ICT4D Research – Literature Review and Conflict Perspective

Full Paper

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Abstract

ICTs can positively influence development outcomes. However, ICT4D projects have achieved limited success in achieving their development objectives. In this study, we conduct a literature review of ICT4D studies conducted over the period 2006 - 2016. We find that theory linking ICT use and development impact is lacking, and that mobile devices might offer high positive impact possibilities than personal computers. We also find that studies characterize development in different ways: 1) development as expanded digital inclusion, 2) development as increased economic productivity, 3) development as expanded freedom, and 4) development as increased well-being. Across these development perspectives, however, conflict among stakeholders impacts development outcomes. By examining the literature under the lens of postcolonial theory, we find that power asymmetry among stakeholders might increase the resource dependency of beneficiary communities on donors, and might lead to the former resisting further ICT interventions.

Keywords

ICT4D, literature review, post-colonial theory, conflict theory, digital inclusion, capabilities approach.

Introduction

When successfully executed, ICT4D projects can yield impressive results. These results support the notion that ICT can have a significant and positive impact on the lives of people in marginalized communities. For example, in Kenya, mobile payment systems provide financial services to millions of poor citizens that might otherwise not have access (Mbiti and Weil 2011). In the Amazon region of Brazil, telemedicine technologies assist medical professionals with early detection of leprosy in local inhabitants (Paixão et al. 2009). And in rural India, game-based education tools help students learn math in an interactive manner (Kim et al. 2012). These projects are termed ICT4D because they are designed to develop the communities in which they are conducted. Sadly, such success stories in ICT4D implementation are few and far between. ICT4D projects spanning a gamut of technologies and geographical regions routinely fail, particularly because of inadequate sustainability (Best and Kumar 2008).

To understand failure, we must define development. So how exactly is the dependent variable in ICT4D defined? What is meant by development remains ambiguous and inconsistent across studies. Thus, our study mainly aims to understand how ICT4D scholars perceive development.

ICT4D entails intergroup interactions characterized by power imbalances, because any ICT4D project involves a would-be benefactor endeavoring to help a marginalized community (Avgerou 2008; Lin et al. 2015). The reality that most ICT4D projects are initiated by donors and researchers in the global North (developed nations in the Northern hemisphere) on behalf of communities in the South (developing nations in the Southern hemisphere) underscores the existence of these power imbalances. With a few exceptions, most ICT4D studies emphasize factors such as inadequate digital infrastructure, lack of financial resources, and lack of community participation as contributors to project failure (Heeks 2010) while downplaying the role of power disparity in affecting the outcomes of ICT4D projects. We believe that power imbalances play an influential role in influencing the trajectories of ICT4D projects and therefore deserve more attention than they presently receive in the literature. Power imbalances

commonly produce conflict between the relevant groups (Lin et al. 2015), therefore theories of conflict are useful in illuminating how ICT4D projects unravel.

The paper is organized as follows. First we detail our method of data collection i.e. selection of relevant articles. Next, we present a set of findings from the literature. The last of these findings, that different studies have different notions on what constitutes development, forms the basis for our organizing framework. We employ this framework to organize the studies. We also examine the literature using postcolonial theory and present a set of its implications for ICT4D projects.

Method – Review of Prior Literature

Our review covers the ten-year period between 2006 and 2016. ICT4D is multidisciplinary; therefore, we did not limit our search to IS journals. Further, there are multiple journals entirely devoted to ICT4D research. To keep the article sample size manageable, we searched for articles on one database, EBSCOhost, which yielded a sample of articles from a diverse set of journals.

Our literature search proceeded in the following manner: first, we searched through the EBSCOhost database for articles containing the following keywords in the title, abstract, or keyword list: ICT4D, "information communication technology for development", "information technology for development", and "ICT for development". More articles were found by backward search of cited articles. In all, the search yielded 119 articles. Careful examination of the abstracts of the selected articles revealed that 19 articles did not directly focus on ICT4D; hence we removed these articles from the sample. A further 4 articles were written in a language other than English, and were similarly removed from the sample. We also removed 3 policy documents written by the Africa Research Bulletin on Telecommunications. Among the remaining 93 articles, 22 were commentaries on the state of ICT4D research, 8 were review papers, 4 were conceptual papers, and 59 were empirical papers. We organized the papers according to their development perspective. Our review focuses on the 59 empirical papers, although we still draw useful insights from the remaining articles.

Review Findings

From the literature review emerged four main findings, which we elaborate on in the next few subsections. The first three of these findings concern general attributes of the ICT4D research, ranging from the incorporation of theory in ICT4D research to the prevalence of failure in ICT4D projects. The fourth and most significant among these findings addresses the different perspectives of development as revealed in the ICT4D literature. We describe the four different perspectives of development covered in the ICT4D literature. We then elaborate the notion of development to present a new perspective of development that depends less on the outcome of the ICT4D, as the four perspectives contained in the existing literature do, and instead focuses on the inherent conflicts across stakeholders introduced by ICT4D.

ICT4D studies inadequately theorize about development and ICT artifacts

Our first observation from the literature review is that the ICT4D literature shows inadequate application of theory in general, and about the link between ICT artifacts and development in particular. The proportion of empirical studies employing theory – e.g. actor-network, the capability approach, structuration – was only 54%. In fact, ICT4D researchers generally treat IT artifacts as unproblematic black boxes that provide no impediments in the development process. This is perhaps unsurprising, because the same problem occurs in IS research more generally (Orlikowski and Iacono 2001). Studies rarely justify why specific ICT artifacts should lead to development. Instead, they subsume these specific artifacts under the technology umbrella. This theoretical laxity is particularly salient in studies on the impact of telecenters or communication media centers (CMCs). Some studies that investigate this impact implicitly acquiesce to the assumption that the mere installation of a telecenter/CMC should lead to development (e.g. Best and Kumar 2008). Missing in the studies is the focus on the technological artifacts housed in these telecenters, and why those specific artifacts must lead to community development.

Mobile devices might offer higher impact possibilities than PCs

A second finding is that mobile devices appear to offer higher impact possibilities in developing environments than do traditional technologies. Mobile technology rapidly diffused throughout populations of developing countries over the past two decades (Heeks et al. 2009). Thus, a high proportion of the world's poor own or have access to mobile devices. Some studies hint at the reasons why mobile technology has found more success in developing countries than either PCs or the internet. First, they are relatively more affordable (Donner 2008). Second, the infrastructure required for coverage is much cheaper than for other technologies. For example, fixed telephones require huge investments into the poles and telephone lines that transmit the signals, and PCs require a steady amount of electricity.

This mobile device diffusion has been accompanied by an increase in the number of mobile apps. In turn, the emergence of useful apps such as m-banking, m-health, and m-education apps further fuel mobile device adoption, creating a virtuous feedback loop (Mbiti and Weil 2011). This is because individuals that do not adopt certain mobile apps incur a penalty. For example, mobile payment apps such as M-PESA allow individuals to transfer money to their social connections. These social connections can more conveniently access the funds if they also have M-PESA. As such, peer influence drives adoption of such apps, and by extension the mobile devices on which these apps run. The mobile technology revolution is therefore self-sustaining, and is the vehicle through which positive ICT4D impacts are likely to arrive in.

Such positive impacts from mobile technology have already been underscored in various studies. For example, Ganju et al. (2015) showed that developing countries are likely to reap benefits in citizen well-being from ICT4D through the use of mobile phones. Such benefits include reduced social inequality, and increased health, education, and commercial opportunities. In another study, Sreekumar (2011) found that the use of mobile phones by fishers in Kerala, India amplified the collectivistic culture of the community. The fishers cooperated by sharing information on fish prices and demand in distant markets, leading to higher profits for fishers. Given the success of mobile technology in developing countries, ICT4D research must shift its focus from PC-based solutions to mobile-based solutions.

Most ICT4D projects fail

A third finding from our review is that many, if not most, ICT4D projects ultimately fail to achieve their stated development goals (Awowi 2010; Heeks et al. 2009; Marais 2011). A concrete definition of a successful project is one which achieves a state of maturity – a stage where a project does not require external financial injections in order to survive – and sustainability – a stage where a project can grow with only local resources (Breytenbach et al. 2013). Examples of projects that have failed vary from telecenter ventures in India and Mozambique, implementation of a healthcare system in Malawi, to the installation of a prepaid electricity billing system in Nigeria (Best and Kumar 2008; Ibrahim-Dasuki et al. 2012; Sanner and Sæbø 2014). Failure is typically declared when a project's user adoption and usage levels are unsatisfactory (Awowi 2010), it cannot achieve long-term sustainability (Sanner and Sæbø 2014), or if it produces serious negative unintended consequences (Ibrahim-Dasuki et al. 2012).

Various studies have advanced different reasons for such failures. For instance, Awowi (2010) identified lack of infrastructure i.e. electricity and fixed telephone lines in Ghana's rural areas as the reason why community information centres failed to achieve full operational and functional levels. Awowi (2010) hinted at another interesting reason for ICT4D project failure, that a technology may simply have no positive socio-economic impact on its targeted community. This situation arises when the barriers to development are expensive to overcome; for example, in rural areas characterized by high illiteracy and lack of trained technical staff to solve technical problems when they emerge, people are likely to focus their development efforts on activities that entail limited financial pain (Awowi 2010; Duncombe 2006). In other words, the deterministic view of technology may subtly influence ICT4D donors to install technologies in places where such technologies have limited potential to lead to development. In addition to a limited infrastructure base, Bailur (2006) identified lack of financial sustainability as a reason for the closure of telecenters meant to avail information and technological access to a poverty-stricken district in rural India. Financial troubles arise when donors cease providing financial support towards an ICT4D project; usually, such projects' revenue bases cannot offset maintenance costs.

ICT4D studies adopt four main development perspectives

Analysis of the empirical literature shows that scholars have different perspectives on what constitutes development in the ICT4D context. These perspectives fall into four broad categories: 1) development as increased freedom (14% of all empirical articles), 2) development as expanded inclusion (40%), 3) development as increased economic productivity (27%), and 4) development as improved well-being (19%). The first category, *development as increased freedom* is due to Sen (1999) and posits that, in the ICT4D context, development only takes place if the freedoms of target beneficiaries are increased. The second category, *development as expanded inclusion*, posits that development takes place when previously disenfranchised groups are afforded access to ICT artifacts. Another category, *development as increased economic productivity*, postulates that development occurs only when economic productivity rises due to an ICT intervention. The final category, *development as improved well-being*, looks beyond economic productivity and declares development to have been accomplished if target beneficiaries feel more satisfied, happy, or fulfilled as a result of an ICT intervention (Ganju et al. 2015; Marks and Shah 2004). Although many studies presented multiple perspectives of development, we classified the studies according to the primary development perspective, which was usually clear from reading each study's abstract, but could be clarified through a deeper reading of the article when need arose.

The above four categories exhaust the development perspectives of the ICT4D literature. Hence we organized the studies according to these categories. We explore these perspectives below.

Development as freedom

The Capabilities Approach (Sen 1999) is an influential paradigm in development studies, and it bears a detailed description. A common criticism of development measures such as the Human Development Index (HDI) and Gross Domestic Product (GDP) is that they only capture national level statistics, and hence cannot take into account individual differences (Andersson et al. 2012). To address that, Sen (1999) proposed a bottom up development perspective where individuals must decide for themselves what they value. As such, Sen defines development as a process of expanding the freedoms that people enjoy. Development is anchored on two concepts: functionings and capabilities. For a given individual, functionings are the things that s/he values doing or being, and capabilities are those functionings which are feasible for him/her to achieve. Capabilities include economic facilities, social opportunities, and political liberties (Díaz Andrade and Urquhart 2012; Sen 1999). For some individuals, development means increased economic facilities, while for some others it is as an increase in political liberties, or a combination of both. Because functionings and capabilities vary across geography and context, different societies should create their own lists of what they value, in order to accurately measure development.

Despite its promise, the CA has gained slow traction in its impact on project evaluation. Because it emphasizes the individual interpretation of development, it is difficult to directly operationalize, especially when compared to traditional measures of human development such as the United Nations' Human Development Index (Andersson et al. 2012). Nevertheless, multiple ICT4D studies have attempted to demonstrate the theory's utility to ICT4D. For example, Ibrahim-Dasuki et al. (2012) linked the benefits of pre-paid electricity installations in Nigeria to Sen's capabilities by arguing that consumers' new-found freedom to save electricity was a manifestation of the social opportunities explicated in the CA. Breytenbach et al. (2013) argue that ICT4D projects should primarily increase the economic, social, and/or political opportunities of target communities. From a symbolic interaction perspective, we understand that different objects have different meanings to people Aksan et al. (2009). Hence researchers can determine whether development due to ICT intervention has occurred by evaluating first, the meanings that individuals assign to the ICTs, and second, whether such meanings meaningfully increase individuals' freedoms to pursue the lives they value.

Development as expanded digital inclusion

Another perspective of development revealed in the ICT4D literature is that of development as the expansion of ICT access to disenfranchised members of society. A common theme among some studies in this category is the digital divide across countries. Development, in this paradigm, means the closing of the divide between the less developed and more highly developed nations. For example, Frieden (2013) investigated the best practices for advancing the diffusion of broadband services by governments. Such

practices include strictly defining what constitutes broadband, and enacting service standards such as network transmission rates, price, and geographical coverage. Giovannetti and Sigloch (2015) adopted a network centrality approach to understanding entry barriers in the erstwhile monopoly-controlled broadband service market of Bhutan. The authors found a hierarchical configuration of the network of service providers, where strongly embedded providers enjoy high bargaining power but peripheral providers endure high costs. This hierarchical structure therefore presents a strong entry barrier, which ultimately discourages competition in the broadband service industry to the detriment of primarily rural consumers.

The digital inclusion perspective of development also focused on systematic barriers to access based on demographic characteristics. One such barrier is that of gender. Studies have examined the presence of a technology gender divide and its influence on women's access to ICT, to careers in ICT, and to their own sense of mattering. For instance, Elnaggar (2008) examined access to ICTs for women in the Arab Gulf Region, with a particular focus on Oman. He found that Omani women's access to ICTs and careers in ICT are inhibited by socio-cultural norms and lack of career counseling; hence, ICT usage in Oman exhibits gender differences. Seemingly, the benefits of ICT interventions disproportionately accrue to men, but how to rectify these imbalances is still a source of debate. Often, women are portrayed as passive recipients of change; hence a more active role for women in bridging the technological divide should be fostered (Asiedu 2012). Beyond economic issues, ICT use also has effects beyond economic issues for women. For instance, Chew et al. (2011) examined the effect of ICT use on women's sense of "mattering", or "the perception that others are aware of, interested in, and depend on us" (pg. 1). They found a significant and positive relationship between female entrepreneurs' mobile phone usage and their perception of mattering. As such, initiatives that dismantle systematic barriers to access can help further the development cause.

Development as well-being

A third perspective of development taken in ICT4D research is that of development as increased well-being. This concept of development is broad, and subsumes a variety of dependent variables such as happiness, education, social capital, poverty reduction, and health (Ganju et al. 2015). Broadly speaking, well-being is defined as "feeling satisfied and happy … as a person, being fulfilled, and making a contribution to the community" (Marks and Shah 2004). It was the dependent variable for 19% of the studies. Ganju et al. (2015) caution that the impact of ICT interventions on well-being takes long to manifest, hence projects that are deemed failures in the short term may prove successful with time.

At the country level, Ganju et al. (2015) examined the effect of ICT use on overall well-being. They theorized that ICT use would positively influence a country's well-being by 1) enabling citizens to build their social capitals (see also Molony 2009; Thapa et al. 2012), 2) lowering social inequalities through amplifying marginalized voices, 3) enhancing citizen health through ICT-enabled health interventions (see also Michelsen 2012; Miscione 2007; Paixão et al. 2009), 4) expanding education access to deprived communities (see also Breytenbach et al. 2013; Kim et al. 2012; Mamba and Isabirye 2015), and 5) improving commerce by expanding information access to producers, traders, and customers. They found that the well-being of citizens of less developed countries benefits primarily from mobile phone usage, in contrast to citizens of developed countries that benefit primarily from landline telephone and Internet usage. This finding is in keeping with previous observations that mobile devices have enjoyed organic adoption and usage rates that far outpace their Internet and PC counterparts (Awowi 2010; Heeks et al. 2009). This finding has implications for ICT4D research, most of which does not focus on how specific technologies should lead to development. The implications include the need for finer grained analysis of the link between specific technologies and development, and for exploring how other rarely studied technologies such as radio and TV might also be used for development. In fact, a preponderance of the literature neglects to theorize about the IT artifact, which leads to gaps in our understanding of ICT use's impact on development.

Development as increased economic productivity

The final perspective of development revealed in the ICT4D literature is that of development as increased economic productivity. In this perspective, development is said to have occurred when the introduction of an ICT artifact leads to an increase in productivity. For example, Huaroto (2012) examined the effect of

internet use on productivity of Peruvian microenterprises. He found that increased internet use resulted in positive productivity growth. Heeks (2006) employed Porter's five forces model to understand the competitive forces shaping India's software industry. He found that India's software industry obtained a competitive advantage over other countries because of its advanced skill base, domestic rivalry, and government vision. In turn, this competitive advantage translated to increased economic output. Other studies focused on the effect of ICT use on financial metrics such as savings and cash transfers. For instance, Mbiti and Weil (2011) examined Kenya's mobile banking platform, M-PESA, and found that the platform is used for cash transfers, bill payment, and savings and benefits the economy substantially. Similarly, Hayes and Westrup (2014) examined the evolving use of the M-PESA mobile payment system in Kenya as the context changed over time. M-PESA was originally intended to facilitate microcredit transactions between micro-finance institutions and rural Kenyans. However, actual usage patterns of the service showed that users utilized the service as a bank account that allowed for cashless travel. With these shifts in context, service providers re-conceptualized M-PESA as a money transfer system. Thus, productivity increased because financial transactions increased due to the introduction of an ICT artifact.

Some studies examined the impact of ICT use on work practices, and how they mediate the former's impact on productivity. For instance, Aanestad et al. (2014) examined the design, implementation, and scaling of a hospital information system in India. The health information system transformed work practices in a gradual rather than immediate manner. After the project, the billing function became more efficient in its logistics, hence saving healthcare costs. Sreekumar (2011) examined how Kerala fishermen cooperatively use cellphones in their fishing activities to cooperate with other fisherman by providing information sharing on promising fishing spots, resulting in increased economic output. Hence, ICTs can impact productivity by positively transforming work practices.

Table 1 summarizes the development perspectives, and presents a set of potential research questions for each perspective.

Development Perspective	When is development said to have occurred?	Potential Research Questions	Study examples
Increased freedom (14%)	If the freedoms of target beneficiaries are increased.	How might technology curtail development? How might multiple technologies clash in impacting developmental outcomes?	Ibrahim-Dasuki et al. (2012), Breytenbach et al. (2013)
Expanded digital inclusion (40%)	If previously disenfranchised groups are afforded access to ICT artifacts.	How are potential recipients identified? Who has the power to define the marginalized?	Frieden (2013), Elnaggar (2008)
Increased economic output (27%)	If economic productivity rises due to an ICT intervention.	What strategies can be employed to ensure that effects on the environment are minimized?	Huaroto (2012), Heeks (2006)
Improved well being (19%)	If target beneficiaries feel more satisfied, happy, or fulfilled as a result of an ICT intervention	How might technology negatively impact well-being? What are the moderating variables on the relationship between ICT use and well-being?	Ganju et al. (2015), Molony (2009)

Table 1: Perspectives of development

Having explored the findings from the ICT4D literature, we shall now turn to one sociological theory that might help explicate the complex interplay among micro- and macro-level factors during the planning, implementation, and use of ICT4D artifacts, and how these manifest in development outcomes.

The Conflict View of ICT4D

The above delineated conceptualizations of ICT4D emphasize its goal of improving society and while taking differing views of development, all emphasize development as an outcome. The ultimate aim of ICT4D across these perspectives is the improvement of society. The perspectives differ in their conceptualization of improvement. Nevertheless, a commonality in the perspectives is that ICT4D is a sociological effort. Conflict theory is a macro-level sociological perspective that emphasizes struggles among different classes of society (Knapp 1994). In ICT4D, we can employ the conflict perspective to understand how ICT4D entrenches prevailing power structures. Conflict theory subsumes a variety of theories and among them are critical and postcolonial theories (Avgerou 2008; Ravishankar et al. 2013). Among these, postcolonial theory features prominently in the ICT4D literature (Lin et al. 2015; Ravishankar et al. 2013; Rivers et al. 2016) and we examine its applicability to ICT4D projects below.

Postcolonial Theory

Postcolonial theory refers to "the ways in which colonialism continues to affect the former colonies after political independence" (Adam & Myers, 2003). In such former colonies, strong colonial influences linger for long periods of time and they manifest socially and culturally rather than politically or economically (Adam & Myers, 2003). Postcolonial theory has a unique ability, among the major sociological theories, to reveal the effects of the macro environment on micro-level processes (Ravishankar et al. 2013).

Generally, postcolonial theory emphasizes the negative effects of power asymmetries on development projects in former colonies. The vast majority of ICT4D projects are undertaken by agencies based in the West on behalf of communities in Asia and Africa (Heeks et al. 2009). The relationships between these agencies and intended project beneficiaries are largely unequal, because donor agencies provide the expensive resources required, while beneficiaries are treated as passive recipients of donor largesse. In many cases, the donor has the wherewithal to declare the project a success, regardless of the beneficiary's opinion (Lin et al. 2015). In the parlance of postcolonial theory, intended beneficiaries resemble the subaltern – groups of people perceived as inferior in social status (Ravishankar et al. 2013); and donors resemble the mainstream i.e. the elite and powerful groups with access to key resources in the relationship (Lin et al. 2015; Ravishankar et al. 2013).

Implications of postcolonial theory on ICT4D research

The asymmetric relationship between the mainstream and subaltern groups leads to three key outcomes which we explore next.

Devoicing of subaltern

Various proponents of postcolonial studies argue that subaltern groups cannot even speak for themselves, and instead rely on mainstream groups to articulate their opinions (Ashcroft et al. 1998). This has implications for ICT4D project evaluation, because donors and governments that comprise the mainstream often have the power to declare success or failure on behalf of intended project beneficiaries. For example, Lin et al (2015) recounted how complaints and feedback from aboriginal students, parents, and teachers were noted but ignored in an ICT project meant for their benefit. In contrast, the government and donor proclamations of success were widely reported in the media. The devoicing effect means that declarations of ICT4D success must be viewed with healthy skepticism.

Resource Dependency

Resource dependency is another important outcome of asymmetrical power relations between subaltern and mainstream groups. ICT4D projects cannot proceed without the financial and technical resources supplied by the mainstream; hence, the subaltern comes to depend on the mainstream for resources (Adams & Myers, 2003). This resource dependency implicates the long-term sustainability of ICT4D

projects. For example, Best and Kumar (2008) explored the long-term success of 78 telecenter projects in rural India. Although these telecenters were initially successful, most of them failed soon after the government and other donor agencies withdrew from the projects. In addition, the mainstream technical resource provider showed favoritism to some telecenters whilst ignoring requests from others, hence effectively choosing winners and losers. In the Ghanaian community information center initiative, disparities in access to electricity and telephones meant that some areas benefited and others did not (Awowi 2010). Hence, the theme of favoritism also extends to government-initiated projects.

Long-term resource dependency might lead to another negative outcome in ICT4D. When the mainstream is looked upon as the primary resource provider, its ideas becomes elevated in stature. The effect of this elevation is double-barreled: the mainstream becomes more convinced of the superiority of its ideas, leading to a decoupling of project conceptualization from project implementation – ideas conceived in the West increasingly ignore the local context. At the same time, the subaltern becomes less confident of the value of its contributions, leading to project demise as soon as mainstream groups withdraw. These effects reinforce each other, and may explain the high sustainability failure rates of ICT4D projects.

Resistance to IT

A deeper reading of the postcolonial literature reveals that subaltern groups sometimes actively resist mainstream ideologies and domination (Childs and Williams 2014). According to Childs and Williams, former colonizers still seek to exert control over the economic, political, and cultural matters of their former colonies. However, the former colonies are not blind to these maneuvers, and they resist them. In ICT4D, such resistance is reminiscent of the system conflict articulated by Leidner and Kayworth (2006), in which the values embedded in an IT artifact contradict the values held by a group – in this case the subaltern group. IT artifacts are endowed with values from their (usually) Western creators; such values include freedom of expression via social media, free market principles, and freedom of association and they are actively resisted by governments that view them as Western neo-liberal values. Certain responses to ICT4D project endeavors illustrate this resistance. For example, the Internet might be viewed as a "vehicle of racism and propaganda" (Rivers et al. 2016, pg 19), which is used as a destabilizing tool by erstwhile colonizers. This view might explain the failure of some e-government ventures. Further, the West is commonly accused of professing the superiority of its scientific knowledge to indigenous knowledge (Ibrahim-Dasuki et al. 2012); ICT artifacts may also be viewed in that light, which leads to subaltern resistance to educational and other ICT artifacts.

Conclusion

In this study, we conducted a literature review of ICT4D studies published over the past decade. The review revealed multiple findings: that 1) most ICT4D projects still fail to achieve their stated objectives, 2) many studies do not employ theory in understanding development 3) mobile devices might offer higher development impact that alternative technologies, and 4) studies adopt different perspectives on what constitutes development in the context of ICT4D. Consequently, we identified a set of potential research questions associated with each perspective. Digital divide articles thus constitute the plurality of studies in the ICT4D ecosystem. However, the demonstrated positive impact of ICTs on well-being should encourage further investigation on other indirect impacts of ICTs, which would contribute to development.

Across these development perspectives, however, conflict among different stakeholders might impact development objectives. We interpreted our findings using postcolonial theory, to highlight how asymmetric relationships among stakeholders might introduce this conflict. Alleviating these power imbalances can be the focus of future empirical articles. For example, power imbalances between project donors and target beneficiaries might result in beneficiaries resisting ICT interventions aimed at improving education outcomes. It is important to note that historical relationships might impede the success of ICT4D ventures, even when they might ultimately prove beneficial to subaltern groups. Hence, persistent colonial influences exert hidden yet powerful effects on the trajectories of ICT4D projects.

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