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Privacy Vs Protection: Mapping Crucial Challenges in Implementing the ICT4D Agenda in Global South

Case Analysis of India's Aadhaar Program

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Abstract

A rising number of Global South countries are investing in Information and Communication Technologies to streamline their social protection delivery systems despite a dearth of evidence supporting their effectiveness in non-western contexts. To address this crucial gap, the current master's thesis examines the impact of the ICT4D agenda on comprehensive social protection and privacy standards in Global South, through a case analysis of India's enormous digital identification project, Aadhaar. The thesis is theoretically grounded in Milan and Trere's (2019) framework for examining datafication in the South which proposes a shift beyond data universalism, to perceive and portray the South as a composite and plural entity, and to hold agency at the center of the analyses. Findings from the research revealed that the subsumption of core welfare delivery programs into the Aadhaar ecosystem led to arbitrary exclusion or denial of services due to inadequate technical infrastructure, disempowering the already vulnerable. Additionally, the lack of composite privacy protection and accountability mechanisms led to aggravation of data injustice for the poor. The Aadhaar project provides invaluable insights about ICT4D realities in the grassroots, and upon addressing its key shortcomings, has the potential to function as a blueprint for adoption to other countries of Global South.

Key Words: ICT4D; Aadhaar; Global South; Social Protection; Privacy

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List of Abbreviations

- AAY: Antyodaya Anna Yojana
- ABBA: Aadhaar Based Biometric Authentication
- APBS: Aadhaar Payment Bridge System
- BC: Business Correspondent
- BJP: Bharatiya Janata Party
- DBT: Direct Benefit Transfers
- ETAAL: Electronic Transaction Aggregation & Analysis Layer
- G2P: Government to Person
- GB: GigaBytes
- GDP: Gross Domestic Product
- GOI: Government Of India
- ICT: Information and Communication Technologies
- ICT4D: Information and Communication Technologies for Development
- ID: Identification
- ID4D: Identity for Development
- ILO: International Labour Organization
- INR: Indian Rupee
- JAM: Jan Dhan- Aadhaar- Mobile
- JDY: Jan Dhan Yojana
- KYC: Know Your Customer
- MGNREGA: Mahatma Gandhi National Rural Employment Guarantee Act
- MNC: Multinational Corporation
- NABARD: National Bank for Agriculture and Rural Development
- NRC: National Register of Citizens
- NREGA: National Rural Employment Guarantee Act
- OECD: Organisation for Economic Co-operation and Development
- PAN: Permanent Account Number
- PDP: Personal Data Protection
- PDS: Public Distribution System
- PER: Purchase- Entitlement Ratio

- PM: Prime Minister
- POS: Point of Sale
- RBI: Reserve Bank of India
- RCT: Randomized Control Trial
- RTI: Right To Information
- TPDS: Targeted Public Distribution System
- TRAI: Telecom Regulatory Authority of India
- UDHR: Universal Declaration of Human Rights
- UID: Unique Identification
- UIDAI: Unique Identification Authority of India
- UN: United Nations
- USD: United States Dollar

"I am not your data, nor am I your vote bank, I am not your project, or any exotic museum object, I am not the soul waiting to be harvested, Nor am I the lab where your theories are tested,

I am not your field, your crowd, your history, your help, your guilt, medallions of your victory" Abhay Xaxa

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1. Introduction

The United Nations Sustainable Development Goals offer ambitious milestones and a set of comprehensive pathways and indicators to foster human development including the complete eradication of global poverty by the year 2030. With less than a decade to materialize this internationally ratified goal, a staggering 10% of the global population still lives in extremely impoverished conditions (less than USD 1.90/day), with a projected increase of 1.5% due to the extenuating circumstances presented by the Covid-19 pandemic, making it the first time in decades to record a substantial setback on this metric (World Bank, 2021). While the role of the pandemic in exacerbating socio-economic inequalities is quite pronounced and undeniable, the existing inadequacies of governance structures coupled with the far-reaching economic repercussions of a skewed global economy have led to disproportionate vulnerability of Global South countries and particularly their marginalized populations. Nearly 82% of the newly impoverished 150 million people are predicted to be residents of middle-income countries such as India (World Bank, 2021).

The need for developing resilient and coherent social protection systems for poverty reduction has been reiterated time and again. While countries in the Global North have had the economic

calibre (lent by an exploitative world order) to set up and perfect such mechanisms since the onset of the industrial revolution, erstwhile colonies of the South, otherwise known as emerging or developing economies, such as India, South Africa and Brazil have ramped up their efforts to rehash and customize the remnants of colonial institutions into coherent welfare systems over the past few decades. And not without incident. In a rather macabre but pertinent case, over 15 hunger deaths in India since 2016 have been attributed to failures in the institutional reform of the state's welfare system, which was merely an attempt to foster centralization and coordination of its several social protection programs. Incoherence of social protection due to inadequacies in delivery methodologies can be merely wasteful in some contexts and catastrophic to the social fabric of newer welfare states in others.

Within this broader quest to the formation of robust welfare states, the rapid proliferation and increased accessibility of Information and Communication Technologies (ICTs) has created the perception of its omnipotence to bridge the gaps of coordination through previously unimaginable precision and efficiency. As a result, emerging economies have begun to rapidly invest in ICTs as the de facto policy measure to addressing the inadequacies in their social protection and security infrastructures. International development organizations and aid agencies, including the UN have played a significant role in promoting ICTs as the next developmental tool by creating the ICT4D agenda, which encapsulates the use of technology to assist the marginalized population in developing countries (Walsham 2017). While this discourse provides adequate attention to the transformative capacity of the digital paradigm, there is a dearth of attention to crucial considerations emerging from the deployment of ICTs for development and social protection, those of implementation, privacy and surveillance. This discussion is all the more pertinent in light of a substantial number of Global South countries embarking on enormous data collection projects for the digitalization of their citizens' identities and their subsequent linkage to social welfare schemes.

China's proposed social credit system involves a close monitoring of its citizens' online presence, banking activity and criminal records to allocate a credit score that will be employed in determining one's eligibility for social welfare programs, loans and other government provisions. This Orwellian nightmare of a system, although it would be unique in its own right upon successful execution, also represents a global trend of governments building national identification databases with a concerning degree of penetration into their citizens' everyday lives, justified as efforts to streamline social protection delivery and curb leakages. India, Bangladesh, Chile, Philippines and South Africa are amongst the other Global South countries

to have introduced initiatives to link social protection to digital identities, including but not limited to biometric and facial recognition softwares, typically spearheaded through public-private partnership models (Callander 2019).

Schopp et al (2019) highlight the important questions and aspects of digitalization that must be addressed from an ethical standpoint in countries of the Global South including unequal power relations, neo-colonialism, (digital) illiteracy, general barriers to access, and the gender digital divide. In light of these significant and pervasive gaps in digitalization efforts in non-western contexts, the aforementioned national big data projects to streamline social welfare delivery can be detrimental to the society, especially the poor, through the stark privacy risks alongside the potential failure of the resultant social protection delivery mechanisms. This calls for a critical enquiry into this intersection of digitalization of identities and social protection in such contexts. This dissertation aims to contribute to the growing literature on the complexity of deploying ICTs as a 'one-stop-shop' solution to deep-rooted systemic and societal inadequacies in the Global South through a policy analysis of India's enormous techno-social endeavor, the Aadhar project.

2. Research Design

2.1. Research Question

The complex socio-political and historical context of the Global South and its intersection with technology offers a crucial multi-disciplinary research project with far-reaching implications to public policy and global governance. This dissertation aims to contribute to the growing body of literature examining the effectiveness of deploying ICTs to foster human development in non-Western contexts, particularly whether such techno-social endeavours lead to empowerment and inclusion of the marginalized or if they play a role in institutionalizing social inequalities and threatening citizens' right to privacy. In doing so, the dissertation's central research question is the following: *What is the impact of the ICT4D agenda, especially identity digitalization schemes, on social protection and privacy in the Global South*?

2.2. Theoretical Framework

2.2.1. Datafication in the South

With the rapid proliferation of big data projects in the Global South, digital anthropologist Payal Arora (2019) points out that, despite the fact that the majority of geolocated digital data is predicted to be from these emerging economies as of 2020, our epistemic understanding of digitalization, privacy and surveillance debates remains primarily driven by Western contexts, concerns and user behaviors. She argues that while such data centralization projects are being met with suspicion and abundant caution in Western contexts, 'there is a bias in framing big data as an instrument of empowerment in the Global South'. Part of this bias can be attributed to the hyperbolic framing of the 'big data revolution' by the Western epistemic centres (Cukier and Mayer-Schoenberger 2013). Chakravathy et al (2014) have reiterated that 'white masculinity' still remains the normative core of scholarly enquiry, including the shaping of the pathways of digitalization and the framing of associated concerns in the Global South, with frequent disregard to the cultural, historical and political contextual differences.

In order to harness the positive impacts of deploying big data for development, we need to address the questions of how it would unfold in Global South countries with fragile democracies, deep social inequalities and noncomprehensive human and digital rights regimes. Milan and Trere's (2019) proposed framework to examining datafication in the South is instrumental to this analysis, at the core of this conceptual framework lies the practice to move beyond data universalism, to perceive and portray the South as a composite and plural entity, and to hold agency at the center of such analyses. This dissertation will derive from this framework and policy analysis tools, supported by the Hague Framework to analyze the unique contextual challenges presented by the Aadhar project in India and its implications for social protection.

2.2.2. ICT4D Phenomenon and the Hague Framework

Due to the relative novelty of the ICT4D agenda, comprehensive theorizations of the multiple causal mechanisms of technology-society interactions are few and far between. The Hague Framework (Fig 1) was an effort to bridge this gap between practice and theory by developing an explanatory model for the ICT4D phenomenon. The foundational construct of this framework is derived from the works of Beal et al. (1957),

Rogers (1962), and Quebral (1973) and postulates that 'Communication can effect developmental changes in societies.' The model attributes higher importance to the communication and social rather than the technological aspect of ICT4D (Flor 2015). This framework has been criticized for its lack of adequate focus on empirical referents, however, it is composite and comprehensive in its explanatory capacity of the conceptual referents.



Fig. 1 The Hague framework

2.3.Concepts

2.3.1. Individual Agency

Kennedy et al (2015) postulate that understanding agency is critical to understanding data power relations in the contemporary world. Individual agency in discourses and debates around datafication has remained an underexplored area despite its centrality in shaping our understanding of human-technology interactions. The concept of agency is used extensively to explore social and cultural processes and in fostering fairness and equity among existing structures. Within the pervasive agency/ structure dichotomy, structuralist and Marxist scholars assert that structures not only determine, but also serve to constrain and oppress already marginalized groups in society (Kennedy, Poell, and van Dijck 2015) essentially depriving them of their agency. Social theorist, Layder (2006) defines agency as 'the ability of human beings to make a difference in the world'. Couldry (2014) offers a more reflexive definition of the concept, 'the longer processes of action based on

reflection, giving an account of what one has done, even more basically, making sense of the world so as to act within it'. Deriving from these definitions for the purpose of this dissertation, individual agency will be understood as the ability of an individual to make an informed choice of whether and how they want to participate in datafication projects of the state, their ability to shape pertinent policies and ultimately, proprietorship and control of their personal data.

2.3.2. Social Protection

United Nations Research Institute for Social Development (2010) offers a broad working definition of social protection: it is concerned with preventing, managing, and overcoming situations that adversely affect people's well-being, consisting of policies and programs that are aimed at poverty and vulnerability reduction, mitigation of social and economic risks including unemployment, disability, exclusion, and old age. Social protection is a composite framework encompassing all of the systemic and institutional provisions from the state to ensure universal human rights and foster human development of its citizens.

2.3.3. Privacy

Originally defined by American jurists in the late 19th century as the 'right to be left alone' (Brandeis and Warren 1890), the concept of privacy has evolved and expanded significantly with its inseparable relevance in the age of ICTs and big data. Privacy can be defined as an individual's or entity's claim to determine how, to whom and what extent information about them is used, shared or retained. Article 12 of the Universal Declaration of Human Rights (UDHR) is interpreted as an assertion of individual right to privacy, which states that:

No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks. (UDHR 1948)

The recognition of the right to privacy as a fundamental human right has laid the pathway to advocating for and developing comprehensive privacy protection systems in both Global North and Global South countries. Scholars have identified three crucial issues of information privacy pertinent to governance and policy analyses. Firstly, government regulation of personal data processing followed by the prevalence of cross-organizational data sharing practices and finally, affects of the safety and security agenda in light of real or perceived terror and criminal threats (Raab and Koops 2009). The analysis of the case for its implications on individual privacy rights in latter sections of the thesis therefore uses this categorization.

2.3.4. Global South

With a gradual epistemic shift away from traditional Western-centrism and the changing nature of the global political landscape, traditional terms of geopolitical categorization such as the 'third world' have become obsolete. The term "Global South" refers to the continents of Latin America, Asia, Africa, and Oceania collectively, essentially regions outside Europe and North America that are predominantly (but not exclusively) low-income and frequently politically or culturally marginalized. The term 'Global South' denotes a shift away from a central focus on development or cultural difference and toward an emphasis on geopolitical power relations (Dados and Connell 2012). The term has gained wide popularity since it has been coined especially in disciplines such as International Relations, Development Studies and Global Governance as it functions well as a tool to visualize, legitimize and comprehend the exploitative global relationships enabled by colonialism and now, capitalism. A curious aspect of the dichotomous portrayal of the Global South and Global North, as articulated by Milan and Trere (2019), is the pervasive yet sorely incorrect perception of homogeneity within the respective poles in scholarship. While the premise of this thesis is to explore digitalization in the Global South, it does not attempt to generalize the findings across this entity. In fact, as highlighted throughout the text, a key underlying feature within the Global South is its vibrant plurality of contexts and resultant techno-social manifestations. The concept of Global South is therefore instrumentalized in this dissertation to challenge the reductive and exoticized portrayal of non-Western digitalization trends and preferences, by highlighting the skewed political economy of knowledge production in this subject.

2.4. Research Methods

Due to the complexity and context specificity of effects of digitalization in the Global South, this thesis will adopt a case study methodology to evaluate the impact of ICT4D initiatives. Using qualitative research of secondary sources and policy analysis tools, the thesis examines the case of India's digital national identification project, Aadhaar and its effectiveness in improving social protection delivery with keen consideration on the plethora of privacy and surveillance concerns on the way to realizing its central goal. The rationale for the choice of case is explained in the following section. Conducting a case study allows for data to be collected using a variety of sources and methods and facilitates building a holistic understanding of the case. The scope of the current study is to examine the pathways and state of the art of the Aadhaar scheme's introduction and execution, which closely interacts with the socio-cultural and political context of India. Because the boundaries between the phenomenon and the context are not well defined in such technosocial projects, case study design offers us with the opportunity to conduct an in-depth investigation of contemporary phenomena within its real-life context (Schoch 2020), through analysis of data from multiple sources (Yin 2018).

A vast repository of existing literature has critically addressed different independent variables that influence the successes and failures of digitalized identification schemes in the Global South. The key observations from the literature review have been used throughout the text as and when relevant and appropriate, to allow for derivation and application to the context.

To explore the impact of the nationalized identification scheme on improving the efficiency of social welfare delivery, official government data, findings from independent surveys and ethnographic (Maseiro and Das 2018; Dreze et al 2017; Libtech India 2020; Khera 2017; Dixit 2017) are utilized. Experimental studies by researchers (Khaira 2017) are instrumental in determining the pathways of implementation in the grassroots. Findings from the survey data of the studies and mainstream media coverage provide us with the necessary insights about how the public perceive the impact of this initiative.

To study privacy protections and the right to self-determination, a rights-based legal analysis on the state of institutional provisions to protect or impede the citizens' right to choose is conducted. This is done through an analysis of secondary sources such as court proceedings, constitutional provisions, petitions, news coverage of the significant cases and anecdotal evidence.

2.5.Case Selection

With over 1.2 billion citizens already registered, India's Aadhaar project is the largest biometric database and digital national identification project in the world. An emerging economy with a colonized past, a multi-ethnic, multi-linguistic and politically polarized population, a complex social protection system and now, a rapidly emerging digital economy position India and the Aadhaar project at the centre of a global debate about the true emancipatory potential of ICT4D projects in Global South countries. Additionally, since the Aadhaar project was introduced in 2009 and has been well-documented throughout, it provides us with a rich repository of data from over ten years to observe the various iterations of the project and their subsequent impacts on society. With a number of emerging non-Western, post-colonial economies rapidly embarking on national big data project can set a pioneering example to successfully implementing such projects in cultures where privacy is not an inherent social value. As an Indian national, the author of this dissertation enjoys an advantageous positionality in studying this case owing to her familiarity with the culture, socio-political climate and few languages of the country.

3. Background

3.1. Social Protection in India

Since gaining independence from the British Empire in 1947, India has experienced tremendous economic growth, with the real GDP of 2021 projected to be over twenty times that of the economy's formative years (World Bank 2017), accompanied by substantial strides in poverty reduction and human development. However, the country continues to be

plagued by deep social inequalities rendering a huge section of its population vulnerable. To foster human development, the Indian Constitution provides for comprehensive social protection of its citizens and recognizes the 'right to life' as a fundamental right, and the Constitution's Directive Principles (India Culture 1949) mandate for the state to provide for adequate means of livelihood; and further:

- --"within the limits of its economic capacity and development, make effective provision for securing the right to work, to education and to public assistance in cases of unemployment, old age, sickness and disablement, and in other cases of undeserved want" (Article 41);
- --make provisions for the ingredients of decent work in terms of conditions of employment and a living wage (Articles 42 & 43); and
- --"regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties." (Article 47).

Within the federal structure, social protection matters are positioned in the concurrent domain of central, state, and local governments. As of 2020, the government has budgeted approximately USD 220 billion for social security (direct cash transfers, financial inclusion, benefits, health and other insurance, subsidies, free school meals, and rural employment guarantee), which amounts to 7.3 percent of the GDP (Union Budget 2019). Public Distribution System (PDS) and the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) are the two most prominent social welfare schemes in the country, and therefore will be used as the core programs in the analysis within this thesis. Figure 2 provides a layout of the welfare system in India.



Figure 2: Welfare in India; Source: Saini 2019

The Public Distribution System, which is the highest funded social welfare project with a budget of approximately 1% of the GDP, is a targeted food security program that distributes subsidized food grains and supplies through fair-price shops. MGNREGA is a self-targeted, labor-intensive public works program that offers employment security to the rural population of the country. India's social protection delivery famously suffers from serious problems such as misallocation (the poorest areas face the greatest funding shortfall) and ineffectiveness (high leakages and targeting errors). The National Economic Survey of India (2017) revealed that as of 2017, only 28% of PDS resources reach the intended beneficiaries, with leakages and misallocation as high as 40%. The survey reported leakages of up to 20% in the NREGA program and as high as 43% of the benefits accrued to unintended recipients.

Of the 950+ state sponsored schemes for social protection, most have no inherent mechanism to measure the impact and monitor the results (Masiero and Das 2018). Social protection data from ILO (2017) estimated that only 24.4% of the Indian population receives effective coverage (which refers to the % of population covered by at least one social protection benefit). With over 27.7% of the population experiencing multi-dimensional poverty, inadequacies in coverage and inefficient delivery of social protection further marginalizes the vulnerable population of the country.

An additional challenge in the coherence of social protection in India has been the lack of a comprehensive national identification system. While various IDs already existed—for example, the electoral identity card, the income-tax PAN (Permanent Account Number) card, the ration card, the birth certificate, and the driver's license—none of them could serve the entire billion-strong population due to their limited coverage and single-purpose focus. Different agencies needed different sets of documentation and verification methods; therefore no single identity card was accepted across the board for public services (Sen 2019). This has historically challenged access to aid, social welfare, and banking services for the most underprivileged population. To address these pervasive challenges in implementation, the government has been investing in the reformation of the welfare delivery mechanisms and institutions to increase effectiveness and coverage, including a proposed shift to Direct Benefit Transfers (DBT) and the introduction of biometric identification and authentication of beneficiaries through the Aadhaar project. Before delving into the overall impact of the Aadhaar project on social protection, the following section is a descriptive analysis of the digitalization process in India, including legislative provisions, internet access and usage trends and an overview of the 'Digital India' vision.

3.2. Towards a Digital India

In a rousing speech at Silicon Valley in the presence of tech giants, India's Prime Minister Narendra Modi shared his boundless optimism in the power of technology, "I see technology as a means to empower and as a tool that bridges the gap between hope and opportunity", he reiterated that "In this digital age, we have an opportunity to transform lives of people in ways that was hard to imagine a couple of decades ago" (News18 2015). Reflecting this passionate sentiment towards the transformative capacity of ICTs, the Modi government launched the 'Digital India' initiative in 2015 positioning ICTs as a key policy strategy for development and social protection. The project, with a budget of USD 14 billion, aimed to (i) make high-speed Internet accessible to the general public, (ii) make all government services accessible to the general population, and (iii) ensure citizens' digital empowerment (Digital India 2021). The Digital India program has been designed to subsume most ICT4D policies of the government, including Aadhaar, creating a comprehensive e-governance system to promote transparency, efficiency, and inclusion universally. Part of this vision is the government's long-term mission for 'Jan Dhan (Public Wealth)- Aadhaar - Mobile', otherwise known as the JAM trinity. The JAM trinity embodies principles of financial inclusion, e-governance, digital identification and appbased public service provision. The success of this reform is contingent on eliminating all barriers to ICT access and reducing the digital divide so that the most vulnerable population can reap these benefits. However, the ICT infrastructure and current state of access in India remain far from ideal.

India has the second largest population on the internet, which comprises of almost 12% of the global internet users (Meeker Report 2019). Internet penetration ensued very rapidly in

the Indian market from a mere 4% in 2007 to 50% in 2020 (Statista 2020). Despite rapid adoption of ICTs, the ICT Development Index (a composite indicator including 11 ICT parameters grouped into three clusters: access, use and skills) of India is quite low, ranking 134th in the world (ITU 2017).

Corporate endeavours in India have been a major source of internet access provision in traditionally underserved areas such as the Facebook's free basics initiative and Reliance Jio's low-cost data and cellular services (priced at an affordable USD 0.05 per GB). Despite this, the Telecom Regulatory Authority of India (TRAI) report (2021) on telecom subscriptions indicates that while urban areas enjoy a tele-density of 141.03%, rural parts of India are severely lagging with a mere 60.24%. It is relevant to note here that 70% of India's population reside in rural areas (Census 2011). The TRAI report also highlights the substantial differences in ICT access across the different states in the country, ranging from 281% in Delhi to 53% in poorer states like Bihar. The National Family Health Survey (2020) revealed a stark gender digital divide in India, with an average of only 42% of women to have ever used the internet as compared to 62% men. This is particularly troubling in rural areas where a mere 34% of women were reported to have ever used the internet.

Research has demonstrated that socio-economic disparities, associated with digital differences, could further intensify if the existing digital divide is not bridged (Avgerou & Madon 2005; Wei et al., 2011). Therefore, the Prime Minister's utopian vision for a 'Digital India', operationalized in 2015, still remains a distant reality for a vast majority in the socio-economic fringes of the country.

3.3. Inception of Aadhaar

Aadhar, which translates to 'foundation' in several Indian languages, set out to be a monumental feat of centralizing India's vast population's relationship with the government. Introduced in 2009, the project was created with a mission to "provide for good governance, efficient, transparent and targeted delivery of subsidies, benefits and services" (UIDAI, 2021) to all Indian residents. The creation of a national identification card had been proposed previously in the year 2000 after the Kargil War to ensure security in the

contentious borders. But this endeavor culminated in the creation of a National Register of Citizens (NRC) instead of a centralized ID.

In 2009, the then government of Congress-led United Progressive Alliance, by the recommendation of the central Planning Commission created the Unique Identification Authority of India (UIDAI) a statutory body tasked with the creation and maintenance of Aadhaar, with Nandan Nilekani as the chairperson. UIDAI is part of an amalgamated machinery that is supposed to streamline service delivery through data collection and verification (Henne 2019). Mr Nilekani was the co-founder and ex-chairman of Infosys Technologies, an Indian MNC currently valued at USD 70 billion (Infosys 2021) and he authored a book called 'Imagining India: The Idea of a Renewed Nation' which has come to essentially function as a manifesto for the Aadhaar project (Parker 2011). At the onset of this project, the undertaking was massive, Nikelani was in charge of building a biometric database 10 times the size of the largest database at the time. Data was collected and processed at a rapid pace from the people, through government approved private subsidiaries. Starting from phone numbers and addresses to biometric data like fingerprints and retina scans of 1.3 billion people were to be stored and handled by the UIDAI at a centralized server in Bangalore.

The original model placed this process of biometric identification, verification, and authentication as a voluntary alternative for people seeking social benefits and food subsidies. When it was in opposition, the currently incumbent Bharatiya Janata Party (BJP), had openly criticized the program. "On Aadhaar, neither the Team that I met nor PM could answer my Qs on security threat it can pose. There is no vision, only political gimmick" said Narendra Modi in a tweet before his election to the office of Prime Minister in 2014 (Modi 2014). Inconsistent with their original stance, the BJP-led government substantially increased the scope of Aadhaar, notably without addressing the very security concerns mentioned in Modi's tweet. Possession of an Aadhaar card was made mandatory to access social welfare services like collection of PDS supplies, enrollment in the NREGA program, to receive pensions and eligibility to receive mid-day meals at school. This was in direct contradiction to a Supreme Court interim order prohibiting the refusal of welfare services based on an individual's lack of Aadhaar card.

The inception and expansion of Aadhaar was similarly riddled with numerous challenges questioning its constitutionality. Ensuing a legal tussle between the legislative and judiciary,

the Parliament passed the Aadhaar Act of 2016. This has enabled the government to issue notifications to make Aadhaar mandatory for various schemes. As a result, additional petitions challenging these notifications have been filed.

In 2017, after Parliament made Aadhaar mandatory for filing tax returns and applying for PAN (Permanent Account Number), new Supreme Court petitions were filed. The new provision stated that if an individual fails to link their PAN to their Aadhaar number by the central government-notified deadline, their PAN will be invalidated. The government stated that this will alleviate the issue of multiple PAN cards being obtained under fictitious names, resulting in tax fraud and evasion, as Aadhaar will ensure proper identification. However, the petitioners contended that this could jeopardize an individual's fundamental rights, including their right to practice any profession, trade, or business and their right to equality. The Supreme Court held that the new provision of the Income Tax Act requiring income tax assessees to have Aadhaar does not violate either the fundamental right to equality or the fundamental right to practice one's profession or trade.

A significant concern about the constitutionality of Aadhaar was raised due to the way Parliament passed the Aadhaar Act, 2016. The Act was introduced in the Parliament as a Money Bill. A Money Bill requires only the approval of the Lok Sabha (Parliamentary lower house), while the Rajya Sabha (upper house) may make non-binding recommendations. In the case of the Aadhaar Act, Rajya Sabha made several recommendations to the Lok Sabha that were rejected. It has been argued in court that the Aadhaar Act is not a Money Bill because it contains provisions unrelated to government taxation and expenditure. A Supreme Court bench presided to determine the constitutional validity of Aadhaar and upheld its status in 2018 to the dismay of legal activists.

Aadhaar today covers over 3500 government and non-government activities in India (ETAAL 2021), ranging from opening bank accounts to making digital payments, registering in school, activating a mobile phone, collecting pension payments, filing taxes, voting, and e- signing.

4. Aadhaar and Social Protection

4.1.Financial Inclusion

Financial inclusion is a crucial part in the JAM functionality of the government's vision of ICT adoption for governance, and a prerequisite for building towards a long-term goal of centralizing and eliminating sources of leakages in the social protection system. Shift from in-kind welfare provisions through subsidization programs like the PDS to DBT through Government to Person (G2P) Payments require the proliferation of access to banking services in the poor and vulnerable sections of the society, who have historically remained outside of the formal financial infrastructure. To enable this, the Modi government launched the Jan Dhan Yojana (JDY) in 2014 to create no-frills or zero-balance bank accounts for the poor with the use of Aadhaar card as a Know Your Customer (KYC) document. The KYC directive for banking services had been a major impediment to the widespread usage of financial services for the poor due to their lack of comprehensive identification documents, a gap that was to be seamlessly filled by the Aadhaar project (Banerjee 2016).

Data on financial inclusion provided by the Reserve Bank of India (RBI) inspires optimism about effectiveness of the government's multidimensional endeavors. From 2011 to 2017, India's banked population more than doubled, reaching 80 percent in 2017, with Jan Dhan accounts accounting for 66 percent of the country's 536 million no-frills accounts (RBI 2017). The total number of unique bank accounts has increased from 73 million in 2010 to a staggering 649 million in 2020 (RBI 2021). This raises an important question, does the mere possession of a bank account mean empowerment of the poor and what effect, if any, does the complex fintech ecosystem of India have on improving social protection delivery?

The G2P model was deployed for NREGA wage payments and pensions in a South Indian district as a pilot program, which proved to be a success in eliminating leakages and in efficient and cost-effective service provision (Banerjee et al 2013), and the composite model was scaled to the entire country. Despite the success of the pilot and the impressive data on the number of bank accounts and financial transactions following the introduction of Aadhaar, the net incidence of these schemes has been less than empowering for the Indian poor. Independent studies in different parts of the country have shown that 80-90% of these new bank accounts have remained inactive since being opened (Microsave 2018). As a result, banks have no incentive in promoting these accounts as it has proven to be a poor business case.

The dormancy of these bank accounts, and the resultant shortcomings in the financial inclusion plan of the government can be traced to key gaps in the government's assumptions about the viability, financial literacy, and on-ground compliance of the Aadhaar based financial ecosystem. The National Bank for Agriculture and Rural Development's All India Rural Financial Inclusion Survey or NABARD (2017) revealed that only 11% of the respondents had 'good' financial literacy, which accounts for knowledge of banking processes, ability to execute them and a positive financial attitude. The same study also shed light on the fact that despite possession of bank accounts, up to 52% of the respondents preferred to keep their funds at home (NABARD 2017).

An ethnographic study in a village of rural Maharashtra (Abraham 2019) has uncovered the ground realities of the Aadhaar based banking services. Firstly, some of the people entitled to the no-frills bank accounts were under the impression that by opening a bank account, they would receive INR 5000, when actually the amount was the overdraft provision for such accounts. Secondly, the nearest bank branch to this village is 10 km away, and most residents, who are daily wage laborers, must skip the day's work to walk to this branch. Finally, some respondents also reported that they had been instructed by the bank authorities to deposit up to INR 600 during the opening of the account in contradiction to the foundational promise of the entire scheme: incorporation of poor people into the financial system at no cost to them. Some of them never used their bank accounts after opening them nearly 4 years before the study.

As evidenced by such grassroots studies, the road to financial inclusion of the poor is laden with challenges such as misinformation, high cost, barriers to access such as financial illiteracy and lack of banking services in their physical proximity. While the value of the Aadhaar-based Jan Dhan program lies in its inclusive capacity, scalability and ultimately, the recognition of the poor in the national financial system, this analysis demonstrates that the policy design did not adequately account for numerous factors that determine the implementation realities of such a reform. Within the larger goal of the government to move towards Direct Benefit Transfers as the sole welfare provision, composite financial inclusion, not merely opening bank accounts, facilitated by the Aadhaar program has the potential to be instrumental for streamlined and efficient delivery of social protection.

4.2.PDS and Food Security

The Public Distribution System is the single largest welfare undertaking of India, launched in the year 1947 and modified to its current form as Targeted PDS (TPDS) for the poor in 1997. The program distributes staple food supplies such as rice, wheat, sugar and other essentials such as kerosene at a highly subsidized price through Fair Price Shops, also known as ration shops. Eligibility to this scheme was contingent on the possession of a Ration Card issued by individual state governments based on the household's economic status, in that there are two categorizations: Priority Household Ration Cards that entitled families to 5kg of food grains per head per month and Antyodaya Anna Yojana (AAY) ration cards for the 'poorest of the poor' that entitled families to 35kg of food grains per head per month. As explicated in Section 5.1, the PDS ecosystem that consisted of multiple agents was plagued with leakages, pilferage, and misallocation.

Since the introduction of Aadhaar, the government has gradually rendered it the central identifying document for several social welfare programs including the PDS to prevent well-documented challenges in delivery. In linking the Aadhaar UID number to the PDS system, there are two crucial steps: Aadhaar seeding, which refers to the linkage of the UID to existing databases of social welfare entitlements, in the case of PDS, this is the ration card database. This is followed by the installation of Point of Sale (POS) machines for Aadhaar Based Biometric Authentication (ABBA) in the fair price shops. PDS provides for an excellent case to study the effectiveness of Aadhaar because of its extensive coverage and the richness of data and literature documenting the grassroots implementation realities of the new PDS delivery system.

The government claimed that the introduction of Aadhaar in the PDS has resulted in the deletion of 23 million 'ineligible' ration cards, saving INR 140 billion (USD 1.89 bn) (GOI 2017c). However, a closer examination of individual state-wide data conducted by Khera (2017) uncovered that the data presented by the government was severely misleading. Firstly, a single ration card was issued for each household whereas the UID is issued to individuals, therefore, the unit of comparison is different. Second, the government failed to mention that while a large number of ration cards were deleted, a significant percentage of new ration cards had also been issued. In one instance, the government had admitted to the role of connectivity issues and server capacity of the Aadhaar system led to authentication failures and denial of services in the state of Rajasthan (GOI 2016).

In light of such unreliable government data, independent studies reporting on the ground realities of Aadhaar remain our chief source of reliable information. As identified in Section 5.2, rural areas in India experience poor tele-density and inadequate internet coverage. To address issues of connectivity, the system operates in 'offline mode' in some parts of rural India. This offline mode does not require biometric authentication, instead, a receipt is generated, and purchase information uploaded to the online system when connectivity is found. However, similar to the former ration card-based system, this would allow ration dealers to fabricate purchases and redirect the supplies, in this case leading to pilferage.

Dreze et al (2017) conducted a Randomized Control Trial (RCT) based study on the effectiveness of Aadhaar for food security in the state of Jharkhand, which is historically infamous for leakages from the PDS system as high as 85% in 2004-05. The study compared villages with online Point Of Sale (POS) mechanisms which requires biometric authentication and offline ones for effectiveness of distribution of the supplies, and the results revealed that the villages with the online system had significantly higher number of transaction failures, with nearly 50% of the households reporting failures as compared to the 10% in the offline villages. The study also revealed that the Purchase- Entitlement Ratio (PER) which is used to measure the success of PDS in terms of fulfilling the quantity quota promised to the households, has remained the same before and after the implementation of Aadhaar.

The PDS online system allows for double transactions in a given month in case of a transaction failure in the previous one due to technical problems. However, the survey results revealed that most of the beneficiaries were unaware of this provision and that ration dealers had been reporting fake double transactions to route the supplies illicitly. One of the more well-documented issues in the introduction of Aadhaar Based Biometric Authentication (ABBA) is that most of the targeted population owing to their participation in manual labour have the risk of possessing undistinguishable fingerprints that would invalidate the authentication process, denying them of the service they are entitled to for no fault of their own. To reduce the risk of exclusion due to this reason, the government allows for any member of a given household to provide their biometric authentication to collect the rations for the rest of the family even if one or more of them face fingerprint related issues. Even with this provision in place, 7% of the households in the Jharkhand sample have been unable to access their PDS supplies because they do not have a single POS-able member in the family due to issues of fingerprint recognition.

A study conducted in the South Indian state of Karnataka by Masiero and Das (2018) has also identified the issue of non-recognition that particularly affects the elderly and people employed in manual labour, resulting in the denial of rations for months at end. Additionally, the study found that people who have migrated from one state to another are unable to access rations in their new locality without undergoing the tedious process of changing their address.

The study in Karnataka has found that public narratives about the use of Aadhaar in the PDS systems are techno-rational in nature, meaning that the public perceives Aadhaar as a problem-solver to the issues of wrongful inclusion of beneficiaries and leakages due to corruption of the PDS dealers. For instance, an official in the system articulated the perception of Aadhaar in the public (Masiero and Das 2019), that:

The old [paper-based] system was fraught with bogus ration cards, with which non-poor people could turn up at the ration shop and get subsidies just like the poor. With Aadhaar this is not possible, because biometric credentials are unique for each person.

The study by Dreze et al (2017) revealed similar trends in public perceptions of the Aadhaar scheme. In villages of Jharkhand where internet connectivity is reliable and authentication relatively easy, the public shared a supportive techno-rational sentiment towards ABBA for PDS because they believed that it protected them from fraud.

Such a simplistic view of techno-social interactions has drawn attention away from the risks of arbitrary exclusion presented by even the minutest error in the computerized system, leading to far reaching implications for human life and well-being. As a direct result of continuous technical authentication failure at the PoS machine which led to denial of rations, an 11-year-old girl in Jharkhand had died of starvation in the state of Jharkhand in 2017. The child's death prompted a nation-wide investigation by the Right to Food campaign which tied at least 19 out of the 57 starvation deaths recorded between 2015 and 2018 to the failure of ABBA (Johari 2018). While particular causes varied, from technical or authentication failures to the inability to be verified in person, a concerning trend has emerged: marginalized social groups of Indian society, "including Muslims, Dalits, and members of isolated tribes," were more likely to be among the deceased (Bhatia 2018).

This not only reiterates the high stakes involved in the reformation of social protection delivery but exposes the glaring absence of a socially embedded perspective to understanding the potential impacts of technological innovation and anticipating such tragedies. Ultimately, there is a dearth of reliable data to suggest the transformative capacity of Aadhaar for ensuring Right to Food, but there is mounting evidence of continued leakages and pilferage and of the critical failures in the system leading to arbitrary denial of basic welfare provisions to the most vulnerable populations, a flagrant risk to fundamental human rights of the Indian poor.

4.3.MGNREGA and the Right to Work

The Mahatma Gandhi National Rural Employment Guarantee Act of 2005 is a social security program that offers guaranteed employment of 100 days per year to any volunteering adults in a household to perform unskilled manual labour in government funded public works programs and aims to secure to its vulnerable population the constitutionally guaranteed 'right to work'. While all adults above 18 years of age residing in rural areas are eligible, participants were required to apply for a job card at the local government. Since 2014, Aadhaar has been used at various levels of the NREGA process. First, the verification of job cards against Aadhaar UID followed by the payment direction which uses the Aadhaar Payment Bridge System (APBS) and finally, the requirement of ABBA for withdrawing the money.

The government's claims of savings after the integration of Aadhaar into this program were grand and impressive. According to them, INR 7,600 crore or approximately USD 1 billion have been saved by the state by reducing leakages and misallocation by 2016-17 (GOI 2017). For the same year, 9.6 million 'fake' job cards (8% of the total NREGA job cards) were reportedly deleted (Chatterjee 2017). In reality, only 12.6% of all deleted job cards were classified as 'fake' or 'duplicate', others were deleted for reasons of address change or surrendered entitlements as revealed through an RTI query (Dreze 2017). This brings into focus, alongside the obvious gaps in measuring the impact of Aadhaar, the government's tactics of fabricating findings and results to hyperbolize the transformative capacity of Aadhaar. The role of propaganda through biased media and sponsored studies has been rampant in shaping skewed ICT4D narratives in the country, by omitting uncomfortable truths about the unintended effects (further discussion in Section 9).

Technical and robustness issues have emerged in the enrolment, eligibility and payment processes in the NREGA program. This scheme was riddled with issues of wage corruption or what is characterized by the government as quantity fraud or identity fraud, which can take on three forms: extortion, collusion and deception. The ABBA system has been found capable only to address the issue of deception which is identity-based (Khera 2017), of which there is no baseline data to measure the real impact of Aadhaar. The challenges of extortion and collusion are tactically unpreventable through the extended UID system.

The last mile challenges of receiving and withdrawing the NREGA wage payments through biometric authentication were measured in the states of Jharkhand, Rajasthan and Andhra Pradesh as a part of the study by LibTech India (2021). The study has revealed some telling statistics about the high percentage of authentication failures that delay the wage payments of NREGA workers, which is often their major, if not sole, source of income. As visualized in the graph, a substantial percentage, ranging from 13-19% for different states of the sample population have reported that their wage payments were halted due to authentication failures the previous 5 times, and around 35% of the workers experienced such 'last mile' challenges at least once in the last 5 times.

Therefore, the introduction of Aadhaar to NREGA has not only slowed down the program due to administrative and technical hurdles, but the acute centrality of the ecosystem fostered by Aadhaar has made it extremely difficult for the workers to seek assistance upon failure to seed their job card with the UID or the access their payments, which they are legally entitled to receive within a 15-day period.

4.4.One Way Transparency

A consistent feature in the incorporation of Aadhaar into social protection delivery is the conditionality of possessing a UID for access to basic provisions. As a result, the right to self-determination of the people who depend on such services for sustenance is impinged upon. The principles of transparent and efficient delivery of subsidies (ibid.) are held at the core of UIDAI's mission for Aadhaar. However, as the analysis of Aadhaar's impact on financial inclusion, PDS and NREGA programs demonstrated and scholars of development and privacy studies (Henne 2019; Dreze et al 2017; Khera 2017) identified, the UID program essentially functions based on a one-way expectation of transparency. In that, the

government mandates the citizens to disclose their personal information in exchange for welfare services while building opaque, difficult-to-navigate, jargon-filled and inaccessible systems of redressal or assistance for the public, consequently reducing the accountability and transparency of the system. This information asymmetry, as Henne (2019) addressed in her article, lends to the structural power of the state through knowledge accumulation about its subjects, enabling the creation of sophisticated surveillance mechanisms.

5. Visibility or Vigilance?

In a bid to improve the visibility of vulnerable populations, whose disempowerment has been closely related to their exclusion from the formal economy and state infrastructure, the Aadhaar project has evolved into a big data project collecting data for every financial and welfare-activity related transactions and recently, contact-tracing initiatives for Covid. The government can now 'see' its population better, but a critical question about what this means emerges at this juncture, does the Aadhaar infrastructure enhance the visibility of the population, or does it expose them to risks of surveillance?

Due to the magnanimity of data under the jurisdiction of a single agency, UIDAI, the Aadhaar project has been a host of multiple data privacy and security related concerns due to the lack of comprehensive data protection legislation to govern the collection and processing of Aadhaar data. Distinct to some non-Western contexts like in the Indian society, privacy is not always perceived as a positive attribute, and occasionally carries connotations of shame and secrecy (Manzar and Chaturvedi 2017). This does not justify state's systematic erosion and violation of privacy rights. Cohen (2012) reiterated that privacy is an indispensable structural feature of liberal democracies and 'freedom from surveillance is foundational to the capacity for critical self-reflection and informed citizenship', and that privacy is a prerequisite for innovation and development. The Supreme Court of India, in a landmark ruling in 2017, held that the Indian constitutions enshrines the right to privacy as a fundamental right and an integral part of right to life and liberty.

This constitutional provision is not adequately supported by a legislative framework to protect data privacy or offer redressal in case of violations. The Personal Data Protection (PDP) Bill of 2019 is supposed to address this long-overdue need for a privacy legislation. However, there

have been significant delays in presenting this bill in the Parliament. At the time of writing this thesis, enactment of the PDP Bill is indefinitely postponed. Meanwhile, the Aadhaar Act enables the government to accumulate data from people without institutional and legislative accountability mechanisms.

In response to the mounting privacy and security concerns, the government defended the program by stating that Aadhaar data operations are guided by three fundamental principles: minimal data, optimal ignorance, and federated databases (OECD 2018). This means that only crucial data is collected in order to verify identity, religious affiliation, race, education, and occupation are not documented. Although the Aadhaar database verifies individuals, no usage data is transmitted to the government. This limits the government's ability to gather personal information about individuals. Finally, anyone who collects Aadhaar data is legally required to use it solely for the purpose for which it was collected. Aadhaar-enabled services (such as PDS, scholarships, and pensions) maintain their own databases of pertinent data. Personal privacy is maintained due to the dispersion of data, which prevents profiling. Additionally, the design ensures security, as there is no single point of entry for attackers or leaks.

In the current system, UIDAI manages and supervises a central repository run by three private sector companies. As a security measure, no one company can access the entirety of an individual's data. Those data cannot be shared with any public or private agency without the individual's consent. The government can check for duplicates via UIDAI by running the number through the system or make the payment when the individual authenticates at the point-of-sale machine. That is, any government department can get the person's number but not their biometric or other data.

Despite such design protections, Aadhaar data was compromised on multiple occasions. Particularly notable is an investigation by the Tribune's journalist Rachna Khaira (2018), which exposed the glaring vulnerability of the UIDAI database, risking the personal data of all the registered people. For the meagre price of INR 500 or approximately USD 8 transferred through an online payment portal, an 'agent' provided the team with credentials to login to a gateway via Whatsapp within a span of ten minutes. This gateway allowed them to retrieve the personal details such as phone number, address, postal code, photo, and email of the approximately one billion people enrolled with Aadhaar. For an additional INR 300 (USD 4), the 'agent' also supplied them with a software to print the physical IDs of any Indian citizen registered on the UIDAI database. This incident exposed that a vast network of Aadhaar service subsidiaries,

who have been rendered obsolete following a government decision to centralize this process, have now gained illegal access to UIDAI data and provide Aadhaar services to public for a cost. Researchers also identified a website in 2017 that held the UIDs and demographic data of over 500,000 adolescents registered in the Aadhaar system (Dixit 2017). This contradicts the government's claims about how secure the Aadhaar database is.

Cohen (2012) elucidated that when privacy and its purportedly outdated values must be balanced against the cutting-edge imperatives of national security, efficiency, and entrepreneurship, privacy comes up the loser, as reflected in the Indian case. Additional risk to privacy is presented by a provision in the Aadhaar Act which allows UIDAI to share personal and biometric data of individuals with law enforcement authorities in exceptional cases of a perceived threat to national security. The vagueness of these provisions and the absence of accountability mechanisms for the government exaggerate the risk of Aadhaar system being used as the foundation for a surveillance state.

6. Saffron Colored Glasses

"I don't think people have fully internalized the agency that this gives, the fact that you can go to any PDS outlet to get your rations, go to any BC (Business Correspondent) to withdraw money—the bargaining power shifts from the supplier to the consumer." (Nilekani via Parker 2011)

This quote by Mr. Nilekani represents the dominant discourse about the impact of Aadhaar in India. Despite a growing repository of telling evidence of Aadhaar's shortfalls and failures in implementation and its role in deepening the suffering and destitution of the country's poor, perception of its overwhelming success prevails in public narratives. The role of propaganda in the framing of this issue has been pervasive since its inception. Notably, UIDAI has allocated a budget of INR 300 million (USD 4.2 mil) solely for advertising and branding of the Aadhaar project (Economic Times 2014). As demonstrated in Sections 6.2 and 6.3, the government has been advancing this narrative through bogus or inflated statistics to highlight the cost-saving and fraud prevention capabilities of Aadhaar.

Scholars (Dreze 2017; Khera 2017) have identified a range of propaganda tactics employed by the government to similar ends. These include favourable media stories (Singh 2017),

manipulative headlines (Chatterjee 2017; Das 2016, 2017), labelling of Aadhaar critics as antiprogress and anti-technology, media diplomacy for damage control and sponsored studies by corporate interest groups. In the age of disinformation, growing Hindu nationalistic sentiments in the country coupled with the lack of technical and process related awareness about the functioning of the Aadhaar ecosystem allows for fake news outlets to fabricate targeted stories to appease to sections of the population. The country's political climate since BJP's election to the office has been highly divisive, and disinformation or a biased saffron-tinted (saffron is the colour of BJP's logo and widely used to represent Hinduism) media coverage on the core undertaking of the Indian government only advances Modi government's problematic vision of transforming India into a Hindu nationalist state.

7. Recommendations

As this study has highlighted, India's Aadhaar project is riddled with a plethora of implementation issues related to connectivity, technical failures, inadequate ICT infrastructure, pervasive digital divide, and a lack of legislative protections for personal data. This section provides a brief set of recommendations to mitigate these obstacles for the continued and coherent integration of Aadhaar for social protection delivery without the risk of exclusion, directed towards the Government of India. Additionally, the section provides an overview of the lessons derived from this case, to invite the governments of other Global South countries to carefully consider such potential challenges while employing similar ICT4D projects.

Since majority of the issues generated by Aadhaar for social protection are technical and authentication based, we recommend that the government make enrolment and use of Aadhaar UID voluntary and reinstate the previous models of authentication for welfare services, complementary to the use of Aadhaar. The creation of independent and well-designed grievance and redressal mechanisms will allow for constant adaptation of the program with the emergence of new challenges. Apart from the swift instatement of the Personal Data Protection legislation, to address the concerns of privacy, we recommend that the government provide enrolled individuals complete control of their data, including the provision to withdraw from the program. Similarly, lawful interception and tracking of data should be restricted to a functional minimum and accountability mechanisms should be put in place to check the usage of data by government agencies. To protect the database from cybersecurity threats, the handling of data

should be decentralized, and the functions of identification and authentication should be separated.

The World Bank's Identity for Development (ID4D) program directly supports countries to achieve Sustainable Development Target 16.9: "By 2030, provide legal identity for all, including birth registration" (ID4D 2021). This robust and composite model for digital identification schemes should be adopted by countries in the process of planning and designing for such projects. ID4D principles which are tethered to inclusion, design and governance aspects of digital identification programs encapsulate prerequisites of privacy and agency protection by design and by legislative provisions, clarity of institutional mandates and accountability and the creation of flexible and interoperable platform. While the introduction of Aadhaar did not account for these principles, critical failures in the system can be attributed to the non-inclusion of the above prerequisites. Therefore, global south countries should operationalize the core principles of the ID4D framework to avoid the challenges that India is currently facing.

8. Conclusions

Addressing the rapid proliferation of ICT tools to foster coherence of social protection systems in Global South countries, this thesis answers a central question regarding the effectiveness of ICT4D agenda while identifying the major considerations to its actualization in these contexts by evaluating the net impact on social protection and privacy rights of the beneficiaries. The multi-dimensional case analysis of India's Aadhaar project has reiterated the importance of adapting a socially embedded perspective to comprehending techno-social phenomena like ICT4D. The Aadhaar project, in its current form, has proven to be detrimental to social welfare delivery and the privacy rights of Indian citizens, owing to impediments rooted in inadequate ICT infrastructure, pervasive digital divide, risk of arbitrary technical failures and absence of legislative provisions for personal data protection and accountability of the government, betraying its core principle of 'inclusion by design'.

The case has demonstrated that the potential of ICT tools to solve challenges of inefficiency, wastage and lack of transparency is limited and often determined by political will. The study also addressed the role of propaganda in embellishing and exaggerating the true emancipatory potential of ICT tools, leading to biased public narratives in this regard. The exhibited failures of the Aadhaar project can be attributed to the government's premature implementation of the

project without sufficient evidence or controlled experimentation. The architects and proponents of the Aadhaar ecosystem and their techno-rational justifications demonstrate naivete at best or a latent agenda of building a surveillance state at worst.

The thesis offers some recommendations to eliminate the issues plaguing Aadhaar based social protection delivery, while ensuring the right to privacy of the people. These include reinstatement of the optional status of UID, a hybrid delivery system to prevent denial of services upon technical failures, compliance with the principles of World Bank's ID4D agenda, decentralization of the UID database and swift instatement of the PDP Bill. The key lessons from the Indian case have been briefed with implications for development of similar projects in other global south countries.

This research is a rousing call for policy makers and governments in the Global South to phase out of the techno-utopian delusions that serve corporate interests and populist governments more than the common people, whose lives and livelihoods are often contingent on the smooth functioning of welfare states. While this is not an effort to denounce the usage of ICTs for governance processes, it is an invitation to consider the possibility that techno-centrism is not the answer to social injustices. Systemic and comprehensive reforms that instrumentalize technology, however, offer opportunities to amplify and scale emancipatory processes. Further research on socio-cultural determinants that impact the ICT4D phenomena in Southern contexts, is not only an imperative, but an extremely pertinent and exigent project.

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