

# Peacekeeping's Digital Economy: The role of communication technologies in post-conflict economic growth

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**Abstract:**

Peacekeeping operations, mandated through the United Nations and regional bodies, play an increasingly diverse role in the development and economic recovery of post-conflict countries. A key way that missions can use their administrative capacity to support economic recovery is through effective technology and communications acquisitions in host countries. Using mixed methods, our paper introduces the potential ways that missions' use of information communication technologies (ICTs) can support local economic growth post-conflict, developing a theoretical argument that draws on both the literature on ICTs in peacekeeping and economic development and growth. We specify a growth model that describes the potential impact of peacekeeping mission-led ICT investment on longer term political-economic development in combination with statistics on mission technology spending and internet use in host countries, providing a formal scaffold for our theoretical argument. Using this model and data in combination with a case study of the Central African Republic-based MINUSCA mission, we argue that peacekeeping missions should use their purchasing power and stabilizing influence to attract value-added technology investment and support development outcomes.

**Key Words:** Peacekeeping, Economic Growth, ICTs, Peace Durability

## Introduction

Since the turn of the century the fields of peacekeeping and economic development have increasingly become interwoven, as missions have remained in countries for longer periods of time and expanded their administrative footprints. Peacekeeping missions, originally tasked with observing ceasefire agreements, are now providing administrative and humanitarian services, and by omission and commission impose a unique political economy on the countries they operate in. While the impact of peacekeeping missions on macroeconomic outcomes is debated, and difficult to demonstrate quantitatively, qualitative research on the micro economies of peacekeeping indicate that there are pernicious economic-geographic impacts on host countries, as well as differences in how individuals relate economically to the mission depending on their political and social networks. Because of the inherent political and economic impacts that missions have, we argue that peacekeeping operations should integrate economic impact planning into their deployment processes. To frame our argument, we focus on how peacekeeping missions budget for and deploy information communication technologies (ICTs) in host countries, and argue that this represents an opportunity to use their economic and administrative capacity to mitigate the negative economic impacts of their operations, and potentially encourage economic growth. With the right combination of political and economic incentives and regulations, investments in ICTs can have a significant impact on long run economic, political and social development.<sup>1</sup>

The increasing use of ICTs in missions has been formalized in the “Performance Peacekeeping” report, henceforth ‘Performance Peacekeeping’, which lays out current and future technology issues that will arise in peacekeeping from the tactical to the institutional level.<sup>2</sup> While there are a number of examples of peacekeeping missions using new technologies such as digital maps, mobile phones and social media for tactical purposes and monitoring operations, the Performance Peacekeeping report also discusses ‘business continuity’ in technology use and acquisition in peacekeeping.<sup>3</sup> This shift toward a comprehensive strategy for information communication technology (ICT) use across peacekeeping operations creates a space to view acquisition and technology strategies through a political economy lens, using the missions’ administrative and economic capacity to actively support the wider peacebuilding process in post-conflict host countries.

We argue that when peacekeeping missions arrive in a host country, the combination of financial and administrative capacity they bring with them be used not only to keep the peace but to indirectly support

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<sup>1</sup> Simmons, *The Politics of Technological Progress*

<sup>2</sup> Holl Lute et al “Performance Peacekeeping” 85-107

<sup>3</sup> Ibid

the initial phases of economic and administrative recovery. While there are a number of ways that a mission can achieve this, we focus on the role of a mission's technology and communications spending. Performance Peacekeeping formalizes much of what has already been going on with missions' technology strategies, but with policy formalization comes the need for theoretical analysis of how larger technology foot prints can be leveraged to support economic growth and security. Development studies has recognized the importance of ICTs in economic development, as well as the importance of administrative capacity for establishing business and regulatory standards in a country's ICT sector. Since peacekeeping missions are often the first large-scale actors on the ground in post-conflict settings, they play a crucial political-economic role in the initial phases of recovery and peacebuilding.<sup>4</sup> Given what we know about the role of ICTs in economic development, and the increasingly formalized role they play in peacekeeping, we argue that peacekeeping missions can leverage their technology budgets to encourage early stage investment in communications infrastructure that can be used for civilian purposes as well. While this will not eliminate every negative economic impact a mission has on a host country, a clearer view of how a mission fits into the political economy of a host country can indicate where its administrative and financial capacity can be directed to support more equitable political economic development.

Our aim with this article is to contribute to the ongoing discussion of the role of ICTs in peacekeeping, and by extension their impact on wider peacebuilding and development outcomes. There are many ways that peacekeeping missions influence and impact the social, political, and economic dynamics of host countries. By leveraging their relative administrative and financial capacity to encourage early, equitable investment in communication infrastructure, peacekeeping missions can support economic growth and by extension further their security and political mandates.

### **A Political Economy of Peacekeeping and Technology?**

Information communications technologies (ICTs) continue to play a growing role in development, conflict management, and peacekeeping.<sup>5</sup> Using the Performance Peacekeeping report to anchor our argument in a policy space we place ICTs within the wider context of peacekeeping, addressing the tactical role they play as well as the systemic aspects of developing business continuity across technology applications and investments within missions and between missions and host country institutions. While the arguments for

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<sup>4</sup> The United Nations Peacebuilding Commission's reports (UNGA 2009, UNGA 2011, UNGA 2012) to the General Assembly highlight the importance of early intervention by international actors in stabilizing the administrative, political and economic sectors of post-conflict countries, so that the longer processes and peacebuilding and recovery can take root.

<sup>5</sup> Bott and Young, "The Role of Crowdsourcing for Better Governance in International Development." 56-59

using ICTs to support tactical operations are relatively straightforward, and there is evidence tools like mobile phones and social media are already being effectively used in operations in the Democratic Republic of Congo and Liberia, achieving a more systemic level of continuity in how missions use ICTs is a challenge. When peacekeeping missions seek to create business continuity in their technology use and acquisition processes in host countries, it can have a secondary effect of supporting economic and political development more broadly. This reframes technology use in peacekeeping as a political-economic question instead of an issue of which types of technology are best used. This provides a more universal way for peacekeeping planners to understand the systemic level of ICTs in peacekeeping; each mission will have different hardware needs to meet different operational demands, but all missions can achieve their mandates for security and improved governance if they account for the potential economic impacts of their technology acquisition and data demands.

Empirically demonstrating the economic effects of peacekeeping missions using more ICTs is not our goal, since the rise in access to ICTs in peacekeeping countries is only about a decade old and no missions that have been deployed in that timeframe have closed down. Thus, we cannot show the long term effects on missions' spending on technology and local economic growth. Instead we merge the literature on the economic impact of peacekeeping with the larger literature on economic development and ICTs to stake out a theoretical argument that peacekeeping missions, with their large economic footprints, could leverage their technology and data spending to encourage investment in ICT infrastructure that can also be used by local governance and civil society actors. In this way the mission plays a political-economic role; administrative stability and security are often prerequisites for investment, and peacekeeping missions can help provide both during early periods of post-conflict recovery. But they are also mandated to support the development of good governance and equitable public administration. Thus there is a power dynamic at work; post-conflict countries are unlikely to have the administrative and legal resources to effectively regulate new ICT and telecommunications investment. Peacekeeping operations, a number of which openly state that they play an administrative support role in host countries,<sup>6</sup> can use their relative political-economic strength to negotiate with ICT providers to meet their operational needs, and also lay groundwork for more equitable ICT regulation as the country recovers.

To formalize this argument, we use the concept of endogenous growth as a mechanism for framing the

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<sup>6</sup> For example, on the Department of Peacekeeping Operations' website, the MINUSTAH mission in Haiti's operations include "...strengthen Haiti's Government institutions and rule-of-law structures...", UNMISS in South Sudan is mandated to "...establish conditions for development...", and the UNOCI mission in Cote d'Ivoire provides "...good offices..." (UNDPKO 2016).

relationship between economic development and technological innovation. We evaluate the political economy of economic growth in post-conflict settings, and use available budget data from peacekeeping missions to illustrate how peacekeeping operations have the capacity to influence the scope and dynamics of economic and political development in host countries. We also developed a basic Solow-Swan function that accounts for peacekeeping missions and technology spending, which provides a quantitative scaffold to build on as new data about technology in post-conflict settings becomes available. We use this conceptual approach to argue that technology spending by peacekeeping and international missions can have positive economic impacts on the host country, *but only if the mission recognizes the administrative and financial power it brings to the table*. There is empirical evidence that technology alone does not spur economic growth, and that functional governance institutions are required to gain the economic benefits of ICTs.<sup>7</sup> This economic-institutional relationship is key to peacekeeping operations and their hosts deriving the widest possible benefit of ICTs in post-conflict peacebuilding. To supplement the theoretical and data discussion, we provide case analysis of the recently deployed mission in the Central African Republic, MINUSCA, and discuss how its technology and communications budget is large enough that with some planning it could encourage investment in communications infrastructure that meets both the mission's needs as well as secondary needs from local governance or business actors.

While we focus in this case on ICTs in this paper for specific theoretical and policy reasons, the analysis of the case creates space for a wider theoretical argument about the potential positive impact a peacekeeping mission can have on a host economy. It is a space that is important both theoretically and practically for the peacekeeping community since missions are operating in increasingly complex political and economic contexts. With larger military and civilian components being deployed for longer periods in post-conflict settings the role of missions as economic and administrative actors is increasingly important from a normative perspective: Peacekeeping missions, which come with a mandate not only to provide physical security but also administrative and economic stability, and thus must be party to the development of equitable political and economic norms in their host country.

### **Placing Communications Technology in the Context of Peacekeeping**

The Performance Peacekeeping report speaks to the need for better use of technology and data in peacekeeping, to improve the impact of missions in complex settings. The evidence indicates that there is a positive impact on ceasefire durability when a peacekeeping mission is deployed post-conflict. Fortna uses proportional hazards analysis of ceasefire durations across cases, comparing the difference on average

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<sup>7</sup> Avgerou, "The link between ICT and economic growth in the discourse of development." 373-386

between ceasefires where there was a peacekeeping mission and where there as not a peacekeeping mission.<sup>8</sup> She found that there is a statistically significant positive effect on the duration of a ceasefire when there is a peacekeeping mission. This finding supports Walter’s earlier analysis that the value of a peacekeeping mission is to act as a third party to support trust building and provide a credible commitment that both sides of the conflict will honor the peace process.<sup>9</sup> It is important to frame these observations of peacekeeping success within the context of missions only going to the hardest cases, and that there are many critiques of how peacekeeping falls short. So if peacekeeping generally works, but due to the hard contexts often falls short, how do ICTs potentially enhance tactical performance?

The arguments in support of peacekeeping tend to operate at the national level though, and this opens them up for criticism when discussing localized processes for *peacebuilding*. Peacebuilding is a much wider process of post-conflict stabilization, and goes beyond the securitization mandate of peacekeeping.<sup>10</sup> Auteserre takes a firm position on the failure of the international peacebuilding agenda, analyzing the MONUC mission in Congo; she highlights the ways that the mission was focused on the establishment of national level governing authorities and elections, but missed or ignored the necessary local-level peacebuilding processes that would create the foundation for local-level stability in the Democratic Republic of Congo.<sup>11</sup> So how to large, cumbersome missions more efficiently coordinate with disaggregated population centers? From a tactical perspective engaging widely at the local level is an area where technologies such as mobile phones and social media can have a significant effect on how a mission engages with local communities. Karlsrud describes this as “Peacekeeping 4.0,” in which missions take advantage of existing and civilian communication infrastructure to manage relationships with local actors and increase operational awareness and effectiveness using new streams of data available through social media and networked devices such as mobile phones.<sup>12</sup> These technologies can help bridge gaps between peacekeepers in forward operating bases and the local communities that surround them, helping being local voices into direct communication with peacekeepers.<sup>13</sup>

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<sup>8</sup> “Does Peacekeeping Keep Peace? International Intervention and the Duration of Peace After Civil War.” 269-292

<sup>9</sup> *Committing to Peace: The Successful Settlement of Civil Wars*.

<sup>10</sup> The UN Peacebuilding Support Office’s (UNPBSO) definition of peacebuilding is available at: <http://www.unpbf.org/application-guidelines/what-is-peacebuilding/>. As peacebuilding as a term is defined in different ways by different organizations, this paper uses the UNPBSO definition.

<sup>11</sup> *The Trouble with the Congo: Local violence and the failure of international peacebuilding*

<sup>12</sup> “Peacekeeping 4.0: Harnessing the Potential of Big Data, Social Media and Cyber Technology.” 141-160

<sup>13</sup> Axworthy and Dorn, “New Technology for Peace & Protection: Expanding the R2P Toolbox.” 88-100

Mobile phones, open source mapping, and data visualization programs are increasingly being used in peacekeeping operations as a tool for monitoring situations where larger scale information systems are not practical.<sup>14</sup> The idea is to use mobile telephony as a secondary mechanism for intelligence gathering in peacekeeping operations, where the intelligence is not great to begin with. A case study of mobile phones being used in peacekeeping operations is in the Democratic Republic of Congo's MONUC mission. Peacekeepers used mobile phones to communicate and receive information from local actors about militia activity and violence, using trusted reporters in villages as monitors of risk who can provide early warning to peacekeepers at field posts about potential violence.<sup>15</sup> Increasingly these tools have been integrated into the peacebuilding space, with organizations such as USAID, UNDP, and UNOCHA developing best practices for using crowdsourcing technology in conflict settings.<sup>16</sup> These technologies help the missions, which are big, create channels for communicating with local actors who are inherently diffuse – they create tactical efficiencies by connecting communities to peacekeepers.

What is clear from the literature is that ICTs can enhance, in identifiable and direct ways, the performance of a mission in undertaking its military mandate. Identifying the systemic level of impact that technology has on missions and host countries is more complex, but is necessary for fully addressing the political economy aspects of technology and peacekeeping. To address this the following section lays out a theoretical narrative, and descriptive formal modeling, of the political economy of ICTs in peacekeeping that are key to developing a systemic technology strategy in peacekeeping operations.

#### *A Political Economy of Performance Peacekeeping*

Along with the tactical aspects outlined in Performance Peacekeeping, the systemic impact of new technologies being used in peacekeeping provides new avenues for exploring complex operations and peacekeeping theory. One important role that new technologies can play in peacekeeping operations is an economic one. While there are examples of peacekeeping missions having negative economic effects on local economies, the comprehensive use of ICTs could have positive effects on the economies missions operate in which is a significant bonus when taking the Performance Peacekeeping policies forward. The concept of 'peacekeeping economics' remains under explored because for much of peacekeeping's history there was not an economic component to missions. There may have been economics in budgeting, but missions were not mandated to be part of the local economic ecosystem in host countries. Performance Peacekeeping, with its focus on creating business continuity across operations' and institutions' technology

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<sup>14</sup> Dorn, *Keeping Watch: Monitoring, technology and innovation in peacekeeping operations*.

<sup>15</sup> Ibid.

<sup>16</sup> Mancini, *New Technology and the Prevention of Violence and Conflict*. 1-3



use, creates a new space for defining a political economy of peacekeeping in relation to a host country's communications technology sector.

In modern peacekeeping, the economic impacts of missions on host countries have broadened significantly, with observed negative impacts but also potential areas for positive impacts on economic growth and stability. Jennings recent work on peacekeeping economies focuses on the gendered political economic dynamics that shape the economic roles of peacekeepers and the 'peacekept', noting that the institutional aspects of peacekeeping are reflexively shaped by how peacekeepers interact with locals engaged in the sex trade, domestic help and private security.<sup>17</sup> Ammitzbøll and Tychsen also provide critical analysis of the unintended impacts of peacekeeping operations, highlighting a variety of ways in which missions distort social and political economies of host countries.<sup>18</sup> There are obvious observations such as income disparity between international and local staffs, which drives prices up relative to real local incomes, and job displacement as the most talented civil servants leave their country's government to work with the UN at better wages. Their work reiterates the need for missions to perform deeper economic analysis before and during missions, and a comprehensive discussion about the power missions have as economic actors in host countries. It is important to differentiate the development of regulation and policy, administrative power, from the power that a mission has by virtue of being a large, comparably well-organized spender. A peacekeeping operation, or any large-footprint international mission, can influence economic and policy development through its spending and contracting strategies.

This leads to a question of whether peacekeeping missions contribute positively to the country they are serving in, with mixed results. While there has been some socio-economic research on how operations affect local populations during their tenure, there is less understanding of the long-term impacts on a country's economy.<sup>19</sup> Ernst et al attempted to develop a better understanding of the long-term effects of peacekeeping by looking at how a mission effects growth and level of GDP per capita.<sup>20</sup> While they find that missions have level effects (e.g. higher baseline GDP when a mission departs), there is no evidence that they impact GDP growth over time. Carnahan et al make a comprehensive effort to fully address the

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<sup>17</sup> "Service, sex, and security: Gendered peacekeeping economies in Liberia and the Democratic Republic of Congo." 313-330

<sup>18</sup> "The Unintended Economic Consequences of Complex Peace Operations on Host Societies." 263-282

<sup>19</sup> Collier et al, "Breaking the Conflict Trap: Civil War and Development Policy."; Sambanis, "Short-Term and Long-Term Effects of United Nations Peace Operations."; Sambanis and Doyle, "No Easy Choices: Estimating the Effects of United Nations Peacekeeping."

<sup>20</sup> "The Economic Impacts of United Nations Peacekeeping Operations: Growth versus Level Effect." 100-117

ways that a peacekeeping mission can utilize its economic impact positively.<sup>21</sup> Like other authors, Carnahan et al discuss the negative impacts of peacekeeping operations on local economies, but also develop an argument for the ways that peacekeeping operations can provide stimulus for local and national economies. They focus their recommendations both on short term issues like local procurement and analyzing wage disparities between local and international staff to prevent price spikes, but also discuss issues such as doing long-term analysis of infrastructure projects beyond the time frame of the mission mandate so that mission spending is designed to meet the strategic economic needs of the host country. This speaks directly to the business continuity issues around peacekeeping technology strategies that are highlighted in Performance Peacekeeping, and ties them into a larger discussion of the macroeconomics of peacekeeping operations and economic growth.

### *Peacekeeping, ICTs and Economic Growth*

Because peacekeeping missions are deployed in countries that are not only post-conflict but are also often having to rebuild economically, missions could view their funding as potential stimulus, and provide a credible guarantee to investors that there is both security and administrative capacity in what is often a chaotic environment. ICTs play a key role in economic growth and development, and are uniquely able to provide a sector for initial stimulus spending when missions buy equipment, data and bandwidth, as well as long term growth as businesses and governments use latent ICT capacity to expand their economic and social activity. But to achieve these positive economic benefits, peacekeeping operations that are going to be increasingly technology dependent and networked must recognize the ways that their technology strategies map onto the wider economic ecology of their host country. This economic ecology includes the micro economies described by Jennings & Bøås and Ammitzbøll & Tychsen, where there are significant differentials between how mission staff, elites, and locals are impacted by the day-to-day economy of the mission, as well as macroeconomic considerations such as how to equitably encourage investment in technology infrastructure that requires buy-in from multinational actors and governing elites.<sup>22</sup> A historical perspective on the growth of digital technology in developing economies can be useful in understanding how missions impact geographic and horizontal inequalities in the countries they operate in.

During the 1990s the expansion of networked capitalism and globalization meant that economic development would be driven by socio-economic networks as much as trade and capital allocation. By the late 1990s it was apparent that the core mechanism for encouraging socio-economic networking and

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<sup>21</sup> “Economic Impact of Peacekeeping.” Final Report, Peace Dividend Trust

<sup>22</sup> “Transactions and Interactions: Everyday Life in the Peacekeeping Economy.”; “The Unintended Economic Consequences of Complex Peace Operations on Host Societies.”

knowledge sharing would be ICTs, and access to ICTs.<sup>23</sup> Castells goes on to note that the growth of networked ICTs would have the same disruptive effect on the global economy that production lines had during the late 1800s and early 1900s; he notes though that disruption is not synonymous with the decentralization of capital and that there is a major risk of a digital divide that would leave to extreme economic exclusion for those that did not have access to ICTs and networked information. This conclusion is also noted by Anselmo de Castro and Jensen-Butler, who use a regional uptake analysis of ICTs across of varying population density to identify differences in technology investment and technology integration into local economies.<sup>24</sup> These regional differences are cyclically compounding in nature; regions that have faster uptake benefit exponentially, while regions that are not able to integrate technology as quickly due to sparser population density experience a cyclically increasing exclusion from the benefits of a networked economy. Understanding these gaps in detail has proven difficult since there have not been any thorough analyses of mobile phone ownership versus phone use in the developing world, leaving researchers with very general aggregate numbers such as mobile network coverage to work with when doing economic analyses.<sup>25</sup>

While there are risks of digital divides and exclusion in a networked global economy, this should not be a reason to ignore the possibilities that ICTs can provide to a developing economy. Efficiency and information sharing were the initial benefits of ICTs in developing economies; even in the early 2000s the presence of mobile phones in developing countries could be linked to more efficient distribution of food commodities across domestic markets.<sup>26</sup> At a macroeconomic level this trend has continued, with an increase in mobile phones and access to ICTs correlating with increased economic output in developing countries when controlling for the effects of capital and labor.<sup>27</sup>

We broadly know that countries with healthy economies are at lower risk of experiencing conflict. Further, peacekeeping missions can play an economic role in the countries they are operating in, and this role can be positive, and ICTs can be leveraged to support and encourage conflict prevention and peacekeeping.<sup>28</sup>

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<sup>23</sup> Castells, "Information Technology, Globalization and Social Development."

<sup>24</sup> "Demand for information and communication technology-based services and regional economic development." 27-50

<sup>25</sup> James and Versteeg, "Mobile phones in Africa: how much do we really know?" 118-123

<sup>26</sup> Eggleston et al, "Information and Communication Technologies, Markets, and Economic Development." 62-74

<sup>27</sup> Sridhar and Sridhar, "Telecommunications Infrastructure and Economic Growth: Evidence from Developing Countries."

<sup>28</sup> Carnahan et al, "Economic Impact of Peacekeeping."; Letouze et al, "Big Data for Conflict Prevention: New Oil and Old Fires." 4-27; Mancini, *New Technology and the Prevention of Violence and Conflict*. 1-3; Meier, "Crisis Mapping Libya: This is no Haiti."

ICTs also play a unique role in encouraging and supporting economic development, even in difficult circumstances.<sup>29</sup> If these streams merged, ICTs become a useful touch point between economic growth and peacekeeping.

### **Formalization: The relationship between economic growth and peacekeeping**

Both physical and human capital can be harmed from conflict, and the institutions that manage economic growth are often non-existent when conflict stops. However, growth can accelerate dramatically in the initial stages of post-war recovery. While it is difficult to tease out the impact peacekeeping missions have on growth, Abadie and Gardeazabal provide a useful case of how perceptions of peace and stability affect investment.<sup>30</sup> They showed that when there was a serious prospect of a peace agreement between the Spanish Government and Basque separatists there was a noticeable increase in stock investments in firms based in the Basque region. Stability is important to investors, and in a post-conflict setting a peacekeeping mission can represent some semblance of stability, as well as a source of demand when the economy of the host country is recovering. While this may be the case, the significant capital destruction caused by conflict, combined with a reduction in local institutional capacity can lead to low growth if not aided by external institutions or support. In the global context, where information technologies are playing a significant role of everyday life, the development of ICTs is integral for underdeveloped or post-conflict economies to grow with the rest of the globalized world. What can assist in the immediate stages of post-conflict economic growth is a change in the level of capital growth and the development of technology and technical knowledge. As Vu explains, ICTs can assist developing or low income economies by fostering technology diffusion and innovation.<sup>31</sup>

Economic growth theory tells us that capital is responsible for only a small amount of increased output and cannot lead to long-term equitable growth. However, in a post-conflict environment long-term growth is not necessarily the most important factor. Due to large amounts of destruction and capital flight, it is necessary for the levels of capital stock to be restored quickly in order for an economy to stabilize its weak economic situation. International institutions are able to facilitate in this process by providing needed funding and institutional capacity to support the rebuilding of institutional and financial capacity. For example, 69 per cent of Afghanistan's national budget for 2016 is funded from external resources or foreign

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<sup>29</sup> McNamara, "Enhancing the Livelihoods of the Rural Poor through ICT: A Knowledge Map. Argentina Country Study."

<sup>30</sup> "The Economic Costs of Conflict: A Case Study of the Basque Country." 113-132

<sup>31</sup> "ICT as a Source of Economic Growth in the Information Age: Empirical Evidence From the 1996-2005 Period." 357-372

aid.<sup>32</sup> This not only pays for the administrative costs of the public sector but also significantly funds developmental projects. An example is the nationwide fiber optic cable network, implemented as part of the National Development Strategy (NDS), which has currently placed 200 kilometers of high caliber copper wire across the country with plans of further expansion.<sup>33</sup> It is unlikely that such technical implementations will take flight on their own in a post-conflict environment without the significant aid or support from international institutions or political missions. The heightened risk, volatile political situation and destruction of human and physical capital deters foreign and local investment into growth augmenting industries. Further, host governments often lack the capacity to make such investments themselves.

What is of significant importance in growth augmenting policy is the development of ICT capacity. This particular sector can increase both physical capital, leading to greater output, while also increasing the technical human capacity which furthers the goal of long-term growth. Because countries where peacekeeping operations go include the Democratic Republic of Congo, Central African Republic and Haiti, it is not enough to expect that large amounts of capital will jump start the economy. While institutional robustness is not enough to support economic development on its own (see Dreher, Méon and Schneider on the impact of shadow economies on economic output),<sup>34</sup> rapid capital accumulation in a post-conflict setting will likely not lead to equitable long term growth either.<sup>35</sup> Peacekeeping missions play both roles; they bring capital in the form of budgets that are spent on technology and data infrastructure, but also play an institutional role and providing institutional and administrative stability.

#### *Modeling Growth: Peacekeeping Investments in ICTs*

The phenomena we study in this article remains emergent, and there are relatively few peacekeeping missions deployed globally. This makes quantitative empirical analysis not possible at present, so we use this section to provide a quantitative scaffold to formalize our argument along with related data on internet use in peacekeeping countries and mission technology and communications budgets. The classic Solow model uses a Cobb-Douglas framework, showing output as a function of capital  $K$ , labor  $L$  and technical innovation  $A$ , shown in equation (1).  $A$  represents an ambiguous term which may aid the implementation of technically sophisticated equipment, the advancement of the labor force or both. Both factors are needed for the productive capacity of an economy to develop. The implementation of mobile phones will not boost communication capacity if individuals are unable to operate the device, similarly, the development of a mobile phone wouldn't occur without increased levels of research and development.

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<sup>32</sup> Afghanistan Ministry of Finance, National Budget Document.

<sup>33</sup> Ibid

<sup>34</sup> The Devil is in the Shadow. Do institutions affect income and productivity or only official income and official productivity? 121-141

<sup>35</sup> King and Levine, "Capital fundamentalism, economic development, and economic growth"

$$Y = F(K, AL) = K^\alpha (AL)^{1-\alpha} \quad (1)$$

In the context of the model, output is determined by an economy's endowments of  $K$  and  $L$ .  $L$  grows at rate  $n$ ;

$$\dot{L} = nL(t) \quad (2)$$

Classically knowledge grows at a constant rate  $\dot{A}$ :

$$\dot{A}(t) = \dot{g}A(t) \quad (3)$$

While capital growth ( $\dot{K}$ ) is the determinant of the savings rate (investment) ( $s$ ) and its level of depreciation ( $\delta$ )

$$\dot{K}(t) = sY(t) - \delta K(t) \quad (4)$$

When a peacekeeping mission arrives, technical innovation ( $A$ ) is probably going to be exceptionally low if there is any at all. Labor ( $L$ ) will be available, but there will be at most limited capital ( $K$ ) in the formal market. Informal markets and shadow markets will exist, since even in a conflict people need food, fuel and services.<sup>36</sup> Upon arrival though, missions bring a relatively large amount of capital that can be quickly directed into the purchase and provision of technology and data services. In reality, while technical innovation is low compared to an advanced economy, six countries that currently host peacekeeping operations have seen growth in the number of people using internet services.

FIGURE 1:

INTERNET USERS PER 100 PEOPLE ACROSS SIX MULTIDIMENSIONAL PEACEKEEPING OPERATIONS. SOURCE: INTERNATIONAL TELECOMMUNICATIONS UNION (ITU)

Even in the Democratic Republic of Congo, which hosts the MONUSCO mission, while growth in internet users has not been as robust as Haiti (which hosts the MINUSTAH mission), it has still grown slowly from zero to 1.6 users per 100 people. Missions bring with them capital ( $K$ ), which we consider the missions' technology and communications budgets. Between 2007 and 2015 these have been notable portions of host country GDP, with Table 1 showing the years of highest communications and technology budgets per mission.<sup>37</sup>

<sup>36</sup> Andreas, *Blue Helmets, Black Markets: The Business of Survival in the Siege of Sarajevo*.

<sup>37</sup> It is important to note that these numbers only represent the budget allocations for Communications and IT in mission line-item budgets.

TABLE 1:

MISSION BUDGET FOR COMMUNICATIONS AND TECHNOLOGY, REPRESENTED AS A PERCENTAGE OF HOST COUNTRY GDP, HIGHEST YEAR BETWEEN 2007-15 SOURCE: UNDPKO

The sample of countries is quite small and the timelines are short, partly due to the recent nature of internet availability and the deployment period of the missions. While there is a positive correlation between increases in mission technology and communication budgets and increases in internet users, this relationship is confounded by the fact that internet access is expanding globally; basically, missions do not drive internet access but they spend money on it, and provide a large single market for ICT providers in their host countries. More importantly they do play a role in stabilization, administrative support, and governance, all of which are made easier with ICTs and can have a positive impact on economic inclusion and growth.

#### *Implementation of Peacekeeping on Capital Growth*

In the post-conflict framework, peacekeeping or foreign institutional support can significantly affect levels of investment  $s$ . Our model differs only slightly to the classic Solow model by including a variable of peacekeeping or institutional implementation noted by  $(\omega)$ . This has a positive yet diminishing return on  $s$ , leading to increases in steady state capital  $k^*$  output  $(y^*)$  per effective unit of labor. As a result we can find the dynamics on the growth of capital per unit of labor  $k = \frac{K}{AL}$ . As we have stated, peacekeeping or international institutions noted by  $(\omega)$  can increase the level of savings at a positive yet diminishing rate. That is, an increase in  $\omega$  has a positive yet diminishing effect on  $s$  and as a result a positive yet diminishing effect on  $\dot{k}$ .

$$\dot{k}(t) = s^\omega f(k(t)) - (n + g + \delta)k(t) \quad (5)$$

An increase in  $s$  increases  $k^*$  to a point where investment increases above the break-even point represented by  $(n + g + \delta)$ , where  $\delta$  is the depreciation of capital,  $n + g$  is the labor growth rate. This is known as capital deepening, whereby the level of capital growth per unit of labor increases faster than the depreciation of the current stock of labor as well as the depreciation of capital stock.<sup>38</sup> As capital growth increases at a diminishing rate, it will continue until  $\dot{k}=0$ , that is where the growth rate of capital returns to a constant

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<sup>38</sup> A significant impairment of capital growth is depreciation. Unfortunately, the development of works using inferior inputs to production can cause significant long-term costs as infrastructure breaks down. As a result it is imperative that quality infrastructure is used especially in the case of ICTs. Increased levels of depreciation increase the cost of capital and as a result decrease  $s$ ,  $k$  and  $y$ .

rate. While at the same time the break-even investment point will rise due to the increase in capital stock. As a result this increase in the savings (investment) rate will bring a temporary increase in the growth rate of capital per effective unit of labor until it ultimately converges to the new  $k^*$ .

As the Solow model suggests capital growth can increase output per effective unit of labor, though it will only have a short-term effect on growth. However, this may have a significant effect in a post-conflict framework where capital accumulation is significantly lacking and necessary in the short-term to rebuild after fighting stops. Peacekeeping missions can increase the growth of capital stock, and capital growth may provide the support for future improvements in the effectiveness of labor and as a result, long-term growth. Why ICTs play such an important part of post-conflict recovery is due to the fact that communication networks play a vital role in trade, administration and social networking, and as a result economic growth. Internet access, mobile phone coverage, and telephone lines all lead to increases in economic activity, increasing market access, decreasing production time as well as supporting knowledge sharing.

### ***Speed of Convergence***

While the increase in capital stock is important, the rate at which the increase converges is key in post-conflict economies. The speed of convergence is the rate at which  $k$  moves to  $k^*$  shown in equation (6). The growth rate of capital  $\dot{k}$  is determined by the level of  $k$ , shown in equation (6). The growth in  $k$  can be seen as the product of the difference between capital per effective unit of labor and the steady state level of capital. The rate at which  $k$  moves toward  $k^*$  is proportionate to its distance from  $k^*$ , however as  $\dot{k}$  is dependent on  $k$ , which is positively affected by increases in  $s$  which are positively affected by increases in  $\omega$ , peacekeeping can increase  $\dot{k}$ .

$$\dot{k} \simeq \left[ \frac{\partial k(k)}{\partial k} \right]_{k=k^*} (k - k^*) \quad (6)$$

This can be seen as the difference in point a and b in Figure 2. An economy with higher levels of  $s$  can cause increases in capital growth whereby it reaches its steady state depicted by point  $a$ , while slower levels of  $s$  can prolong this as an economy reaches the steady state at point  $b$ . While this will lead to a higher level of output per effective unit of labor ( $Y/AL$ ), growth will eventually stabilize to its previous level of growth.



FIGURE 2:

*SPEED OF CONVERGENCE. SOURCE: AUTHORS*

It is important to note in Figure 2 the rapid return to steady growth that we see in curve *a*, where technology spurred growth, because mission technology spending follows a pattern where there is a quick build up followed by a decline in budget sizes over time. We see this pattern reflected in Figure 3, with four of the longer serving multidimensional missions decreasing their technology and communications budgets over time. To have an impact on initial growth in the host country's technology sector, and potentially its economy, and economic development goals built into a mission's mandate need to be implemented early while the mission is still investing in equipment and driving demand for new communications infrastructure.

FIGURE 3:

*TRENDS IN MISSION SPENDING ON TECHNOLOGY AND COMMUNICATIONS BETWEEN 2007-2015 SOURCE: UNDPKO*

In terms of when a mission can have the highest potential impact on the technology sector and economic recovery of a country, the budget trends show that early in the mission would be the time to implement any strategic use of technology and communications resources to support economic growth. But, while the mission can spur the growth, over time the local technology sector needs to become self-sustaining.

#### *Solow Model with Technological Progress*

Capital deepening and the speed of convergence caused by increased investment can cause significant levels of initial growth. They can increase total welfare in an economy as the level of output per effective unit of labor is increased. However, according to the Solow model this is not sustainable. Only increases in technology *A*, or technical progress are able to deliver long-term increases in income over time. For example, as the level of technology increases within the production process the level of output per unit of labor increases. This is where ICTs play a significant role; not only can they lead to increased technological advancements, they can also lead to increased human capital deepening through greater access to information and learning tools, which are important in country whose level of physical capital in institutions such as education may be lacking. By framing economic growth and ICTs within the framework of an institutional actor (peacekeeping missions), we aim to address the critique offered by Avgerou (2003, 379-383) where she indicates that ICT access without requisite institutional economic capacity does not have

an effect on economic growth.<sup>39</sup> As many peacekeeping missions now play a role in institution building, infrastructure projects and technical adaptation. With effective mission planning they can support secondary technological investment, having an augmenting effect on labor output in the long-run.

The Solow model can be shown with the addition of technological progress. As peacekeeping missions invest into ICT use, they can spur on the incorporation of ‘capital-technology’ or the ratio of capital per worker to technology. As noted in equation (3) technology is assumed to grow at a constant rate of  $g$ ; this is unrealistic as technology often follows an exponential growth rate. This is especially the case when peacekeeping missions spur on technical advancements through their normal acquisitions process. This may be similar to increases in  $s$ , however. As peacekeeping missions’ spending demands development of large components of technical infrastructure such as mobile telephone networks, there is the ability for a long-term increase in the technical ability from both increased levels of digital communication in production as well as an increase in the technical knowledge of the population by using these technologies in daily life.

These two components together are able to initiate the base for significant technical augmenting advancements of the labor force. According to the Solow model, output per worker is dependent on  $A(t)$ , as shown in equation (7). Our model differs from the classic model just as it differed for levels of  $s$ , the level of technical advancement is also positively affected by peacekeeping mission’s presence.

$$y^*(t) = A^\omega(t) \left( \frac{s^\omega}{n+g+d} \right)^{\alpha/(1-\alpha)} \quad (7)$$

The level of peacekeeping support will disappear once peacekeeping missions or international support decreases. This is usually done at a decreasing rate until a country is considered to be independently viable; that is, it is not dependent on foreign support. Once investment from peacekeeping operations stops, it stops for good. However, technical growth is able to build on previous technical growth; a mission’s spending and technology use holds endogenous growth properties since the infrastructure the mission used for communications and business continuity remains in-country. As a result, the tactical use of ICTs by a mission can increase productive capacity within a range of local enterprises, since these technologies are transferable between sectors.

The above models have shown how peacekeeping efforts can, according to classic economic growth theory, increase an economy’s output in three specific ways. First increased levels of investment can increase capital deepening in the short-run and speed up the rate of convergence to the steady state. Second, it speeds

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<sup>39</sup> “The link between ICT and economic growth in the discourse of development.” 373-386

up the rate of convergence. Quick economic recovery is important in a post-conflict environment, so this may be the initial most important economic effect peacekeeping operations have. Further, long-term economic growth can also be spurred on by peacekeeping missions supporting technical adaptation through the strategic use of commercial ICTs that will remain in the hands of civilians after the mission departs, spurring labor-augmenting growth.

### **The Model in Practice: Informing future peacekeeping theory and strategy**

We use the MINUSCA case study to describe a potential scenario where the logic of our growth model could play out; it is inherently prescriptive, but also provides a framework for future data collection. The ICT and communications budgets of current missions alone can constitute notable portions of the host country's GDP. In our model we describe two levels of effect. The first is the initial flow of money and demand by the peacekeeping mission, which has a capital deepening effect. The second is the long term effect of ICT infrastructure that remains in the country after the peacekeeping mission leaves, and continues to be used by business and government to build the economy further. It is important to reiterate that the peacekeeping mission is not directly investing in the ICT infrastructure or the domestic economy of the host country. They are providing the initial communications demand and institutional reliability to motivate telecommunications firms to invest in mobile telephonic and cable infrastructure. This infrastructure can immediately be used by local actors for governance, business and education purposes, and then be expanded upon over time as demand increases with more durable peace.

One of the newest missions, MINUSCA in the CAR, currently has a combined information technology and communications budget of \$35.4 million USD for operating year 2015-2016 (UNGA 2015).<sup>40</sup> This represents 2.3% of CAR's GDP,<sup>41</sup> though there is limited indication that in the mission planning phase there has been an analysis of how this funding could be spent strategically to encourage or maintain investment in ICT capital infrastructure. Taken another way the MINUSCA ICT budget is equal to \$7.67 USD per capita, in a country where per capita income is \$333.20 USD. While this line of analysis falls outside the traditional scope of a peacekeeping operation, there is indeed an opportunity for the mission to seek opportunities to encourage investment in ICT infrastructure that supports its tactical needs while adding long term value to the civilian economy.<sup>42</sup> What kind of steps would our model indicate a mission should take?

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<sup>40</sup> "Approved resources for peacekeeping operations for the period from 1 July 2015 to 30 June 2016."

<sup>41</sup> GDP and income numbers are the World Bank's 2013 estimates, available at:

<sup>42</sup> This 63% includes the budgets for military, police and civilian staff, which is paid out to the contributing member states; while soldiers, police and civilian staff can spend money locally it is unlikely their spending would be significant enough to make a difference to CAR's macroeconomic outlook.

The first step is to recognize and account for the inherent economic dislocation that happens when a mission arrives. While difficult to measure quantitatively, Jennings & Bøås and Ammitzbøll & Tychsen use field methods to identify empirical geographic and demographic disparities in the economic impact of peacekeeping missions.<sup>43</sup> While a mission cannot prevent all negative externalities, an awareness of them and recognition of the potential economic geography of their operations can create spaces for economic planning. The geographic distribution of assets in the MINUSCA mission is country-wide, meaning that there is an opportunity to direct resources and administrative capacity to areas outside the capital, particularly posts like Birao in the north and Obo in the east (Figure 4).

*FIGURE 4:*

*MINUSCA MISSION MAP. SOURCE: UNDPKO*

Distributing the potential infrastructural benefits of a mission are important, since there is qualitative evidence that a passive approach to mission spending and physical planning has unequal economic effects on local communities.<sup>44</sup> By actively planning how the distribution of a mission's administrative and physical presence could impact a community, there is the potential opportunity to develop strategies for the purchasing and deployment of communication technologies in such a way that they achieve a hybrid outcome; the mission meets its technical needs, while the communities around them gain access to internet and communications systems that may not otherwise have been installed due to a lack of market demand.

Going beyond the military and security aspects of the mission, there are opportunities to implement some level of development programming that uses the mission as a platform for bringing in communication infrastructure. The mission can use this technology to support peacebuilding processes at the local level, which include good governance and public service provision. The capital deepening process can be achieved through the civilian protection mandate of the mission. If field posts outside the capital are set up in the vicinity of population centers or camps, communications infrastructure that is used for non-secure communication or wireless broadband can be shared with local schools, small-scale farmers and other small enterprises. In the early stages of a ceasefire spoilers could use these technologies to organize violence, negating the economic benefit; this is why technology alone will not lead to growth, and the security provided by a peacekeeping mission is critical in our model.

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<sup>43</sup> "Transactions and Interactions: Everyday Life in the Peacekeeping Economy." 281-295; "The Unintended Economic Consequences of Complex Peace Operations on Host Societies." 263-282

<sup>44</sup> Ibid

During the span of the mission, its administrative needs increase as does local demand for connectivity. This demand creates a market for telecommunications firms to invest in, whether it be cellular towers or fiber optic wiring. The potential risk on investment returns is mitigated by having the mission, with a set budget, buying a large portion of the data for the its remaining deployment. Using our example of MINUSCA, the mission is operating in what the GSMA, the global mobile carrier industry body, classifies a ‘Discoverer’ market, with SIM penetration of only 36% and 2% mobile broadband coverage.<sup>45</sup> As the mission shifts from modular transmitting devices to increasing mobile broadband infrastructure businesses and schools can begin to take advantage of the increased access as well. Ostensibly, if the mission is achieving its core task of providing security, the local business and government sectors’ spending on communications and broadband will catch up. When the mission leaves, the infrastructure will remain and support further business and human capital deepening. This economic growth will theoretically play a role in helping maintain durable peace.

## **Conclusion**

Peacekeeping missions, and similar large intervention operations, can indeed play a positive economic role in post-conflict recovery while maintaining a relatively neutral position vis-a-vis the host country’s political system. Our model demonstrates that integrating economic and investment planning into peacekeeping missions can have positive effects for the host country economy. It therefore addresses a challenging economic issue in post-conflict recovery: How does the mission have a potential positive economic effect? By acting as the initial consumer of data and digital services, peace operations and the international organizations behind them can encourage external investment in multi-use technology infrastructure that adds value to the overall economy.

While these are positive outcomes, it is critical that peacekeeping missions recognize the risks that marketization and investment in fragile settings bring;<sup>46</sup> without basic political-economic planning, capital investment can undermine political efforts to secure social and political stability at the local level. This topic is particularly timely in light of Flores and Nooruddin’s findings regarding the importance of a government’s fiscal space and the likelihood that elections will lead to deeper democratization.<sup>47</sup> Peacekeeping operations historically have overseen elections as a key transitional step to greater stability,

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<sup>45</sup> GSMA, “Markets: Central African Republic.” GSMA Mobile Intelligence.

<sup>46</sup> Millar, “Local experiences of liberal peace: Marketization and emergent conflict dynamics in Sierra Leone.” 573-577

<sup>47</sup> *Elections in Hard Times: Building Stronger Democracies in the 21<sup>st</sup> Century*. 120-143

but often without requisite efforts to help create a stable fiscal space for an elected government to then deliver services. With missions staying in countries longer, and bringing a larger military and civilian footprint, the economic impact that they have can be oriented toward addressing many of the negative economic effects of war. A concerted effort to understand the ways that a peacekeeping mission, through its budgeting, spending, and institutional stability, can positively affect the economy and fiscal space of its host country could significantly increase the impact of traditional governance, security and capacity building processes missions already implement.

One of the key challenges we identified as we were developing our model is finding ways to empirically demonstrate the relationship between peacekeeping mission spending on IT and communications, and increases in economic growth and capital deepening. In large part this is due to the fact that many missions which fall into the fourth generation category are either ongoing or have only recently ended, making historical analysis difficult. This difficulty is compounded by the relatively small number of missions that have been deployed in the last 10-15 years, the time frame in which mobile technologies and wider broadband access in developing and conflict-affected countries has increased significantly. To take this research further in the short and medium term, we suggest methodological approaches that focus on building qualitative understanding of local economic, social and governance information needs in countries currently hosting peacekeeping operations. Surveys and ethnographic research focusing on how local markets and governance systems develop around peacekeeping and international missions can provide base data for both policy makers and researchers seeking to better understand economic growth in post-conflict environments.

Complex operations and modern peacekeeping require integrated theoretical and policy analysis, recognizing that missions are actively affecting not only the security and political environment of the host country, but also its economy and opportunities for commercial growth. Traditionally peacekeeping and peace operations have focused on remaining neutral, playing the role of demarcation and observation. As peacekeeping has become more complex, the political and institutional processes behind peacekeeping operations are struggling to keep up. Our model and analysis provides conceptual and theoretical grounding for peacekeeping researchers and policy makers to understand the role of information technology as both a tactical tool for maintaining security, and a strategic sector that provides unique economic and capital support in post-conflict economies.

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## Table 1

<b>Country</b>	<b>Mission</b>	<b>Year</b>	<b>Tech/Comms Budget</b>	<b>Percent of Host Country GDP</b>
Central African Republic	MINUSCA	2015	USD \$45 million	2.85%
Mali	MINUSMA	2015	USD \$39 million	0.31%
Haiti	MINUSTAH	2011	USD \$46 million	0.61%
Democratic Republic of Congo	MONUC	2010	USD \$55 million	0.27%
Liberia	UNMIL	2007	USD \$29 million	3.91%
Cote D'Ivoire	UNOCI	2012	USD \$28 million	0.11%

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