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Digital Innovation by Displaced Populations: A Critical Realist Study of Rohingya Refugees in Bangladesh

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Abstract. We are living in a time of unprecedented human displacement both within countries and across international borders. The United Nations High Commissioner for Refugees (UNHCR) notes that the number of displaced populations are on the rise, both internationally and within individual countries, with this resulting in a wide range of significant international development challenges. If some of these challenges are to be addressed by technology, an understanding of the manner in which displaced persons access and interact with technology and the conditions necessary for digital innovation in such contexts is vital. This paper adopts a critical realist-based philosophical approach and associated methodology to seek the underlying generative mechanisms that both enable and restrain digital innovation by Rohingya refugees in Bangladesh. The majority of these Rohingyas have severely restricted access to technology as well as practically non-existent access to the Internet. Despite this, innovation in the form of creation and sharing of digital content in mobile phone repair/recharge shops has flourished. This paper provides mechanism-based explanation of this particular form of digital innovation, with a total of three mechanisms being hypothesized as follows: 1) the communications and technological infrastructure built around the mobile phone shops; 2) the motivation and social, cultural, and political belief structures of the Rohingyas themselves; and, 3) the legal and technical infrastructure which applies to the Rohingyas in the refugee camps in Bangladesh.

Keywords: Rohingya, ICT4D, critical realism, Myanmar, Bangladesh, refugee

1 Introduction

Wide scale displacement of people is fast becoming one of the most critical challenges for humanity. According to the UNHCR approximately 71 million people were displaced, either locally or internationally, at the end of 2018 [1]. A growing number of problems created by these crises are also surfacing which are more long-term and developmental in nature instead of being the more traditional, short-term humanitarian

crises we have become used to. Some information and communications technology (ICT) enabled preliminary-level development interventions for such displaced groups show promise. However, very little research has been undertaken on this multifaceted topic with the majority of research being confined to a certain geolocation or ethno-identity. Our initial observations show that the majority of these proposed ICT solutions for refugees are significantly context specific and have limited scope to scale up or be used for other challenges. We believe that in order to build a stronger body of scholarship in this domain additional in-depth research examining underlying systems and processes is needed. In addition, a comprehensive understanding of the manner in which displaced people access, interact, and innovate using technology is critically important in order to document, analyze, understand and design possible future iterative and scalable interventions.

1.1 Background of Rohingyas

The Rohingyas are originally from Myanmar and are recognized as one of the most persecuted ethnic groups in the world. Rohingyas have suffered through various atrocities over the past decades including being stripped of their citizenship status in Myanmar due to the discriminatory policies taken by successive governments since that country's independence from the British in 1945. In addition, they have been consistently discriminated against by the army-led administrations in Myanmar with very limited access to education, health, and other basic human rights. All of this, accompanied by ever-increasing levels of hostility and violence towards their community over the past decades, has resulted in a mass exodus of Rohingya from Myanmar. Approximately 400,000 Rohingya refugees were living in Bangladesh before this mass exodus began in 2017, with current estimates putting the Rohingya population in Bangladesh at 1.3 million. The vast majority of these Rohingyas live in refugee camps and have little access to technology or the Internet [2].

1.2 Challenges with ICT and Internet Access for Rohingyas

The government of Myanmar has placed severe restrictions on the use of ICT by Rohingyas. By law Rohingyas are not allowed the use of any ICT with the exception of non-smart or feature phones, and any Rohingyas caught with a smart phone in their possession are subject to severe sanction and punishment [3]. Added to this is the tradition that Rohingya women should not access technology and are likely to be admonished within their own social groupings if they have ownership of any digital devices or phones [4]. To make matters even worse, the ICT infrastructure in Rakhine state in Myanmar where many Rohingya originate is considered to be quite poor.

Bangladesh, the new refuge for the majority of Rohingya refugees, had the potential to offer relatively better ICT access and services. However, this potential was never realized and any Rohingya who wishes to purchase a SIM card in Bangladesh is required to provide official identification and their biometric information to service providers in order to prove legal status in the country. Unfortunately, the vast majority of Rohingyas, especially the ones who arrived in Bangladesh after August 2017, are highly

unlikely to have any such legal documents in their possession and this automatically excludes them from obtaining mobile data and voice services legally in Bangladesh. The Government of Bangladesh has tried to address this lack of access to technology and connectivity among Rohingya refugees in a number of ways, but many of these initiatives have been ineffective or unsuccessful. One example is the provision of free telephone booths in different parts of the major refugee camps, but these have been rarely used. These ineffective initiatives, combined with the poor ICT infrastructure in the south-eastern part of Bangladesh where all the Rohingya camps are located, make getting access to any kind of technology or Internet connectivity very challenging indeed.

1.3 Overcoming ICT Challenges and Restrictions

The first outcome of the restriction of mobile phones and Internet usage among Rohingya refugees in Bangladesh was the rapid rise of the illegal SIM market within the various refugee camps. According to our research, the majority of the Rohingyas procured Bangladeshi SIM cards through the black market with the help of a variety of people, mainly ethnic Rohingyas who had previously gained Bangladeshi citizenship. We also found that the refugees consistently paid significantly more than a Bangladeshi citizen for accessing mobile data and other mobile voice related services. In the refugee camps near the border of Myanmar a significant number of refugees carry multiple active SIMs with them which are capable of accessing both Bangladeshi and Myanmar mobile network services. This is because the signal strength of Myanmar's telecom companies is stronger in this particular region of Bangladesh. Hence, such practice became standard in order to ensure constant connectivity between the Rohingya refugee population both within and outside Bangladesh.

By the first quarter of 2018, the overall situation in all the major Rohingya refugee camps had become more stable and organized in terms of access to food, shelter and healthcare. This was when Rohingyas started to more strongly express their multifaceted needs to communicate with others and for accessing various localized information. Around the same period, we witnessed the growth of a support structure for mobile phone repairing and recharging which was in sync with the ever-increasing use of mobile phones by Rohingyas (which was technically illegal). Such supports were primarily provided through numerous small mobile phone repair/recharge shops managed by young Rohingyas and financially supported by local entrepreneurs. This was important for a variety of social and economic reasons as within the refugee camps there are not many opportunities available to young male Rohingyas in the form of education, employment, or entertainment. As a result, these mobile phone shops have become popular hangout places for this particular demographic.

1.4 Services Offered by the Mobile Phone Shops

A typical mobile phone shop offers two to three services as follows: 1) mobile phone repair for both smart and non-smart phones; 2) mobile phone recharging; and 3) the transfer of audio-visual data from a shop's laptop or phone to client's memory card or phone. In addition, we saw the relatively bigger shops sell other products including

refurbished mobile phones, memory cards, earphones, mobile chargers, various mobile phone accessories, small and medium sized solar panels, solar lamps, etc. Other services such as photocopying, scanning, printing, laminating, and printing wedding cards were some of the other services provided by the mobile phone shops.

These shops also offer a variety of mobile phone repair services, with the majority of the shopkeepers having had prior technical training and some of them receiving assistance in setting up their services from the host community experts. However, according to almost all the repair personnel and their customers, the level of service provided in the refugee camp areas is very basic and the price range is capped at around BDT 200 (US\$2.50).

Due to the lack of electricity in the camp areas, recharging a modern mobile smartphone is a huge challenge. This task is made even more difficult during the monsoon season as the majority of the solar lamps used for domestic purposes become too weak to charge a mobile phone due to the relative lack of sunlight during daytime. Hence, recharging phones is a steady earning source for all the mobile phone shops with each of the shops offering multiple power supply sources including solar panels, car batteries, power banks, and diesel-powered generators. The price for charging a phone is strictly regulated by the shop owners across the camps at approximately US\$0.12 for charging any phone completely. In addition, in order to avoid confusions with mobile phone ownership, the shopkeepers came up with their own two-point verification system for verifying ownership of the mobile phones.

1.5 Digital Innovation and an Alternative Internet: Acquisition and Transfer of Audio-Visual Content by Mobile Phone Shops

The third and arguably the most digitally innovative service offered by the mobile repair/recharge shops is audio-visual digital content transfer which we frame as an alternative Internet. As mentioned earlier, due to the restriction on owning mobile phones and accessing the Internet for Rohingyas, there has always been a huge demand for good quality information and entertainment among the refugee communities. It is also worth noting that Rohingyas do not have any official written script based on the newspapers, books, or other literary materials they use. Hence, culturally appropriate audio-visual content among this particular community in their newly adopted host country has become increasingly significant. Despite this, the humanitarian agencies and other NGOs working for the betterment of Rohingyas have mostly prioritized services on physical health, hunger, and shelter related issues over creation and supply of digital news and entertainment content customized for Rohingya consumption. This has led to a dearth of such culturally appropriate services and audio-visual content, which was quickly and organically filled by the mobile phone shops. Each of the shops is usually equipped with at least one laptop and a number of hard drives loaded with a wide variety of audio-visual content. As already mentioned, poor internet connectivity and restricted access to technology means that Rohingyas in Bangladesh are unable to access such content online or in real time. In order to circumvent this lack of access, short audio and video clips on Rohingya related news, reports, and features are being downloaded

and saved on the mobile phone shop's laptop and hard drives. This content is then transferred to the customers mobile phone for a small fee.

This highly organized network of digital audio-visual content providers facilitates the supply of up-to-date and relevant content for Rohingyas on a regular basis. This network is mainly comprised of Bangladeshi entrepreneurs who first download the content using high speed Internet which is widely available outside the camp areas in bigger cities like Cox's Bazar and Chittagong. This content is then collated and transferred to mid-sized mobile phone shops on the outskirts of the refugee camps. From there, the mobile phone shop owners from the camps go to these intermediary shops and procure content based on local demand. On average, a 500GB hard drive filled with downloaded audio-visual entertainment including news and various religious sermons can be sold for approximately US\$5. According to our research, the mobile phone shopkeepers' collection frequency of newer content ranges from one to four times per month depending on the level of demand for the content.

2 A Critical Realist Philosophical Approach and Methodology

This section briefly presents the philosophical approach adopted for this research and the associated methodology.

2.1 Field Data Collection Method

We collected field data for this research from various field visits between November 2017 and August 2019. Data was collected at refugee camps within the Kutupalong, Balukhali, Leda, and Teknaf areas of Cox's Bazar district in Bangladesh. During this period, we conducted interviews and focus group discussions with around 200 people including Rohingya refugees, local NGO workers, Government officials, and international humanitarian officials. Furthermore, we conducted around 100 hours of participatory observations and contextual inquiries. We faced numerous challenges while collecting the data from the Rohingya refugee camps. With the exception of law-enforcement agency people, no non-Rohingya refugee people were allowed to stay or work in the camp areas after sunset, thus forcing us to leave the camp areas by 4pm daily. Moreover, as evidenced from our findings, the majority of the areas where we conducted our research did not have any mobile phone service coverage. Such obstacles made our observation and data collection processes significantly more difficult.

2.2 Critical Realism, Mechanism-based Explanation, and ICT4D

As already mentioned, this research adopts a philosophical approach based on critical realism [5, 6], with the methodology being adapted from Wall et al. [7]. Importantly, the paper answers the call for the increased use of critical realism in ICT4D research as made by Heeks & Wall [8] who suggest that such an approach has many advantages for the field. In addition, this research used the basic principles proposed by Hussain & Brown [9] who utilized a critical realist philosophical approach in collecting in-depth

field data and insights from ICT driven grassroots development initiatives in Rwanda and Bangladesh.

A critical realist-based approach is highly relevant to this research as it can enable us to identify the underlying causal mechanisms which both cause and prohibit the digital innovation in the Rohingya refugee camps as described in the proceeding sections of this paper. This has not been done previously and we could find no similar research which carries out a critical realist, mechanism-based exploration of digital innovation in this context. We thus view this as a significant contribution to the ICT4D literature. Moreover, the hope is that this work can create a broader research agenda which seeks mechanism-based explanation in other refugee and internally displaced person (IDP) contexts.

2.3 The Philosophy of Critical Realism

This section will give a brief explanation of critical realism in an attempt to provide some degree of context for this research. Should you wish to delve deeper into this philosophy we refer you to the more extensive works of Bhaskar [5, 6], Archer [10] and Mingers [11]. For those more interested in the application of critical realism to the field of ICT4D we refer you to the recent special edition of the Electronic Journal of Information Systems in Developing Countries (EJISDC) on “Critical Realism and ICT4D Research” as published in 2018 (volume 84, issue 6).

Put simply, critical realism asserts that elements of an independent reality exist through three separate levels of stratification. This stratification is represented as three nested domains as proposed by Bhaskar [5] and represented by Mingers [11] in Figure 1 below. The research questions posed by this research seek underlying causal mechanisms, but these mechanisms reside in the domain of the Real and we as human beings do not have the ability to perceive them. The Actual domain contains events, and the domain of the Empirical contains the events that we as humans are able to experience.

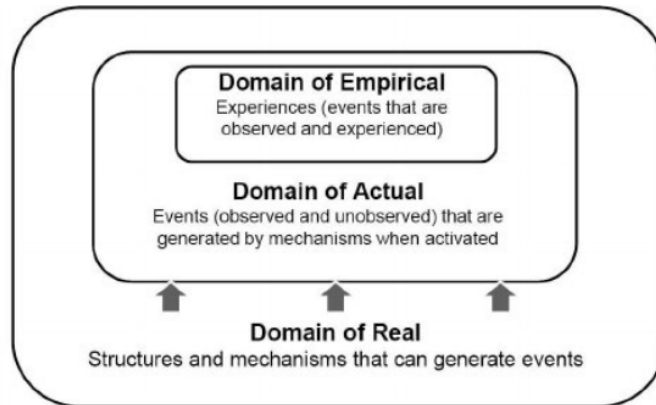


Figure 1: Three overlapping domains of reality in the critical realist ontology [11]

A variety of technical definitions are available in the literature for these phrases: mechanisms are causal structures that generate observable events [12], and events are specific happenings resulting from causal mechanisms being enacted in some social and physical structure within a particular context [13]. The concept of retroduction is also key to any critical realist-based methodology [5] and requires the researcher to take some unexplained phenomenon and propose hypothetical mechanisms that, if they existed, would generate or cause that which is to be explained [11]. In other words, we as researchers seek causal mechanisms but we can only perceive the events which are in the Empirical domain. Thus, we must retroduce (or hypothesize) the mechanisms that exist in the Real from the events that reside in the Empirical.

Over the past years a variety of methodologies have been developed to achieve this retroductive process. As already mentioned, this paper relies on the methodology as developed by Wall et al. [7] who leverage Margaret Archer's [10] morphogenetic approach. The first step in this methodology is to create a factual case description and a chorological account of events in as much detail as possible. This can be done from interview data, but also from other qualitative methods such as observation and document analysis. From this, the theorization of mechanisms can occur when causal influences in social structures, interactions and relationships have been identified. This is discussed in section 3.2 below.

3 Discussion & Analysis

3.1 Factual Case Study Description & Chronological Account of Events

As mentioned, we conducted a variety of in-depth interviews and focus group discussions between November 2017 and July 2019. This data was then used to create a factual case description and a chorological account of events in as much detail as possible. Some quotes from the data collected are given below in order to provide context for the retroduced mechanisms which follow. The objective was to cover as many diverse shops as possible in order to develop a holistic view of such digital technology centered businesses in adverse conditions. The absence of a robust, reliable and legal mobile network for communication (both voice and data), lack of content and scarcity of power to charge phones and light up shelters within the camp areas played key roles behind the establishment, growth and evolution of these shops.

The shopkeepers are actively encouraged to choose the types of content they would like to populate their hard drives with based on the popularity of certain content. According to one mobile repair shopkeeper (Rohingya, male, age 26);

"At first we were not sure what to keep in the hard drive. But now we know. We bring new collections (of movies and music video) in every other week from Ukhiya bazaar (a big marketplace right outside the main camp areas). Sometimes, the customers tell us what types of content to bring."

On the demand side, a typical Rohingya customer usually purchases a memory card of 4 or 8GB which costs between US\$2 and US\$5 and then transfers the content he chooses onto that memory card. For each such transfer, the customer pays around US\$0.50.

In general, the nature of the audio-visual content can be divided into four broad categories: news, entertainment, religious sermons, and education. For many years, Rohingya refugees living in Malaysia, Middle East, Europe, and the USA run news channels based on YouTube and other social media platforms. Rohingya refugees living in the camps access this digital content mainly through memory card transfers. In some cases, when there is mobile network signal available within the refugee camp area Rohingyas share these news clips via WhatsApp, imo, or WeChat with their peers and family members. Similarly, a clear pattern of preferences and popularity emerged when we analyzed the contents on the laptops of the 15 representative mobile phone shops.

When it comes to entertainment, we found that Indian, Pakistani, American, Arabic, Burmese, and Turkish movies, music, and dance videos are in high demand. In many cases, these programs are somewhat unprofessionally dubbed with Rohingya language. Aside from that, Bangladeshi dramas and music videos are also very popular. Religious sermons (of religious scholars belonging to Rohingyas, Bangladesh, etc.) are also very popular. One customer (Rohingya, male, age 32) stated;

"I miss listening to Rohingya Tarana (music). I come to this shop all the time to get new collections of Rohingya Tarana."

Unfortunately, we found content of some of these sermons to be fear mongering, belligerent and filled with false information. On a smaller scale, we found short videos containing educational instructions in the Rohingya language covering issues on the opening of new social media accounts, healthcare, etc. These videos are made by the expat Rohingyas and started getting disseminated via the mobile shops and the Internet.

Besides the demand and supply chain that emerged out of the demand for audio-visual content in camp areas, we observed a strong demand of digital content created inside the camps by the refugees themselves, mostly among the expat Rohingya groups based in South East Asia, Australia, Middle East, and Europe. These contents are also developed and distributed using the same network of mobile phone repair shops, other mid-size shops, and bigger shops with Internet connectivity.

As a whole, the entire network of gatekeepers engaged in collecting, creating, localizing, and distributing audio-visual content for Rohingyas works similarly to the Internet. The mobile repair/recharge shop laptops and hard drives are full of options and the Rohingyas have clear agency to choose, buy, and watch or listen to whatever they would want or need to. For a population persecuted for decades, and for whom the regular internet or mobile network is officially illegal, such options seem like a welcoming change. One user (Rohingya, male, age 24) mentioned;

"We can access the songs and videos we like from this shop and then can watch those with our family. I don't have access to the Internet. But I am using my smart phone and memory card to get what I want from this shop. I am happy."

However, a significant gender imbalance exists with relation to existing services and customers of this alternative network of content and communication in the Rohingya camps. Rohingya women, who are around 55% of the Rohingyas recently arrived in Bangladesh, are not directly benefitting from the mobile repair/recharge shop-based content network. One middle-age Rohingya women (age 39) told us:

"We watch the videos of songs, dramas, and movies our sons share with us. We don't download those or buy such things from others."

This can be partially explained by the attitude of the patriarchy and the religious leadership of Rohingya towards women (especially the younger ones) using mobile phone or the Internet. All the senior and married women respondents in our study believe that it is a “problem” if young, unmarried women get access to mobile phones and the internet. One Rohingya women (age 43) mentioned:

“It’s not acceptable for the young women to talk on the mobile phone. There are many crank calls coming for our girls. That is unacceptable.”

When we asked different male respondents about their perceptions of women using ICTs or accessing mobile repair/recharge shops, the reactions were almost unanimous. Rohingya males, be they religious or community leaders, young, senior, literate, or illiterate, all agreed on the fact that women should not have a lot of access phones or the internet, and they should not be in any mobile repair/recharge shops. A prominent religious leader (age 50) explained the boundaries or limits of Rohingya women’s ICT usage by saying:

“Women can talk over phone, but they should not be allowed to use the phones.”

That respondent, along with others during the same conversation further explained that it is okay for the married women to have access to phones in order to ensure food and other relief for their families. However, women should not use it for some other reasons, and most importantly,

“...young and unmarried women should never use mobile phones or the internet.”

3.2 Retrodution of Causal Mechanisms

The first step in the methodology as developed by Wall et al. [2] is prepare a factual case study description and a chronological account of events in as much detail as possible. This is then used to empirically identify discrete and separate cycles in the case. From our data we identified three cycles as follows:

1. The “exodus from Myanmar to Bangladesh” cycle (pre-August 2017 to December 2017). This cycle includes the exodus of the Rohingya to Bangladesh because of persecution in Myanmar and takes into account the very poor access to technology and Internet connectivity available to them during that time.
2. The “inception of frugal digital innovation” cycle (January 2018 to mid-2018). This cycle includes the hope for better access to technology and Internet connectivity in Bangladesh, and the ultimate loss of hope when this didn’t happen. It also includes the way Rohingyas managed to get access to technology and Internet connectivity and the beginning of the alternative Internet and the mobile phone repair/recharge shops.
3. The “Expansive and increasingly Inclusive Digital Innovation” cycle (mid-2018 to mid-2019). This cycle includes increased access to technology and improved Internet connectivity (because of pressure from UN/NGOs/INGOs to open up mobile and Internet services). Additionally, included is the massive growth in mobile phone repair/recharge shops. As the situation in the refugee camps settled there was also a massive increase in demand for localized content, with this demand being met by the mobile phone repair/recharge shops.

Each of these 3 distinct cycles were then analyzed to produce analytical histories of emergence [10]. Analytical histories of emergence are retroductive, corrigible accounts of sociological transformation over time which are never final because we can always improve on our explanations as more or better data becomes available. These analytical histories of emergence then formed the basis for retroduction. The resulting retroductive process produced a total of three generative mechanisms which are discussed in the following section.

4 Causal Mechanisms which Explain Digital Innovation Rohingya Refugee Camps

This section briefly presents the three generative mechanisms that were retroduced from the analytical history of emergence, with the first of these mechanisms being discussed in brief. The three mechanisms are as follows:

1. The communications and technological infrastructure built around the mobile phone shops. This mechanism includes what we frame as the alternative Internet where digital audio and video content was downloaded and distributed.
2. The motivation as well as the social, cultural, and political belief structures of the Rohingyas themselves. This includes the attitude towards women having access to technology, the desire to access news and entertainment content of relevance, and the desire to keep in contact with disperse family and other social networks.
3. The legal and technical infrastructure which applied to the Rohingyas in the refugee camps in Bangladesh. Important here were the attempts by the Bangladeshi authorities, under pressure from the UN and other various NGOs and INGOs, to open up mobile and Internet services.

The space restrictions imposed by this paper prohibit a detailed discussion of all three mechanisms, but we do discuss the first of these retroduced mechanisms, i.e. the communications and technological infrastructure built around the mobile phone shops. This mechanism includes all elements of the way the mobile phone shops operate, including the communication structures between the people who downloaded the audio-visual digital content, the mobile phone shop owners and operators, and the final customer who purchases the digital content. An important component of this mechanism is the communication structures that operated within and between the various parts of this supply chain and the way this evolved over time as the Rohingyas were able to access more advanced technology and smartphones. This mechanism also includes elements of Bangladeshi Government policy to maintain a stable communication network and the legacy technological needs of the Rohingyas themselves.

This mechanism had the important effect of creating an environment where the mobile phone shops could flourish both socially and financially. Another important effect was the creation of a strong and stable social structure where young Rohingya males could gather and socialize. This is important as these young males mostly ran

the mobile shops and made up the largest customer demographic. It also gave confidence to those willing to invest their time and money in establishing the shops (mainly Bangladeshi nationals and Rohingyas living in Bangladesh for many years) which was a vital component needed for the long-term viability of the shops themselves.

5 Summary

This research adopts a critical realist philosophical and methodological approach to uncover underlying causal mechanisms which identify why digital innovation occurred in the way that it did in the Rohingya refugee camps in Bangladesh. A total of three causal mechanisms were retroduced, and these mechanisms explain how the interaction of different structural, cultural and agency factors have influence in this particular context. Although we suggest the communications and technological infrastructure built around the mobile phone shops mechanisms is the most important mechanism in this case, it should be noted that all three mechanisms are important and all together go towards explaining why the conditions necessary for digital innovation and the alternative Internet evolved and developed in the way they did. Our belief is that such mechanism-based explanation allows a theoretically informed and empirically rich account of how context and mechanism interact to produce this specific outcome in this specific case.

As a result of this research we add our voices to the recent calls by many scholars for an increased amount of critical realist-based research and mechanism-based explanation [7, 14, 15]. In particular, we call for this approach and methodology to be used for additional research on displaced persons and refugees. The hope is that such mechanism-based explanation will play an important part in promoting a wider research agenda which seeks such mechanism-based explanation in similar cases.

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