Chapter 16 - Digital Technology and Social Protection:

Promises and Pitfalls

Sandip Sukhtankar

University of Virginia; National Bureau of Economic Research (NBER); Abdul Latif Jameel Poverty Action Lab (J-PAL); Bureau for Research and Economic Analysis of Development (BREAD)

1 Introduction

Digital technology refers to the use of digital (relying on binary code) information and communication tools, processes, and systems to create, store, transmit, and manipulate data. This technology has revolutionized various aspects of modern life, encompassing both hardware components, such as computers, smartphones, and servers, as well as software applications and platforms. Given these widespread applications, it is natural that digital technology is used to enhance the delivery of government programs and services;

and like in other areas, it has the ability to transform governance and the delivery of social protection.[1]

While digital technology is ubiquitous and encompasses many uses, for the purposes of this review, I consider the following digital technologies given their prevalence in the developing world as well as current use and potential in social protection: mobile phones, mobile money, digital payment systems, digital identification (IDs), and digital data.[2] Each of these has seen dramatic growth in everyday use, especially in developing countries: 70% of the world's population has access to a cellphone, mobile money and digital payment transactions amount to over a trillion dollars each, 161 countries have some form of digital ID system, while the use of data everywhere has exploded. In terms of social protection, 62% of beneficiaries receiving a government transfer or pension in 66 mainly developing countries received a mobile or digital transfer (World Bank Findex Survey 2021); and these numbers are rising over the course of social protection payments sparked by the COVID pandemic.

The growth in use of digital technology in social protection promises much: governments in developing nations face non-trivial hurdles in transferring

[1] Social protection, for the purposes of this chapter and the others in the handbook, refers to both "redistributive programs, which seek to assist the poor, and social insurance programs, which aim to insure against shocks" (Banerjee et al., 2023).

[2] One could imagine other candidates, but they are either too broad (for example, "the internet") or too specific (for example, purpose-built or particular software apps).

benefits to vulnerable populations across remote locations. Identifying vulnerable populations is difficult; transfers may "leak" and not reach intended beneficiaries; and last-mile hurdles abound. In such settings, sending electronic transfers to automatically targeted and digitally verified beneficiary at the touch of a button seems like a dream solution.

Against this rosy idyll is the real possibility that the automatic transfer may end up excluding beneficiaries, especially the most vulnerable. These populations may not be listed on digital registries, may not have access to digital technologies, may face higher than average failure rates, or other hurdles obtaining their benefits. Whether the net benefits are positive or not can only be determined with representative data and rigorous research.

In this paper I survey the state of this research.[3] The bottom line is that research on the impacts of the use of digital technology in government social protection programs is staggeringly scarce. I found exactly ten (10!) unique papers that use representative data and rigorous methods of modern causal inference; half of these are based in India. To be sure, there are innumerable papers on mobile money and its impacts, as well as papers on NGO-run

[3] To find this research, I ran searches for the terms "technology" AND "social protection" on both Google Scholar and Econlit. I supplemented this with reverse citation searches of Banerjee et al. (2023) and other key papers; going through every edition of Ugo Gentilini's "Social Protection Weekly Links," at https: //www.ugogentilini.net/; as well as reports from the World Bank's ID4D and G2Px websites at https: //id4d.worldbank.org/.

humanitarian efforts, and other papers that are informative about the broad topic; but papers that isolate the impact of technology, and/or those that might help governments determine the extent to which there are trade-offs between efficiency and exclusion in implementing their programs, are surprisingly limited.[4]

I begin with some statistics on the use of digital technology in social protection around the world. The ensuing section discusses the various ways this technology can enhance the delivery of social protection, and reviews the evidence; followed by a description of the potential problems, and evidence on these issues. I conclude with some policy recommendations as well as a discussion of open questions.

2 Digital technology in social protection around the world

Digital technology is pervasive in modern life, and mobile phones and digital public infrastructure (DPI) - the digital platforms and legal frameworks allowing for identification and authentication, digital payments, and associated data transfer - are essential in modern developing economies. Indeed, the World Bank notes that DPI's "transformational potential in today's digital age can be likened

[4] A contemporaneous review (Lowe et al., 2023) examines pathways towards the adoption of digital technologies in social protection, and in doing so provides numerous examples of current implementation in both poor and rich countries.

to the way roads, railways, and other physical infrastructure fueled economic transformation in previous centuries" (ID4D Group, 2022a). This section briefly quantifies the growth and coverage of the digital technologies relevant for social protection programs - mobile phones, mobile money, payment systems, digital IDs, and data processing - as well as an overview of their use in social protection.

To begin with, there has been rapid growth in mobile phones and networks, with the number of mobile phone users worldwide soaring to unprecedented levels. There are currently about 11.9 billion cellular connections with 5.6 billion unique mobile phone subscribers around the world, amounting to over 70% of the world's population.[5] Moreover, over threequarters of these connections involve smartphones, which have become ubiquitous tools for not just communication, but for digital inclusion more broadly, including information access, education, and financial services.

The speed of mobile phone penetration has been matched by the rapid adoption of mobile money services. Mobile money allows anyone with a mobile phone connection to conduct simple financial transactions without a bank account, relying on widespread networks of local agents for last-mile cash transactions (deposits and withdrawals). Mobile money service providers exist in

[5] Data from https://www.gsmaintelligence.com/data/, accessed September 8, 2023

nearly every developing country in the world, with over 1.35 billion registered accounts and over a trillion dollars in transactions in 2021 (Suri et al., 2023). A vast literature has documented its benefits in private sector usage, for example in risk sharing (Jack and Suri, 2016, 2014; Riley, 2018), for remittances (Lee et al., 2022), savings (Batista and Vicente, 2020), obtaining loans (Suri et al., 2021; Riley, 2024), and for firms overall (Beck et al., 2018).[6]

In addition to mobile money, mobile banking services as well as other digital payments systems have also seen fast growth. India's Unified Payment Interface (UPI), for example, is an inter-operable payment system that allows individuals and businesses to send and receive money, pay bills, make online purchases, and conduct a variety of financial transactions directly from their bank accounts using a smartphone. There were 74 billion transactions amounting to approximately $1.5 trillion using this interface in 2022.[7] With the proliferation of payments banks and online banks around the world, transferring money securely has become convenient and inexpensive, at least within countries.

Moving away from payments, digital ID systems are also becoming common around the world, with 161 countries using such systems (Clark et al., 2022). Yet

[6] The spread of mobile money is somewhat uneven, however; for example London˜o-V´elez and Querubin (2022) describe the bottlenecks related to mobile money delivery of a cash transfer program during COVID-19 in Colombia.

[7] https://www.livemint.com/news/india/india-saw-record-of-rs-149-5-trillion-upi-cardtransactions-in-2022-this-city-tops-the-list-11681789465771.html, accessed September 8, 2023.

globally nearly a billion people do not have an ID, mainly concentrated (90%) in poor countries; meanwhile the United Nations Sustainable Development Goal (SDG) target 16:9 is "to provide legal identity for all", while the World Bank's ID4D initiative notes that "being able to prove who you are matters for equitable, sustainable development." While IDs do not need to be digital, digital - especially biometric - IDs are especially useful in contexts with low literacy and numeracy. Digital IDs can also play a critical role in enhancing the efficiency of government transfers through digital payments, as they get integrated in social protection architecture. Currently, the ID4D initiative is supporting over 40 countries in their efforts to build digital ID systems and integrate them to improve delivery of public services (ID4D Group, 2022a).

Finally, the data produced from countless mobile and payment transactions, as well as digital administrative databases, can play an important role in enhancing the effectiveness and efficiency of social safety nets. For example, there were 54 billion mobile money transactions worldwide in 2021 (Suri et al., 2023); meanwhile, over a billion people have digital IDs in India alone, and even the EU has just mandated digital IDs for citizens.[8] The proliferation of machine learning and artificial intelligence tools has improved the potential of these data,

[8] https://www.forbes.com/sites/forbestechcouncil/2023/03/24/2023-the-year-digital-identities-go-mainstream/?sh=2231f6f344b5, accessed September 12, 2023.

enabling predictive analytics, recommendation systems, and automation of complex tasks.

Despite the wide proliferation of mobile money in private transactions, its use in social protection is lower than expected. While notable examples like GiveDirectly provide aid, and there are scattered examples of other international donors like USAID in Somalia (Radice and Hussein, 2017), governments seem reluctant to use mobile transfers in social protection. For example, only 20% of respondents in the 2021 World Bank/Findex survey (68,681 respondents in 66 countries) who received a government transfer or pension reported receiving it via mobile money; since less than 20% of respondents overall received any government transfer or pension, this means that only about 4% of respondents received a mobile money payment from a government.[9] This does not account for variation across countries; yet even in Kenya, the vanguard amongst countries in mobile money transfers, only about 42% of those who received government transfers got them through mobile money.

Digital payments into bank accounts seem more common. The World Bank/Findex survey notes that 54% of those receiving government transfers had

[9] Author's calculations using World Bank/Findex data, available at https://www.worldbank.org/en/ publication/globalfindex. Note that the full survey includes 127,854 respondents in 123 countries; the restricted sample of 66 countries is used since the mobile money question is only asked in these countries. These 66 are mainly low and middle income countries, which are most relevant for the purposes of this paper. All percentages are calculated using the provided survey weights, which account for probability of sampling as well as non-response.

them deposited into a bank account. Altogether, 62% received at least one of mobile or digital transfer from the government. Moreover, these types of transfers have become even more common after COVID-19; an analysis of relief assistance in 48 developing countries showed that 80% of them used digital payments for the delivery of at least one social assistance program, and 75% of them used digital administrative databases to assess eligibility for these programs (ID4D Group, 2022b). Further, an astounding 1.3 billion people worldwide received COVID-related cash transfers; of available data on 107 COVID relief cash transfers worldwide, 62% of beneficiaries received digital payments (Gentilini et al., 2020).

Meanwhile, in the case of digital IDs and digital payments India is a notable exception, where 77% of social protection spending was in programs that used the national biometric ID *Aadhaar* (Abraham et al., 2017). Elsewhere, the existence and availability of digital IDs and payments does not necessarily mean they are integrated into social protection programs; while a number of examples exist, many of these are at the assessment and pilot stage (ID4D Group, 2022a).

3 Promises

Given the distribution and availability of digital technologies, there is much potential in their use to improve social protection programs around the world,

especially in developing countries with limited state capacity. In this section I consider the different pathways to improvement, providing examples from the literature along the way.

Let us begin with the basic problem: the government wants to make a transfer to some vulnerable population. This could be a recurring transfer or ad hoc humanitarian assistance; and it could be an in-kind or monetary transfer. The government must identify and enroll beneficiaries, and then securely transfer the correct quantity to the correct individual, without leakage. Digital technology can assist in each of these steps, as well as assist in the potential re-design of social programs, and have potential positive spillovers on other outcomes.

3.1 Identifying and enrolling beneficiaries

As the framework chapter (Banerjee et al., 2023) notes, identifying eligible beneficiaries in developing countries is difficult since income is hard to observe; endogeneity of reported income is key. Governments must thus rely on tags or proxy means tests, self-selection, or community information to make eligibility determinations.

There are at least three potential gains from using administrative and other digital databases to help identify potential beneficiaries over traditional methods like collecting in-person surveys or censuses: they may be cheaper to use, more up-to-date, and potentially more comprehensive. For example, mobile phone

usage meta-data is automatically collected (and hence cheaper than on-the-ground surveys), continually updated (as people make calls), and can cover significant parts of the population. Getting up-to-date data on consumption is particularly important in the social protection context since households may be moving in and out of poverty, and may face numerous systematic as well as individual shocks.

More concretely, consider a simple example using databases containing "tags": suppose ownership of a car or motorcycle disqualifies households from a particular transfer program, then using the motor registry database matched with beneficiary rolls would automatically identify ineligible beneficiaries. A more sophisticated approach might involve the use of mobile phone data to predict individuals' socioeconomic status, as in Blumenstock et al. (2015b);[10] as they note, this approach is particularly attractive in places (like Rwanda) where representative survey or census data may not be available. Similarly, Jean et al. (2016) show how publicly available high-resolution satellite imagery can be used to identify area-level poverty using an "accurate, inexpensive, and scalable method." From these proofof-concepts to actual implementation, Aiken et al. (2022) demonstrate how Togo used mobile phone usage meta-data to target cash transfers to eligible households in COVID relief.

[10] The paper combined a phone survey on income and wealth of a subset of phone subscribers, matched (with permission) this data to their mobile records, and used the merged data to model and then predict values out-of-sample.

Meanwhile, combining databases across programs could improve the overall efficiency and targeting of social assistance, and may also assist in redesigning social protection architecture altogether. A combined "social registry" could allow for a simple basic income transfer, for example, as opposed to multiple difficult to administer programs. A number of countries have created or are in the process of creating such registries (Honorati et al., 2015; Barca, 2017; Pereira Guimaraes Leite et al., 2017). An evaluation of a combined social registry in Indonesia finds that targeting improved by 117% as compared to the previous regime of targeting in three separate programs (Tohari et al., 2019). More broadly, research by G2Px suggests that countries "that had the ability to use and cross-reference existing administrative databases reached half of their population (on average), while those that did not reached only 16 percent of the population" while providing COVID relief (ID4D Group, 2022b).

Identifying eligible beneficiaries is of course only half the battle; enrolling beneficiaries and ensuring that they actually take up benefits is another hurdle for governments to overcome. This issue is complicated since governments often purposely introduce ordeals - explicit or implicit - in order to induce self-selection. However, administrative and digital databases can help eligible beneficiaries by simplifying the enrollment process.

For example, already identified beneficiaries may have their information pre-filled from government databases, and contacted only for final enrollment

consent. Even simpler is automatic enrollment and transfer: in Togo, individuals identified as above were directly enrolled and had transfers sent to their accounts, without the need for in-person data collection or enrollment (Aiken et al., 2022). Other countries were also able to use similar strategies for COVID relief, where in-person interaction with beneficiaries was not advisable (Gentilini et al., 2020). Separately, in a unique natural experiment, Chong et al. (2017) found that Bolivian applicants renewing their national ID quasi-randomly assigned to a digital renewal process were much more likely to complete it than those who had to use the regular manual process, and took far less time.[11]

3.2 Transferring benefits

Even if the problems with identifying and enrolling beneficiaries issue are resolved - trivially in the case of identifying beneficiaries for universal transfers, say - making sure the transfer gets to the right person in a timely manner without leakage is a significant hurdle in developing countries, where citizens may not have identity documents, bank accounts, or a way to securely receive and store value. This is where digital technology has huge potential in improving current social protection programs. Not only can mobile/digital transfers as well as

[11] A distinct experiment in Mongolia examines the issue of enrollment of self-employed workers in the pension system; providing these workers with a mobile money option to pay in their contributions increased payment rates significantly (Tanaka and Munro, 2019).

digital authentication make sure that the money gets to the right person, they can reduce transactions costs and wait times for beneficiaries, can be cheaper for the government to implement, and also assist in monitoring last mile outcomes.

Mobile and digital money transfers can cut out the middleman and ensure that the money goes directly to the beneficiary's account. Combined with ID authentication at the time of account setup and/or withdrawal of cash, this ensures that the money actually reaches the hands of the intended beneficiary. Last-mile authentication could also reduce leakage in the transfer of in-kind goods, for example foodgrains. There is now significant rigorous evidence demonstrating that digital payments and authentication can reduce leakage/corruption in the delivery of social programs; for example, Muralidharan et al. (2016) find a leakage reduction of 41% in payments in India's workfare program, while Muralidharan et al. (2023) find that using transaction data and authentication led to a leakage reduction in foodgrains in India's food safety program, and Barnwal (2022) finds that using direct benefit transfers for India's cooking gas cylinder subsidy also reduced leakage. Moreover, digital tracking systems can also reduce corruption; Banerjee et al. (2020) found that the implementation of e-governance systems reduced corruption by at least 24% in the same workfare program.

By reducing the number of gate-keeping entities, mobile and digital payments could also mean reduced transactions costs for beneficiaries, including less time

waiting for their benefits at home and in line. Evidence from the experiment in India's workfare program finds beneficiaries received their payments 17-29% faster, and spent 20% less time collecting their wages; just the time cost of waiting less was enough to pay for the cost of the digital transfer and authentication program. In Niger, an NGO humanitarian transfer program also saved beneficiaries significant transaction costs by making mobile money transfers, spending 2.5 fewer days to get transfers as opposed to those receiving cash in-hand (Aker et al., 2016). Digital payments can be particularly useful during humanitarian emergencies and/or cases of conflict, when other modes of delivery may not be logistically feasible (Callen et al., 2024).

Finally, the transaction records created by last-mile authentication, as well as the simple fact that most beneficiaries have mobile phones, can be used to increase accountability and monitor last-mile outcomes. For example, by simply telling officials that they would call beneficiaries to confirm whether they had received benefit checks, Muralidharan et al. (2021) found that beneficiaries were more likely to receive their checks on time, and at all. The costs of making these calls from a call center were miniscule when compared to the extra money received by beneficiaries.

3.3 (Re-)Designing social programs

Beyond improving current programs, digital technology can allow for the redesign of social protection programs towards less distortionary transfers, as well as allow more flexible arrangements. The key here is the ability to make direct transfers via digital payments or mobile money transfers, and keep track of beneficiary receipts or choices.

For example, there is ample evidence that electricity subsidies in many parts of the world are distortionary; yet political economy concerns and logistical challenges mean that free electricity for farmers is common (Burgess et al., 2020). Digital transfers and electricity tracking could help restore the correct marginal price of electricity, by offering farmers "free" electricity upto a specified amount, while paying them (or charging them) the appropriate cash amount if they use less (more) electricity than this amount (Mitra et al., 2023). In a separate case, there is much debate about whether transfers should be in-kind or cash; yet beneficiaries may not unanimously prefer either one. Here again, digital technology may allow governments to offer the choice of transfer modality to beneficiaries, thereby increasing welfare (Muralidharan et al., 2018). Finally, an innovative program in Bangladesh truly highlights the potential of digital technology, including both predictive data and mobile money transfers: an

"anticipatory" transfer of cash via mobile money to households about to experience severe flooding (Pople et al., 2021).

3.4 Spillovers

In the course of employing digital technology in social protection, there may be spillovers leading to other desirable outcomes. As Gelb et al. (2018) note: "Digital transformation is not only in government systems, but for people to adapt to new infrastructure." Most obviously, obtaining a digital ID can allow for accessing government transfers and services; mobile money, as noted above, can allow for simple financial transactions without a bank; while being able to access a bank account can open up a much broader array of financial transactions, as well as potentially empower beneficiaries.

There is now growing evidence of such spillovers. For example, Brune et al. (2017) find that net deposits into bank accounts in Malawi increased from payments directly made to bank accounts as opposed to those handed out in cash. In Mexico, switching from cash payments to electronic transfers in the famous Progresa/Oportunidades/Prospera transfer program led to not only increased bank savings but improved consumption smoothing. In India, direct deposits of workfare program payments into women's accounts led to increased empowerment of women, as well as increased female labor force participation (Field et al., 2021).

Finally, using digital technology to improve social protection programs can have positive general equilibrium impacts as well. Muralidharan et al. (2023) found that the improvements in India's workfare program (noted above) affected private labor markets as well: overall, private sector wages increased by 10%, beneficiary incomes increased by 14%, and poverty declined by 26%, with only 14% of the increase in overall earnings related directly to more income from the workfare program. Egger et al. (2022) find multiplier effects on the economy from large GiveDirectly transfers to beneficiaries in Kenya.

4 Pitfalls

The promises of digital technology in social protection are clear; yet there is also the potential for significant harm, especially for the most vulnerable. These harms are mainly related to the burdens of obtaining and accessing technology, but also to the largely untested legal frameworks and protections related to the use of personal data. Moreover, to obtain evidence on harm, it is necessary to actually interview beneficiaries, a far more involved and costlier exercise than relying merely on administrative data to calculate fiscal savings. I summarize below the mechanisms as well as evidence that exists, and highlight what is missing.

4.1 Potential for exclusion

Although mobile phones, mobile money accounts, and digital IDs are widespread in many developing countries, a significant minority may not have them: fewer than 50% of people in sub-Saharan Africa have a mobile phone, for example (Suri et al., 2023). Even if beneficiaries do possess them - India's ID authority claims 99.9% of adults have Aadhaar cards[12] - they must be linked to the enrollment registries and payment systems for the social protection program that is transferring benefits. Hence switching to making and/or authenticating transfers using these digital technologies from more traditional systems may lead to the exclusion of benefits. This is particularly concerning since evidence suggests that more vulnerable people are less likely to have access to digital technology.[13]

Determining levels of exclusion is difficult, however, by the very nature of the question; people who are not listed in administrative data but are eligible for the program need to be found, mostly likely through in-person surveying. This simple fact is often overlooked by boosters of digital technology; a common error is to calculate reduced leakage or fiscal savings by simply determining the

[12] https://www.firstpost.com/india/99-9-adults-in-india-have-aadhaar-number-and-use-it-at-least-once-a-month-says-uidai-10948761.html, accessed September 15, 2023

[13] For example, in India individuals from minority religions and historically disadvantaged castes are less likely to have the digital ID Aadhaar than the national average (Totapally et al., 2019).

reduction in government transfers on a program preand post- a switch to using digital tech, which of course ignores the possibility that some genuine beneficiaries may have not received transfers, as well as the standard issues related to identification of impacts.[14] Consequently, far less research is available that systematically measures the *impact* of using digital technology on exclusion.

Amongst the few papers is Aiken et al. (2022), which examines the use of digital data for targeting in Togo. They use previously collected household data to simulate exclusion scenarios under targeting using mobile-meta data versus other methods. They find that although the mobile data machine learning method improved targeting compared to the alternative available to the government of Togo to provide COVID relief, it would not have improved targeting over a 'perfectly calibrated' PMT.

Some descriptive evidence on exclusion based on the use of Aadhaar to authenticate identity is provided by Abraham et al. (2017). In a broad survey, they found that 2.5% of respondents said they were excluded from a social protection program due to the lack of an Aadhaar card. However, the importance of rigorous impact evaluation is underlined by the fact that they also note that

[14] For example, India's national website on direct benefit transfers suggested that $2.1 billion in food subsidies and $3.9 billion in LPG subsidies were saved by removing 23 million and 35 million duplicate individuals from the beneficiary rolls (Abraham et al., 2017). However, without on-the-ground truthing, it is not possible to determine how many of these were genuine beneficiaries or actual duplicates.

other (logistical, bureaucratic) reasons for exclusion were far more common that Aadhaar-related reasons.

Finally, Muralidharan et al. (2023) rely on a large-scale RCT that examined the introduction of Aadhaar-based identity verification and authentication for obtaining grains from India's large food security program. Simply requiring authentication led to the loss of benefits for 300,000 people, mainly those who did not have their Aadhaar linked to beneficiary rolls; using transaction data to determine future grain disbursement led to a further 1.7 million people being excluded. While these losses may have been transitory, the context of food security in a particularly poor part of the country is important; moreover, the episode highlights the importance of design protocols around the use of technology.

4.2 Increased transactions costs

While for the most part it is reasonable to believe that digital technology may make the transfer process more efficient, it is possible that transactions costs for beneficiaries may also increase. This may be due to mistakes in initial enrollment (for example, linking the wrong bank account), technology failure (authentication systems fail), or remaining last-mile issues (accessing bank accounts or cash-out centers is difficult in remote areas).

There is some limited evidence on this issue. Muralidharan et al. (2023) find that monetary value of time and travel costs to obtain grains increased by 17% after the introduction of required authentication in the food security program in India. Blumenstock et al. (2015a) find that using mobile money to make salary transfers of a development organization increased the delays that employees faced in receiving their actual cash, mainly due to local agent stock-outs.

4.3 Legal frameworks and protections

While evidence on exclusion and transactions costs is limited, even more sparse is quantifiable information on perhaps the biggest potential downside in the use of digital technology for social protection: the lack of legal frameworks and protections on citizen privacy and security. Given the types of digital technology we have considered, the potential for surveillance or misuse of data is serious, along with less malicious yet equally important vulnerabilities in digital security. Governments may have limited capacity to create protections for citizens, and even less capacity to implement these protections, once the data are "out there."

According to the UN, 71% of countries around the world have some sort of legislation on data protection and privacy (See https://unctad.org/page/data-protection-andprivacy-legislation-worldwide, accessed September 22, 2023). However, this drops to 48% when considering the group of least developed countries. A coordinated effort by a large number of international agencies

(Social Protection Inter-agency Cooperation Board, SPIAC-B) has provided conceptual and technical advice on best practices for data privacy and protection (Wagner et al., 2024); yet the implementation and interpretation of enacted laws depends on state capacity in a given country, and we have limited evidence of impact.

The debate surrounding the recently passed Digital Personal Data Protection Act in India highlights these issues. It took six years after the Supreme Court recognized the right to privacy to come up with the act. "The DPDP creates far reaching obligations, imposing narrowly defined lawful grounds for processing any personal data in a digital format," according to a recent commentary, while also creating a supervisory authority to handle complaints.[15]However, the Act also provides "significant exceptions for the central government and other government bodies." In practice, how strictly the law is implemented, and the extent to which government bodies respect it, is far from known.

5 Discussion, recommendations, and open questions

There are two important areas which are beyond the scope of this paper. The first involves revenue collection. Digital technology has the ability to enhance state

[15] See https://fpf.org/blog/the-digital-personal-data-protection-act-of-india-explained/ (accessed September 19, 2023) for an excellent overview.

capacity in this important area, for example the use of tax collection using mobile money (Apeti and Edoh, 2023), the use of data analytics to detect potential tax evasion (Mittal et al., 2018), and improved tax compliance given better records (Das et al., 2023).[16] The second area is simply the massive amount of private sector transactions enabled by digital technology, which can also help protect the poor against shocks (Jack and Suri, 2016, 2014; Riley, 2018). With these caveats, and an additional one restating how limited the evidence is, I discuss some policy recommendations and open questions.

5.1 Policy recommendations

Some of these recommendations are repeats from previous work (Muralidharan et al., 2020, 2022), and I direct readers to those papers for details. I begin with a simple point: it is crucial to recognize that each use-case is inherently unique. Policymakers must carefully consider whether technology can genuinely enhance the objectives of a given social protection program prior to adoption and integration. Moreover, the mere adoption of technology is not a panacea; technology per se is rarely fully positive or negative. It is the protocols and safeguards surrounding its use that truly matter.

[16] Digital data could also be used by governments to improve functioning of other important departments, not just social protection or revenue. For example, (Chemin et al., 2023) show how its use in Kenyan courts improved judicial process.

Second, safeguarding beneficiaries and citizens is paramount. Governments need to invest in legal frameworks around digital technology, and multilateral organizations should assist those governments who may not have the capacity to develop these. Local and international media can also help pay attention to the actual implementation of laws and regulations. In addition, protecting beneficiaries against exclusion is extremely important; even small (< 1%) rates of failure could mean millions of people may be denied critical benefits. For example, relying on offline authentication as a fallback option may be able to help. In general, as we note in Muralidharan et al. (2022), focusing on the beneficiary experience, rather than immediate efficiency gains and cost reductions, may end up being a better longer-term strategy for achieving these latter goals, by building larger and longer-lasting coalitions in support of the technology. Long-term political buy-in is particularly important given that support from multilateral organizations might lead to push-back, and a lack of political will - rather than the technology itself - can lead to failed implementation (Mason et al., 2020).

Third, governments would do well investing in the public good that is data. This includes the streamlining, matching, and merging of beneficiary databases; doing this in an exhaustive manner, with built-in mechanisms for updating, will leave governments not only able to better target benefits, but to be prepared in future emergencies. Governments should also invest in real-time data collection

for outcomes assessment, allowing for timely adjustments and improvements in social protection programs based on real-world results, ultimately enhancing the effectiveness of these vital systems. Finally, nothing can replace collecting representative, detailed data on citizen outcomes to obtain good pictures of beneficiary welfare. Perhaps this may also spur research, which has been sorely lacking.

5.2 Questions for future research

It is impossible to think about digital technology these days and not consider artificial intelligence (AI). Given the rapid evolution of AI over the last year or so, its use in social protection is not yet widespread, although it is growing.[17] The temptation, however, to use AI in social protection is likely strong. As an experiment, I asked ChatGPT to list the ways AI might be able to help in social protection, and it listed ten, including the obvious ones of assisting in determining eligibility and detecting fraud, but also in monitoring real-time data to adapt policy and provide early warnings. It will be extremely important to understand and evaluate the costs and benefits of using AI in conducting any of these tasks.

[17] See, for example, this article in the Guardian which documents various uses of AI in the UK government, including a case where the article claims benefits were wrongly denied: https://www.theguardian.com/technology/2023/oct/23/uk-officials-use-ai-to-decide-onissues-from-benefits-to-marriage-licences, accessed May 1, 2024.

Understanding externalities, network, and general equilibrium impacts of DPI is another area where research is basically non-existent and payoffs may be high. Thinking through the various ways digital public infrastructure might impact not just social protection programs but the overall economy - and hence the need for social protection - is clearly important. Understanding externalities and network effects would help determine the extent to which public - versus private - funding should be used for building DPI.

5.3 Concluding thoughts

There is a surprising lack of research on the impacts of the use of digital technology in social protection. While at the World Bank ID4D/G2Px as well as other aid and donor agencies are doing excellent work with providing technical assistance to governments as well as supporting research,[18] on the ground data collection is still rare; there is the sense that implementation is moving faster than research in this area. Moreover, it feels like academic economists seem to be stepping away from these plumbing type issues. Perhaps this is because conceptually the issues involved are well understood, and so perhaps less exciting. And there is limited or no incentive for academics to conduct replication-type studies across contexts.

[18] See, for example, the innumerable technical reports listed in Lowe et al. (2023).

But this is a travesty, since the consequences for the lives of the poor and vulnerable are enormous. A potential solution is a coordinated systematic effort across countries and contexts, with rigorous individual studies having a broadly similar structure asking the same basic set of questions. While difficult, this is not unprecedented, as the six coordinated studies on microcredit have shown (Banerjee et al., 2015); indeed the Metaketa Initiative at EGAP (https://egap.org/our-work/the-metaketa-initiative/) is set up precisely to help organize this type of effort. If successful, this effort will go a long way in bridging this surprising gap in the literature.

Author Acknowledgements: I thank Arlen Guarin, Rema Hanna, Gabrielle Kruks-Wisner, Paul Niehaus, and participants at the Social Protection Handbook conference for comments, and Ashwin Nair for excellent research assistance.

A full set of references for all Handbook chapters, including this one, can be found at this link: https://www.dropbox.com/scl/fi/9lqs2mdrawkjdrv4m648e/References-Social-Protection-Handbook.pdf?rlkey=jt0f8kute31mhdke77aoiw99d&st=kd7l8ff1&dl=0