanned across the field agents' jurisdiction areas. Therefore, linkage among them was important for tracking the activities of the violence networks. However, there was no direct connection between the state/non-state actors and the field agents. This was because the field agents were designed to remain anonymous in their role for their security. The governance stakeholders provided the brokerage role between the two. Various sources of data revealed that many community members feared reporting cases or early warning indicators to the security and government officers because of intimidation and subjection to litigation processes. In Mt. Elgon, some security officers collaborated with cartels and violence-endorsing networks to execute heinous acts for their benefit. This meant that reporting to them amounted to risking personal life as pointed out in an FGD with community peace champions;

> *"There was no confidentiality when reporting sensitive issues hence demoralizing us from reporting and there was no response to the early warnings as we were not involved, and some that were responded to, the response was very slow with no results."*

A retired police officer in the area also expressed similar sentiments;

> *"Most junior officers are weak and can leak the information regarding secret reports – thus they can easily pass over classified information that is so confidential to the criminals. They also tend to ask irrelevant questions such as how many criminals did you see? Which clothes were they putting on? For example, upon recovery of a cow, a civilian may not be interested to follow up on the case in court due to such useless questions. More so, some police officers still threaten residents that sema vizuri otherwise nitakuweka ndani* (say correctly otherwise I will lock you up). *Thus, residents require more civic education to trust police officers with information. As an example, in Muji area of Bungoma County, the approach by the police to the community is poor. The security agencies should thus give priority time to people with ease of volunteering information quickly."*

Finding 5.2.3: Establishing and maintaining the ICT infrastructure in the peace network

The interaction among the different stakeholders was enabled through ICTs, particularly the mobile phone. The working of this ICT-enabled EWERS is schematically depicted in Fig.5.3 below and then described.

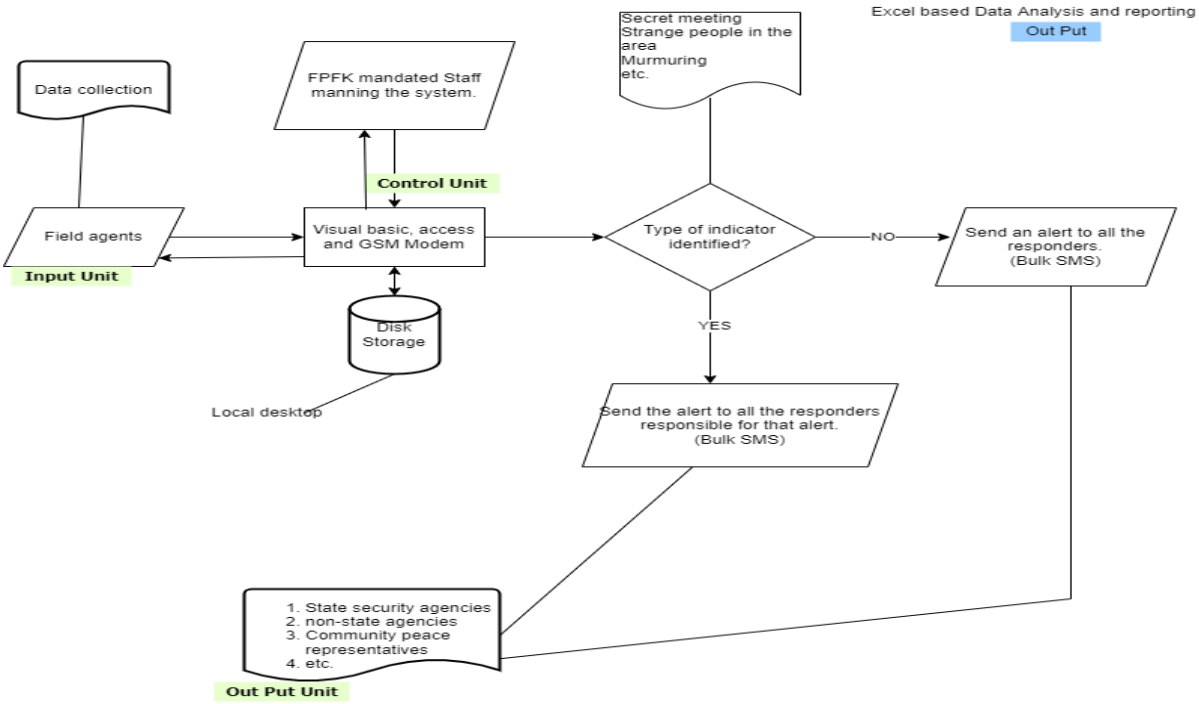

Figure 5. 4 Functional mapping of the ICT-enabled peace network for the Mt. Elgon conflict system

The *input* unit supports the gathering of early warning data on conflicts and relaying the same to the control unit for further action. The main components of the input system were the field agents, early warning indicator manual/codes, mobile phone, power bank/solar charger, network/internet, and airtime. The field agents/peace monitors provided the human face of the input system who used the mobile phones to send alert messages and receive feedback from the control unit. The field agents used SIM cards (Safaricom, Airtel, and Orange/Telkom) that had sufficient and reliable coverage in the areas, and solar chargers were provided to agents in areas with no electricity connection. Further, they were given the indicator manual with codes for reference during reporting.

The human face of the *control unit* comprised:\

- the FPFK staff, including the peace and conflict management specialists and the software development/data analysts. They were equipped with computers and accessories like USB modems, printers, UPS, and batteries for power backup as the area experienced frequent power outages.
- 1500 VA APC uninterrupted power supply and 100 AH maintenance-free gel 12-volt battery was used to supply stable power.
- The control room phone was used to make necessary official communication from the data analyst and other authorized users.
- A USB modem from Safaricom was used to receive data from the field agents and send the processed data (information) to relevant bodies/organizations and state security agencies. The modem had a Safaricom sim card; the mobile number for this sim card was given to all the field agents. All sensitive data was sent to this SIM card from the field agents. The system received data from the sim card through the USB modem, processed it, and relayed it to the relevant authority through the same modem and sim card.

- The internet was used for email communication and for updating antivirus and other installed applications, but not by field agents. The field agents operated in areas with no or limited internet access and that explained why the system was mainly SMS based. Another component of the control unit was the SMS software that was installed to handle bulk SMS related to early warning. Software operation was structured as shown in Figure 5.5

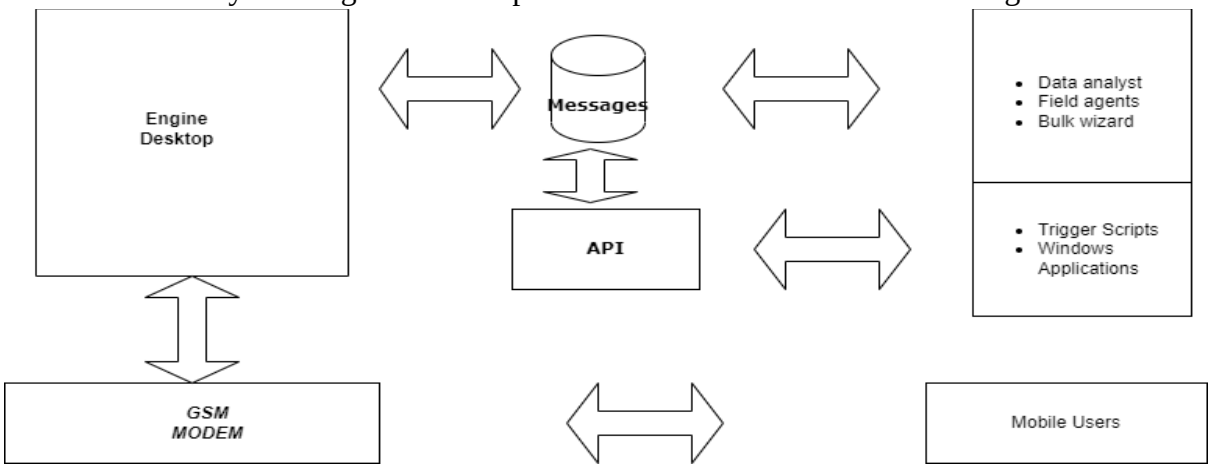

Figure 5. 5 Structure of the SMS messaging software under the control unit

The software enabled the automatic sending, receiving, and processing of messages operated through the GSM. It operated on Windows 2012(R2)/2008(R2)/10/8/7/Vista/XP platform, 32 or 64-bit, and e-mail communications through (secure) SMTP and POP3. The messaging server was installed on a Windows computer, connected with a modem (USB/COM) and a SIM card. The software could send, receive or process a maximum of 10 messages per minute. The data analyst took control of all these technical components of the control unit. He also verified messages before relaying them to the response team within the output unit. The data analyst physically waited for the alert messages on the desktop computer as it was a stand-alone system. Two analysts alternated between day and night. The rest of the staff cooperated with the output unit team (state and non-state stakeholders) in response.

The *output unit* for response included the state and non-state actors including FPFK. They were connected to the SMS system in the control unit as the end users of the messages received from the field agents. Their phone numbers were enrolled in the system as recipients of the messages. They had the mandate to receive and respond to messages based on their geographical area of operation and the incidents they were responsible for. The control unit sent a particular message, alerting the leaders at all hierarchical levels to respond. For example, when the chief would receive the message, his/her boss the deputy county commissioner would receive the same message for accountability purposes. Another output component was the system reports, which were shared with the response teams for scenario building and effective coordination of response. Examples of reports generated are shown in Figure 5.6 and Table 5.2.

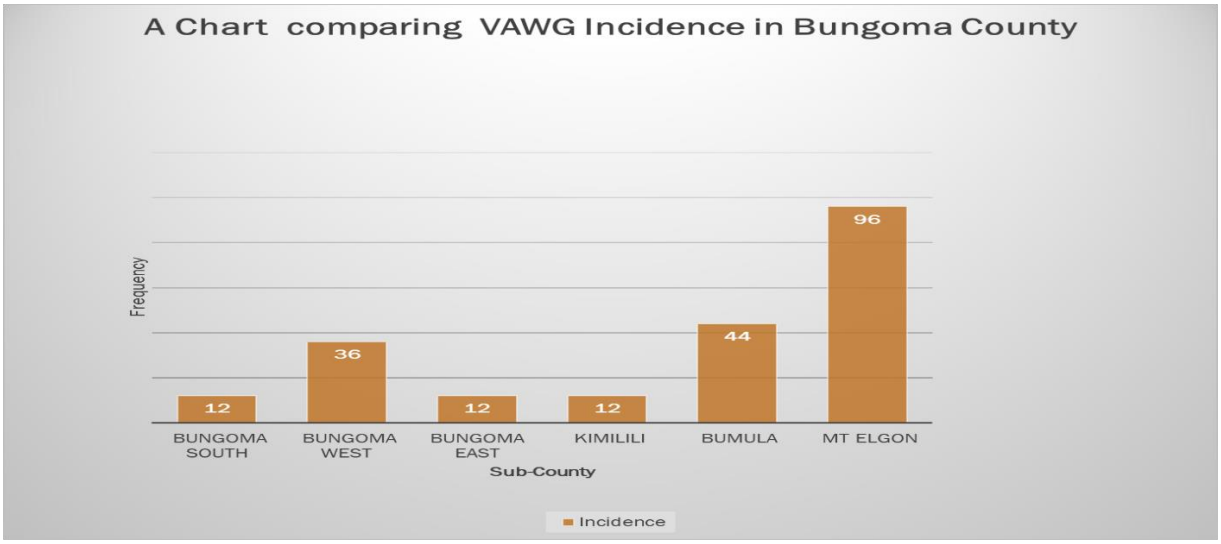

Figure 5. 6 VAWG warning messages in each sub-county over a period of 6 months in 2016

Table 5. 2 Summary of small arms incidences reported between July and September 2017

Violence hotspot area	JULY2017	AUGUST2017	SEPTEMBER2017	Total
Sabot	133	389	265	787
Cherengany	13	34	22	69
Endebess	44	140	91	275
Kwanza	31	60	90	181
Total Incidences	**221**	**623**	**468**	**1312**

Finding 5.2.4: Establishing, repairing, and evolving operations of the peace network

This involved the establishment of regular coordination mechanisms, such as through monthly coordination forums. The system reports formed the basis for discussions. The coordination forum was the main decision-making organ when it came to the response. They evaluated the performance of the system and updated indicators according to the reports and held accountable departments that had failed to effectively respond and also circulated success storied. The membership of the forum was updated by recruiting new interested members, which supported the scaling up operations of the network.

Finding 5.3: Scaling the ICT-enabled peace network

FPFK scaled the peace network to two different areas — Muhoroni and Turkana/Pokot, based on requests by members of the coordination forum, who had subsequently been transferred to these areas of violence. For example, Mr. Sangura had been an assistant county commissioner in one of the sub-counties in the Mt. Elgon conflict area during the implementation of the ICT-enabled network and was later transferred to Nyakach within the Muhoroni conflict area as a deputy county commissioner. He found that the conditions of ethnic violence were similar to Mt. Elgon and requested FPFK to introduce the peace network in the area. He told us:

"I was an assistant county commissioner in Cheptais, Mt. Elgon, from 2008 to 2014. FPFK started their work in the area in 2009 and I even participated in their dialogues. But the introduction of the ICT system was a game changer! They caused us to meet with victims and "Janjaweed" whom we had never met. The system dealt a big blow to the remnants of militiamen as they were named. I had struggled with cattle theft for years, but it reduced drastically when this system was introduced. So, when I was transferred here as a deputy county commissioner, I found the same thing of cattle rustling. I called Mr. Lusweti and asked if FPFK can introduce the same system in Nyakach. That is how FPFK started the work here."

Such requests formed the basis for the scaling efforts by FPFK.

Finding 5.3.1: Scaling ICT-enabled network to Muhoroni conflict system

The scaling process followed similar steps as in Mt Elgon, albeit with modifications, as next described.

Building content for peace-building

when FPFK first conducted the conflict analysis in the area in 2015, which led to the initiation of the network building in 2017 when they received the request. The conflict analysis highlighted the main actors and their interests and highlighted violent hotspots, including Kibingori–Chemase border, Miwani–Chemase, Kupere-potopoto-Nyangore, Songhor-Mombwo border, Koru-Kunyak border, Soba-Tamu border, Muhoroni-Chepserian border, and Sondu town. This is depicted in Figure 5.7.

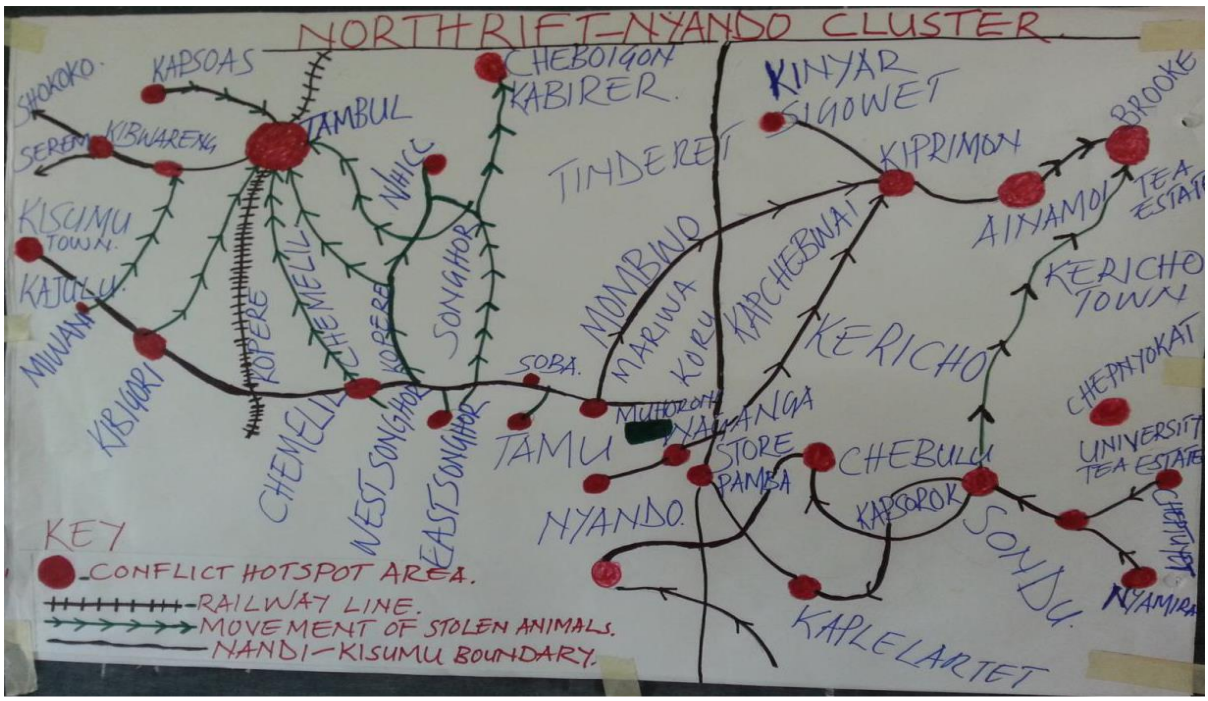

Figure 5. 7 Violence hotspot areas in the Muhoroni conflict system

The violence indicators were then mapped based on in-depth interviews and FGDs. Forty-six indicators were identified, which included 11 new ones as compared to the Mt. Elgon conflict system. Figure 5.8 shows some of the indicators.

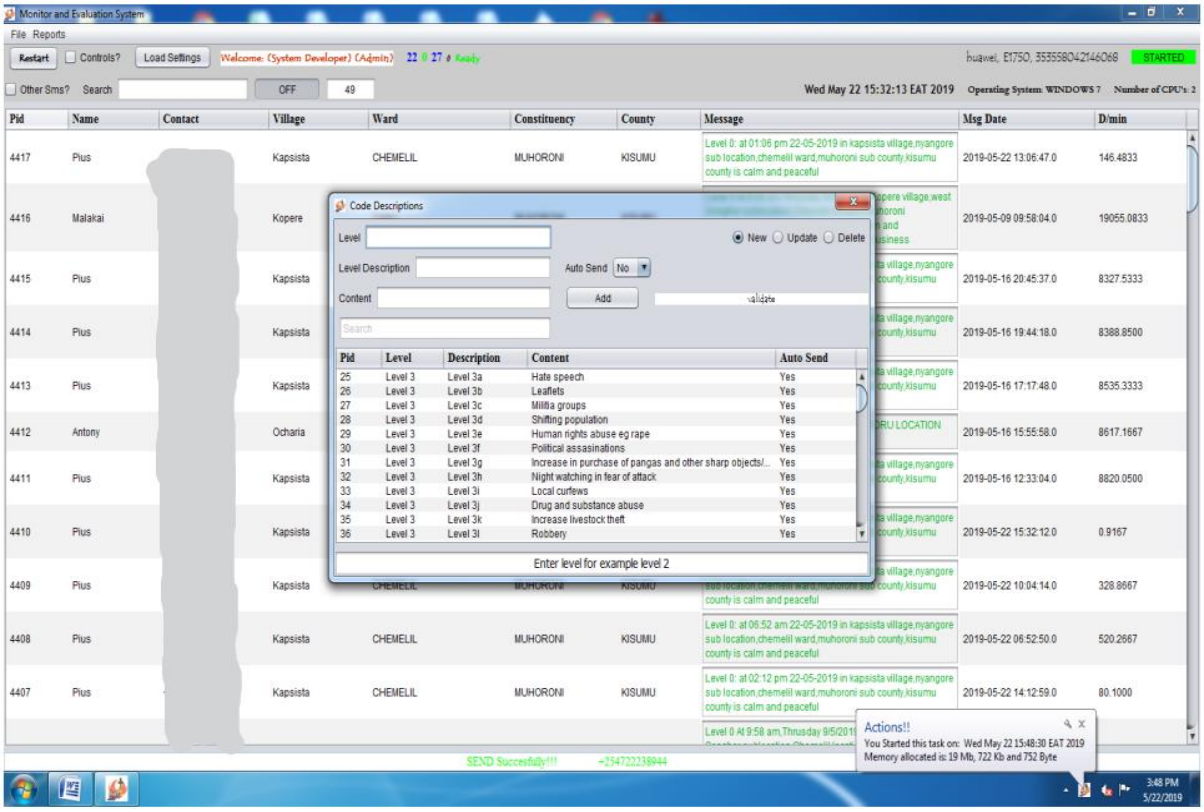

Figure 5. 8 Conflict early warning indicators in Muhoroni conflict system as displayed on the dashboard

Enrolling key stakeholders in the Muhoroni conflict system

Though the peace network structure remained similar to Mt Elgon, the composition of stakeholders changed. Field agents were selected through a similar process and their operational ethics remained similar. While the FPFK continued to be responsible for governance, the response stakeholders changed to a structure of thematic committees. The conflict analysis identified five main root causes of conflict including poor governance, land and boundary disputes, livestock stealing, unsettled internally displaced persons (IDPs), and accumulated trauma that sustained revenge attacks. Stakeholders were enrolled according to their knowledge and experience in these five areas. They were coordinated as shown in Figure 5.9

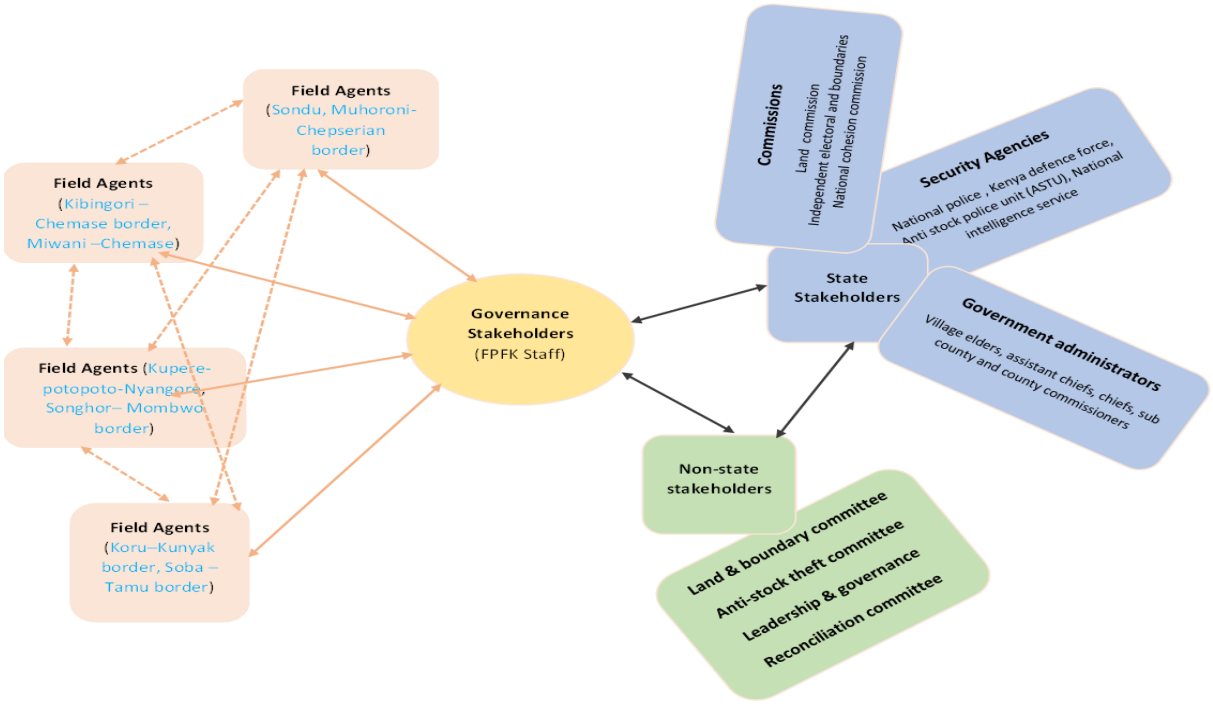

Figure 5. 9 Muhoroni conflict system stakeholders

Different thematic committees were established for dealing with different issues. The Leadership and Governance committee responded to alerts related to discrimination in employment, political incitement, discrimination in allocation of resources and service provision, injustice to vulnerable groups, and the unresponsiveness of leaders. The Land and Boundary committee addressed underlying causes of land and boundary feuds, including illegal invasions of private land, grazing illegally on private farms, distorting land boundaries, and land grabbing. The IDPs resettlement committee addressed existing problems of internally displaced persons evicted forcefully from their farms. The Anti-stock theft committee addressed cattle rustling-related violence and the Reconciliation committee addressed issues of trauma healing, justice, and enabling reconciliation dialogues across warring groups. The state commissions for land, elections, boundaries, and cohesion were enrolled as new state stakeholders to contribute to addressing conflict issues within their jurisdictions.

Establishing and maintaining ICT infrastructure in the peace network in Muhoroni

The ICT system was structured in the same way as the Mt. Elgon system save for the software and the modification of the response team. The network is schematically shown in Fig. 5.10 and then discussed.

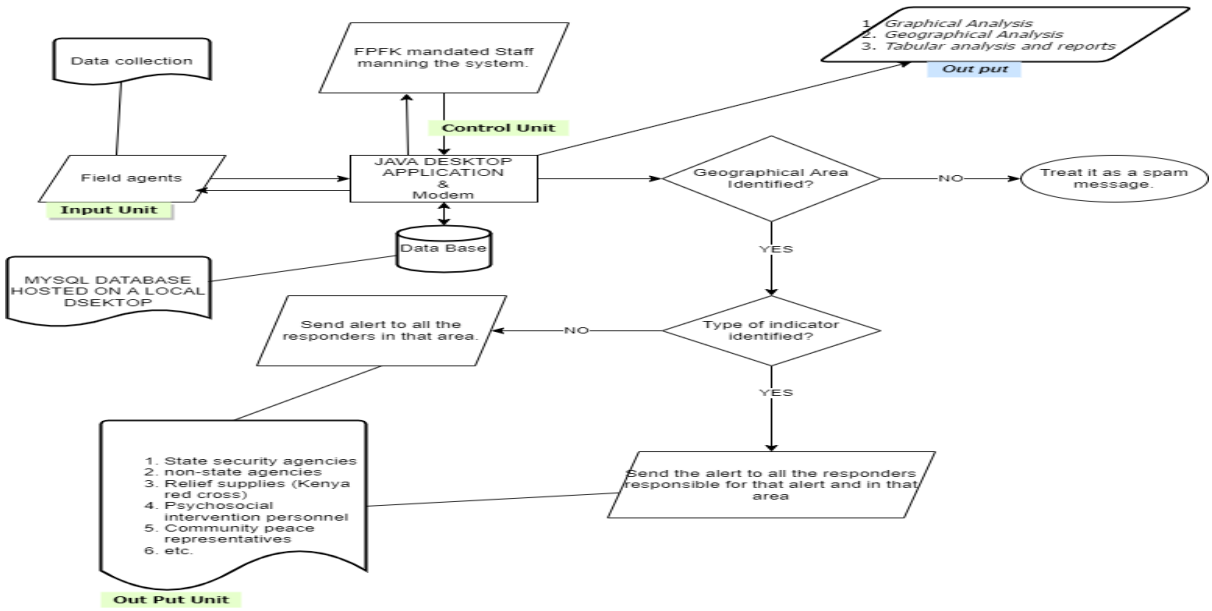

Figure 5. 10 ICT-enabled peace network structure in Muhoroni

The field agents were selected from the hotspot areas and used their phones to send and receive messages from the governance team. FPFK remained the custodian of the ICT system and they seconded a technical staff to Muhoroni for setting up the systems there. The existing software had many technical shortcomings, such as slowness of response, which needed to be addressed. The stand-alone desktop configuration made the system vulnerable to data loss in the event of a system crash. The system had dependencies on other applications, to offer full functions, for example, it could not generate the reports without Excel and could only handle a limited number of messages, requiring at least two data analysts to allow the system to function on a 24-hour basis.

The system needed to be upgraded before being taken to Muhoroni to address these weaknesses. A new application was introduced, based on SMS, which allowed the user to send and receive information using a mobile phone. This system was developed using Java programming language for the inbuilt intelligence, reports, data processing, security, and a user-friendly interface (Figure 5.11). The data was stored in a normalized MYSQL database for ease of access and processing and linked through a Java library called mysql-connector-java-5.1.14-bin. The system used Jasper reports to produce its reports. The modem with a SIM card from a network service provider like Safaricom, Airtel, Telkom, etc., was used to send and receive information.

Main dashboard

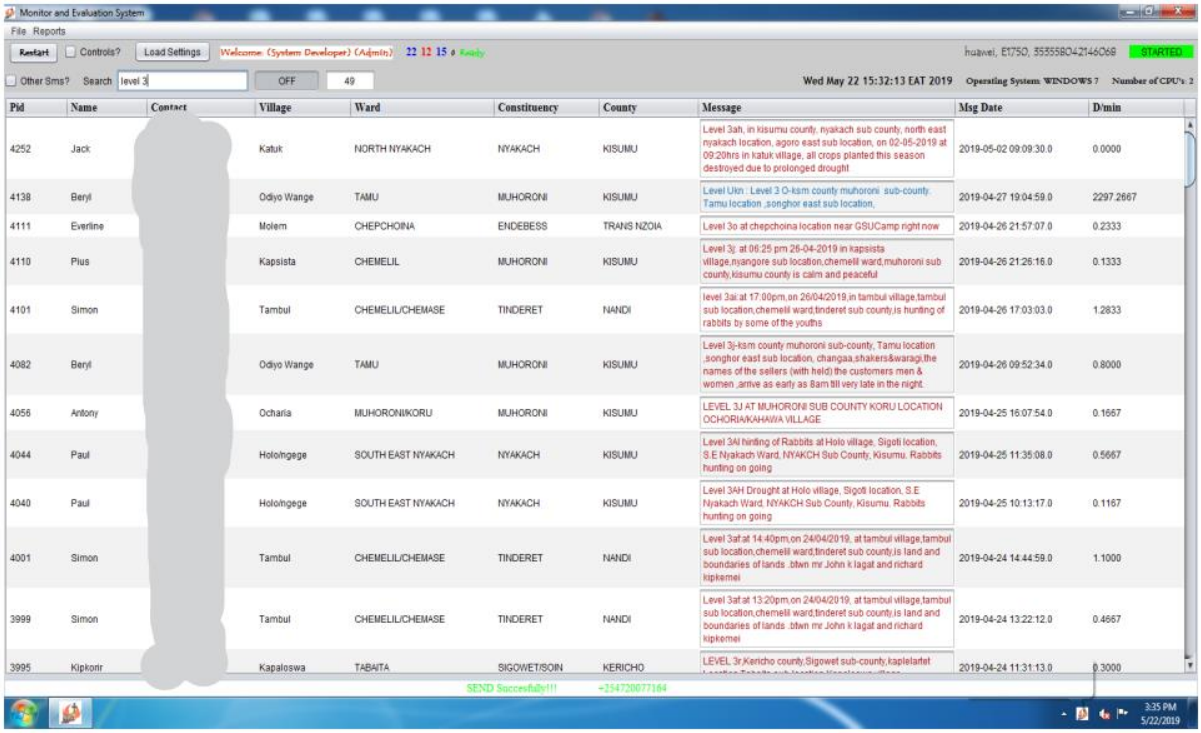

Figure 5. 11 The dashboard showing received messages in the Muhoroni conflict system

County-level heads of land, boundary, and cohesion commissions were enrolled as responders in addition to the security, local administration, and members of the different committees. Also, since the conflict spanned across three sub-counties, the Regional Commissioner was enrolled as a responder. Many NGOs and specific groups like women, youth, and elders were not involved in response. It was more of a targeted response.

Establishing, repairing, and evolving operations of the peace network

As part of the output, reports were continuously generated and shared with all the stakeholders during quarterly review meetings for further action. Examples of the reports from the Muhoroni conflict system are shown in Figures 5.12, 5.13, and 5.14.

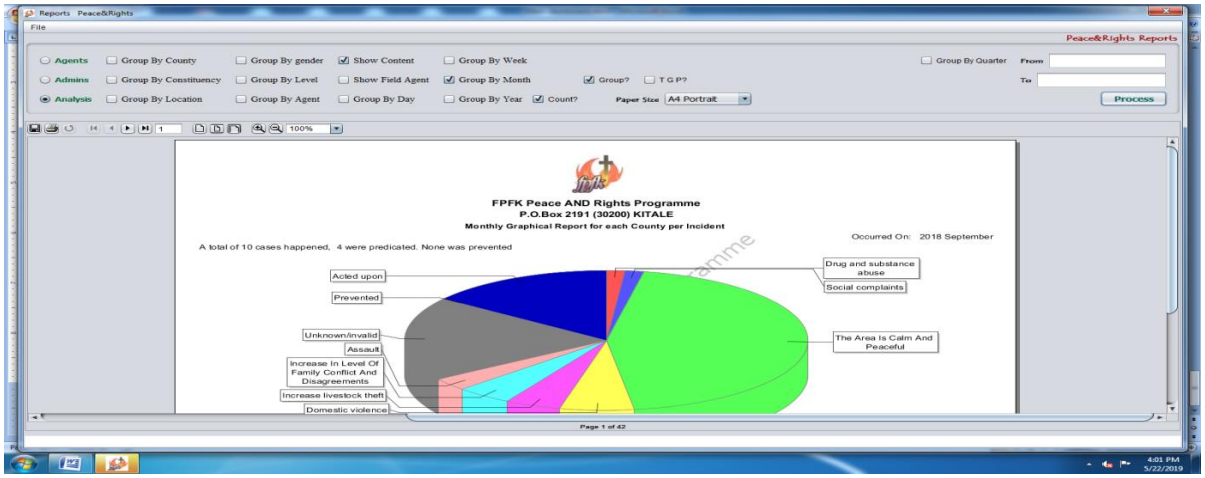

Figure 5. 12 System generated monthly report shared during stakeholders' review forums

The report could also be generated in numbers to compare as shown in Figure 5.13.

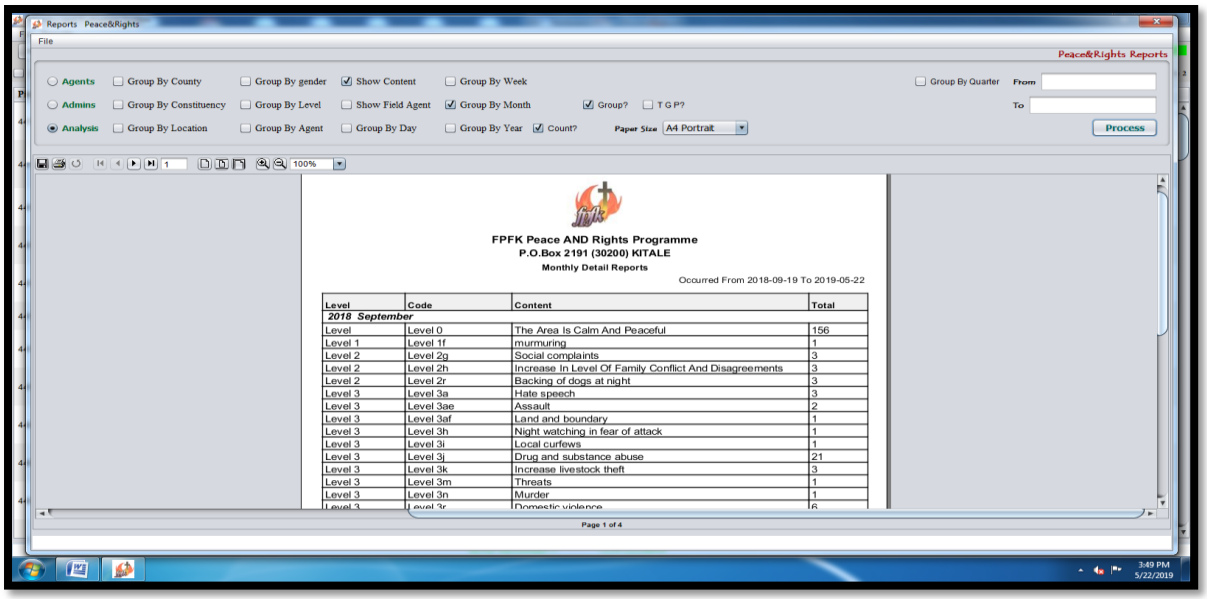

Figure 5. 13 System-generated report showing indicators and their frequency over some time

Finding 5.3.2: Scaling ICT-enabled peace network to Turkana/Pokot conflict system

The need for scaling to the Turkana Pokot conflict area was a result of demand from those who had experienced its positive impacts in Mt. Elgon. Mr. Mogere worked as a sub-county police commander in Kwanza and was a member of the coordination forum in the Mt. Elgon conflict system and was transferred to Turkana. He requested FPFK introduce the system to the area. During my interview with him, he said:

> *"I was transferred here in late 2018 after serving in Kwanza and being a member of the coordination forum for 4 years. The early warning system helped us a lot, especially during elections. When I came here, I noted that the relationship between the Pokot and Turkana is worse than the Bukusu and Sabaot. I quickly thought that I need that kind of a system here to apprehend criminals and include the community in policing as this was not happening. Am grateful to FPFK for accepting my request to start the system here in 2019."*

The request to replicate the system in the Turkana/Pokot areas came at the same time when FPFK was in discussions with the ICT4COP team to initiate a pilot research project in Kenya. The European Commission Horizon 2020 Research and Innovation Project had similar objectives to the EWERS, and Turkana/Pokot was selected as the site for a one-year pilot project.

Approach to building the peace network in Turkana/Pokot conflict system

The establishment of the ICT-enabled peace network in this area was modeled against the two previous interventions. There was a process of participatory conflict analysis that sought to understand the community, and the context, including triggers and indicators. It also involved mapping violent hotspots areas jointly with police and community members, followed by stakeholder mapping, integration of ICTs, and network coordination and operations.

Building content for peace-building

The participatory conflict analysis helped in building an understanding of the community in the context of violence and identifying the violence hotspots. Figure 5.14 shows the main hotspot areas in the Turkana/Pokot areas.

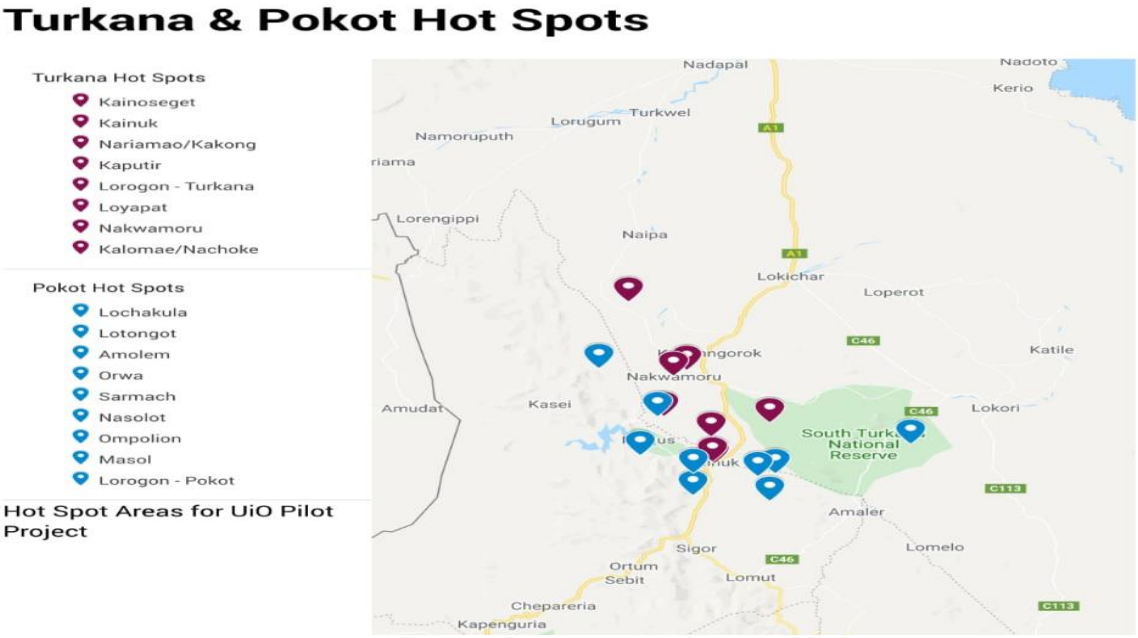

Figure 5. 14 Main violence hotspot areas in the Turkana/Pokot conflict system

The conflict analysis produced about 111 early warning indicators, which was almost three and two times those for Mt. Elgon and Muhoroni, respectively. This is summarized in Figure 5.15.

1. Secret meetings
2. Strange people in the area
3. Food shortage/increase in food pricing
4. Early closing of businesses
5. Early stocking of food stuffs
6. Murmuring
7. Community polarization
8. Change of language(coded language)
9. Transfer of property
10. Severing trade Links
11. Disappearance of youths
12. Village elders calling for too many meetings
13. Social complaints
14. Increase In Level Of Family Conflict And Disagreements
15. Professionals asking for transfers and moving children from the current schools
16. Heavy presence of security personnel
17. Individuals relocating families
18. Purchasing of extra maize, tobacco, akala shoes, nails 5 inch and 1/2 inch and purchasing of jerricans 3 Litres
19. Wearing of white skin on the wrist, white orchard application
20. application of white orchard on guns and restocking of more gun bullets
21. Sudden migration
22. Presence of mass footprint in the bush
23. Backing of dogs at night
24. Hate speech
25. Carjacking
26. Rape
27. Child defilement
28. Assault
29. Land and boundary
30. Tribalism
31. Drought
32. Hunting of rabbits, gazelle etc.
33. Leaflets
34. Militia groups
35. Change of walking style
36. Use of Panya roots
37. Sexual deprivation
43. Shifting population
44. Human rights abuse e.g., rape
45. Political assassinations
46. Increase in purchase of pangas and other sharp objects/arms
47. Night watching in fear of attack
48. Local curfews
49. Drug and substance abuse
50. Increase livestock theft
51. Robbery
52. Threats
53. Murder
54. Burning Of Houses/sugar Cane
55. Prevalence and rumours of SALW (small arm, light weapon)
56. Social groupings
57. Domestic violence
58. Kidnapping
59. Human trafficking
60. Early pregnancies
61. Early forced marriages
62. Poaching
63. Lynching
64. Suicide
65. FGM
66. Lack of communication between family members
67. Threats from family members
68. Personality difference
69. Exchange of words
70. Behavior changes
71. Drinking he/she was not drinking
72. Change of provision in family
73. Women delaying in merry ground
74. Change in treatment among family members
75. Attention shifting from the husband to the children
76. Women communicating through children
77. Change of physical appearance in women
78. Business shops/supermarkets not following government regulation
79. people not observing sanitization requirements
80. people observing sanitization requirements
81. Children left with the father after quarrelling with the wife
82. The behaviour of children changes
83. Neglecting children
84. Daily routine changes (the time of going to job or opening business changes)
85. Change of interests
86. Provocative pressure (e.g., removing air from car tires etc.)
87. Singing songs that are provocative to the opposite sex
88. Over drinking
89. Unfriendly tone
90. Claiming to commit suicide
91. Talking to himself/herself
92. Emerging sickness like ulcers
93. Isolation and yet he/she was interactive
94. Restlessness
95. A woman bringing many men to the house
96. Children/girls have expensive gadgets, dress etc
97. Mode of dressing changes
98. Abandon jobs they used to do
99. Becoming busy at night than day
100. Young girls/boys having unexplained confidence with older opposite sex
101. Strategic position to target track drivers
102. Guilt/shyness for young girls/boys
103. tattoos in women/men
104. Groupings (same boys' same hairstyle, ear piercing etc.)
105. Young girls eating a different meal from other family members
106. Misuse of government resources in hospitals, schools
107. husband battering
108. wife battering
109. child battering
110. Corona/COVID -19 cases affected and infected person/family
111. social grouping despite government directive not to assemble in one place

Figure 5. 15 Conflict early warning indicators for the Turkana/Pokot conflict system

Enrolling key stakeholders in the Muhoroni conflict system

The stakeholders continued to be structured into three main categories of monitors, controllers, and responders. Responders included all units of police operating in the project area as well as at the national level to the Inspector General of Police; humanitarian agencies such as the Red Cross, and National Disaster Management Authority; county government departments for disaster, peace, and conflict management; and the civil society actors such as the World Vision, among others. Unlike in Muhoroni and Mt. Elgon, the national disaster management authority was added as a responder because the conflict was often climate-related. The field agents or monitors and the FPFK team retained their characteristics and roles like the previous interventions. The stakeholders are shown in Figure 5.16.

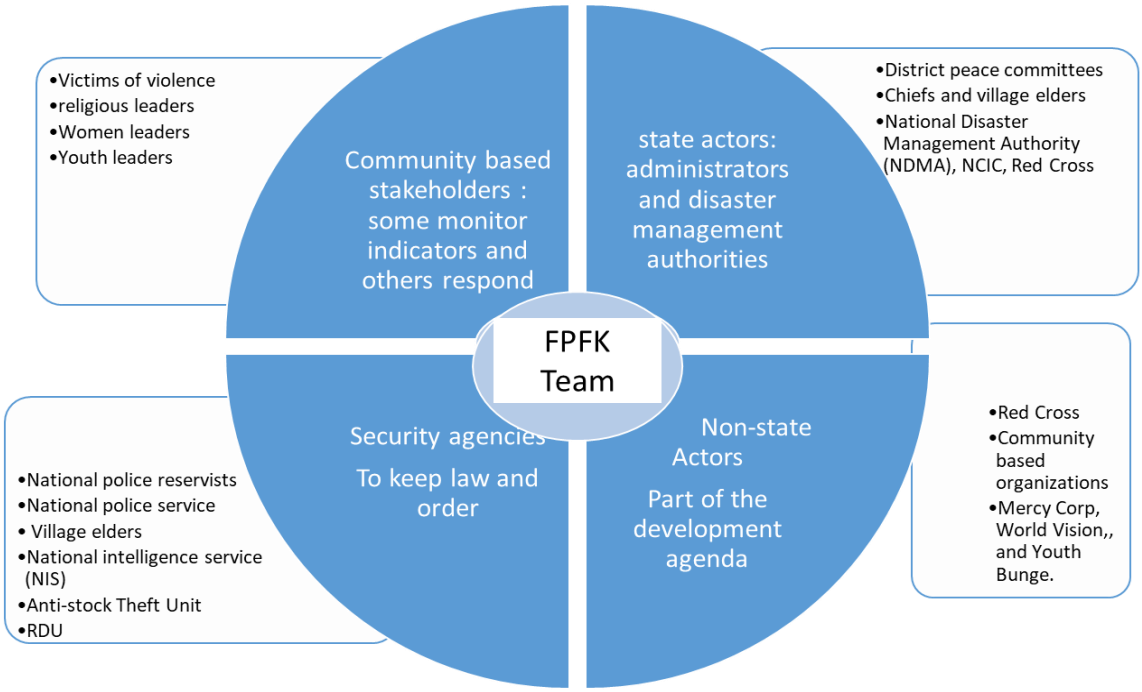

Figure 5. 16 Key stakeholders in the Turkana/Pokot conflict system

Establishing and maintaining ICT infrastructure in the peace network in Turkana/Pokot

While the upgraded Muhoroni software provided significant improvements, it was not without shortcomings. The processing speed was low and hence, slow in disseminating information to the response team. When a computer crashed, there were high chances of losing data as the system was still hosted on a stand-alone desktop. To scale to Turkana/Pokot, the system needed to be upgraded to accommodate the increasing numbers of field agents, responders, and the volume of messages. Another limitation was in the number of users, as only one person could log into the desktop application at a time. To address these limitations, FPFK in collaboration with the University of Oslo upgraded the system to DHIS2[4], which was web-based and could be accessed from anywhere and significantly enhanced the speed of operations. The system was made suitable for a cloud computing environment and can take data sent through mobile phones. DHIS2 offered an enhanced set of data analytical tools that needed to be adapted to the EWERS. Once the customization was completed, the system was tested by the control room team, by comparing the data of coded incidents sent from the mobile phones and what was received in the DHIS2 database. The system was customized to make it relevant for lay users to access outputs through friendly graphical interfaces (Figure 5.17).

[4]https://dhis2.org/ ..District Health Information Software 2 (DHIS2) is an open source, web-based health management information system (HMIS) platform.

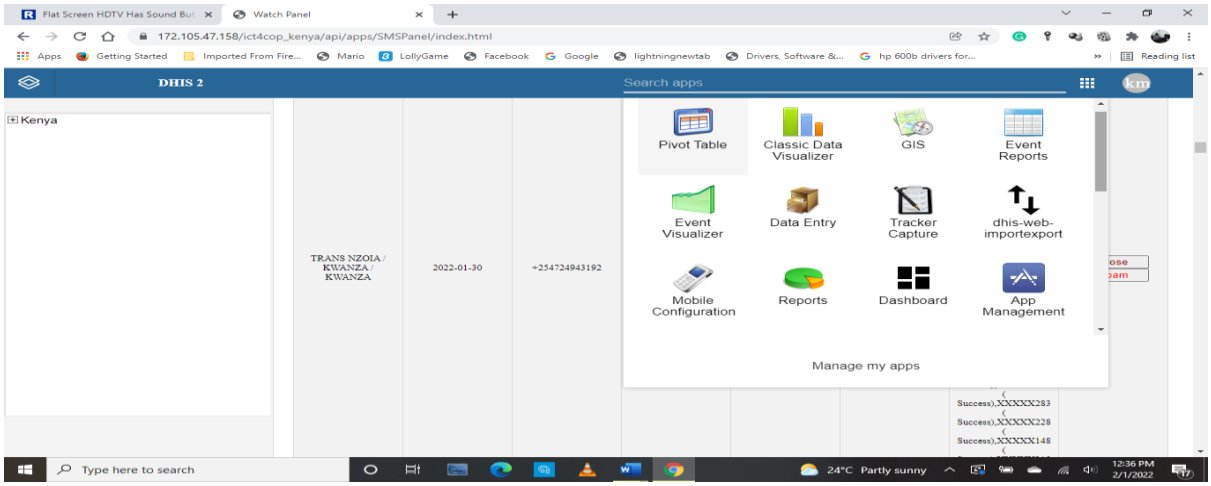

Figure 5.17 The DHIS2 system was customized for conflict early warning and response in Turkana/Pokot.

The EWERS linked the peace and conflict monitors in the hotspot areas with the government security and disaster actors, the responders, through the control unit. The monitors send the messages to the system's SMS code, which in turn sent them to the responders without divulging the identity of the monitors. The responders moved in to handle tensions before they escalated into violence. This happened when the monitors observed indicators of a conflict such as secret meetings, group gatherings of warriors, and the sudden disappearance of men in the community. The schematic flow of this interaction is summarized in figure 5.18.

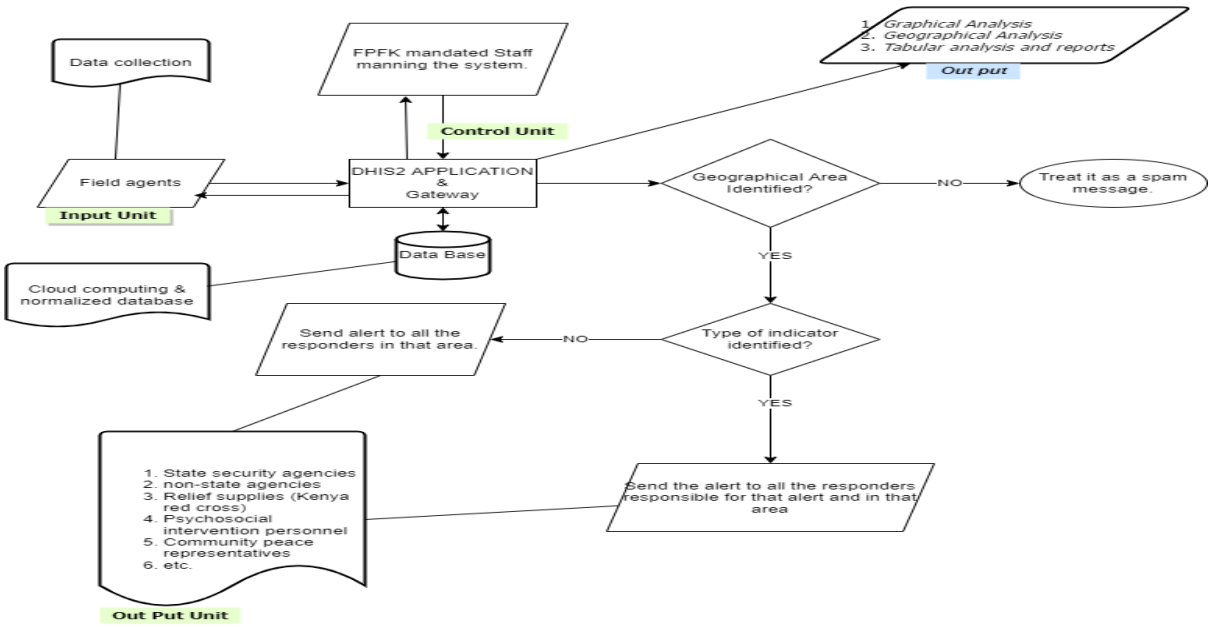

Figure 5.18 ICT-enabled peace network components in Turkana/Pokot conflict system

Establishing, repairing, and evolving operations of the peace network

The continuous relaying of the messages kept both horizontal and vertical interactions alive between the security agencies in Turkana and Pokot counties, as well as among the junior and senior security officers; between the members of the community, and the peace actors within and between the two communities. The system further promoted analysis of trends by bringing together security actors, community peace actors, peace champions, and county government representatives.

As a result of continuous interactions amongst stakeholders, confidence in field agents was enhanced because of the anonymity provided by the system and evidence that the information sent was being acted upon by authorities. Timely response to reported data also encouraged the community members to participate in sharing information with the security agencies. This eventually contributed to the reduction in cases of conflict, as demonstrated in Figures 5.19 and 5.20.

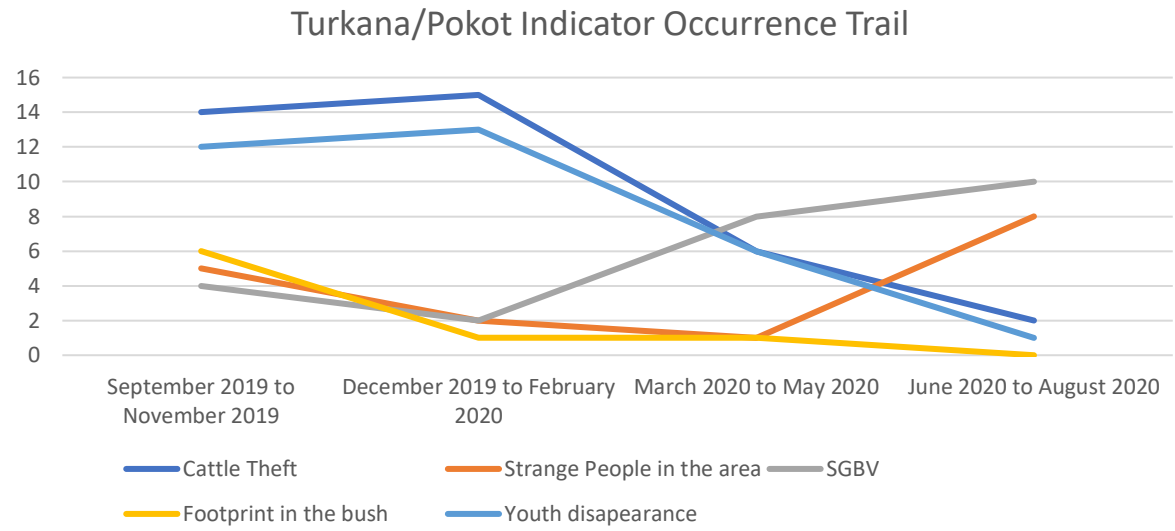

Figure 5. 19 Changes in the frequency of livestock theft in the Turkana/Pokot area

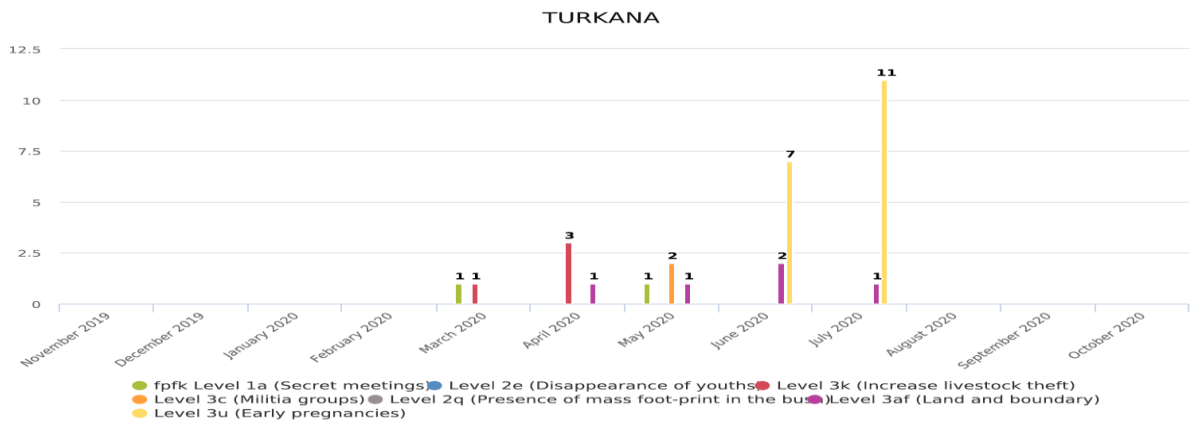

Figure 5. 20 Reduction in prevalence of militia groups in the study area

Summarizing the comparison between the network building and scaling processes

Table 5.3 gives a summary of the processes of building and scaling the ICT-enabled peace network.

Table 5. 3 Summary of the comparison between building and scaling the peace networks

	Building the peace network	Scaling to Muhoroni	Scaling to Turkana / Pokot
The content	• 9 violent hotspots areas • 36 ethnic or inter-group-related conflict indicators • Land and resource-sharing conflict • Visible militia groups • Gun culture and violence	• Covers 3 counties • 17 hotspots areas • 46 indicators that also included GBV, hunting, and carjackings • Land and boundary and livestock theft were the main issues • No identifiable militia groups • Less gun violence	• Semi-arid and arid conditions • Pastoralism economy • Livestock rustling and competition over pasture and water • 17 violent hotspots • 111 indicators that included GBV, corruption, Covid-19, drought, child trafficking • Militarized youth
The stakeholders	• Field agents • FPFK team • INGOs and NGOs • Elders councils, youth groups, and women's groups • Reformed warrior groups • Widows groups • State and security officers	• Field agents • FPFK team • Land & boundary committee • IDPs committee • Governance and leadership committee • Anti-stock theft committee • State (IEBC and Land commission) and security officers including the anti-stock theft unit (ASTU)	• Field agents • FPFK team • Village elders • Reformed warrior groups • Women groups • Security personnel including rapid deployment unit (RDU) and Anti-stock theft unit (ASTU) • State officers
The technology	• Mobile phone • Visual basic and Access based software • Runs on the modem • Only a limited number of monitors and responders • Limited number of messages • Can only be managed by 2 analysts • Runs on stand-alone computer hardware and its accessories • Agents given airtime • Disk data storage • System took control of manually • Dependent on excel for the generation of reports • All responders regardless of where they were received the alert message	• Accommodate any number of monitors and responders • Java desktop application and modem • MYSQL Database on stand-alone computer hardware and its accessories • Agents given airtime • Disk data storage • System manned manually • Dependent on excel for the generation of reports • Alerts sent to designated people in the specific area for response • Does not require internet • Produces graphical, geographical, and tabular reports	• DHIS2 application and gateway • Cloud computing • Can be accessed anywhere and reports can be generated from anywhere • Fast in disseminating information to the response team • Does not require the internet to receive or send information • Can accommodate any number of response teams from different categories or sectors. • Can accommodate any number of monitors/field agents from different parts of the country • It is scalable • Works 24/7 with or without power • Mobile phone • Agents have a toll-free number

Finding 5.4: The role of social capital in building and scaling the peace network

ICTs played a key role in building, sustaining, and scaling the peace networks, through multiple inter-connected processes of identifying and reporting on indicators of violence and disseminating them to the appropriate responders within an agile framework. The ability of the network members to access and use the mobile phone was a key factor in network strengthening processes In all the areas where the peace network was either initiated or scaled, most households had ownership of mobile phones that could be utilized to achieve the purpose. The simplicity of the technology motivated its use by members of the peace network. It involved simply writing and sending an SMS using any phone including the most ordinary ones. Another technology feature that motivated its use was anonymity which helped ensure

the safety of members during reporting. The availability of generic, flexible, and extensible technological infrastructure enabled the quick adoption of ICTs.

ICTs enabled bonding, bridging, and linking social capital mechanisms which helped in mitigating violence. The pre-existing social groups like reformed warrior youth groups, women victim groups, elders' councils, religious leaders, peace committees, community policing groups, and cultural leaders among other community-based organizations or civil societies formed viable foundations for the network. These groups were mobilized from across the conflict divides connected to ICTs, and capacity was built to form and scale the peace network. Anchoring the peace network to existing social groups from across the ethnic divide strengthened its effectiveness, ownership, and continuity. By strengthening the use of ICTs, the social connection between different actors across ethnic entities was enhanced. ICTs enabled frequency in interactions, leading to the expansion of trust and reciprocity in different forms like the inclusion of the minority, strengthening of economic cooperation, enhanced tolerance of diversity, and commitment towards reconciliation efforts.

This networking contributed to building reciprocity in reporting and responding to conflict-escalating concerns like cattle theft, land grabbing, gender-based violence, smuggling and trading in illicit arms, drug and alcohol abuse, and robbery with violence. The use of ICTs helped unlock some of the existing bonds of community members and build trusting relationships, such as through inter-ethnic economic partnerships, with the simultaneous weakening of bonding relationships that promoted in-group processes. Increasing bridging social capital reduced bonding relationships as members joined the peace network changing their existing identities, such as former warriors and gunrunners becoming identified as peace champions. Therefore, the reduction in ethnic bonding social capital worked for the general peace and welfare of the majority including those previously excluded.

Finding 5.5: Challenges and lessons in building and scaling ICT-enabled peace network

5.5.1 Challenges in building and scaling peace networks

Various challenges experienced during the initiation and operationalization of the ICT-enabled peace network is summarized in Table 5.4.

Table 5. 4 Summary of challenges in building and scaling peace networks

Challenges		**Mitigation Measures taken**	**Observations**
Technological challenges	1. Lack of reliable phones and phone chargers for field agents and some responders. There was limited access to electricity in some places	During the building of the peace network, field agents were provided with phones and solar chargers. However, this was found unsustainable in scaled areas and ownership of the phone became a prerequisite for inclusion as a field agent or responder.	Recruitment of actors with phones left out potentially useful field agents and responders. This act created a new challenge of the digital divide in the network. How can this be addressed to make the peace network more digitally inclusive?
	2. Poor connection to networks	All study areas had 2-3 network service providers. Field agents were given SIM cards with reliable connections	The action by the peace network to lobby for a booster influenced the business community to invest strategically for peace, leading to

		in their respective areas. In Mt. Elgon where there was no network coverage at all, the community lobbied the service provider to install the network booster in the area as their contribution to the peace process.	scaling through partnerships. In addition, this helped to address the challenge of the digital divide in the area.
	3. Lack of airtime and internet bundles for field agents and for the control unit. Initially, field agents were given monthly airtime to send messages which was not sustainable. It also used to get exhausted before the time	The ordinary number that was being used was replaced with a short-code number in collaboration with Safaricom. The number is used for free by field agents but paid for by FPFK.	The introduction of this short code (kind of free toll number) was received with excitement and a recommendation came that it should be opened to the rest of the public so that more messages could be shared through *crowd-sourcing*. The question that needs further interrogation is, what changes need to be made to the ICT system and the peace network in general to incorporate the crowd-sourcing aspect? Or how can satellite technology be introduced into the peace network?
	4. Technological illiteracy: In the conflict areas, levels of illiteracy were remarkably high which compromised the reporting processes. Some monitors ended up asking other people to write on their behalf, which put their safety at risk.	Hands-on training of field agents on the importance of confidentiality during the collection and sharing of information from the field.	Whereas the question of technological literacy was being addressed through experiential training, the technical question that beckons is how can the system be simplified to accommodate non-digitally savvy but useful peace actors.
Operational challenges	5. The regular transfer of security personnel disrupted operations, requiring resources for retraining which were hard to come by.	All the study areas adopted a structure that strongly depended on existing community-based structures like a council of elders and civil society groups for response.	While the community-level structures are a critical component of the response, the police responsibility to protect cannot be taken away. The question is, how can such a system be institutionalized within the security system?
	6. Lapses in maintaining the anonymity of the field agents, inadvertently or deliberately, endangered their safety.	This issue was gradually addressed through deliberate follow-ups to monitors and maintenance of anonymity between reporters and responders.	Technological security around maintaining anonymity needs further examination, especially guarding against hacking into the system to access the names of field agents.
	7. Some field agents and responders had integrity issues in reporting and responding. For instance, some chiefs shared information with the perpetrators of violence to escape arrest instead of apprehending them.	The governance stakeholders addressed this formation of a feedback platform so that the responders can report back to the system on action taken against reported cases. Honest discussions were held through regular reviews	Shifting identities toward owning the peace process takes time and great effort.
	8. The indicator monitors had challenges moving to where the incidents were taking place. Transport was a problem.	In some cases, like Muhoroni and Turkana/Pokot, the number of field agents was increased in the hotspot areas so that they do not travel long distances to verify the information.	This also introduced the dilemma of maintaining a high level of confidentiality. More field agents in the same area meant increased susceptibility to their identity being known.
	9. Inadequate financial and material resources hampered the conduct of training and make follow-up visits, hampering the	The peace network was highly localized so that most forums took place within the community and in some cases, non-confidential meetings were mainstreamed within pre-	Further mechanisms of integrating the peace network model in the national government protocols.

	effectiveness of operations.	planned activities	
	10. Traditions and cultural practices often came in the way of reporting on indicators such as related to GBV. Field agents would take these traditions as given and will be reluctant to report.	Passion was cultivated among all actors through mentorship, training, and sensitization. The results in other areas like the reduction in livestock theft became the motivation for adherence to network principles.	A model for the transformation of identities as part of the peace network could be explored. Can the behavior-changing model be integrated into the peace network?
	11. Some police officers were corrupt. There is a challenge of the police not taking the EWS messages seriously.	Since only the police officers in the rank of sub-county commander received messages, there was a change in responders so that their seniors in higher ranks were included in the messaging loop to enhance accountability. A new feature was created where security agencies can report back to the system on action taken against reported cases from the system.	There is a potential area of scaling the system to focus strongly on governance issues like resource complaints such as favoritism in certain cases, and inequality in the distribution of resources. Furthermore, ethics and anti-corruption officers, etc. could be made responders.

5.5.2: Lessons learned

The ubiquity of mobile phones was a critical factor in building and scaling the peace network as they increased ***informational capabilities*****.** It was noted from the initiation process of the peace network that the enrolled stakeholders were well organized and networked but they were challenged by the lack of capabilities in generating and sharing information. A similar problem was noted in Muhoroni, as illustrated in an interview with an NGO leader:

> *"We partnered with other organizations like Local Capacity for Peace Project (LCPP) and NCCK which were focusing on Early Warning and Early Response (EWER) and together we realized both success and challenges on equal measures. Our EWS failed because it lacked pertinent features of anonymity and ICT. My trusted Kalenjin friend could not alert me of the planned attack during the 2008 clashes because of fear to be killed by his people for betrayal."*

In addition, the ICT-enabled peace network was self-driven due to reliance on a critical mass of committed ***volunteers*** with informational capabilities derived from their prior experiences of operating in violence-endorsing networks. They understood the sociocultural environment and anthropological behavior of the parties in the conflict.

The success of building and scaling the ICT-enabled peace network lay in the ***mobilizing capacity*** of the members. The members could discover the community's social resources that they quickly tapped into, thereby enriching the peace network. For example, one of the chiefs in the Muhoroni conflict system gained trust when he connected the women groups and youth to resourceful people and organizations like financial institutions for business capital. During the KII, he said,

> *"I have gone an extra mile to lobby the support of loaners such as Uwezo and women funds who lend the youth money to start businesses so that they can upgrade their*

livelihoods and as a result of this, community members have gained trust in the administration and relates with me well."

This way, people connected with him and built close relationships which are essential for influencing peace.

Building and scaling the peace network involves ***shifting the identities*** of the stakeholders toward the value of peace. This peace value became the focal factor driving the ICT-enabled peace network.

Adaptation was a central factor in building, scaling, and operationalizing the ICT-enabled peace network. The study noted that adaptation existed in four different forms including stakeholder, technological, outcome, and peace/conflict content. Each type of adaptation affected the other in a cyclical relationship. For example, the increase in the number of stakeholders (stakeholder adaptation) automatically resulted in the need to reconfigure the technology (technology adaptation) which then dictated the kind of reports and responses (outcome adaptation) that were needed to reduce the level of violence within the content adaptation. A key informant interview with the chief in Muhoroni demonstrated an example of outcome adaptation.

"He noted that we supported the young people who through the EWS were identified and named as involved in community raids, to start new ways of earning a living. Most of them started agriculture and small businesses that have transformed their focus from raids. We have helped them adapt to new ways of living."

Technology adaptation was achieved through reconfiguration, conversion, and replacement of the software system to accommodate emerging dynamics and new functionalities, especially in scaled areas. The stakeholder adaptation aimed at having community members with a stake in mitigating violence at the core of the peace network. It involved redefining designated functional roles assigned to different stakeholder groups and to strengthen interaction through the coordinating functions of the different network stakeholder groups.

Another lesson in building and scaling the ICT-enabled peace network is the need for ***a robust governance mechanism.*** While many of the problems to operations experienced were novel, given the difference in context and the nature of violence, these needed to be engaged with at the micro level of practice, and solutions identified locally. Supporting these processes of finding local solutions to context-specific conflict challenges was enabled through robust governance mechanisms established by FPFK. It put in place well-defined processes of operations, supported by regular training and field visits.

This chapter has highlighted the findings — the existing violence endorsing networks, the building process of the peace network, and scaling the peace network. The next chapter develops on this to synthesize the findings from various papers.

6. SYNTHESIS OF FINDINGS

This chapter comprises two parts. The first discusses the findings of individual papers forming this thesis. The second part presents the synthesis of findings from these papers and how they contribute to answering the following research questions posed in the thesis:

- *How can existing social networks be influenced by ICTs in mitigating ethnic violent conflicts in the study area?*
- *What is the interplay of ICTs and social capital mechanisms in building community-driven peace networks in ethnic violence settings?*
- *How can ICT-enabled peace networks be scaled in mitigating ethnic violent conflicts?*

6.1 List of papers and findings from individual papers

The five papers forming the thesis are listed as follows:

1. Mukoya, F. and Mukherjee, A. (2019), "ICT enabled peace network: Case study of conflict early warning system in Kenya." 15th IFIP WG 9.4 International Conference on Social Implications of Computers in Developing Countries, ICT4D 2019 Dar es Salaam, Tanzania, May 1–3, 2019

2. Mukoya, F. (2020) "ICTs as Enablers of Resilient Social Capital for Ethnic Peace." COMPASS '20, June 15–17, 2020, Ecuador © 2020 Association for Computing Machinery. ACM ISBN 978-1-4503-7129-2/20/06…$15.00 https://doi.org/10.1145/3378393.3402266

3. Mukoya, F. and Mukherjee, A.(2020), "The Role of Social Capital in Mediating ICT-Enabled Peace Building Efforts: A Case Study from Kenya." IFIP International Federation for Information Processing 2020 Published by Springer Nature Switzerland AG 2020 R. K. Bandi et al. (Eds.): IFIPJWC 2020, IFIP AICT 601, pp. 326–340, 2020. https://doi.org/10.1007/978-3-030-64697-4_24

4. Mukherjee, A. and Mukoya, F. (2022). "Building and Scaling ICT Enabled Peace Networks: Lessons from Kenya (Under review at Information Technology &People)

5. Mukoya, F. and Sahay, S (2022). Mitigating Violence Against Women and Girls In Kenya: The Role of ICT-Mediated Social Capital — (Under review at the Journal of Human Security)

The papers represent collaborative work, seeking to develop multidisciplinary understandings of the phenomenon of ICTs for Peace (ICT4P).

6.2 Findings from individual papers

6.2.1 Paper 1: ICT enabled peace network: Case study of conflict early warning system in Kenya

This paper introduces the concept of the peace network, how it is formed, the role of ICTs in its formation and evolution, and the inherent challenges experienced. The peace network concept is at the core of my research, helping to zoom out on the conflict *setting*, the causes of violence, and how "counter networks" seek to address them. The paper elaborates on the *processes of initiating and evolving this counter network, with a focus on its structure and functions.*

The notion of counter network highlights issues of exclusion and inclusion from the networks, both from the perspectives of violence-endorsing networks (such as related to gunrunning, cattle theft, and militancy) and also of the peace networks. Peace networks are opposed to violence and comprise community members across ethnic groups, typically those who have lost loved ones, livelihoods, and opportunities for well-being and safety**.** The paper highlights how the peace network was formed and strengthened over time, particularly through processes of enhancing the inclusivity of membership of relevant groups. The role of ICTs is examined in these processes, particularly in ensuring the safety of members, the sharing of information across groups, and supporting the building of a rapid response system to reported acts of violence.

This paper contributes in three ways to addressing the first research question, *"How can existing social networks be influenced by ICTs in mitigating ethnic violent conflicts in the study area?"* Firstly, it identifies the key stakeholders in the peace network and their respective interests and functions. Secondly, the paper elaborates on the different processes that were vital in the creation and cultivation of this peace network, such as identity formation where community members seek to transform their identities from being "victims of violence" to "protectors of peace." Thirdly, the paper sketches out the role of ICTs and information in the formation and functioning of the peace network driven by the victims of violence, with strong ties of social capital between them.

The conclusion was that the combination of people's inherent interests and motivation, the network structure, and its membership included the victims of violence, community social groups, community leaders, FBOs, CBOs, and NGOs. ICT-enabled processes were essentially characterized by the Early Warning and Early Response System mechanisms (EWERS) which contributed to the mitigation of ethnic violence. The EWERS has three main components comprising the monitoring, control, and response units. The monitoring unit comprises a team of field agents knowledgeable about the violent hotspot areas and equipped with a simple feature phone and a reliable network provider for easy communication through both SMS and voice calls. Their primary role is to collect data from the hotspot areas according to pre-defined indicators of violence and relay the same to the control unit, which hosted the computer-based EWERS. The personnel manning the system analyze, interpret and double-check the reports from the monitoring unit by calling the sender (field agents) and generating relevant reports for action by the response team. The response unit has a team of responders, including state

security agencies, NGOs, and local administrators responsible for particular geographical areas and types of incidents. They respond with appropriate action based on information about incidents received through their mobile phones. The paper discussed the need for more explicit strategies to make this network resilient and scalable to other regions.

6.2.2 Paper 2: ICTs as Enablers of Resilient Social Capital for Ethnic Peace

This paper analyses the contribution of ICTs in building resilient social capital for the mitigation of ethnic violence. Since peace networks are based on social relationships and their inherent social resources, these relationships must survive the tide of violence to continue mitigating the same. Peace networks must be resilient to survive violent contexts, for which they leverage upon the capabilities of ICTs, such as in the identification and reporting of indicators of violence and to initiate a rapid response to diffuse the situation. The paper highlights the important role of ICTs in building resilience, understood through the lens of existing social relationships which are core to the peace network. The main question answered in this paper is, *what is the role of ICTs in building resilient social capital-based relationships that form a critical component of the peace network?*

Conceptually, the paper describes the relationships between f resilience, social capital, and ICTs. ICTs help increases the resilience of social capital and by extension, the peace network by enabling the preparedness of the members in responding to indicators of violence across ethnic divides. They also help by strengthening processes of coordination within the peace network. Partnerships in the network are characterized by high levels of reciprocity that strengthen trust, which contributes to building resilience in relationships. ICTs facilitate social contracting and self-organizing helping to build independent internal capacities to take decisions and actions rapidly. Effective communication enabled by ICTs contributes to enhanced knowledge sharing among the network members. The three elements of effective communication, the power of knowledge, and action orientation are critical characteristics of network resilience.

In conclusion, the paper analyzed the influence of ICTs in building resilient relationships necessary for the prevention of ethnic violence. The paper contributes to debates within ICT4D research by elaborating on the key roles and processes of how ICTs contribute to resilience and development. The paper contributes to Heeks and Ospina's (2018) conceptualization of resilience formulated in the context of agriculture, by extending this notion to the domain of the peace and security sector. In terms of practice, the paper points to the significance of ICTs in resolving ethnic violence in a developing country setting and the need for policymakers to take cognizance of the critical role that ICTs play in peace-building. The paper highlights the need for further research on the negative consequences of social capital and how ICTs can help in mitigating them.

6.2.3 Paper 3: The Role of Social Capital in Mediating ICT-Enabled Peace Building Efforts: A Case Study from Kenya

This paper focuses on the relationship between ICTs and social capital understood through the lens of bonding, bridging, and linking social capital in mitigating violent conflicts. The key

research question explored is*: What is the interplay of ICTs and social capital in the mitigation or not of ethnic violence?*

The paper analyses the role of ICTs in redefining social capital mechanisms which contribute towards peace-building. By strengthening, through the use of ICTs, the social connections between different actors across ethnic entities, and ethnic violence were mitigated. The mechanisms of the peace network involving the village elders, chiefs, security teams, youths, women leaders, and businesspeople from across different ethnic divides were supported by the use of ICTs. This networking contributed to building reciprocity in reporting and responding to conflict-escalating concerns like cattle theft, land grabbing, gender-based violence, smuggling and trading in illicit arms, drug and alcohol abuse, and armed robbery. The paper notes that increasing bridging social capital reduces the implications of bonding relationships, as members joined the peace network shifting their existing identities. The former warriors and gunrunners become identified as peace champions. Therefore, the reduction in ethnic bonding social capital worked for the general peace and welfare of the majority including those previously excluded.

The paper demonstrates the importance of the growth or expansion of trust and reciprocity in different forms like the inclusion of the minority, strengthening of economic cooperation, enhanced tolerance of diversity, and commitment towards reconciliation efforts. All these represented foundational principles of violence mitigation. The dominant community had previously used the bonding relationship to unite against the minority from being appointed to leadership positions. This required an imbalance to be created between bonding and bridging social capital, for justice to be promoted. Bridging economic relationships was created when markets opened up to accommodate members from across ethnic divides who had been denied such access previously. Within the bonding framework, individuals and communities had restricted freedom in terms of interactions with other community members because of their norms, values, and cultural practices. The use of ICTs helped unlock some of the existing bonds of community members and build trusting relationships through inter-ethnic economic partnerships, with the simultaneous weakening of bonding relationships. By enabling information flows, ICTs contributed to increasing tolerance and acceptance of different people and their values, and beliefs and the growth of bridging relationships.

6.2.4 Paper 4: Building and Scaling ICT Enabled Peace Networks: Lessons from Kenya

This paper focused on the process of scaling the ICT-enabled peace network and the technology itself. The paper describes the different components or sub-processes of the overall scaling process, anchored in the theoretical concepts based on social capital and drawing upon theoretical insights on scaling from the ICT4D literature. Some practical and conceptual challenges experienced in network building and scaling processes are discussed. Scaling is relevant in ICT4D projects, where there are limited resources and typically, there is the need for urgency in action across multiple settings. In these circumstances, it becomes important to learn from similar experiences, to speed up the agility of response and contribute towards cumulative learning.

The challenge is particularly acute in ICT for Peace (ICT4P) projects, as violence is present in many different geographical areas involving multiple ethnic groups and communities. There may be similarities and differences across settings, leading to the research challenge of

understanding "how and what to scale." Unpacking this research challenge involves understanding the process of how ICT4P initiatives are implemented in one setting, discerning learning from them, and sensitively adapting them in the design of ICT4P efforts in other settings, recognizing the contrasting and similar elements across settings. The paper was guided by the research question, "How can ICT-enabled peace networks be scaled, and understood through the lens of social capital?"

The scaling process is analyzed through the social capital mechanisms of bonding, bridging, and linking, and how they contributed to *improving the processes of governance* in the ICT-enabled peace network. The ICTs facilitated the creation of strong collaborative relations between community members and security agencies, especially the police. This trust emerged because of the mutual sharing of information useful to each other. As there was an increased flow of information between the community and the police, some barriers to trust were mitigated, such as mistrust due to feelings of fear and intimidation. This constraining condition was reduced with the formation of a peace network where the ICTs enabled the anonymization of members. Police officers from across the conflict divide networked and jointly responded to the alerts. The network contributed to transformative changes in security management approaches and the police started attending community forums such as church functions, organized seminars, and public security forums to interact directly with the public. They also started inviting some members of the public to give motivational talks to the members of the police force. In the same vein, through public and other community meetings, police officers educated the community on case reporting, investigation processes, and their respective roles and responsibilities. This resulted in greater bonding between the police and community leaders.

The formation and scaling process of peace networks was about meeting the biggest deficits in violent contexts which is relationships, norms, and trust between communities, social networks, and institutions. Peace networks can potentially sustain and scale, based on strong ties of social capital, in the form of bonding, bridging, and linking, without which these peace networks cannot exist. Analyzing the scaling of peace networks through a social capital lens offers new insights for organizing and aligning resources, capacities, and partners to reach large numbers of people. Changes in the underlying social and political narratives, relationships, and perceptions of favoritism and resource distribution are important mechanisms driving these changes. Bonding without bridging can lead to insulated communities that strengthen inter-communal divisions; bridging without bonding leads to shallower forms of cooperation; bonding and bridging without linking confine efforts to the grassroots level without higher levels of financial support, leadership, and state legitimacy. The key principle in guiding scaling efforts is to ensure keeping the focus on improving the conditions of those most affected by the violence.

6.2.5 Paper 5: Mitigating Violence against Women and Girls in Kenya: The Role of ICT-mediated social capital

Social capital can play both an expanding and mitigating role in efforts to combat violence against women. What role do ICTs play in this mitigation or expansion is the focus of analysis in this paper, in the context of the historically existing violence against women in Kenya. ICTs, if appropriately designed and managed, can play two key roles. One, make visible these unjust acts of violence, which previously were invisible and not acted upon. Two, strengthen the

accountability of actions that need to take place, based on the visibility of violent actions. Empirically, this analysis is conducted in the context of long-term peace-building efforts of a faith-based organization in Kenya. One of the authors of this paper has a long-term engagement with these efforts and had an intimate understanding of the ongoing interventions, including the use of digital systems. The paper makes two key contributions to the domain of human security. One, it explicitly includes the analysis of digital systems and data in the studies of violence against women. Two, it goes beyond traditional research thinking that social capital contributes to enhancing violence, by building a more granular understanding of social capital to also highlight its positive effects in mitigating violence.

The paper contributes to responding to research question one which seeks to determine the existing social networks and the role that ICTs can play in mitigating violent conflicts. Conceptually, the paper discusses key concepts of violence against women and girls (VAWG) through the lens of social capital and the role of ICTs in the mitigation of violence.

The EWERS supported a networked pattern of social interactions amongst various stakeholder groups (administrators, security agencies, community peace representatives, and community-based organizations), playing different roles in mitigating incidents of VAWG. Bonding, linking, and bridging social capital relationships were evoked during violence mitigation efforts. Bonding relationships at the family level tended to suppress information about acts of violence within the family which sought to keep incidents of violence hidden. However, the analysis of the figures from the EWERS provided a different picture, say of increasing child pregnancies, which made the peace network members suspect the accounts given by family members, and look for other social mechanisms to penetrate the "truth," such as have women talk to affected women in other less-intimidating circumstances. At another level, larger than the internal family, the EWERS helped create a sense of bonding amongst the peace network, making them think of themselves as a unified collective, all engaged in mitigating violence, albeit with different roles and responsibilities for different groups.

Information was the key resource created, shared, and acted upon as a basis to enable networked action to mitigate VAWG. The introduction of the EWERS facilitated timely reporting of incidents, such as those related to alcoholism which contributed to incidents of VAWG. The EWERS encouraged timely response action leading to a reduction in the number of these incidents. The accountability of leaders, especially security officers, was enhanced through information resources. By sharing information amongst different stakeholders at the same time, there was visibility created and with-it accountability. When the EWERS was implemented, security agencies were put in the spotlight on how they would respond and address VAWG issues because, in some instances, they would receive calls from above without knowing how the information reached their bosses. The EWERS offered a platform for community members to report the perpetrators of VAWG, conducted with the utmost confidentiality. The security agencies had no option but to cooperate with the community on dismantling violence networks as the EWERS had enhanced the relationship between the community and the security officers, further promoting community policing. The EWERS contributed to transformative changes in security management approaches. Consequently, the police started attending community forums such as church functions, organized seminars, and public security forums to interact directly with the public.

6.3 Synthesis of Findings

In this section, I first summarize the contributions of the papers to research questions in (Table 6.1), which is followed by a synthesis of the findings.

6.3.1 Paper contributions to research questions

Table 6. 1 Contribution of Papers to research questions

Research papers/ research questions	*How can existing social networks be influenced by ICTs in mitigating ethnic violent conflicts in the study area?*	*What is the interplay of ICTs and social capital mechanisms in building community-driven peace networks mitigating ethnic violence?*	*How can ICT-enabled peace networks be scaled in mitigating ethnic violent conflicts?*
Paper 1	• It identifies some of the existing networks that sustain ethnic violence in the three study areas such as militia networks, livestock theft networks, corruption cartels, and political clientelisms. •	• This paper makes visible social relationships in which resources are embedded and utilized for building the peace network. it also identifies key stakeholders in the peace network and their respective interests. • The paper elaborates on the different processes that were vital in the creation and cultivation of this peace network. The paper sketches out the role of ICTs and information in the formation and functioning of the peace network	The paper contributes to the aspects of scaling as the fundamental processes that are modified in scaling are founded and described in the paper.

Paper 2	Identifies some of the pre-existing violence endorsing networks like political clientelism, land grabbing, gunrunning (SALW), livestock theft cartels, gender-based violence gangs, drug and substance abuse cartels, and militia groups	• This paper contributes to some aspects of this question by describing ICTs and their role in scaling community
		  • organizations and enterprises through bridging social capital. The paper highlights the important role of ICTs in building resilience.
		  • The paper describes the relationships among the main concepts of resilience, social capital, and ICTs
			• The paper analyses scaling through the resilience of social capital and the contribution of ICTs in building the peace network.
			•

Paper 3		The paper analyses the role of ICTs in changing social capital mechanisms that contribute towards peace-building. The paper demonstrates the importance of the growth or expansion of trust and reciprocity in different forms. It notes that increasing bridging social capital reduces bonding relationships as members joined the peace network changing their existing identities.	

Paper 4	• Political clientelism working for political dominance, land, and boundary cartels, the proliferation of Small Arms and Light Weapons (SALW), and large-scale cattle theft. The existence of militia groups and high rates of corruption among some police and chiefs encouraged drug and substance abuse. Ethnic exclusionary networks championing discrimination in resource sharing		• The paper describes the different components or sub-processes of the overall scaling process. • The paper analyses the scaling process through social capital mechanisms of bonding, bridging, and linking • Some practical and conceptual challenges experienced in the network building and scaling processes are discussed
Paper 5	• Conceptually, the paper discusses the key concepts of violence against women and girls (VAWG) through the lens of social capital and how ICTs are applied in their mitigation towards achieving positive peace • It demonstrates how bonding social capital (family level) sustains violence against women and girls, countering the popularly held view that social capital has primarily positive consequences on building peace. • The paper analyses the role of ICTs in mitigating violence-enhancing consequences of social capital.		• This paper contributes to scaling through thematic expansion from conflicts to gender-based violence by addressing violence against women and girls thereby contributing to positive peace.

6.3.2 Overall synthesis

Building ethnic violence mitigation: An ICT-enabled peace network

Overall, the different papers help build conceptual and practical insights into mitigating ethnic violence in an LMIC context. A first key insight is the role of a 'peace network' to fight against the prevailing violence sustaining conditions manifested in various forms, such as cattle rustling, gunrunning networks, militia groups, political clientelism, land-grabbing cartels and violence against women and girls (VAWG). A second insight was that the peace network needed to be comprised of members who themselves have been victims of violence, as that provides them with intrinsic motivation to engage in peace-building processes, which are extremely complex, long-term, and fraught with risks. Given this nature of engagement, the network is conceptualized as a "peace network." A third insight is the key role that ICTs play in the building, sustaining, and scaling of these networks, through multiple inter-connected processes of identifying and reporting on indicators of violence and disseminating them to the appropriate responders within an agile framework. A fourth insight was the key role that social capital had in both enabling and also constraining these peace-building efforts, and how ICTs could help mitigate some of these negative consequences. However, for this ICTs needed to be designed and implemented in a way to be able to support resilient and scalable relationships in

the peace networks. For this, they must be resilient, scalable, and sustainable. This overall synthesis helps provide the answers to the different research questions posed in this thesis.

6.3.3 Existing social networks and how they were influenced by ICTs in mitigating ethnic violent conflicts

This subsection responds to the research question (RQ1) which sought to identify existing social networks and how they were influenced by ICTs in the process of building peace. This process had to contend with the violence-endorsing networks which existed in all three empirical areas of Mt. Elgon, Muhoroni, and Turkana/Pokot. These networks were engaged in cattle rustling, gunrunning networks, militia groups, political/ethnic clientelism, cultural intolerance, and promoting exclusionary networks. These networks worked to not only disenfranchise communities of their livelihoods but also sustained violence against women and girls (VAWG). The security agencies charged with the responsibility to protect the citizens were non-responsive and in some cases, the officers were part of the cartel syndicates. The community members that reported criminals and unpleasant events were subjected to unending litigation processes and threats from the perpetrators, weakening the collaboration between the security, government leadership, and communities. The existing violence-mitigation strategies were largely traditional such as forced disarmament and arbitrary arrest of young people involved in the crimes. Use of ICTs was minimum, delayed by the Inter-governmental Authority on Development (IGAD) based in Ethiopia, which deployed a public number, 108, to report acts of violence. But there was no response and feedback system attached to this number, which limited its use. Despite promising hope to many users, this mechanism failed to provide area-specific responses to peace threats. This allowed the violence-endorsing networks to thrive.

Exclusionary networks

Social exclusion was a key contributor to ethnic violence, which played out by limiting opportunities for minority and vulnerable groups and limiting their participation in political and decision-making processes. This exclusion had negative consequences on employment and resource sharing, and these minority group members were, treated like “others” and became victims of stereotypes and prejudice, reduced employment opportunities, and contributed to inequitable access to education and health facilities. The lack of political representation led to the denial of power and enhanced a sense of insecurity among the communities.

In Mt. Elgon, the Sabaot felt marginalized in terms of political representation in Bungoma County. The dominant Bukusu community exploited their ethnic identities, drawing upon bonding social capital, to elect their members regardless of their competence at the cost of the exclusion of the Sabaot. The Sabaot, on the other hand, exploited their geographical advantage to deny the Bukusu community access to water resources, by vandalizing pipes and blocking access to water tanks which led to ethnic violence. In Muhoroni, the Luo community members that fell under Kericho County were denied access to essential services like health care and admission of their children in some schools. The Luo, people were restricted from conducting business in certain areas.

The introduction of ICTs created a medium through which minority groups could raise their voices and be better included in decision-making processes, by facilitating the flow of information, such as related to discriminatory actions, which helped to challenge the deeply

entrenched power structures. For example, when appointing the Assistant Chief in Kaplamai, the Nandi community which was dominant in the area, noted that somebody from a minority community was going to be appointed instead of their own. They started threatening to evict the minority. They mobilized themselves through the use of social media to oppose the appointment of the minority as a chief. The minority group members shared these emerging threats through the ICT platform which were escalated to higher-level authorities including security agents. The intervention increased solidarity among the minorities, leading to a minority woman gaining the appointment. While ICTs played a fundamental role in such processes, they had to be embedded in social relationships like the solidarity of minorities, to be effective.

Militia networks

Social capital based on strong social identities contributed to the formation of militia networks in all three conflict systems. Ethnic nationalism, politicization, and polarization of identities, coupled with ethnic mobilization contributed to the emergence of armed militia groups in Mt. Elgon, which was based on bonding social capital.

In 2005, the government embarked on the redistribution of land in Mt. Elgon which resulted in the eruption of clashes because residents were unhappy with this process. The Sabaot mobilized themselves into an ethnic militia group known as the Sabaot Land Défense Force (SLDF) to fight the government, drawing upon linking social capital, to strengthen identification with other such militia groups like the Moorland Force, 7 Brothers, 42 Brothers, Chebarakachi Social Force, 24 Brothers, and the Brokers. These groups had high bonding, and social capital characterized by high within-group trust and strong ethnic identities. These militia groups had terrorized the region for over 10 years and were used extensively by politicians to instigate violence between the Sabaot, Bukusu, and Iteso. In Muhoroni and Turkana conflict systems, bonding social capital was exploited in recruiting cattle rustling members and in organizing livestock raiding groups.

When ICTs were implemented, security agencies were in the spotlight on how they responded to and address militia gangs because some of them were colluding with the militia groups. The anonymized reporting enabled by ICTs led to reporting of such security agencies to their supervisors. In some instances, the compromising officers would receive calls from above without knowing how the information reached their bosses. The EWERS offered a platform for community members to report the organizers of the militia groups, conducted with the utmost confidentiality. The security agencies that were colluding with criminals were also anonymously reported to their supervisors leaving them with no option but to cooperate with the community in dismantling the militia networks. ICTs helped to enhance the relationship between the community and the security officers thereby building linking social capital relationships and further promoting community policing. The alert messages from the ICT system led to regular meetings between the security agencies and the community members. The police started attending community forums such as church functions, organized seminars, and public security forums to interact directly with the public. This resulted in building greater bonding between the police and community leaders, leading to improved reporting from the community and effective responses. The involvement of security teams in public meetings and community dialogues enhanced understanding among the parties of the issues underlying the violence.

Livestock theft and gunrunning cartel networks

Several cartels were identified in the study area, including livestock rustling and arms trafficking. Livestock rustling cartels, the forced taking away of livestock by one group from another, was a major cause of violent ethnic conflict among the Kalenjin, Luo, Sabaot, Iteso, Turkana, Pokot, and Luhya communities in Muhoroni, Mt. Elgon, and Turkana/ Pokot. Livestock rustling cartels were formed based on shared cultural values associated with traditional social structures and belief systems of pastoralist societies, which also served as drivers of violence. Raids were driven by shared values of male prestige, high bride prices, and the influx of modern arms, representing a form of organized and economically lucrative crime. For example, a member of the Mosop community stole animals and handed them over to a member of the Soy community, who traded them with the Bukusu community who sold the cattle for profit. Criminals were able to organize livestock theft using armed violence and make such illicit activities appear supportive of traditional cultural practices. Small Arms and Light Weapons (SALW) cartelism was another key driver of ethnic violent conflicts, spanning communities, counties, and neighboring countries (Uganda and South Sudan) which brought in firearms to Kenya firearms, representing a lucrative economic activity. A firearm could be purchased between KES 80,000 - 120,000 and exchanged for three to five bulls. Such illegal transaction was conducted between closed groups having high levels of trust and reciprocity, representing bonding and bridging social capital.

The introduction of ICTs enabled the real-time sharing of messages to multiple peace actors. This led to timely reporting of incidents of cattle theft and gunrunning, which encouraged timely response that contributed to the increased recovery of stolen animals, especially in the Muhoroni conflict cluster. Communities along the borderlines of Kisumu and Kericho collaborated to ensure the recovery of stolen animals and returned them to their rightful owners. ICTs facilitated the creation of strong collaborative relations by the sharing of information between community members and security agencies, leading to the development of trust relationships. For example, in Endebess, a Turkana woman saw a group of some Pokot youths crossing the border from Uganda to attack the Bukusu and take away their animals, and also smuggle in weapons. She sent a message to the EWERS warning that the Bukusu farms will be attacked shortly. The police in collaboration with community leaders responded quickly before the culprits could carry out the attack. While the ICTs helped the flow of information, trust relationships were important to prompt timely responses.

Ethnic clientelism, and cronyism

Social capital contributed to the breeding of ethnic clientelism, and cronyism, leading to intractable ethnic disharmony. Clientelism represented the transactions between politicians and citizens whereby material favors, goods, or services were promised in return for political support at the polls. Voting was based on particularised loyalties defined by kinship and ethnic ties and how benefits were distributed to particular groups rather than for the benefit of citizens at large. Promises were sometimes made to other ethnic groups to win their votes, leading to declining political competition and increased instability. For instance, in the Kiguta area, the Kalenjin are the majority, and the Luo are the minority. During elections, the Kalenjin politicians promised the Luo minorities equitable sharing of resources to secure their votes. They would however renege on their promises after winning the elections, which led to dissatisfaction and ethnic violence between the majority and minority groups. The behavior of

politicians manifested moral deficiencies where they only treated the Luo voters as instrumental means to their ends.

The introduction of ICTs enhanced communication between community members and state agencies contributing to increased transparency and accountability in the delivery of services and justice. The message alerts conveyed through the EWERS made community members active in sharing information thereby enhancing citizen participation, particularly of courageous women, in community development decisions and reduction in cases of corruption and discrimination, particularly amongst security agencies. The chiefs used to favor the rich but now were hesitant to do that because of the visibility of these cases, which to a large extent disempowered the political leaders who previously had relied on local goons for strengthening their support base. This made those who relied on violence for winning elections lose their support base and reduce negative ethnicity and nepotism. This led some county police commanders to make the EWERS a key mechanism to achieve their targets for Rapid Response Initiatives (RRIs), which had a heavy bearing on their performance appraisals

Cultural intolerance conditions

Bonding social capital was the source of ethnic intolerance contributing to the exclusion of the 'others' who did not ascribe to certain cultural practices, which was a source of instigating violence. For example, a major contributing factor to ethnic violence was the cultural practice of circumcision of men and women which existed in some communities but was not accepted in others. While the Bukusu practiced male circumcision, the Sabaot practiced both male and female circumcision, and the Iteso did not have any of these practices. Among the Bukusu and Sabaot, undergoing the rite of circumcision was a form of heroism and manhood, which ostracised the uncircumcised. When an Iteso man married a Bukusu or Sabaot woman, they forced him to be circumcised to be respected as an in-law. When a Bukusu woman married a Sabaot woman, she is forced to undergo clitoridectomy. The political and ethnic significance of male circumcision made it much more than just circumcision, it served to diminish the cultural identity of those that did not circumcise, and violence was exercised against them. These prejudicial tendencies towards the uncircumcised restricted their freedom of choice in marriage and political participation, causing deep-rooted social conflict. Some local politicians were accused of inciting hate by invoking narratives and myths that were the basis for kinship and ethnic ties using hate speech. Forced circumcision was used as a strategy for inflicting pain and violence during outbreaks of ethnic clashes from 1991 to 1993 and the 2007-08 post-election violence. Such cultural intolerance helped perpetuate ethnic conflicts in these areas.

The integration of ICTs in violence prevention led to enhancing the visibility of otherwise hidden cultural and behavioral prejudices. This motivated community leaders to regularly meet and conduct dialogue over such messages which promoted social contracts that prohibited such attitudes. The EWERS-based messages revealed polarized relationships among the communities which drew the attention of national-level government leaders that acted by forming community-based dialogue and reconciliation groups, which helped diffuse some of these polarized relationships. Firstly, it helped to create an inter-connected peace network involving the village elders, chiefs, security teams, youths, women leaders, elders, and businesspeople across different ethnic divides, who in collaboration acted against incidents of forest destruction, cattle theft, land grabbing, and gender-based violence. For example, in the Mt. Elgon conflict system, a tree by the name of *simatwet* became their symbol of peace where

they would always meet whenever the EWERS messages pointed to possible dangers to security. These meetings contributed to an increase in tolerance and acceptance of different people, values, and beliefs through contact with diverse others leading to the growth in bridging relationships. In this way, the EWERS contributed to promoting a culture of tolerance between previously warring ethnic groups. Table 6.2 gives a summary of existing violence-endorsing networks and the role of ICTs in their mitigation

Table 6. 2 Summary of existing violence-endorsing networks and the mitigation role of ICTs

Violence-endorsing social networks	**Examples of negative consequences**	**How ICTs helped mitigate**
Exclusionary networks	• Exclusion concerns discrimination of women and members of minority ethnic groups in leadership, employment opportunities, and resource allocation	• ICTs provided a medium through which minority group members could raise their voices and be included in decision-making platforms, resource allocation, and peace-building efforts • The ICTs facilitated flows of information, empowering the minorities to challenge the deeply entrenched power structures exercised by the majority groups. • The use of the ICT application helped unlock the bonds to freedom of community members by connecting them to NGOs, government agencies, and others across ethnic entities
Militia networks	• Ethnic communities across all three conflict systems mobilized themselves into ethnic-related militia gangs like the Sabaot Land Défense Force (SLDF) in Mt. Elgon, warriors in Muhoroni and Turkana/Pokot conflict systems	• The ICTs offered a platform for community members to report the organizers of the militia groups bringing their secret activities into the limelight leading to their arrest and disbandment. ICTs provided an anonymized way of reporting that encouraged many peace lovers to report. • ICTs helped to enhance the relationship between the community members and the security officers further promoting community policing against militia activities

Cartel Networks	• Livestock theft Criminals organized into networks that used armed violence to execute heinous acts • Gunrunning traders created well-connected networks of individuals spanning across the communities and counties -Uganda and South Sudan • Political leaders in Muhoroni and Mt. Elgon study areas relied on the distribution of personal favors in exchange for political support, and voting was based on particularised loyalties defined by kinship and ethnic ties	• The introduction of ICTs facilitated the timely reporting of incidents of cattle theft and gunrunning encouraging timely response and leading recovery of stolen animals and arrest of gunrunners • ICTs facilitated the creation of strong collaborative relations between community members and security agencies leading to timely response and action • The introduction of ICTs enhanced communication between community members and state agencies leading to transparency and accountability in the delivery of services and justice • ICTs helped to connect people of like minds such as peace lovers across communities, improving relationships among ethnic groups.
Cultural Intolerance	• The major contributing factor to ethnic violence in all conflict systems was prejudices related to the cultural practice of circumcision • Cultural intolerance also manifested through gender-based violence like forced child marriage, domestic violence, defilement, etc.	• The integration of ICTs in violence prevention led to the open sharing of otherwise hidden cultural and behavioral prejudices. This motivated community leaders to regularly meet and dialogue over such messages. The conversations resulted in social contracts that prohibited such attitudes and provided guidance on how such cultural matters should be handled.

6.3.4 Interplay of ICTs and social capital mechanisms in building the peace network (RQ2)

ICTs enabled through the use of the widely available mobile phone played a key role in building and sustaining the peace network, through multiple inter-connected processes of identifying and reporting on indicators of violence and disseminating them to the appropriate responders within an agile governance framework. Early warning indicators of violence were identified through participatory processes, which were then coded and ranked according to their severity. Once the list of indicators was generated, the field agents or indicator monitors were identified from violence hotspots across the ethnic divide in confidence and were trained on how to understand and report on these indicators from their local communities. The simplicity of the technology and the availability of generic, flexible, and extensible technological infrastructure, which promised anonymity to the responder, enabled the quick and effective adoption of ICTs.

ICTs helped to create bonding, bridging, and linking social capital mechanisms which helped in mitigating some of their negative consequences. Existing social groups like reformed warrior youth groups, women victim groups, elders' councils, and others, drew upon the capabilities of ICTs to form viable collaborations for building the peace network. Since the operation of the peace network started with sharing indicators through SMSs about the threat to peace, the field agent needed to be connected to relevant social relationships, such as farmers' associations, football club cheering squads, school committees, and political party meetings (Figure 6.1) to gather and report relevant information and provoke timely response actions.

Figure 6. 1 Social relationship through which agents get intelligence information for reporting through ICTs

ICTs also connected actors, including victims of violence, across ethnic divides, as shown in Figure 6.2.

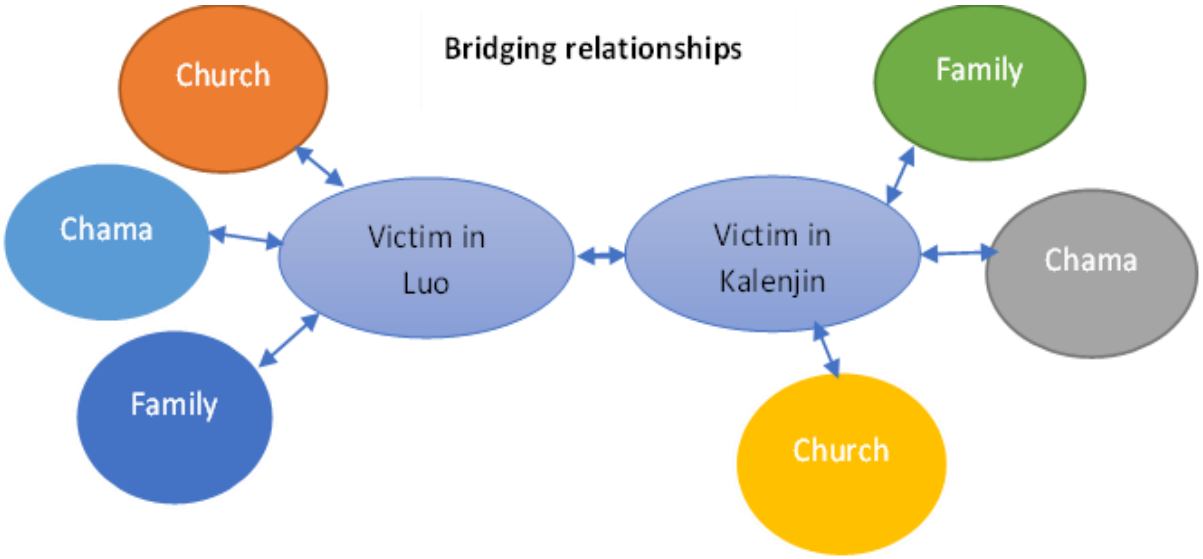

Figure 6. 2 Victims from one community connecting with another victim through ICTs

These connections provided platforms for exchanging social resources needed for the running of the peace network. The field agents used mobile phones to share data anonymously with the response team. The data analyst, who was based at FPFK and managed the computer system, reviewed the message, verified it, and broadcasted it to the three groups of responders — community social groups (women, youth, elders, reformed warriors, and paralegal groups), the NGOs, and the state entities including the government administration and security personnel. These entities were trained in basic conflict management skills, managing trauma disorders, elementary legal procedures, and advocacy. They all received the same message from the system almost at the same time and could mobilize each other for enabling collective action. In some cases, the responders developed protocols to guide action, such as on how livestock theft should be handled in the area. The ICTs enabled frequency in interactions leading to the inclusion of minority groups, strengthening of economic cooperation, enhancing tolerance of diversity, and commitment towards reconciliation efforts.

6.3.5 Scaling the ICT-enabled peace network (RQ3)

For the EWERS to be effective, they needed to be linked to a constant supply of reliable social resources and solid trust among the members. The performance of the peace network in Mt. Elgon attracted various requests for similar services in other settings. The network scaled first to Muhoroni to help address the border conflicts between ethnic communities in Nandi, Kisumu, and Kericho. In this setting, the structure remained similar, but the type of stakeholders involved, especially the response part, was different. Whereas the structure in Mt. Elgon was anchored on pre-existing groups like elders councils, the response team comprised various committees in Muhoroni where relevant commissions were enrolled to address issues that fell within their mandates like land and election boundaries. The number of people involved also increased.

This then also led to the need for reconfiguration of the EWERS from the visual basic access system used in Mt. Elgon to an upgraded Java and MYSQL-based web system. The features of self-organizing were enhanced, for members to detect warning indicators by themselves, conduct internal conversations over indicators, and agree on relevant actions required to mitigate violence. This process of self-organizing was crucial to sustain and scale the networking processes. The use of ICTs further strengthened the linking relationship between the community peace network members with various state organs and NGOs, which enhanced the implementation of the legal aspects that raised the legitimacy of the violence mitigation process. Upon successful initiation in Muhoroni, the peace network was successfully introduced in Turkana/Pokot based on similar principles and processes of conflict analysis, stakeholder mapping, and indicator identification including integration of ICTs into the peace-building processes.

The expansion of the project to Turkana/Pokot was a result of concerted efforts involving an extended group of partners through the ICT4COP project, which provided financial support and the University of Oslo (UiO) and HISP India for the technical upgrading of the EWERS, such as by moving to an open-source platform of DHIS2 and in enabling a cloud-based deployment. With this upgrade, a toll-free short code number was created and given to the field agents, which s made it possible for them to call anytime, without facing the problem of airtime shortages. The system was expanded to accommodate diversified indicators monitoring Covid-19, gender-based violence, corruption activities, and diverse indicators related to

wildlife management on poaching and illegal hunting. These led to the number of indicators being monitored increasing from 36 to over 100 and the expansion of the peace-building actions.

The thesis thus highlighted scaling as being multi-faceted, spanning quantitative, functional, political, and organizational dimensions. ICTs contributed to quantitative scaling through mobilization for collective action by connecting members expanding the numbers and diversity of peace actors and the geographical coverage. ICTs increased the ability of the peace actors to access new resources, creating more synergies and networks. In terms of functional scaling, the flexibility and ubiquity of ICTs enabled the expansion of functions beyond those designed for peace to also include issues of health, business, and gender-based violence. Politically, ICTs enabled the inclusion of minorities and marginalized groups into the peace network, thereby enhancing their participation and contribution to the peace process. For example, ICTs contributed to increasing the visibility of FPFK's actions to fight against violence against women and girls during the Covid-19 pandemic. The success of the efforts helped attract other actors like Humanity and Inclusion to partner with FPFK in implementing a community safety-related project addressing small arms and light weapons. The ICT innovation also led to institutional partnerships with academic institutions like the University of Oslo, Norway, and the Hekima Institute of Peace Studies and International Relations, Kenya.

6.4 Conclusions

This chapter highlighted the findings of the different research papers, in elaborating on the concept of the ICT-enabled peace network — its structure, functions, scalability, and sustainability. The findings emphasize the role of ICTs in shaping and being shaped by social capital mechanisms of bonding bridging and linking in its formation, operations, and scaling. The analysis highlights that for the peace network, to continuously mitigate violence, it should be anchored in pre-existing social groups and build on and cultivate ties of trust, solidarity, and reciprocity. The role of the ICT system is crucial, particularly, its capabilities to be upgradeable, replaceable, and flexible to accommodate new features attributed to the dynamic nature of the context of violence. Faith and community-based organizations played important roles in shaping processes of governance, coordination, and the ongoing processes of capacity strengthening. The heterogeneity of the actors and their actions, and the role of strong governance to provide and sustain a shared vision amongst this diversity was a crucial and defining feature of a successful ICT-enabled peace network.

The next chapter develops on this synthesis to provide theoretical and practical implications that can be derived from this thesis.

7. DISCUSSIONS AND CONTRIBUTIONS

In this chapter, I discuss my research contributions, summarized first in the form of a conceptual framework, and then their theoretical and practical implications developed relevant to the field of research and practice related to the mitigation of ethnic violence in LMIC contexts.

7.1. Articulation of a conceptual framework

Figure 7.1 illustrates the analytical linkages of the peace network, social capital mechanisms, and the ICT infrastructure in mitigating ethnic violence and the inherent scaling challenges.

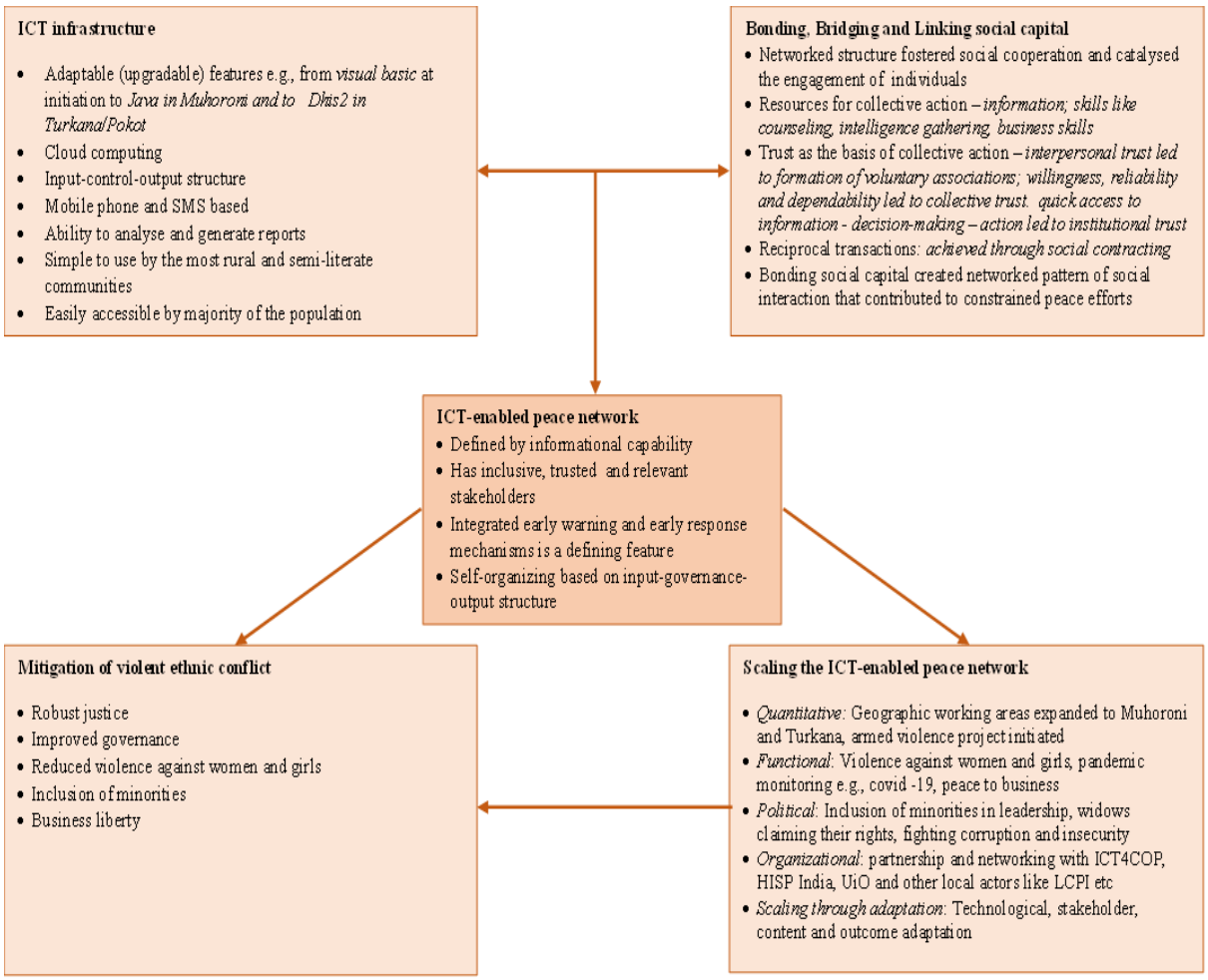

Figure 7.1 ICT infrastructure interacts with social capital generating a scalable ICT-enabled peace network that mitigates violent ethnic conflicts

Figure 7.1 shows that the interaction of the EWERS comprising of mobile phones, computer systems, and reliable networks can leverage social capital mechanisms to facilitate the formation, operations, and scaling of a peace network. ICTs can strengthen the social and technical networking infrastructure, which encourages the formation or expansion of social capital in the form of trust, reciprocal transactions, and enables social resources for action. The peace network is anchored in building informational capabilities and self-organizing features of the various stakeholders. Violence mitigation is manifested in the form of enhanced justice,

governance, the inclusion of minorities, strengthening of business opportunities, and reduced VAWG. The peace network needs to be scaled, thereby spreading its benefits to more people experiencing similar challenges of violence in other areas. Scaling is conceptualized through quantitative, functional, political, and organizational forms. In its development and scaling, the peace network needs to engage with and mitigate potential challenges emerging from the ICTs which are also being used in violence-endorsing networks. The thesis argues that while ICTs do have potentially both positive and negative consequences, the differences in outcomes achieved depend fundamentally on how the technology is embedded in existing social relationships and can draw upon existing resources of trust, solidarity, and reciprocity, to address problems that are of local priority.

7.1.2 Building and evolving the ICT-enabled peace network

The ICT-enabled peace network had trusted and inclusive stakeholders

The peace network was formed through the emergence of new identities defined by the strong passion of stakeholders for mitigating violence and promoting peace across ethnic conflict divides. There are multiple stakeholders including victims of violence, civil society organizations especially women groups, humanitarian actors, security personnel, and local administration from across ethnic and political divides. Other members included converted cattle rustlers, gun runners, hate-mongers, political inciters, and militia. This group of peace champions formed the peace network to counter the gunrunning cartelism, livestock rustling, militia, and ethnic hatred elitists, which also drew upon the affordances provided by ICTs. The identity of members had to be transformed from victims of violence to protectors of peace, from perpetrators of violence to advocates of peace, from gunrunners to diplomats of disarmament, from militia to champions of non-violence, and from livestock rustlers to anti-stock theft committee leaders. The identity shifts brought together members and helped foster a common vision and purpose with solidified social connections among them. This finding agrees with Sensenbrenner and Portes (2018) who argued that identity or solidarity made it clear who belongs to the networks and who does not, which has implications for risks and threats experienced by members (Miller, 2017). These multiple stakeholders were organized and networked along what I call the "input-governance-output" structure, creating a social fabric of those willing to cooperate in the mitigation of ethnic violence and developing collaboration and engagement of the willing (La Due Lake & Huckfeldt, 1998).

The function of the peace network is to draw upon ICTs and their underlying informational soundness to counter the threat of violence-endorsing networks (Castells, 2011) through early warning and early response. The countering role was four-phased. First, it involved the identification and sharing of the risks to peace. This is where sensitive and highly classified data on peace threats are collected and transmitted by the input-level field agents. Second, processing, analyzing, and monitoring the data from the field agents, supervised through an effective governance framework, who receive, process, analyze and transmit the data and reports to the responders The third function involves communicating and disseminating the processed information for action. This is the mobilizing and solidifying stage focusing on action. The final function is the response to threats by the respective output side stakeholders, to help mitigate violence. This process is summarized in Figure 7.2.

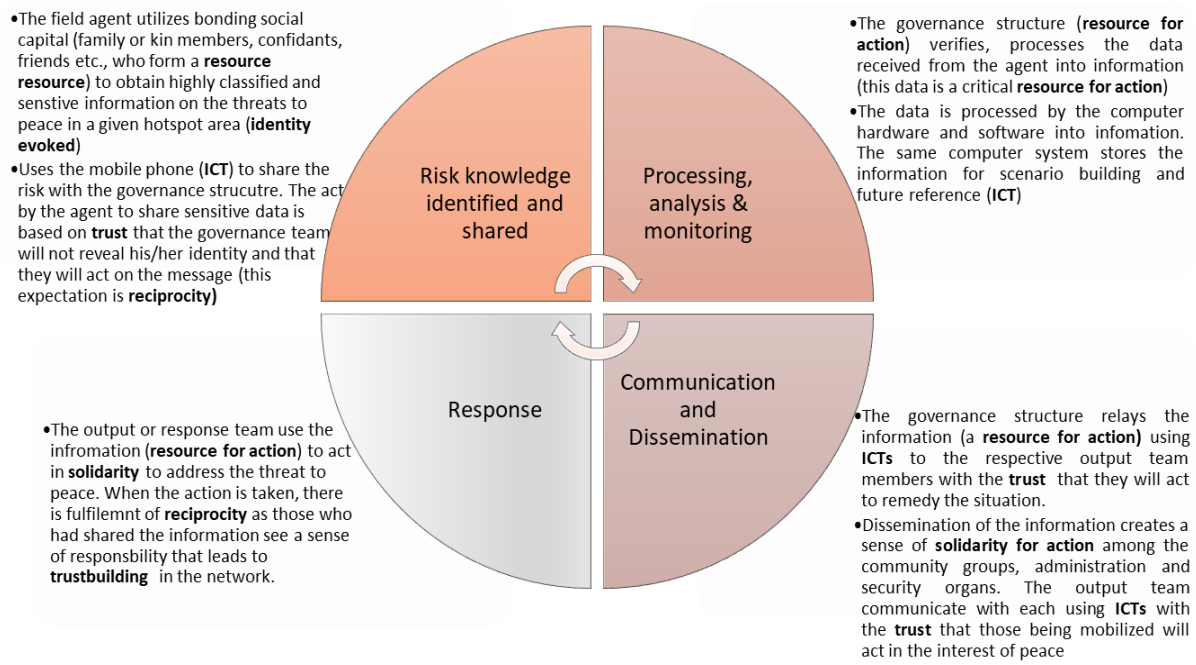

Figure 7. 2 ICTs interacting with social capital to form a functional peace network

ICTs and the informational logic of the peace network

ICTs formed an important component of the peace network, comprising mobile phones and accessories like SIM cards, a computer, software, and cloud services. The SMS-based technology was appropriate as it was relatively ubiquitous and could be used in rural areas, which often had no or limited internet. The SMS-based technology was also adaptable and flexible, as it could be reconfigured to accommodate new features in the conflict setting, and could be transformed, as it was from a Visual Basic to a Java-based platform based on the free open-source software —DHIS2. The ICT infrastructure needed to be supported by various social resources such as the indicator manual, capacity-building processes, and regular review meetings, which were all socially embedded and driven through participatory processes.

The embedding of ICTs into the social fabric of the peace network played a key role in establishing the network operations. The ICTs enabled the field agents to report sensitive and confidential data that would not have been possible to share physically due to potential victimization and intimidation. Effectively, ICTs created opportunities for field agents to participate in the peace-building processes, as also argued by various other researchers (e.g., Gaskell, 2019, Welch et al., 2015, Turner, 2008), and in providing alternative spaces for participation, particularly enabling for those marginalized and in the minority. ICTs helped in analyzing, processing, and monitoring threats, using effective visualization tools such as the color representation of different levels of threats - GREEN (1), BLUE (2), and RED (3). For instance, a message could fall in the Green level if it notified that there have been "secret meetings." A message on level Blue is a step up in danger and prompts the need for action, such as the "disappearance of youths" could indicate a possible attack. Red could indicate that "cattle have been lost" or a "village has been raided" and urgent action is needed. The system was configured to document statistics on indicators, presented in easy-to-access and comprehended forms of tables and charts, enabling effective action. These analytics were designed to enable the identification of trends in the indicators and were supportive of building relevant policy interventions. These findings support the research of Mancini and Perry (2014)

who argued for the positive role that ICTs play in making relevant data for peace-building. My research expands these findings by highlighting the details of the infrastructure required and how these need to be socially embedded for effective outcomes. For example, how the information shared helped build solidarity and create a basis for collective social action. This is demonstrated in the quote below:

> *"Animals had been stolen from the neighboring Cherengany Sub County. The case was reported through the ICT system. The chief of Kesogon market, the police from Centre Kwanza, and the community peace representatives mobilized one another and pursued the thieves, recovering all the animals, and the culprits were arrested."*

This finding is in concurrence with Blagojević and Scekic (2021) who argued that ICTs are used as mobilization tools to build solidarity networks and enable the construction of collective identities and goals. ICTs also helped to increase the efficiency of the network members by hastening the process of sharing information thereby resulting in quick action to prevent threats to stability. Vignette 1 of the girl that was made pregnant in Nalondo illustrates this point:

Vignette 1

On 3rd June 2020, a message alert appeared on the system, **"A Class 7 girl by the name Nancy Nelima who is schooling at Nalondo primary school is pregnant. It is alleged that one of her teachers by the name David Wanjala is responsible for her pregnancy."** The youth, women, religious leaders, the chief, and the police got the same message at the same time. They mobilized each other for a meeting. The police officer in charge (OCS) advised them to remain calm as he did his investigation so that his work was not compromised. While the police were investigating the matter, the religious leaders conducted counseling of the victim and her family. After two days, the police found out that the mathematics teacher Mr. Wanjala was innocent but the person responsible for the pregnancy was her cousin who stayed with them. The cousin was arrested and is now serving a 15-year jail term. This case motivated the community groups, the police, and administration to keep vigil leading to reduced cases in 2021

As the message alert was received, the community groups quickly and swiftly moved into action, leading to the arrest of the perpetrator within two days. This could have taken longer or not been possible without the effective use of ICTs, as also argued by Pierskalla and Hollenbach (2013), who highlighted the role of ICTs in increasing the management capabilities of peace actors.

However, for ICTs to effectively perform their roles in the peace network, they relied on social capital. Bonding social capital was facilitated by access to mobile phones for members of the network, who shared gadgets like chargers, and electricity which some households did not have access to, but who had phones and airtime. For those who did not know how to use the phones relied on relatives, kin, and friends for training on use. Those who did not know how to read and write depended on family members and trusted friends to read and write messages for them. Some network members had phones that were purchased by sons, daughters, husbands, wives, or friends as gifts. These social dynamics reflect the power of bonding social capital in accelerating access to mobile phones and their use, which enhanced and reinforced mechanisms of bridging and linking social capital. The anonymous feature enabled members to freely share information across ethnic divides, which further enabled feedback loops amongst

members across ethnic divides. The thesis contributed to elaborate on the role of social capital in building the peace network, which is next discussed.

Leveraging social capital in building ICT-enabled peace network

Social capital plays out at different levels in the peace network. The field agents had the mandate to collect intelligence reports about the threats to peace, a process that was extremely sensitive and confidential, which needed bonding relationships to access data. This was enabled by the reliance of field agents on confidants, kinsmen, and members of churches, clubs, school boards, and professional associations. Some of them still had friends in militia gangs from whom they got information. These bonding social connections provided the medium through which the field agents accessed different resources for action, also highlighted by Lin (1999). The field agents did not only get data from their own socially bonded networks but also through bridging relationships (Putman, 2000), based on their connections with fellow field agents from across the communities. For example, during a review meeting with field agents, one of the participants noted,

> *"A Turkana woman field agent informed a Luhya of an impending attack by some Pokots who had crossed the border from Uganda and smuggled in weapons to conduct an attack. The Luhya field agent sent the alert to the system and security agencies were informed who responded quickly before the culprits could conduct the attack."*

Linking relationships between the field agents and the FPFK were also crucial, for example, for recruitment and capacity building as shown in Figure 7.3.

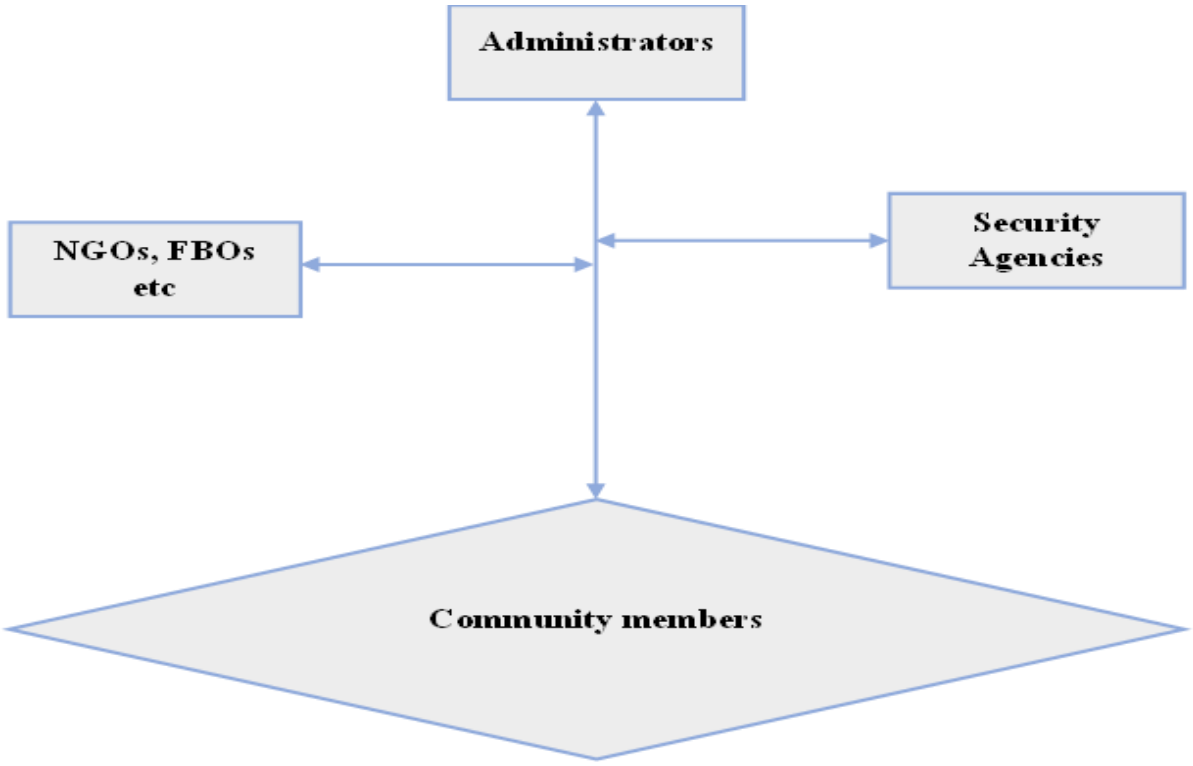

Figure 7. 3 Linking relationship between community members (field agents) and FBOs

Social capital was also manifested at the governance level of the peace network, at both the human and technological levels of the network. The human face includes software developers, data analysts, and peace-building specialists, which had trust relationships founded on bonding social capital to motivate information sharing. Data analysts had the mandate to assess the validity and share the information with the responders without consulting any other person in the organization, highlighting the role of trust. The repair and maintenance of the EWERS lay in the hands of the system developers, who had the backing and trust of the organization, providing important *social resources* for the functioning of the network.
Social capital also played out at the output/response levels of the peace network. Leaders like village elders, chiefs, assistant commissioners, and county government leaders comprised the response unit. The various security units like the regular police, the anti-stock theft, and the rapid deployment units including the military intelligence formed another important wing of the response unit. Whenever an alert message came from the governance structure, all these three categories received it, prompting a collaborative response. This is illustrated through Vignette 2 around an event that occurred in February 2019.

Vignette 2

At Level 3ac, a young girl known as Rose Chebet was overheard telling her friend that Mzee Francis Mantey defiled her, she had gone to watch television at his house. Unfortunately, she was alone, and threatened that she will not be allowed to watch TV if she reported the incident. Mr. Francis's home is located opposite Chepyuk primary school near Mama Sarah general shop. Rose stays with her family just next to Mzee Mantey's home. The community peace group members from that area mobilized themselves with the chief and the police responded. The officer in charge warned them against divulging information to allow for an effective investigation. After one day, the police officer arrested Mzee Francis after confirming the incident and he confessed to similar incidents with other girls in the neighborhood.

The peace groups, the chief, and the security personnel collaborated to ensure that the girls got justice. This collaboration was founded on trust and solidarity, drawing upon the alert message as a *resource for action.* The interaction among the different actors was lubricated by *trust* and actions were based on *solidarity and collective action.* There was reciprocity between the FPFK and the response teams, who sought to mitigate the struggles of the victims in question. The success of these collaborative collective actions helped improve the quality of reporting and the reliability of the early warning information.

Therefore, for the peace networks to exist and function sustainably, they needed to be anchored in community social structures, values, and norms just as argued by Yilmaz (2010). This is where peace networks need social capital mechanisms such as bonding, bridging, and linking oiled by values of solidarity, resources for action, social trust, and reciprocity. Building bonding social capital through shared identity is a non-trivial process (Does, 2013; Tajfel & Turner, 2004), and highlights the important role of governance based on a sense of solidarity. In some cases, this needs to be supplemented with psychosocial support to help in trauma healing for affected individuals and group members. The thesis thus highlights the important interaction efforts between technology, social capital-enabled resources, governance mechanisms, and collective actions to strengthen peace-building efforts.

7.1.3 Mitigating ethnic violent conflicts

The peace network instantiated Galtung's (1969) view that positive peace is a condition in which there is relatively robust justice, equity, and liberty and relatively little violence and misery in society.

Positive peace through robust justice by the peace network

The ICT-enabled peace network contributed to a significant reduction in livestock theft and increased recovery of resources that were the main source of livelihood of communities. These mitigation efforts had to confront the existing violence-endorsing networks. Bridging, and linking social capital were important means in this confrontation, for example in the act of returning the stolen animals and arresting and prosecuting the perpetrators of violence against women and girls. Vignette 3 illustrates this discussion.

The cultural practice of marrying off young girls was violence endorsing as they prevented the girl from realizing her full potential of enjoying the right to education. The peace network, drew upon social capital resources to act swiftly to free her from this bondage, ensuring freedom and justice for the girl, enabling positive peace

Vignette 3

There was a Class 8 girl forced to marry a neighbor. The village elders had known but not taken any action. She shared her experience with some members of the women's group. One of the members of the group was a field agent. She reported the matter through the ICT system, which was forwarded to the local administration. The DCC gave a directive to rescue the girl and take her back to school. This directive was obeyed, and the girl was rescued through concerted efforts among the administration, the security and the members of my group.

Positive peace through the inclusion of the minority in governance

One of the main contributing factors to ethnic violence was exclusion. For example, the Sabaot minority community had been excluded from decision-making for a long time and discriminated against in employment and distribution of development benefits. However, with the initiation of the ICT-enabled peace network which allowed for dialogues and conversations across ethnic divides, a social contract was signed that promoted the minority to be elected, for example, women into leadership positions. For example, one key informant noted,

> *"The initial committee and membership of the Mt. Elgon forest association was made up of people from one ethnic community — the Sabaot. Messages complaining about this were sent to the ICT system (early warning system). The membership of the forest association was reviewed, and the committee leaders were elected afresh factoring in ethnic diversity."*

Positive peace through business opportunities liberty

Due to frequent ethnic violence, people from across communities had been restricted from doing business in important markets like Sondu, Kapcherop, Saboti, and Kapkoi. However, with the initiation of the peace network, markets were opened that promoted inter-ethnic business collaboration, creating novel business opportunities as noted in Vignette 4.

Vignette 4

The Kapcherop market is now a joint market where all communities meet to sell their goods. Initially, the Kikuyu, Luhya and Kisii used to be killed on the way back home after selling goods at this market. The Kalenjin would wait for them after selling, kill some and take away all the money collected from the sales. This scared all other communities from going to the market. However, EWS messages led to dialogue among the communities where they agreed to end ethnic animosity.

Apart from the physical violence of killings and robbery, there was also structural violence, as community members were restricted from doing business constrained their economic growth. By ending animosity and reopening markets for all members, positive peace was achieved, as illustrated in Vignette 5.

Vignette 5

Messages about robbery with violence targeting certain communities at Kapkoi market were shared through the EWS. The DCC Mr. Maina beefed up security and increased surveillance. A peace committee was formed to conduct dialogue among communities living in the area. Now onions, potatoes, maize, cabbages, milk and livestock are freely traded. The Pokot supply milk and livestock products to the Kikuyu and Luhya people as they carry potatoes, maize and onions with them. Even the Pokot can access and supply milk to the Luhyas in Chepchoina which had never happened before.

This vignette demonstrates the opening of increased spaces for business across ethnic communities occasioned by improved social relationships, illustrated through Vignette 6:

Vignette 6

On Saboti market, the Kikuyu, Sabaot, Teso and Bukusu traders jointly formed a Savings and Credit Company (SACCO). This happened after they frequently used to be attacked and robbed. The shops belonging to other communities used to be raided often. Messages were sent to the EWS until the DCC called for a peace forum with all traders of the market. An inter-community business forum was formed to respond to messages from the system. Anonymously, thieves were identified and named. To promote business cooperation, a SACCO was formed that included all communities. Through the SACCO, the Sabaot harvest milk, honey and firewood and supply to the Bukusu who in return supply maize, cooking oil, sugar, soap. Poultry business is also doing well. The SACCO leadership was mandated to manage the commercial plots by distributing them equitably among different business people in an ethnic sensitive manner.

Positive peace through improved governance

The peace network represented a social fabric connecting the community members and the non-state and state actors, which earlier had been characterized by mistrust and lack of cooperation. Some state officers were part of the cartels that disenfranchised the community members of their livelihoods. However, the initiation of the network-enabled tapping into mutually owned resources through improved information flows. This collaboration enhanced trust and accountability between the community and leaders, which improved effectiveness in handling threats to peace. Members also gained confidence when animals started getting recovered and criminals were apprehended and charged in courts. This social and institutional trust restored the rule of law in conflict settings. For example, in one of the interviews, a key informant said,

> *"Information flow increased, and the police used EWS as the primary source of information for their action. This built trust and bettered the relationship between peace committees and the security system."*

An interview with the police officer confirmed these sentiments:

> *"Our participation in public meetings and community dialogues enhanced understanding between us and the community members. Through these meetings, more light was shed on the best way of reporting and as result, the senior officers agreed to share their numbers for reporting and further interaction with members of the community."*

The thesis highlights the importance of governance, which previously was very people-centered and gradually became issue-based, for example in enhancing opportunities for economic engagement. One youth told me:

> *"I have gone an extra mile to lobby the support of loaners such as Uwezo and women, that lend the youth money to start businesses so that they can upgrade their livelihoods. As result, community members have gained trust in the administration and relate with me well."*

Positive peace through the reduction of gender-based violence

Analysis of gender-based violence data in the early warning and early response system between 2018 and 2021 highlighted the role of the peace network in the reduction in its occurrence, highlighted during the Covid-19 pandemic. The peace network played a crucial role in making visible the highly secretive cases of child marriage and child defilement within family-bonded relationships. Earlier, the police used to be bribed so that such cases could not end up in court, but these practices were countered through appropriate governance mechanisms.

In conclusion, the form and structure of the peace network helped enhance collective agency amongst members of the affected ethnic groups. The receiving and sending of messages with the common purpose of peace mitigation stimulated collective action. This collective agency led to better collaboration among actors, leading to an increase in the recovery of stolen animals, business collaboration among members, and building government responsiveness contributing to social justice (Galtung, 2008). These positive impacts became the basic motivation for sustained collective action which reinforced social trust and self-responsibility amongst members and strengthened solidarity

7.1.4 Scaling the ICT-enabled peace networks

The successful initiation and operationalization of the ICT-enabled peace network in Mt. Elgon with positive outcomes towards peace-building initiated requests to scale the networks to similar geographical settings of Muhoroni and Turkana/Pokot. The thesis identified the key conceptual dimensions of quantitative, functional, political, organizational (Uvin, 1995), and adaptation processes to enable the scaling of the network**.** Scaling was about finding a pragmatic balance between starting from scratch and reinventing the wheel, taking learnings from Mt. Elgon setting to Muhoroni and Turkana/Pokot conflict settings and adapting them appropriately to meet the local contexts. I analyze i) aspects of the network that can be taken without adaptation to other settings; ii) what needs adaptation for their spreading; and iii) what has to be done from scratch. The process involved stakeholder, technology, content, and outcome adaptation as depicted in Figure 7.4.

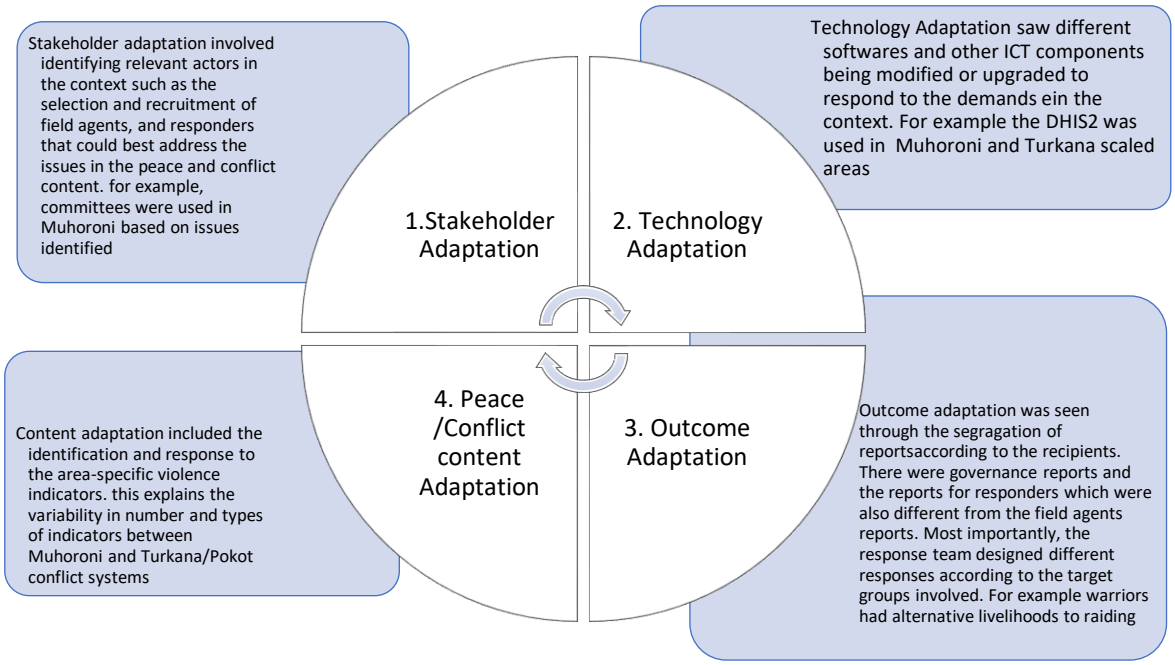

Figure 7. 4 Different forms of adaptation in scaling ICT-enabled peace network

Each type of adaptation affected others in a cyclical relationship. For example, the increase in the number of stakeholders (stakeholder adaptation) automatically resulted in the need to reconfigure the technology (technology adaptation) which then dictated the kind of reports and responses (outcome adaptation) that were needed to reduce the level of violence within the context (content adaptation). The interaction of these different adaptations resulted in quantitative, functional, political, and organizational scaling of the peace networks with ICTs playing a critical role as described in the following paragraphs.

Stakeholder Adaptation and Quantitative Scaling

Stakeholder adaptation aimed at having community members with a stake in mitigating violence at the core of the peace networks. It involved redefining designated functional roles assigned to different stakeholder groups and to strengthen interaction through the coordinating functions of the different network stakeholder groups. Stakeholders supported quantitative scaling through linkage and connection with each other by state and non-state actors. Quantitative scaling involved increasing the organizational size and capacity, to accommodate the increase in the operational and geographical scope of the network activities, in my study from operating in two counties of Bungoma and Trans Nzoia to seven counties including Kisumu, Kericho, Nandi, Turkana, and West Pokot. The number of violent hotspots also increased from nine to 43 and the number of indicators went up from 36 to196. The field agents increased from 45 to 112 and communities served increased from two to nine. This quantitative scaling led to the inclusion of the marginalized Turkana and Pokot communities into the mainstream peace-building processes. Fatigued security officers who had left the community at the mercy of the livestock cartels were re-energized by collaborating with the community members. The role of NGOs and FBOs was fundamental as they became the link between the old and new settings, to ensure the translation of learning and experiences. They facilitated the formation of the peace network in Muhoroni and Turkana/Pokot. Some of the staff involved in the initiation of the peace network in Mt Elgon were seconded to the new areas to support the scaling process. The technical staff manning the system still played vital roles in the scaled areas, steering the process of developing new and relevant conflict indicators

and configuring the system to accommodate the new features. They worked to bring about the various alliances and partnerships needed to support community groups develop their early warning system and response mechanisms. They also built the capacity of the staff in the scaled areas on the technical and related processes, such as mapping new violence hotspot areas based on stakeholder engagement to enhance the participatory processes.

ICTs as tools of communication contributed to quantitative scaling through mobilizing across communities by connecting peace network members with other actors in the same field leading to increased numbers of peace actors and geographical coverage. ICTs also enabled the increase in the number of people reached by connecting to new social resources. For example, more volunteers as peace monitors, more community response team members, and more government leaders including security agents were connected to the ICT systems increasing the area under surveillance by the peace actors. ICTs enhanced information sharing, making coordination easier and effective communication possible across the three conflict systems. For example, peace actors in the Muhoroni conflict system connected with their counterparts in Turkana/Pokot conflict system through the SMS platform. Apart from linking peace actors, ICTs facilitated the creation of linking collaborative networks among peace-building stakeholders. For Example, the police in Turkana and Mt. Elgon conflict systems were connected through the ICT platform. ICT innovation became a source of opportunities for many peace-building stakeholders in different contexts. For example, the ICT-enabled early warning innovation in Mt. Elgon attracted other peace actors in Muhoroni and Turkana/Pokot to think about the possibility of introducing similar technology in their areas. This led to the introduction of an ICT-enabled early warning system in those areas.

Despite the success of ICTs in scaling the innovation for peace-building in the three conflict systems, one of the constraining factors was digital illiteracy, especially in Turkana/Pokot areas. Though the numbers increased, the majority of peace actors could have been included in the networks had they not been digitally illiterate. Some who joined the network but did not know how to read and write had challenges of maintaining anonymity which was the core issue in the innovation.

Technology adaptation and Functional scaling

Technological adaptation was achieved through reconfiguration, conversion, and replacement of the software system to accommodate emerging dynamics and new functionalities. Technological flexibility enabled ICT-enabled peace networks to adapt to different functions at the same time leading to functional scaling. For example, in terms of health, the peace networks got involved in the monitoring of and responding to the Covid-19 pandemic. The outbreak of the pandemic saw the introduction of containment protocols that the public needed to observe to control its spread. Indicators of non-adherence or misinformation about the pandemic were added to the system and field agents were trained on reporting to support the government response. For the health function to be introduced in the early warning system, the flexibility and adaptability of the software to accommodate health-related indicators had to be utilized in reconfiguring the DHIS2. After the reconfiguration of the software, ICTs were used to gather, disseminate, exchange, process, store, and access information and knowledge about Covid-19 that was used by the emergency response committee to act in the interest of the public. The Covid-19 surveillance monitors used mobile phones to report cases of non-compliance to the containment measures. In this case, the system performed more functions that were essential for people to live satisfactory lives.

The peace networks further expanded their functional scope by monitoring and responding to gender-based violence indicators such as defilement, child marriage, female genital mutilation, wife and husband battering, and child pregnancy. These cases skyrocketed during the Covid-19 pandemic, as indicated in one of the FGDs;

> *"A security tip was issued of two girls aged 13 and 11 years who were to be circumcised in Komarok. The women's group reported the matter to the system which informed the security personnel. Quick action was taken by the local administration which collaborated with the community to rescue the girls. They were rescued before they could be circumcised and were taken to a rescue Centre. In this instance, the EWERS proved to be a vital tool in the fight against female genital mutilation (FGM)."*

This example demonstrated how ICTs played a critical role in information and coordination which had been a challenge before introduction. The adaptability and ubiquity of the ICT system enabled the peace network to expand by acting in response to the critical needs of people at the base of the pyramid like in the case of the schoolgirls. In this sense, ICTs helped network members adapt by turning to the immediate and critical needs of society. In these cases of gender-based violence, ICTs enabled the relay of messages anonymously, storing the message as evidence and increasing the capability of network members to report without fear of victimization.

The incorporation of business in peace interventions was also an important functional scaling aspect. The members that frequently met to respond to alert messages agreed to start doing some development together including joint businesses as demonstrated in one of the review meetings with the responders;

> *"We were brought together by EWERS to regularly respond to alert messages from the system. But with time, we decided to also engage in joint businesses that have now become a SACCO whose membership is drawn from all communities living in Saboti."*

From the example above, ICTs' ability to provide alternative spaces for interaction, played an effective role in mobilization across ethnic divides. First, ICTs enabled the creation of a micro peace network by connecting various stakeholders including business people that met often to respond to early warning messages generated. The frequent messages disseminated through the ICTs resulted in regular meetings that led to the formation of business associations. ICTs helped to connect different contacts thereby creating new business opportunities, as observed in the Mt. Elgon and Muhoroni conflict systems.

Content Adaptation and Political scaling

Participatory diagnostic processes helped identify the key communication challenges of the peace actors across the three conflict systems. Critical problems included victimization by the conflict actors, poor coordination among the peace actors, corruption, and non-responsiveness by some state actors, especially security. Most of the peace actors were also not familiar with early warning indicators in their contexts. In all three cases, scaling focused on these critical needs. New peace practices were built on actors' indigenous knowledge about early warning indicators and practices like social contracting. Aligning scaling to the local peace actors' critical needs enabled effective participation, early adoption, and ownership of peace innovations. An enabling policy environment was critical for the successful scaling up of the ICT-enabled peace network. Policy interfaced with scaling up by involving policymakers and

implementers like politicians, government leaders, and security agents in the initiation of peace interventions that ensured the legitimacy of the scaling process. In Turkana/Pokot conflict system, for example, security policy on the application of diplomacy in disarmament was incorporated in the scaling process where security agents played a fundamental role. This encouraged the participation of the security personnel to achieve what they called a "Rapid Response Initiative" (RRI). In Muhoroni, scaling initiatives were aligned with the Anti-stock theft policy enforced by the Anti-stock theft police unit. The police unit owned and supported the initiative by training community members on how to identify stolen animals and what the law said about their recovery. They accepted to be part of the peace network and could freely interact with the community members. This meant that alignment of scaling initiatives with government priorities and policies promoted the adoption of new practices. In the Mt. Elgon conflict system, laws on community cohesion and peacebuilding were enacted through the efforts of the peace network, which mobilized and involved policymakers like County executive committee members, county assembly members, governors, and non-state actors in the process of scaling. Although ICTs were also used as tools for propagating hate speech, the technology was also used to counter such messaging. ICTs provided a platform for sharing human rights injustices that stimulated the involvement of more people in collaborative actions than was previously possible. The interaction of beneficiaries with state agents through ICTs generated social cohesion and social capital and facilitating coordination and cooperation for mutual benefit. Community participation through the use of technologies generated justice for the vulnerable. However, a few cases were mentioned where those who sought justice were threatened through the same ICTs by the perpetrators. Such cases were still handled through the peace network.

Another example of content adaptation was when the ICT-enabled peace networks got involved in the fight against corruption contributing further to political scaling. Corruption had become rampant in the Muhoroni conflict system, especially among police officers, the administration, and other leaders. Corruption and unequal distribution of resources were major causes of enmity between the majority and minority ethnic groups. Corruption was witnessed mostly during the resettlement of internally displaced persons, while the unequal distribution of resources was witnessed during the allocation of constituent development funds, and disbursement of bursaries, appointments, and promotions. Some communities were marginalized in the distribution of resources and development benefits. Roads were developed according to areas settled by certain communities. An ICT-enabled peace network in Mt. Elgon got involved in the fight against corruption as a way of promoting justice and peace in the area. For example, a respondent said,

> ***"****The assistant chief colluded with criminals who used to send him money for a cover-up. The community reported the matter through the ICT system which led to his arrest along with the criminals. He was interdicted. Two other chiefs with similar cases were also interdicted. The system has made other chiefs to be more accountable and submissive."*

Based on this finding and example, ICTs provided new access channels to beneficiaries that had challenges accessing basic services, by facilitating the information flow between government and citizens, across government institutions, and among citizens. ICTs acted as whistleblowing tools that provided invaluable information on corruption cases that would likely otherwise remain secret. This is because they enabled peace actors who witnessed

wrongdoing to anonymously blow the whistle on officers, including their superiors. The issue of anonymity and protection was central to the system. Conversely, ICT also had a corruption-enhancing effect as some government leaders who had the responsibility to respond to message alerts from the system used the data to alert criminals of their possible arrests.

ICTs enabled the inclusion of minorities and marginalized groups into leadership and economic spaces, thereby enhancing their participation and contribution to the peace process. Previously such excluded people did not have physical channels to participate in decision-making and other political processes due to the costs involved, physical distance, or fear of intimidation and harassment. The introduction of ICTs provided alternative spaces for airing their concerns.

Outcome Adaptation and organizational scaling

The system was developed to generate stakeholder-specific reports that increased efficiency. For example, there were governance stakeholders' reports, response stakeholders' reports, and field agents' reports. Each stakeholder's report was different from the others, which allowed the sharing of learnings from successes and failures. As part of her facilitation role, FPFK organized learning exchange visits for peace actors between the three areas. Another source of learning was evaluations. Evaluations were conducted across all three areas that generated lessons for other applications. Some research has also been conducted to unearth insights from the three scaling areas. For example, PMU Interlife, a Swedish faith-based organization conducted research in Turkana/Pokot and Mt. Elgon to understand how technology is applied in peacebuilding. The report was shared through webinars and a science café. The report from the scaling process to Turkana/Pokot was shared with the academicians that coordinated the ICT4COP project. The dissemination of knowledge and information amongst stakeholders contributed largely to *organizational scaling* by ensuring that peace networks functioned effectively, efficiently, and sustainably. Sharing experiences and learning from failures informed changes in strategies by various peace networks furthering growth and capacity. For example, a key informant in Muhoroni demonstrated this with an example:

> *"He noted that we supported the young people who through the EWS were identified and named as involved in community raids, to start new ways of earning a living. Most of them started agriculture and small businesses that have transformed their focus from raids. We have helped them adapt to new ways of living."*

The incorporation of suitable ICT platforms helped the peace networks improve their internal performance. ICT improved communications with stakeholders such as beneficiaries, enabling higher quality performance at a lower cost. Members of the peace network could all receive information at the same time reducing operational costs inside the networks. ICTs made data management possible leading to the production and instant sharing of status reports and without ICTs would simply be cost-prohibitive. ICT innovations increased FPFK visibility attracting other partners to co-join in the implementation of various projects. Humanity and Inclusion (HI) partnered with FPFK in implementing a community safety-related project addressing small arms and light weapons. HI built on the ICT platform to initiate a community safety project in Turkana/Pokot. The ICT innovation also led to the building of institutional partnerships with academic institutions like the University of Oslo, Norway, and Hekima Institute of Peace Studies and International Relations, Kenya. The use of ICTs to fight violence against women and girls during the Covid-19 pandemic further raised the peace network profile, which led development organizations like Kenya for resilience and PMU to study the

process. The discussions on the relationship between adaption types and dimensions of scaling above are summarized in Table 7.1

Table 7. 1 Quantitative, Functional, Political, and Organizational scaling through different adaptations

Adaptation Type	**Dimensions of Scaling**			
	Quantitative	**Functional**	**Political**	**Organizational**
Stakeholder Adaptation	The increase in the number of stakeholders included in the peace network.	New stakeholders were onboarded to support emerging functions like Gender Based Violence, and pandemic surveillance	The peace network focus on advocacy and accountability	Staff capacity was expanded through on-the-job training and advanced studies
Technological Adaptation	The ICT system was reconfigured to increase the capacity for receiving and broadcasting a large number of messages or amount of data in real-time	The ICT system was modified to perform functions such as GBV and pandemic data monitoring and dissemination that were not in the original design.	Whereas technology was used as a tool for including minorities in Mt. Elgon, it was largely adapted to grow business connections in other areas	The ICT system attracted other partners like ICT4COP, the University of Oslo, and NGOs to join the network that increased organizational capacity
Peace/conflict content adaptation	The number and type of violence indicators varied according to the geographical areas.	Scaling was aligned with the local peace actors' critical needs (peace actor-centered approach). This alignment informed the diversification of functions	Policy interfaced with scaling up by involving policymakers and implementers like state agencies	facilitation, building local capacities strategic partnerships knowledge, and information sharing including learning
Outcome adaptation	The number of reports increased based on increasing indicators being monitored and the stakeholders being served.	The system generated reports that were adapted to the responders.	The response team designed different responses according to the target groups involved.	The system was developed to generate stakeholder-specific reports that increased efficiency.

7.2 Contributions and implications

This subsection presents theoretical contributions in the field of ICT4D and concludes with practical contributions from the thesis.

7.2.1 Contributions to academic discourses

ICT4D is a broad and multidisciplinary field and therefore, to position my contribution, I focus on the critical question that Walsham (2012) raised as to whether ICTs are making a better world. This question had not been engaged within the field of peace research, a gap that my thesis has sought to address. Avison (2012), in his commentary on Walsham's question, raises concerns about the ethical implications of ICTs, especially in the context of business environments, such as those related to ERP systems. Qureshi (2016) has argued for using ICTs to enhance health equity by enhancing transparency in information sharing across different stakeholders, such as care providers, insurers, and government officials. Sahay (2016) raises some problematic areas around this question, such as the contested meanings of 'better'.

Synthesizing the propositions by Avison, Qureshi, and Sahay, a better world represents conditions of dignity, equity, civility, and tolerance of diversity. Tying these together with Galtung's (1969) discourse on positive peace, I argue that *"a better world is a peaceful world."* This conclusion leads me to reformulate Walsham's question that peace research needs to grapple with, *"is the world becoming more peaceful with ICTs?"* I contend that the flexibility of ICTs enables them to contribute to making the world more peaceful by being embedded in social structures where they draw on social resources for building counter networks to violence endorsing systems. In reaching this conclusion, the thesis has demonstrated how social capital mechanisms can be interwoven with the SMS platforms in mitigating ethnic violence by neutralizing bonding social capital and enhancing linking and bridging social capital. I argue that this process is achieved by monitoring and controlling relationships while strengthening bonding, bridging, and linking social capital in equal measure. The mobile phone and the SMS in particular support processes of inclusion, accountability, identity transformation, social contracting, and leveraging economic linkages which can support the different forms of social capital. Monitoring and controlling bonding relationships is achieved by anchoring the peace network in an anonymized SMS system which enables the flow of information whilst protecting the identity of the information providers. For members to continually connect and share required information, they inherently needed ubiquitous mobile phones to make it happen. ICTs set up self-reinforcing cycles of reporting, action, and visibility of action, which further invigorated collective action. The continuous exercise and cultivation of collective agency not only gave capabilities to peace network members but also individuals the capacity for self-empowerment to strengthen self-directed collective action. Participation and engagement of the network members through ICTs increased the sense of belonging to the network which created a common identity and greater interpersonal trust.

I further argue that the ubiquity and flexibility of ICTs contribute to making the world more peaceful by enabling strong linking social relationships between community members and groups with government authorities, particularly security agencies including the national intelligence service, the national police, military intelligence, the anti-stock theft committee, the Rapid Deployment Unit, and the General Service Unit. These linking relationships created

legitimacy and efficacy of the peace network, making it stronger than the violence-endorsing networks. This confirms the findings of Peyton, Sierra-Arévalo and Rand (2019) that positive contact with a uniformed police officer can substantially improve public attitudes towards the police, including legitimacy and willingness to cooperate.

These arguments flip some research in this domain (Magid & Schon 2018; Sambanis & Shayo, 2013; Arsovska & Kostakos, 2008; Lemarchand, 1996; Horowitz, 1993), which has argued that social capital, especially bonding, contributes to building ethnic violence. My research argues that this is not necessarily the case. The thesis further contributes to understanding how ICTs contribute to making the world more peaceful by demonstrating how business collaborations can thrive across the divide when founded on strong bridging relationships with mutual benefits to all. ICTs play a key role in bridging these ethnic divides, by providing space for communication and sharing of crucial information, which was not possible earlier in conflict-ridden settings. The peace network created an environment where members of both communities enjoyed a strong sense of inclusion and togetherness, reflecting a new and expanded source of social capital. Inclusivity expanded the market for products created by both communities and joint ventures expanded mutual market spaces. This finding supports Fukuyama's (1995) argument that when groups reach a point at which their mutual self-interest in trade outweighs their mutual dislike, they strengthen processes of cooperation. It was noted that entrepreneurs took advantage of the newly founded relationships to initiate personal contacts and start joint business ventures, strengthening the foundations of entrepreneurship. Contrary to Baron and Markman (2000), I argue that until the divided groups reach the state at which mutual dislike is outweighed by self-interest in business, no amount of social perception, impression management, and persuasion will be effective.

The thesis contributes to peace research literature with insights into how ICTs can be effectively integrated with peace-building efforts. Key questions that this thesis contributes to include, can ICTs be used to improve the situation in the context of violence? Does increased ICT ability and use mean progress and reduced loss of life? What opportunities do ICTs provide in responding to violence and preparing communities for violence-related disasters? Can ICTs facilitate the management of conflicts and post-conflict situations? While there exists policy-relevant literature on ICTs in domains of humanitarian relief (Tellidis & Kapple, 2016), emergency response situations (Mancini et al., 2013), and betterment of socio-economic conditions in marginalized settings (Heeks, 2009), this thesis highlights that peace-building settings are unique and require different approaches. The body of research in conflict contexts has largely revolved around crisis prevention and early warning systems (Meier & Leaning, 2009; Stauffacher et al., 2011), or around issues of democratization (Akoh & Ahiabenu, 2012; Baguma, 2014; Danitz and Strobel, 1999), which have not touched upon unique challenges of scaling and sustainability that this thesis emphasizes.

Peace-building scholars have given different arguments about the role of ICTs in peace-building. For example, Tellidis and Kappler (2016) have argued that socio-technical approaches to peace should conceptualize ICTs as a tool that can serve inclusionary frameworks of post-conflict co-existence. This thesis goes deeper to demonstrate empirically how this happens in contexts of ethnic violence. I argue that ICTs can effectively serve as inclusionary tools when they are embedded in social networks and draw on social resources to build solidarity and trust through bonding, bridging, and linking social relationships. I further contend that inclusion happens when stakeholders in peace, particularly victims of violence

from across ethnic divides, transform into "peace-promoting identities. Tellidis and Kappler (ibid) further note that ICTs are tools through which the grassroots levels of society can be empowered to implement action without seeking to dominate other groups and to share power through enhancing self-acceptance and self-respect. However, Tellidis and Kappler fell short of explaining how ICTs contribute to these violent mitigation processes. This thesis confirms this claim and provides empirical evidence to show how these processes play out in practice.

I, therefore, conclude that ICTs can have both negative and positive effects on peace. They can bring peace as long as they are supported by other peace structures like peace committees, business communities, etc.

The thesis contributes to developing an analytical framework for studying the formation, conduct, and scaling of ICT-enabled peace networks. I build upon Castells' (2011) and Mosse and Sahay's (2005) ideas of informational (counter) networks, design principles of digital platforms (Baskerville & Pries-Heje, 2010; Wakerly, 2008), and peace-building principles (Ledarach & Appleby, 2010). This study emphasizes the central role of ICT-enabled information which when effectively leveraged by members of the network, helps counter the powers of violence-endorsing networks.

7.2.2. Practical contributions

The study makes significant practical contributions to the field of peace-building and violence prevention benefiting peace-building practitioners, conflict prevention practitioners, policymakers, and ICT system developers.

Provides a model for designing and evolving ICT-enabled peace networks: The thesis provides a model for building, evolving, and scaling ICT-enabled peace networks. It provides a four-step process of building a peace network that has the capability of countering violence-endorsing networks like gunrunning, livestock theft, gender-based violence, and exclusionary cartelism. The process includes building content, enrolling stakeholders, integrating ICTs, and evolving the network. The model further provides a framework for measuring the peace outcomes like justice, equity, and business liberty, that can be applied in designing peace projects/programs. The model also offers the principles and dimensions of scaling which have often been neglected during program development. The model has been adapted and scaled to three different settings with consistent results. The formation and effective operationalization of the ICT-enabled peace network resulted in saving lives through the interruption of potential attacks, bringing peace by building bridges across ethnic divides using ICTs, and cultivating viable economic opportunities across ethnic divides. This means that this model can be useful for peace-building practitioners and conflict prevention experts working in deeply divided or polarized settings. The conceptual framework provides insights for designing, planning, and implementing peace-building and violence prevention interventions through the network approach. The model can also be useful for government agencies in terms of understanding how involving community members in policing is fundamental. Apart from involvement, the power of ICTs in governance needs to be taken note of. The thesis offers some insights to ICT professionals and managers in understanding that in as much as ICT is technical, its application is social, which emphasizes the need to develop a socio-technical perspective on peace-building.

Provides a framework for scaling peace networks: The thesis contributes with a framework for scaling the peace networks. The framework comprises the processes —including the methodologies, capacities, and technologies — and the actors required for scaling. The process involves enrolling stakeholders into the network and defining their functional roles, establishing and maintaining the ICT infrastructure in the peace network, building content for peace-building activities which include conflict situation analysis, identifying hotspots, and mapping of indicators, and establishing, repairing, and evolving operations of the peace network. The framework further defines the "what and how" to scale like quantitative, functional, political, and institutional or organizational scaling.

Policy implications: The thesis provides insights for policymakers on the significant barriers in communication between the authorities and the communities about peace and security. At the same time, it demonstrates the value of using ICTs in overcoming these constraints. ICTs, when sensitively deployed, can enable community members to overcome fears of intimidation, harassment, and victimization in physical reporting, which further enhances the volume and speed of information sharing and action. This leads to increased accountability and responsiveness of both parties contributing to the mitigation of violence. This means that policymakers should invest in developing ICT systems that enhance interactions between the state and non-state agencies so that there can be effective collaboration among them for purposes of sustainable peace and policing processes.

8. CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

In this chapter, I conclude and identify some future research directions.

8.1 Conclusions

The overarching aim of this research was to explore how the interlaced relationship between social capital and ICTs contributes to building and scaling peace networks within contexts of ethnic violence in LMICs. To achieve this aim, the following three research questions were explored, and this section provides an overview of their answers.

- *How can existing social networks be influenced by ICTs in mitigating ethnic violent conflicts in the study area?*
- *What is the interplay of ICTs and social capital mechanisms in building community-driven peace networks in ethnic violence settings?*
- *How can ICT-enabled peace networks be scaled in mitigating ethnic violent conflicts?*

1. *How can existing social networks be influenced by ICTs in mitigating ethnic violent conflicts in the study area?*

The thesis identified violence-endorsing and peace networks as the main categories of social networks influenced by ICTs in the context of ethnic violence. First, there were violence-endorsing networks in all three study areas, which included cattle rustling, gunrunning, militia groups, political clientelism, cultural intolerance, and promoting exclusion. These networks worked to not only disenfranchise communities of their livelihoods but also sustained violence, particularly against women and girls. The study identified these networks through the rigorous process of conflict analysis conducted in each study area. The thesis further elaborated on how these networks are formed and sustained by bonding social capital that manifests in the form of strong ethnic identities. The study established that these criminal networks were embedded in pre-existing social relations through which they draw social resources. Social capital, defined in the form of ethnicity, is largely violence-inducing, across physical, social, and structural dimensions.

Second, ICT-enabled peace networks were gradually constructed in the three study areas to counter the violence-endorsing networks. The countering process involved monitoring and controlling bonding social capital within ethnic formations by anchoring the peace network in anonymized use of ICTs, which enabled flows of information whilst protecting the identity of the information providers. In this way, ICTs contributed to the increase in the agency of network members to achieve the explicit objectives of reversing the activities of the violence-endorsing networks to help mitigate ethnic violence.

2. *What is the interplay of ICTs and social capital mechanisms in building community-driven peace networks in ethnic violence settings?*

The thesis concluded that, first, ICTs created networking infrastructures that enhanced interaction and exchange within and between social groups. The infrastructures embedded in social networks led to multiple inter-connected processes of identifying and reporting on

indicators of violence; disseminating them to the appropriate responders within an agile governance framework; and facilitating feedback among network actors.

Second, ICTs facilitated access and mobilization of social resources such as norms, trust, information, social credentials, skills, and emotional support needed for collective action. The resources were mobilized from within and between the communities drawing upon linking and bridging social capital relationships. This enabled communities to access social resources embedded in the state, NGOs, voluntary organizations, and business actors for the mitigation of violence. However, the thesis noted that some of the responders (resources drawn through linking relationships) misused the information shared through ICTs to support the escape of criminals. For example, in Muhoroni, animals could be recovered but the livestock thieves could not be arrested. Meaning some people used bonding social capital to alert the criminals to escape.

Third, ICTs stored and helped convey information that was sensitive in an anonymized way thereby enhancing responsibility, reliability, and dependability among network members across diverse formal and community groups. Finally, ICTs enabled network members to create and share information, make informed decisions, and act together through networks and partnerships. This process encouraged actors to develop shared narratives, common interests, good leadership, and a commitment by members to take risks. ICTs enabled the self-organizing of the members through consensus building and social contracting in response to shared early warning messages. ICTs also enabled visibility of information, accountability of action by network members, increased speed of response, and countering misinformation and disinformation.

3. How can ICT-enabled peace networks be scaled in mitigating violent ethnic conflicts?

The thesis noted two main ways of scaling the ICT-enabled peace network. First, it identified the structure and processes involved in building and scaling peace networks. The four-stage process included: i) building content for peace-building activities which include conflict situation analysis, identifying hotspots and mapping of indicators; ii) enrolling stakeholders and defining their functional roles; iii) establishing and maintaining the ICT infrastructure in the peace network; and finally, iv) establishing, repairing and evolving operations of the peace network which contributed to the realization of positive peace. Positive peace was expressed in different ways such as reduced violence against women and girls, higher business liberty and opportunities, more robust justice systems, and improved governance.

Second, the thesis concluded that scaling to new areas involves carefully designed contextual cyclic adaptations. Four main adaptations were identified. The stakeholder adaptation involved changing the type of stakeholders based on the required content types and functional roles. The technological adaptation involved modifying and/or upgrading computer software and other ICT components to effectively respond to the demands of the peace network when scaled. Outcome adaptation concerned designing different responses according to the needs and types of participants. In addition, reports were generated and made relevant to the various stakeholders. For example, reports for field agents varied from the reports for response teams. Finally, content adaptation included the identification and response to the area-specific violence indicators. This explains the variability in the number and types of indicators per geographical area of intervention.

Finally, the thesis concluded that quantitative, functional, political, and organizational considerations are relevant dimensions to consider for scaling peace initiatives. ICTs contributed to quantitative scaling through mobilization for collective action by connecting peace network members with other actors in the same field leading to increased numbers of peace actors and geographical coverage. ICTs also increased the number of people reached by accessing new resources, creating more synergies and networks. In terms of functional scaling, the flexibility and ubiquity of ICTs used in the peace network enabled the expansion of functions beyond those designed for peace to include health, business, and gender-based violence. Politically, ICTs enabled the inclusion of minorities and marginalized groups into the peace network, thereby enhancing their participation and contribution to the peace process. ICTs also increased the capacity of communities to fight corruption and increase accountability. ICT-enabled peace networks contributed to empowerment and change and addressed the structural causes of violent ethnic conflicts. New partnerships, technological upgrading, knowledge, and skills increased organizational scaling capabilities. ICTs contributed to increasing the visibility of FPFK through the fight against violence against women and girls during the Covid-19 pandemic. The model of the ICT-enabled peace network has now attracted other actors like Humanity and Inclusion (HI) to partner with FPFK in implementing a community safety-related project addressing small arms and light weapons. The ICT innovation also led to institutional partnerships with academic institutions like the University of Oslo, Norway, and the Hekima Institute of Peace Studies and International Relations, Kenya. Strengthening the research component contributes more broadly to peace-building.

8.2 Future research directions

Operational future research direction

Further research could explore how the peace network model can be applied to other social settings. For example, how can this peace network infrastructure also be leveraged in identifying the implications of violent conflict on community or public health? Or how can it be applied in the education sector to track school dropouts, why, and how this can be mitigated? Or how can it be used in improving governance issues like the fight against corruption and discriminatory behavior like racism?

The thesis scope was limited to understanding how ICTs influenced social networks toward the mitigation of ethnic violence. However, much more could be explored to determine how ICTs are leveraged for collective action toward ethnic violence. This would provide a more complete picture that can form the basis for building a more robust theoretical foundation predicting the influence of ICTs in peace and conflict settings.

Technological future research direction

The peace network is designed to collaborate with classified users comprising monitors, community members, responders, data analysts, and a technical support team. This poses the risk of over-reliance on the classified actors for information. In the event of disruption among these classified members of the network, especially the field agents, there would be direct negative connotations on the operation of the peace network. Furthermore, connecting a critical mass of people as sources of information for action can increase the sustainability of the peace network as there would be no cost implications and more varied data would be collected for

action. However, the question that needs further interrogation about this is, what further developments need to be made on the ICT system and the peace network in general to incorporate the amount of varied data? How will the response unit be organized?

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I

ICT Enabled Peace Network: Case Study of Conflict Early Warning System in Kenya

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Abstract. Building peace in post-conflict societies is a contemporary and urgent humanitarian challenge facing the world. ICTs can potentially play a role in this process, but how and why this can be done has not attracted adequate research attention, especially in the ICT4D domain which should naturally be at the forefront of such efforts. Drawing upon Castells' notion of counter-networks, this paper based on an empirical analysis of peace-building efforts in North-West Kenya, examines the role of ICTs in enabling effectively information flows to strengthen the efforts in building a "peace network." Important lessons are discerned on how such counter networks can be cultivated, and some reflections are presented on how these lessons may or not be applied to other conflict-ridden areas.

Keywords: Peace · Post-conflict · Early warning · Kenya

1 Introduction

Most countries that gained independence in 20th century have had difficult road to democracy and peace. Some of the reasons identified by various authors for this slow and difficult pace have been contradictions of colonialism and national oppression, undermining the indigenous groups and class [1]. This has later manifested into class, ethnic and social struggles, which people have used for peculation of democracy and their inclusion into political process. In Kenya, the road to democracy has been a long one. For example, it took 30 years after independence to drop ban on multi-party politics and make space for more people and indigenous groups to participate in state elections. And even today, the process of strengthening democracy is ongoing through constitutional amendments to address the ethnic nature of Kenyan society. The ethnic identity, like in many African countries, influences political and social behaviour, including who one trusts, does business with, gets married to and whom to vote for, [2]. Although it is argued that open elections can help mediate disputes among groups by installing broadly legitimate and accountable governments [2], when citizens vote primarily on the basis of identity (ethnicity, religion, class, etc.) other issues such as performance and accountability are put aside diminishing the value of democracy. Analysis of voting behaviour of 2007 Kenyan elections, which witnessed unprecedented levels of violence, based on aggregate data suggests that, since the introduction of multiparty democracy, opposition parties quickly splintered according to ethnic

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groupings, and ethnicity became a dominant factor in explaining voting patterns and violent clashes [8, 11, 12, 14]. For instance, Oyugi [14] showed that ethnicity was the most defining factor of voting behaviour.

In this backdrop, there have also been community led initiatives to resolve conflict and build peace locally. Indigenous community process of peace have played pivot roles in resolving local conflicts and arresting any escalation of conflicts. Conflict early warning and early response has been a key strategy applied by community led initiatives to prevent violence [15]. Early warning consists of data collection, risk analysis, and providing information with recommendations to targeted stakeholders. Early response systems refer to timely and appropriate prevention interventions. Early warning and early response systems have been adopted by international organisations, bi-lateral agencies, research institutions and NGOs. Much of the literature available on examples of conflict early warning and early response systems comes from grey literature published by the organisations involved. Academic literature tends to focus on overviews and theoretical approaches to conflict early warning and early response systems rather than specific examples [4]. One such specific example is the CEWERS that is run by Free Pentecostal Fellowship in Kenya (FPFK). The CEWERS peace network has been running since 2012 and was introduced to help prevent electoral related violence for 2013 and continued to 2017. Though it might not be completely correct to attribute the peaceful elections of 2013 and 2017 to such a 'peace network', but role of these networks in long term conflict early warning and early response must be acknowledged. Understanding their role can create potential learning which can be taken to diffuse violence in other conflict-ridden areas.

Further, many of these peace building initiative are attempting to leverage upon the potential of ICTs to strengthen the peace building networks to help identify before the fact, indicators of violence, and initiate some form of response to diffuse the situation. A challenge in this process has been how to include community members who have been prior victims of violence into these peace building processes. Their prior experiences tends to leave them scarred, which inhibits their participation. Castells [3] has argued that to include such excluded groups into these "information networks" is crucial, as their exclusion will lead to their further and systematic marginalization. However, this process of inclusion is a non-trivial task for many reasons, not least their prior experiences. Drawing from Mosse and Sahay [10], we term this effort of building this inclusion as the creation of "counter networks", the aim of this paper is to thus examine "the challenges and strategies of building peace (counter) networks and the role of ICTs in the process of conflict early warning and early response".

The paper is organised as follows. In the next section, inspired by Manuel Castells we outline our conceptual approach to the study of communication and information flows, and analyse its role in the creation of "counter networks". Following this, we provide some details of the context of the ethnic violence and conflict in Kenya; and discuss the process of formation of indigenous peace network, we describe the communication practices that surround the peace network. In the section that follows, we analyse the case study based on key concepts from counter networks and informational capabilities. This analysis helps to develop some implications for the implementation of 'peace networks' in post-conflict societies of developing countries. Finally, we draw some concluding remarks arising from the study.

2 Relevant Literature and Conceptual Perspective

This paper draws upon some of the ideas of Castells [3] in the analysis of this case. Castells is a contemporary sociologist who has written on a range of different topics ranging from globalization, identity, network society and the Internet. He has made an important analysis of the role of ICTs in current social dynamics leading to the articulation of the concept of information networks and related processes on how these are developed and maintained and their consequences. Another important point of difference in his writings is his focus on development problems situated both in developed and countries, and not treating it as an issue only relevant for the poor in developing countries.

Castells [3] has sought to understand some of the dialectical processes inherent in globalization. Some of these forces he has identified include inclusion and exclusion, and the net and the self where we both feel connected to the world while at the same time have questions about our identities. Castells ideas are optimistic, providing indicators on how to combat the exclusion and systematic marginalization many groups and regions experience in the contemporary world in conditions of globalization. He argues that while in the past, colonization took place by countries going into capturing other lands, in the contemporary world colonization takes place by countries not going to other places and excluding them. This in essence is his thesis of the network society that marginalized groups will only continue to get more and systematically marginalized if they don't become part of the network society and becoming an active part of it will help them to come out of this systematic marginalization trap. These social networks are a ubiquitous feature of developing countries. The 'role' of these social networks range between shaping social identity, to enhancing livelihoods, to strengthening social security and more.

Castells [3] argues that the presence of networks is a dynamic and powerful entity, and in our case we seek to understand its relevance in strengthening peace building efforts.

The network society in short, represents a structural configuration of a decentralized group of entities (rather than a hierarchy) who are linked through informational flows, like the stock markets globally connected through information flows on financial data. In Castells' writings, there is an implicit capacity of groups to join and participate in the network society. Mosse and Sahay [10] however argue against this assumption about participation, pointing out that Castells does not give adequate attention to how can groups which are marginalized, such as slum dwellers in cities or illiterate populations in rural areas, join the network society? To operationalize how these marginalized groups or organizations can join the network society, despite their constraining conditions, they coin the term of "counter networks". However, forming such networks is a non-trivial task requiring special efforts and capacities, which are counter to the general belief that we can plug and play in the network society.

Our conceptual framework thus seeks to understand the structure, processes and motivations of participating in the peace network, which we conceptualize as a counter network. We call it counter because it seeks to include marginalized groups in the peace building efforts who have inherent constraints in committing to their

participation. Next, we try to understand the role of ICTs and information in enabling their active participation. In our analysis, we are inspired by Castells argument that ICTs and information can be a key enabler in actively engaging in these networks, which can potentially be a vehicle for them to exit from their historical trap of systematic marginalization.

3 Research Approach

A case study design was applied in understanding the role of Conflict Early Warning and Early Response System (CEWERS) in strengthening the peace network in Mt. Elgon conflict in Kenya since 2017. The network of peace building initiatives and dialogue (peace network) brings various stakeholders including local communities, civil society organisations, police, security agencies and Humanitarian organizations together to respond to signs of violent indicators. The Peace Network was initiated by a local Faith Based NGO referred to as Free Pentecostal Fellowship in Kenya (FPFK). The CEWERS is being hosted and coordinated by FPFK. It has been successfully running since 2012 and it is still active and being expanded to other areas. The selection of this case study is based on its achievements as indicated in the unpublished evaluation report by Otieno [13]. Furthermore, one of the authors, a graduate in peace studies, and a staff at FPFK has been deeply engaged on the ground in the Mt Elgon region in Kenya and in the peacebuilding efforts for the last 9 years. He is an "insider" in this research process. The other author, with a background in ICT4D, is relatively an "outsider" in this research who since the last one year has been working with the other author, including making one field trip, to help make sense of the peace building efforts over time and in the design of the CEWERS. Together, these authors bring in a multi-disciplinary perspective that combines domain knowledge of peace building and ICT4D, and applies it in the analysis of this case.

The methods guiding this research can be classified as action research where both researchers are studying and trying to reflect and make sense of the implementation process of the peace building processes and the role of the ICTs in this. The insider researcher, as argued above, in enrolling community members in the peace network and mobilizing them to act in various activities such as early detection of indicators of violence and responding to this information. Together, they are working to understand the role of other project members who engaged in strengthening the peace network. We broadly subscribe to the action research approach of "networks of action" [21] which seeks to direct action efforts in creating linkages between different units engaged in similar development efforts, in our case related to peace building. As researchers, we reflect and draw upon the primary empirical work and also related literature to learn from other similar experiences to understand how it can help here. Understanding these peace building processes over time helps to discern both the mistakes and successes, on what works and what does not, and slowly try to make more general our principles and learnings of how to carry out such tasks in other settings, and also reflect on how we could do the same task better—with the advantage of hindsight.

Sources of data collection are varied, and mostly of informal nature such as meetings, training sessions, community dialogue sessions, and discussions with other

non-state actors. There have also been the use of formal methods of data collection such as participatory conflict analysis, indicator mapping, and project documentation, which are fundamental requirements in the design and development of the requirements for the early warning system. There have been formal presentations made to both the community and to our research colleagues in the university. Data analysis has been broadly interpretive in nature and can be seen as an ongoing process which is inextricably intertwined with data collection. For example, when presentations are made to the community, the feedback obtained helps us to reflect on our own understanding of the situation and make revisions as may be required. There have been various discussions, meetings and presentations to our colleagues in the university which has to develop in an iterative manner the theoretical learning from the case study.

Since the study was introduced in an on-going case, the researchers observed all ethical guidelines especially by informing them about the research and their participation. They obtained informed consent from all participants, protected participants from harm, and ensured privacy.

4 Case Context

This section analyses the case context, which is Mt. Elgon sub county, Bungoma County in Kenya. The presentation provides an overview of the conflict situation in Kenya and going down to the specific contextual conditions in the study area.

4.1 Situation of Conflict in Kenya

Kenya experiences violent conflicts very often and increases during the electioneering periods. The violence manifests in the form of communal violence, militia activities and terrorism. According to the Armed Conflict report of 2015 (ACLED, 2015), Kenya is counted among most violent countries on the continent with over 3,500 recorded violent events between 1997 and 2015. Levels of violent events peaked in the three-month period of January to March 2008, [7] the quarter which also experienced the highest level of reported conflict fatalities (Fig. 1). Kenya experiences multiple, overlapping conflicts, which shape the nature of conflict and vulnerability of civilian populations in particular to violence.

Fig. 1. Reported fatalities associated with violent incidents in Kenya (Source: ACLED data 2015)

According to Fig. 1, the post-election violence that took place in January and February, 2008 was the highest recorded incidence of violence between the period of 1998 to 2014. The fighting resulted in 1,133 casualties, at least 350,000 internally displaced persons (IDPs), approximately 2,000 refugees, unknown numbers of sexual violence victims, and the destruction of 117,216 private properties and 491 government-owned properties including offices, vehicles, health centers and schools.

Initially, the violence was spontaneous and a reaction to the perceived rigging of the elections by the government. In areas like the Rift Valley and the Coast, members of the Kikuyu and Kisii communities (perceived to be associated with the PNU party and with President Kibaki) were targeted. In Nyanza and Western Kenya, the violence was mostly directed towards government facilities and gradually took the form of looting and destruction, and while it also targeted Kikuyus and Kisiis, the intention appeared to be not to kill them but rather to expel them and destroy their property. According to Human Rights Watch, the pattern of violence subsequently showed planning and organization by politicians, businessmen, village leaders and local leaders, who enlisted criminal gangs to execute the violence. This was particularly the case in Rift Valley and Nairobi.

The situation in Kenya began to stabilize towards the end of March 2008. As of July 2009, an estimated 61,000 IDPs remain in camps, transit sites and relocation sites. In addition, there were reports that ethnic gangs were rearming themselves with guns across the country in preparation for the next round of the 2013 elections.

People were displaced as a result of violence and threats of violence. They moved from their places of residence and business to places considered safe. Many lost means of livelihood, schools and their social support mechanisms. As always, violence too heavy toll on women and girls. According to the report by the Commission of Inquiry into the Post-Election Violence (CIPEV, 2008), sexual violence against women and girls took the form of individual and gang rapes, many of which were ethnically driven, as well as female and male genital mutilation. This official investigation into the violence documented cases of gruesome sexual violence, including genital cutting among women and forced circumcision among men and boys. There were instances in which families, including children were forced to watch their parents, brothers and sisters being sexually violated. Perpetrators of sexual violence were cited as ordinary citizens, gang members, and members of security forces. These already marginalised groups, were pushed further away.

4.2 Conflict Situation in Mt. Elgon Region

Historically, there have been various violent conflicts in Mt Elgon region including in 1963, 1975, 1983, 1987, 1992, 1997, 2006 and post-election violence of 2007 and 2008. Violence had been ongoing from December 2006 following a dispute between the Soy and Mosop clans of Sabaot community over a government resettlement program being implemented in Mt. Elgon [20]. The crisis was fuelled by politicians and eventually a well-organized quasi-military outfit the Sabaot Land Defense Forces (SLDF) entered the scene. This well organized group which had good supply of arms and training has been blamed for majority of deaths in the area and for committing atrocities against the residents. Incidents of violence intensified during the closely

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contested and disputed December 2007 elections, which have been described as the worst ever experienced. According to the Human Rights Report, the violence left about 600 people dead, over 84,000 people displaced and many human rights abuses inflicted on the local people. SLDF kidnapped, tortured, and raped men and women who opposed them or their political supporters, and kidnapped and tortured people who owned land that members of the militia coveted, forcing the owners to choose between mutilations or surrendering their property. They collected "taxes" from the population and they effectively ran a parallel administration, punishing civilians by cutting off their ears and sewing up their mouths if they defied the militia [6].

4.3 Initiation of Peacebuilding Interventions in the Region

During 2007/2008 violence, members of Peace and Rights NGO (referred here as FPFK) visited the IDP camps to offer psychosocial counselling and provide food and non-food items to families. During the counselling sessions, the victims were categorized based on age and sex. The women and other affected youths got the chance to narrate their ordeals during the violence. The affected children were categorized according to ages and classes and were taken through therapy using word games, drawing and storytelling. Members drew several things that communicated the nature of violence and their experiences. Many children played burning games where they demonstrated lighting bon fires and shouting the way militia gangs behaved. Others drew men carrying guns, houses burning, people running, others drew images of soldiers. The women, especially the widows narrated experiential stories during the violence. They were given the chance to share what they saw and witnessed. Some women told how their husbands disappeared long before the violence broke out. They mentioned that their husbands left homes three months or even earlier, and had never been seen again. This was confirmed by the Human Rights Watch Report [5]. For example one of the women narrated,

The children remember him. They ask, "*Where is our dad?" ... Sometimes, I don't know what to tell them. I say, "Dad was taken by certain people ... and he wasn't returned." Until this moment, even I don't know where he is. As I haven't buried him, my thoughts trouble me.... I haven't returned to our home. If I stay at home, I find myself wanting to call out to him.*

A lot of information was gathered concerning the experiences of the victims, some of whom had their ears chopped off as stated by one of them,

I was coming from the market. They [the SLDF] stopped me and asked, *"Do you want us to cut off your head or your ear?" ... Then they talked amongst themselves. I was silent while they cut off my ear.*

Some of the youths that escaped from the militia camps and were found in the camps also narrated their experiences during the operation. They told how they were abducted and used mutilate people and kill others.

Learning from these experiences, FPFK initiated a peace and human rights project in Mt. Elgon in January 2009. The project aimed at restoring trust, human dignity and peaceful co-existence among communities for enhanced development in the area. Their primary work focused on promoting peace through dialogue and mediations, rehabilitation and empowerment of militia groups and women, and promotion of indigenous

peoples' rights. This also included psychosocial rehabilitation of victims of violence including women, children and displaced persons. FPFK was also engaged with rehabilitation and reintegration of members of militia groups with their spouses and contribute to the restoration of mental health and economic status of widows associated with violent conflicts. They formed social support and peace groups to champion for peace and social justice in the area.

Another key activity was to build capacity of various members of the community to engage in peace processes. As a result, various peace structures were established like religious networks, councils of elders, professional bodies and various lobby and advocacy groups.

4.4 Peace Network and CEWERS

Noting the need for a strong civil society, FPFK, facilitated the formation of groups for women, youths, elders and mobilized the victims and perpetrators of violence into groups between 2009 and 2011. They were trained in lobbying and conducting advocacy for peace, conflict management with strong components of indicator mapping and monitoring, good governance in the context of devolution and the role of various security agencies including their leadership structures and sexual and gender-based violence. These members were registered with the government as legal entities and members provided with badges to identify them as community advocates and champions for peace.

The FPFK approached other NGOs and CBOs working in the region to join the 'peace network' and help expand it. Other new 'non-state members joined the peace network including the Kenya Red Cross, Handicap International, Mercy Corpse, Human Rights Watch, Catholic Peace and Justice Commission and various others. There was also the involvement of various 'state actors' such as the departments of health, child and women welfare, and internal security agencies including the police, the military and the government leaders at the county levels to strengthen coordination mechanisms. A combination of these various state, not state and citizen groups, together with the formation of mechanisms for coordination and engagement contributed to the establishment of the peace network. The FPFK was the defacto coordinating agency of the peace network.

Another important reason for inclusion of both state and non-state actors into the peace network was to better integrate components of 'response' and 'action'. Given that community members were now discussing and bringing upfront the cases of violations, it was important to link these to response mechanisms, so that the community member could associate 'value' by being part of the network. In 2012, the network expanded to cover other areas like Trans Nzoia, Bungoma North, parts of West Pokot and Turkana South. The expansion was motivated by the success of the Mt. Elgon network and the 2013 general elections that had largely been predicted to be likely more violent than the 2007/2008 elections.

In one of the meetings of the Peace Network, members raised the concern of victimization of the community members who reported the potential perpetrators of crimes and violence by the security agencies and the reported victims. It was agreed that in order to prevent violence, effective participation of the community members and

other stakeholders and communication among them was essential. The members emphasized the challenges related to communication among themselves, with the community, the security agencies and the government. Members were confronted with questions such as how can the community members be motivated to share information with the network and authorities without fear of being victimized? How can the relationship between the security agencies and the community members be improved? What is the role of the network and other non-state actors in preventing violence? How can information communication technology be used in prevention of violence?

In responding to these questions, the idea of application of ICT in violence prevention was born. Three locally based ICT specialists were incorporated in the brainstorming session around design. The project team presented to the ICT team the indicators and how they escalated towards violence. They were asked to conceptualize how a computer-based system could be used to share information in an anonymous way to the stakeholders by the community members. A technical working group was formed comprising of the conflict management practitioners and the ICT specialists to analyse the dialogue reports and extract all indicators. Participants in intra and inter community dialogues had pointed out that they were always aware whenever there were going to be attacks but when they reported these incidents to relevant authorities, they themselves became victims and the perceived victims became witnesses. This inculcated fear of reporting by the community members hindering the taking of interventions prior to the escalation of violence. It was also established from the participants that most community members were never aware of conflicts and even the indicators. They were caught unaware. The group made use of literature to refine the indicators that were validated during the training of surveillors. The indicators were coded by the system experts into Levels 0, 1, 2 and 3 respectively. At Level 0 and 1, these indicators were to signify peace and calmness. Level 2 was a bit serious and needed action while any Level 3 was treated as a serious indicator likely to trigger tribal clashes or chaos or any indicator that could cause serious security problems in an area. Response procedures were designed and responders identified.

4.5 CEWERS Operations

The early warning system enables sending and receiving simple SMS. The CEWERS has three main components:

1. Community volunteers – This comprises a team of trained community volunteers, who will send SMS whenever they notice any activity which could escalate into further violence. Their primary role is send data on the hot spot areas according to the identified indicators and relay the same to the analysis unit or the control room.
2. Communication unit – all SMSs are received in the computer/server installed here. Once the SMS are received, the messages are then manually forwarded to the stakeholders in the peace network to take action – these include both state and non-state actors.
3. Response team – comprise of all state and non-state actors. Once the analyzed reports are generated from the early warning section, they are forwarded to the response coordination unit.

4. The ICT enabled peace network has been working effectively in the region since 2012, and has gained immense credibility of all stakeholders – community, community volunteers and state/non-state actors.

5 Analysis and Discussion

After presenting a brief overview of a complex and ongoing peace building effort, in this section we draw upon Castells' notions of networks, information and counter networks to present out analysis. We do so by discussing the following questions.

5.1 Who are the Marginalised Groups and Why are they Marginalised?

In our case, the marginalised groups are victims of armed conflict and violence and are also first-hand affected by the consequences of violence. Members of the community, across ethnic groups, who have lost loved ones, livelihoods, and opportunities for wellbeing and safety. For example, a family who has not lost lives in the violence, but are starving because there is no food available, or the schools were damaged during the violence due to which the children lost precious schooling period. Though there have been state initiatives for mainstreaming the marginalised, by forming various village councils and committees etc., but given the deep rooted ethnic divide, the process of 'trusting' the state has been very slow and weak.

5.2 Why is it Difficult for These Marginalized Groups to Join the Information Networks?

Insecurity and uncertainty of 'peace' further aggravates their marginalisation, as it pushes their capability to 'gain' means for inclusion into the peace network. For example, unemployment is very high amongst the affected population as there are limited opportunities for work locally. There is the ongoing fear of violence and losing loved ones which stops families to send their menfolk outside the village to take up work. Also to add to this, lack of means and resources to travel out also limits the opportunities to participate in 'newer' networks.

However, there are also many strengths, most so the resilience of the members to withstand these violence incidents. This strength is also reinforced by the availability of a mobile phone in a household/family. Even though most of the phones are old feature phones, they serve as an important means to enable communication across members. It is also relevant to mention 'feature phone' as mostly members the 'big screen smart phone' is somehow understood as the default for 'mobile phone'. This availability of the phone has opened up windows of opportunity for them to connect to outside networks, which otherwise might have been tough. The individual agency of the community members to participate in the 'peace network' coupled with availability of the mobile phone, has given them the opportunity to leverage into the larger network of peace building extending beyond their immediate families and neighbours.

5.3 How have the Marginalised Groups Become Part of the Information Network?

The peace network has helped to build a community of 'volunteers' and 'community peace representatives' in most villages effected by violence. They have become the primary source of information on the 'peace situation' in their respective areas, and have slowly become responsible to share information if they found anything contradicting their understandings or perceptions of a 'peaceful situation'. This pivotal position have made them 'primary' in the peace network, even though they are part of the marginalised groups. In this case, small and simple ICT means enabled through the mobile phones, has given these people the tools to fight against their own marginalisation, and become members of the larger peace network. They have in this process also been able to ward off some of the threats of conflict and violence, which has been the source for their marginalisation. Hence, people have an 'intrinsic' value in becoming part of the network.

5.4 What have been the Determinants and Processes in Building the Counter Network?

Our case demonstrates that an active counter network in the form of the "peace network" has been formed and is being strengthened over time. This network has been successful in mitigating violence in the region, as seen by the far fewer incidents of violence reported in the region post 2010. While there may be various contributing factors to this, we argue that the peace network has played an important and enabling role in this process. It thus becomes important to understand what have been some of the enabling conditions in terms of the structure and processes in creating this network.

Structure: In terms of the structure, a key feature of this peace network has been the membership of all relevant groups, including state, non-state and community. While top down state driven efforts often leads to the failure of such initiatives, the interesting point to note this network is coordinated by a local grass-roots NGO (FPFK) who is well-trusted in the community. The inclusion of relevant groups has been strengthened immensely by the engagement of groups that have historically been marginalized and who themselves are the victims of violence. Including them has been important as they are typically closest to the scene of violence, and are best placed to identify indicators of violence and send this information to actors like FPFK who are equipped to deal with the situation, either through direct intervention or by enrolling other members of the network, such as the security agencies, in engaging with the problem situation. The network is thus structured without a centre and a hierarchy, which has been conductive to enable rapid multi-faceted action.

Processes: The role of different processes can be seen as being vital in the creation and cultivation of this counter network. This includes; (i) identity formation – community members have been able to transform their identities from being "victims of violence" to "protectors of peace." This transformation has been motivated by people's intrinsic motivation to engage in this peace building process, as they have a direct stake in it – their livelihoods and the security of their families and loved ones is at stake; cultivating multi-faceted action – mitigating conflict and enhancing peace are complex processes, requiring multi-faceted action of creating indicators, collection and

transmission of relevant information to the right people, and by acting on this information. Structurally, the network includes different groups that play different roles – early detection, response, advocacy, coordination and capacity building. By ensuring that these different actors play their respective roles effectively, the peace network has become a relevant site for strengthening collective action which has helped achieve some of its peace building objectives; and, (ii) effectively harnessing the power of ICTs and information – no complex technologies have been used, only mobile phones which are anyway domesticated in the lives of people in the region. This phone allows the registration and transmission of relevant information in a timely manner to enable early detection of violence. Further, the CEWERS system allows for the consolidation of information, and also relays it to those most suited to affect response. The ICTs and information helps to not only bring the network members together, it also helps to execute collective action.

In summary, we can argue that the combination of people's inherent interests and motivation, the structure of the network, and processes which have strengthened the "networks of action" have led to the creation of a robust and effective counter network – the peace building network.

6 Conclusion

Now that this counter network has been formed and is operational, two questions become relevant. One, how are these efforts to be sustained over time? Two, how can these networks be scaled to other regions which are similarly affected by violence and conflict? Both these questions have no simple answers?

With regard to the first question of sustaining, it can be seen that the success of the existing efforts of building peace should serve as a self-reinforcing mechanism for the existing members to continue the efforts. Having seen the benefits of peace on their own and their family lives, they will be motivated to carry on the efforts. However, as the situation of peace becomes stable and institutionalized, there may be the need to diversify their efforts into other domains of relevance – such as improving employment opportunities or strengthening community health. This may require in addition to FPFK other actors like health activists to also play more important and active role in strengthening the networks of action. As activities become diverse, complexity will heighten, This may require the need to reflect on the ICT solution and move towards something more substantial, such as of maintaining databases, activity specific dashboards, and integration with other systems and data sources. Bringing in these enhancements would be essential in continuing to leverage on the power of information.

With respect to the second question of scalability, it must be firstly noted that it is a bad idea to try and replicate the structure and processes as they are in other settings. As context is different, locally specific approaches would need to be designed, while however, continuing to build upon the positive learnings. These could be thought of as general principles, such as trying to build a network with people who have an intrinsic motivation in engaging with the processes. While recognizing that ICTs and information plays a central role in building the network, the particular solutions would need

to be designed to cater to the local conditions of infrastructure, capacities and to the particular problems that the systems is trying to support to address.

In conclusion, our paper has tried to make two key contributions. One, to bring the domain of peace building more in the mainstream of ICT4D research. Two, to demonstrate the value of Castells conceptualization of the network society and counter networks to the analysis of a complex socio-technical problem which is adversely affecting development processes in many parts of the world.

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IV

The Role of Social Capital in Mediating ICT-Enabled Peace Building Efforts: A Case Study from Kenya

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Abstract. Inter-ethnic violence has flared in recent years across Kenya's periphery due to struggles around processes of political devolution, corrupt systems of governance, elite sponsorship, cattle rustling, climate change, famine, land, politicization of ethnic relations and illicit arms. Violence has resulted in loss of life, loss of livelihood, increased hatred between communities and large-scale displacement. New ways of violence prevention are needed to achieve sustainable peace, and contribute to broader efforts of social development. This article analyses the implications of integrating ICT in mitigation of ethnic violence in Northwestern Kenya. The theoretical lens of social capital is used, with a focus on different forms of bonding, bridging and linking to analyse how ICTs can reduce those forms of capital that enhance violence and simultaneously promotes those that can promote peace. Our study finds that relatively simple ICT applications that can help inform anonymously on potential violent conditions and initiate speedy and effective response to them, can help promote binding social capital at the expense of bonding forms. This changing dynamics around the constitution of social capital has contributed to effectively promoting peace building efforts. The paper thus contributes to the important domain of 'ICTs for Peace' research and more broadly to ICT4D.

Keywords: ICT · Ethnic violence · Social capital · Kenya

1 Introduction

Inter-ethnic conflicts are a widespread problem on the African continent, with devastating effects on human security through loss of life and livelihood, and large-scale displacement [1]. Ethnic violence involves choosing victims based upon ethnic membership [2]. In Africa, the six worst-hit countries from such violence include Nigeria, Ethiopia, Somalia, Sudan, Kenya and Uganda [3], a trend increasing in recent years [3]. Kenya is reported to experience one of the highest levels of such violence [4], particularly following political devolution [5], often encouraged through elite sponsorship

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[4, 5]. Other sources of conflict include cattle rustling, environmental degradation; drought, land related conflicts and the proliferation of small arms and light weapons (SALWs).

As ethnic violence continues to flare across the Low and Middle Income Countries (LMICs), peace activists are exploring ways of integrating ICTs in peacebuilding efforts [6], such as using mobile phones to help identify and map hate speech and rumours by citizens' perceptions of risk and conflict and providing early warning of potential risk situation [7, 8]. ICTs have been used to track violence in Latin America, for example, Infocrim in Sao Paolo has been credited with a fall in homicides from 12,800 to 7,200 in the period 1999–2005 [6]. Without communication networks, it is difficult and dangerous for civilians to inform on rebel groups, as they run the risk of being identified [9]. The Ushahidi platform has been used in Kenya to map election violence. There are also examples of other ICT applications being used for peace building in Kenya such as the Uwiano Platform for Peace, Umati for monitoring hate speech, Elections I witness and Sisi Ni Amani for monitoring election malpractices. However, the study of these applications have not focused on the role of citizens in implementing these efforts [4]. ICTs can also be used to facilitate organized violence, such as supporting the coordination amongst groups promoting violence [10], by enabling rapid sharing of information [11]. ICTs thus come with both opportunities and risks in peace building initiatives.

There is urgent need to develop more nuanced understanding of the role ICTs play in peace building efforts, and how these play out in particular social contexts. We explore these social dynamics around ICTs through the lens of social capital [12]. We explore this through the research question: *What is the interplay between ICTs and social capital in mitigation or not of ethnic violence?*

This paper is organised in seven sections. In the next section, we outline the theoretical approach based on a social capital perspective. In section three, we describe the methods, followed by the case study narrative. Section five presents the findings, and the analysis in Sect. 6. The conclusions are presented in section seven.

2 Theoretical Framework: A Social Capital Perspective

The use of ICTs in mitigating ethnic violence, are shaped by the social networks in which they are embedded including the shared norms and values, and how trust shapes processes of cooperative relationships within and among conflicting communities. The role of social capital has been highlighted by different academic disciplines, such as public policy and sociology, leading to its multiple conceptualizations and definitions (Hossam, 2009), focusing on the structure and/or on the content of the social [13–15]. We focus on the different mechanisms identified in shaping social capital, namely, bonding, bridging and linking and how these processes are mediated by ICTs. Social capital serves as the glue which can bind community based social networks and are important in shaping processes of technology development and use [16]. Social capital represents resources or assets rooted in an individual's or in a group's network of social relations.

We adopt the definition of social capital as networks, shared norms, and social trust that facilitate coordination and cooperation within or among groups for mutual benefit [15]. Putman emphasizes different means that shape social capital including processes of

bonding, bridging and linking, which can both build and undermine social relationships. These means provide an interesting lens to understand the role of ICT in shaping social capital in peace building efforts, particularly in shaping social trust reflecting the level of confidence that people have that others will act in expected ways [17]. Trust indicates a willingness of a person to be vulnerable to another party either as a consequence of their belief of good intent [18]. Trust is embodied in structures of social relations and grows with increasing sense of personal or group security, and processes of accountability.

We study the means of building social capital within the context of a *social network* and seek to understand the level and type of engagement an individual has within the collective and the level of support he or she can obtain [19]. This is reflected in the *norms of reciprocity* between the individual and the collective [15]. In an interconnected group of people, social networks provide the foundation of personal and group interactions and how they unfold.

Bonding represents a means of building social capital in a collective characterised by high levels of similarity in demographics and social attitudes [20]. Bonding thus exists between 'people like us' such as in a family or close friends [21]. Bonding often escalates the polarization between communities increasing their vulnerability to violence, and simultaneously promotes violence against the perceived "other." *Bridging* social capital describes connections across a cleavage that typically divides society, such as ethnic or religious groups [17, 18]. Bridging helps to understand how can ICTs help peace actors to break constraining factors by enabling information flows between conflicting communities, and the building of consensus. *Linking* social capital describes norms of respect and networks of trusting relationships between people interacting across formal institutionalized power structures [22]. We use linking to understand the ICT-mediated relational dynamics among community members, non-state actors and state actors in the context of violence mitigation.

These three means of building social capital help to analyse the complex relationship between social capital and ICT-mediated violent mitigation efforts. We expect for conflict to increase tensions and decrease trust between engaged actors and also force them to rely and depend on each other. Social capital might be formed on the basis of solidarity in the face of an external threat, while relying on bonding processes. We analyse how ICTs reshapes elements of bonding, bridging and linking can enable or not peaceful coexistence of communities. [21] has argued that social capital can provide the basis for social belonging and constructive social interaction, enabling joint problem solving. However, Putman has not analysed the role of ICTs in shaping the different social capital processes, a gap which this paper seeks to address. However, imbalances in the bonding, bridging and linking forms of social capital can also lead to increased inequalities and subsequent conflicts [23]. Social capital can thus both lead to mitigating and promoting conflict [24], based on whether social capital is 'unresponsive' or 'exploitative' [25]. Social capital can both include or exclude groups [20]. Social capital therefore cannot be assumed to always act as a glue, since it can also function as a source of tension, and contributing to violence. How do ICTs like mobile phones redefine these dynamics, reflects our empirical quest.

3 Research Methods

This paper results from the work that is ongoing from 2018 in a Faith Based Organization (FBO) in Kenya, where one of the authors is involved as a leader for conflict mitigation efforts. The work involves formation and strengthening of community level peace structures, social contracting processes, strengthening community-authority relations and promoting early warning and early response using ICTs. The experiences and engagement is thus rich, intensive and ongoing and involving a diversity of learnings.

The study is based on the longitudinal research design (2018.2020), involving multi-stakeholder analysis based on qualitative data. The study employed a case study design to understand the role of ICT-based early warning and response system (EWERS) being implemented by the FBO in Kenya. The analytical focus of the case is on the role of ICTs in shaping peace building efforts of community groups in sites historically plagued by violence in Northwestern Kenya. We sought to understand how the social dynamics, viewed through the lens of social capital, shaped the use of ICTs in peace building efforts.

One of the authors, a member of the FBO, has been visiting the case study sites at least quarterly during the study period, while the other authors has made one visit each of the last two years. Data has been collected through various means of meetings, focus group discussions, and interviews. In 2020, given the travel restrictions, regular contact has been maintained between the authors and with the actors in the field over phone and Skype. Additionally, system reports were examined at periodic intervals, for example to see the changes reported in key indicators of conflict, such as related to cattle theft, domestic violence, prevalence of small arms, drug and substance abuse among others.

The study also applied a multi-stakeholder analysis approach in identifying stakeholders and classifying them, such as indicator monitors, community peace representatives and security agencies. We tried to investigate the relationships between stakeholders, and how these were being mediated by the EWERS application. The stakeholders were analysed at three levels: i) the first was the indicator monitors, also known as field agents that collect intelligence reports from the field; ii) the second was the system developers and analysts who received the data from the indicator monitors; and, iii) the third was the responders who mainly comprised of end-users, the government authorities and the other non-state actors who were expected to take peace building actions. For each group, we examined how members applied the ICT for peacebuilding efforts given their different roles. Peace building efforts were focused towards different ethnic communities engaged in conflict in two clusters: i) the Kipsigis, the Nandi and the Luo in Muhoroni conflict cluster; and, ii) the Bukusu, the Sabaot, the Iteso and the Kikuyu in Mt. Elgon conflict cluster. The analysis focused on interactions between community groups and exchange of ideas and goods. These clusters were organized through different groups, such as peace committees, community advocates and peace representatives, women peace associations and thematic committees.

Data analysis was broadly interpretive, helping to identify three key themes around the relationship between ICTs and social capital, shaped within the context of economic and power relations. We tried to reformulate stories narrated to us by different respondents, and related to concepts of bonding, linking and bridging social capital.

4 Study Context

The area under study covered Trans Nzoia, Bungoma, Kisumu, Nandi and Kericho Counties in Western Kenya, where there exists intractable ethnic violence. The FBO has been historically engaged in peace development efforts in these regions, including the use of ICTs. The communities under study were the Kipsigis in Kericho; the Nandi in Nandi and the Luo in Kisumu counties. While the Bukusu, the Sabaot and the Iteso in Trans Nzoia and Bungoma counties formed another conflict axis referred to as Mt. Elgon cluster (see Fig. 1)

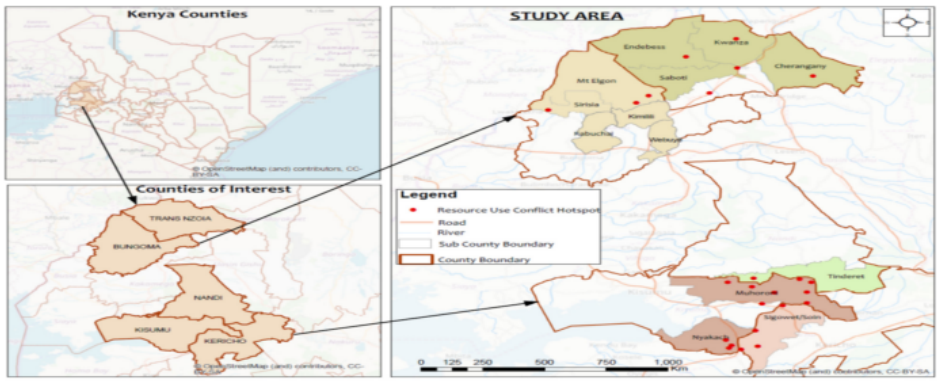

Fig. 1. Muhoroni and Mt. Elgon study areas

Communities in Mt. Elgon and Muhoroni clusters have been embroiled in violence since 1963. The causes include political dominance, land and boundary disputes, the proliferation of SALWs, and large-scale cattle theft. Existence of militia groups and IDPs is a threat to security, and there also exist high rates of corruption among some police and chiefs who also encourage drug and substance abuse. Ethnic discrimination in resource sharing was another cause of conflict.

The FBO registered in Kenya has been working on various development projects with a primary focus on peace and reconciliation projects. The FBO has designed and implemented an EWERS as a key tool in peace building efforts, based on the sending, receiving and processing of SMS. The EWERS receives information from field monitors and sends verified information to the mandated responders in time to take action.

The EWERS has three main components comprised of the monitoring, control and response units. The monitoring Unit comprises of a team of field agents knowledgeable about the violent hotspot areas. They are equipped with a simple feature phone and a reliable network provider for easy communication through both SMS and voice calls. Their primary role is to collect data in the hotspot areas according to pre-defined indicators of violence and relay the same to the control unit. The control unit is computer monitoring system with a web-based software. The personnel manning the system analyses, interprets and double checks the reports from the monitoring unit by calling the sender (field agents) and generating relevant reports for action by the response team. The response unit has a team of responders, including state security agencies, NGO's,

local administrators, responsible for particular geographical areas and for types of incidents. They respond with appropriate action based on information of incidents received through their mobile phones. The system is schematically depicted in the Fig. 2.

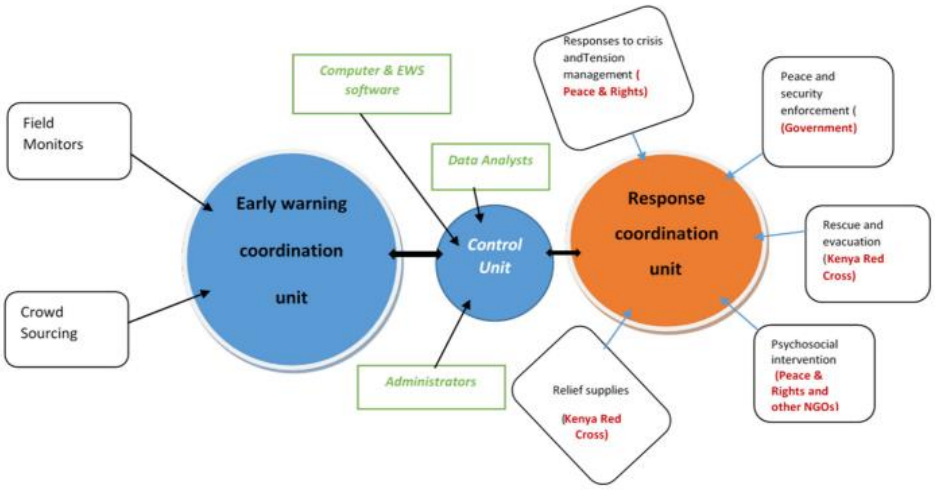

Fig. 2. The EWERS in use by the FBO

5 Case Description

This section describes the case study around key themes identified through the empirical work.

5.1 ICTs as a Platform of Sharing Sensitive Information for Peace and Security

The study established that the introduction and use of ICTs helped community members, particularly peace actors in Mt. Elgon, to overcome conditions constraining information flows between communities leading to better social relationships and improved mobilization of community resources. The EWERS, with its inbuilt features to anonymize the sender, motivated the field agents to share sensitive information to each other thereby contributing to saving lives and properties. For example,

> *"in Endebess a Turkana woman saw a group of some Pokot youths crossing the border from Uganda to attack the Bukusu and take away their animals and also smuggle in weapons. She sent the message to the system warning that the Bukusu farms will be attacked shortly. The police in collaboration with community leaders responded quickly before the culprits could carry out the attack."* (community member in KII).

*In another case, "a Teso family had sold many bags of maize and had got lot of money. A group of Sabaot youths had noted this and were planning to attack this family at night. It was also an opportunity to evict them from their land which the Sabaot had believed that it was theirs. A Sabaot who got hint of the possible attack sent a message to the EWERS. The Teso family got the alert and moved away that night. The security agencies kept vigil at the home and arrested the youths who had come to attack" (*community member part of FGD*)*

Such sharing helped the strengthening of bonding relationships by enabling access to sensitive information which helped to protect other members by preempting potential attacks. We found that ICTs helped members from across communities to alert each other whenever they sensed that there was going to be an attack. Prior to the introduction of the EWERS, such information went unreported due to fear the community members had of being victimized by the security agencies and the police, and to be embroiled in long-drawn out and resource consuming legal cases. The ICTs helped increase confidence of reporting sensitive matters among members of the community.

5.2 ICT as a Medium of Minority Empowerment

The EWERS provided a medium through which the minority groups could raise their voices and be included in peace building efforts. The EWERS facilitated flows of information, empowering the minorities to challenge the deeply entrenched power structures exercised by the majority groups. The prior lack of inclusion of minorities in these communities was a factor that had sustained the violence, and their inclusion contributed to increasing the levels of justice, as demonstrated in the example below:

"When appointing Assistant Chief in Kaplamai, the Nandi community noted that somebody from a different community was going to be appointed instead of their own. They started sending threats and complains which were captured in the EWERS. A Nandi woman received the alert message and opted to use her influence to support a woman candidate who was not a Nandi against the wishes of her community. The Kisii woman who was being supported by the Nandi woman got the position." (community member in KII).

The EWERS contributed to increasing leadership opportunities for women by enabling them to engage in different peace building efforts and help them to ascend to various leadership positions in their communities. Their engagement in response to the message alerts on issues of gender-based violence, corruption, SALW proliferation placed them at a vantage position to be appointed or elected into leadership. For example:

"The community in Chepchoina agreed to unanimously elect one of the most active member of the Peace network to a women leadership position. Everlyne Wasike has caused massive influence through response to the EWERS messages. She became so popular that the men in the community campaigned for her until the fellow women elected her to the chair of Maendeleo ya Wanawake. She was again later elected to the chair of the settlement farm (this position is normally a reserve

*for men). Even recently three other women from Courageous women group were appointed as village elders." (*community member in KII*).*

There were also increased opportunities for the empowerment of youth in the communities. The message alerts from the EWERS motivated regular interactions between the Chiefs and the youths from the affected communities, which also drew the attention of leaders to the economic plight of youths. Some chiefs started sensitizing the youth on the importance of peace and respect for the rule of law, and for them to focus on the development of entrepreneurial skills. This served as a means for youth empowerment.

*"I have gone an extra mile to lobby the support of loaners such as Uwezo and women funds who lend the youth money to start business so that they can upgrade their livelihoods and as result of this, community members have gained trust in the administration and relates with me well." (*Community Chief *in KII)*

5.3 ICTs as a Facilitative for Access to Economic Markets

The EWERS helped open up market spaces that had been before closed to community members, by linking then across ethnic divides and encouraging joint venture efforts. These connections led to new economic opportunities and business partnerships, for example, communities in Mt Elgon formed *chamas* and business groups in Saboti.

*"We were brought together by EWERS to regularly respond to alert messages from the system. But with time we decided to also engage in joint business that has now become a SACCO whose membership is drawn from all communities living in Saboti." (*community member in *FGD).*

Through the focus group discussions, we learnt that that business in the area had improved with the advent of the EWERS as it had facilitated a platform for interaction of diverse groups of people, enabling the opening up of new markets that had before been closed. The Sabaot harvest milk, honey and firewood and supply to the Bukusu who in return supply maize, cooking oil, sugar, soap. This had previously not happened due to high polarization between these two groups. According to a key informant, the Luo and Kalenjin had started to freely interact in the Sondu market leading to joint business ventures since both groups were included in the network engaged with responding to alert messages related to cattle theft.

*"We exchange goods and services, for instance we the Kipsigis bring tomatoes that the Luo buy on credit and take it to Kisumu, and the payments done later." (*community chief in *KII).*

5.4 ICTs as a Driver of Community Conversations for Peace

The early warning messages sent to the EWERS revealed polarized relationships between the Abagusii and Marakwet in the Trans Nzoia County. The persistence of messages drew the attention of national level government leaders who responded swiftly by forming community-based dialogue groups, helping the two communities to engage in reconciliation efforts. After peace was achieved, the communities made a social contract to be

solving their issues amicably without being aggressive against the other through dialogue. A tree by the name *simatwet* became their symbol of peace where they would always meet whenever system alert messages pointed to possible dangers to security. Following such regular conversations, many people who had been earlier displaced, were recalled by host communities.

> *"The Abagusii IDPs have returned to their farms and were busy farming. The roads connecting between the areas occupied by the two communities had been closed but now they have been opened. Chepkaitit primary school located in the area between the Marakwet and the Abagusii had been vandalized and closed due to violence. None of the communities wanted their children to attend the school. The government repaired and reop-ened the school. Children from the two communities (Marakwet and Abagusii) started schooling together in Chepkaitit primary school. The school board now has members from both communities" (*community member in KII)

5.5 ICT System as a Tool for Recovery of Lost Assets in Conflict Situation

The ICTs facilitated the timely reporting of incidents encouraging timely response enhancing recovery of stolen goods and animals especially in the Muhoroni conflict cluster. Communities along the borderlines of Kisumu and Kericho collaborated with each other to ensure recovery of stolen animals and returning them to their rightful owners. One such example:

> *"Following the incident where animals were stolen and one person killed, as a community we all resolved that whenever stolen cattle is reported to have crossed to our area, we must search, find and return so that we breed good relationship with our neighbors and this has improved the relationship between us Kalenjins and our neighboring communities. As a chief, am ensuring that this is being enforced across the borders by members of the community and peace committees."* (community chief in KII).

5.6 ICTs Enabling Networking and Collaboration to Support Governance

ICTs facilitated the creation of a strong collaborative relations between the community members and the security agencies especially police. This trust emerged as a result of the sharing of information useful for each other. As there was increased flow of information between the community and the police, some of the barriers to trust were mitigated. According to one focus group discussion, earlier there used to be high level of mistrust between the police and the community members who feared intimidation. For example, a retired officer commanding a police division narrated,

> *"most junior officers are weak and can leak the information in regard to secret reports – thus they can easily pass over classified information that is so confidential to the criminals. They also tend to ask irrelevant questions such as how many criminals did you see? Which clothes were they wearing? For example, upon recovery of a cow, a civilian may not be interested to follow up the case in court due*

*to such useless questions. Some policemen still threaten residents with penalties of being locked up. Such questions and threats are intimidating and scared members of the public from reporting."(*community member in *FGD).*

The above statement describes the constraining conditions that had previously affected the relationship between the police and community members, and the laxity of the police in responding to community distress calls. This constraining condition was reduced with the introduction of the EWERS with its inbuilt features of anonymization. Police officers from across the conflict divide now networked and jointly responded to the alerts. The EWERS helped in fast reporting which enhanced quick response from the police and other security teams leading to increased recovery of stolen livestock. Such response actions helped enhance trust between the police and community. The EWERS contributed to transformative changes in security management approaches, and the police started attending community forums such as church functions, organized seminars, and public security forums to interact directly with the public. They also started inviting some members of the public to give motivational talks to the members of the police force. In the same vein, through public and other community meetings, police officers educated the community on case reporting investigation processes and their respective roles and responsibilities. This resulted in greater bonding between the police and community leaders leading to improved reporting from the community which supported relevant and effective response. This attracted many community members to report accurately and boldly, as narrated by some key informants;

"The system helped to improve the image of the police as we sat together and shared challenges with the community leaders. The interaction of security teams at public meetings and community dialogues enhanced understanding among the parties. Through these meetings, more light was shed on best way of reporting, as a result, the senior officers agreed to share their numbers for reporting and further interaction with members of the community." (OCPD Mogere, KII). *"I was a policeman in Mount Elgon before retirement and it used to be rough due to absence of technology. Any information that was not IT- based was being leaked. Indeed, the area chief was killed due to absence of confidentiality. The EWERS enables pro-activeness from the security agencies which results in quick action and apprehension of criminals. The recent killings in Matungu Sub-County, Kakamega County almost extended to Bumula Sub-County in Bungoma County had it not been reports in the EWERS revealing actors behind threatening leaflets. While working as a policeman in Mount Elgon, I was threatened by criminals several times but the relay of information through the EWERS system always saved me." (*community member in FGD*)*

5.7 ICT as an Enabler of Accountability in Conflict Situations

The study established that the integration of EWERS in violence prevention process contributed to increased accountability of the government leaders especially the chiefs and the security personnel who were now expected to respond effectively raised security alerts. When the system relayed information to the police and local administration,

the same was also sent to their concerned superiors who could hold them to account. Initially, most of the reported cases to local authorities were ignored or being silenced. Increased accountability helped to enhance trust building between community members and government administration. The trust between the government officials like Assistant Chiefs, Chiefs, Assistant County Commissioners and general members of the public improved due to the frequent interactions during response efforts to message alerts from the system. The trust was demonstrated in the ongoing levels of consultation and the inclusion of community members in key meetings. The Chiefs and their assistants regularly held consultative meetings with community leaders to deal with emerging issues, which has helped enhance transparency in how they were addressed cases of violence. For example:

> *"There is increased interaction between chiefs from Kalenjin side and chiefs from Luo side unlike before when we never used to work together. We collaborate especially on matters related to cattle theft and land and boundary disputes to ensure the two communities coexist peacefully. Whenever cattle theft has occurred on the Luo side and thieves are believed to be crossing to the Kalenjin side, the chiefs from the Luo side will inform the chiefs from the Kalenjin side and with their concerted efforts, the cattle are recovered. The same happens when there is boundary dispute, chiefs from both side would organize public barazas to address the issue."* (Chief Opiyo- KII). *"I received alert messages from the system complaining about the laxity of chiefs to respond to distress calls from the community members. To deal with these, I directed all chiefs in the region to establish security committees that will respond to distress calls within 5 mins. I have made sure this is enforced leading to improved relationship between the community and the administration."* (community member in KII).

6 Case Analysis

Our case highlights the different ways in which ICT contributed to increase trust and reciprocity within the social networks both in Muhoroni and Mt. Elgon clusters.

6.1 ICT –Enabled Social Networks – Peace Network as New Forms of Social Capital

We found various new peace networks emerged with the increase in social capital resources for violence prevention. The EWERS created a platform where community members could connect with the administration and the security agencies to engage in a cycle of responses to conditions of insecurity. This represents a form of linking social capital guided by notions of social trust [25]. Similarly, [26] describe linking social capital as networks of trusting relationships between people interacting across explicit, formal or institutionalized power or authority gradients in society. These emerging networks were characterized by trust and reciprocity, key features of social capital. The networks enabled the setting up of a bottom-up approach to peacebuilding and security governance by linking local initiatives with national plans. These networks enabled mechanisms that allowed local initiatives to inform and influence national peacebuilding

efforts, and help ground them to the needs and conditions of the local context. These means that the ICTs created encouraged positive synergies towards transformations in peacebuilding efforts. For example, these networks contributed to the cultivation of a culture of peace and advancing of reconciliation efforts between the community members and authorities. These linking mechanisms enabled the creation of values such as of accountability, transparency, responsiveness, and tolerance, all of which are fundamental in mitigating ethnic violence. The linking peace network was sustained by the reciprocity between the community members and the administration. The police started to respond promptly to the alert messages leading to the recoveries of animals while the community members became increasingly motivated to willingly share sensitive data with the security personnel. Communication among the entities helped to improve coordination and even understanding of the nature of crimes experienced in the areas, helping to establish both a structural and intellectual dimension social capital as it created knowledge, skills and capabilities to operate in new ways [14]. These dimensions helped motivate the performance of the police to enhance peace building efforts.

The integration of ICTs helped better connect the different warring communities. Intractable violence had previously polarized the social relationships among different ethnic groups. Firstly, it helped to create an inter-connected peace network involving the village elders, chiefs, security teams, youths, women leaders, elders and business people across different ethnic divides. This ICT-enabled network of actors collectively engaged to report and respond to conflict escalating concerns like cattle theft, land grabbing, gender-based violence, smuggling and trading in illicit arms, drug and alcohol abuse, prejudicial tendencies and robbery with violence. The relationship was previously characterised by mistrust, non-cooperation, ethnic alignments to religion, political parties and biased economic activities. This polarization was characterized by higher levels of bonding social capital as compared with bridging and linking capital. The communities were more inward looking and self-centred in their activities, and the transcending of these inter-ethnic divided contributed to the expansion of bridging social capital by reducing levels of individual commitment and building greater inter-community orientation for their mutual benefits. This trend, as [20] has argued, that increasing bridging social capital reduces bonding relations. However, in ethical and moral terms, the action that leads to the benefit of the larger populace should be privileged over actions benefitting a minority. Therefore, reduction in ethnic bonding social capital worked for the general peace and welfare of the majority including those previously excluded..

6.2 ICTs Contributed to the Growth of Trust and Reciprocity Within and Among Ethnic Communities

Our study points to the growth or expansion of trust and reciprocity in many different forms including inclusion of the minority, strengthening of economic cooperation, enhanced tolerance of diversity and commitment towards reconciliation efforts. All these represent foundational principles of violence mitigation.

Inclusion of Minority: The dominant community had used the bonding relationship to unite against the minority from being appointed to leadership positions. However, the EWERS provided a platform where some members who were against this mission to

report and support the minority, gained a larger voice. This required an imbalance to be created between bonding and bridging social capital, for justice to be promoted. While the dominant community lost to a minority group, it was unethical when people belonging to a different ethnic group were treated like "others", and as victims of stereotypes and prejudice. This led to discrimination and social exclusion. The stigma associated with discrimination and exclusion burdens people both as individuals and members of particular communities. Those discriminated and excluded suffer from feelings of guilt, helplessness, incompetence and reduced communal worth.

Bridging economic relationship was created when markets opened up to accommodate the members from across ethnic divides who had otherwise been denied such access. Within the bonding framework, individuals and communities had restricted freedoms in terms of interactions with other community members because of norms, values and cultural practices. [27] has argued that freedom or independence from being constrained by another's choice, the freedom of choice, is an innate human right. This freedom is to be respected and promoted, even when this choice is not exercised in rational or virtuous activities [27]. The use of the ICT application helped unlock the bonds to freedom of community members, and trusting relationships were developed with the growth of inter-ethnic economic partnerships, and the simultaneous weakening of bonding relationships.

Increase in Values of Tolerance of Diversity: A fundamental value for human beings to peacefully coexist is tolerance of diversity. The integration of EWERS in violence prevention contributed to increase in tolerance and acceptance of different people, values, and beliefs through contacts with diverse others leading to the growth in bridging relationships. This enhanced level of tolerance and acceptance amongst protagonist communities followed the increased flow of information between them and to external stakeholders.

Reciprocity as a Key Factor of Reconciliation: In this case, the act of returning the stolen animals to their rightful owners negated the value of cooperation for mutual benefit as those who survived on stolen animals may feel betrayed. However, analysing these consequences through Bentham's principle of utility, that the morally right action is the one that produces the best overall consequences with regard to the utility or welfare of all the affected parties (Crimmins, J. E., 2020). Within this framework, the results from the use of the EWERS can be justified.

7 Conclusions and Contributions

This paper concludes that ICT-integrated micro-based violence prevention systems that build on existing social capital mechanisms are effective in addressing ethnic based conflicts as they help offer local solutions to local problems. The study further concludes that the effectiveness or not of such ICT enabled efforts are well understood within a social capital framework and their means of bonding, linking and bridging. The study reinforces [24] argument that the networks that constitute social capital also serve as conduits for the flow of helpful information that can facilitate achieving goals for peaceful coexistence. The empirical evidence has demonstrated that ICTs facilitated the formation

of peace networks in the conflicting communities that enabled the effective flow of information thereby contributing to reduce animosity.

The study concurs with [24] have argued that for social capital to contribute to the peacebuilding process or conflict management, there must be a balance of bonding, bridging and linking social capital. Many examples from the empirical study showed that in areas with stronger bonding social capital and weak bridging and linking social capital, injustices like discrimination of minorities in leadership, denial of access to markets and opportunities and exclusion thrive. The study shows that whenever bonding social capital reduces, there is a corresponding increase in bridging and linking social capital, leading to peace, new markets, new resources and opportunities. The study also demonstrates how ICTs can contribute in bringing better balance between these different forms of social capital.

The study concludes that for peacebuilding strategies to be effective in contributing to sustainable peace, the functional elements of social capital need to be factored in the design phase and monitored in the implementation process. The social networks form critical foundations through which violence can be pacified or assuaged. Social capital therefore cannot be assumed to always act as a glue, since it can also function as a source of tension

The paper contributes to ICT for Peace (ICT4P) research and more broadly to the domain of ICT4D. In addition, the paper contributes to ICT-enabled peacebuilding efforts that seek to strengthen linkages between state and non-state actors. The key vehicle for building these contributions comes from the adoption of the theoretical lens of social capital to study peace building efforts and the manner in which ICTs can mediate this relationship. The study demonstrates the inter-relation between the three forms of social capital, and how ICTs can mediate these relationships. For ICT4D researchers, there are implications for the design and development of bridging social capital be enabling the flow of information across ethnic divides. Building in robust features of anonymization of the field monitor's identity was an important device that promoted bridging. Enhanced bridging can lead to reduced bonding, with positive consequences on peace building efforts.

While this study has focused on particular conditions of violence in Northwestern Kenya, we believe our study also provides more generalizable finding for peace building efforts in other contexts. The social capital lens can be useful in diagnosing the underlying reasons for violence and in understanding how ICTs can be designed and implemented in a manner which reduces the reasons promoting violence and enhancing those that can potentially build more trust and mutual reciprocity across the warring groups.

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