Technologies that Disempower: Design Flaws in Technologies Used for the Delivery of Social Protection Measures in India

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Introduction

Paper-based bureaucratic procedures to access government services such as welfare measures, can be user-unfriendly and ridden with red-tape [1]. We highlight in the context of the pandemic in India, that despite extensive work over the last decade in the digitization of such processes, government welfare services remain hard to access by low-income populations. The problems are systemic in nature in the design of e-governance technologies and we point out several design flaws that manifested themselves during the COVID-19 pandemic.

To curtail rapid transmission of the pandemic, the Indian government imposed a stringent lockdown of approximately 75 days during which millions of people lost their jobs and all sources of income. This led to widespread distress for poor households and the government announced several emergency relief measures, yet people remained excluded because of technology related issues. We describe these issues and also briefly discuss why design errors continue to emerge with technologies deployed by the state.

We were able to learn about these reasons of exclusion through an IVR (Interactive Voice Response) based community media platform operated by the social enterprise, Gram Vaani, on which people recorded their grievances and experiences in their own voice [2].

Technology can be widely adopted without a clear use-case

Two primary relief measures announced by the government were (i) an increase in the quota of subsidized food for the poor, through the Public Distribution System (PDS), and (ii) cash transfers to the bank accounts of people registered under government schemes on agriculture, banking, employment, etc. Both these schemes use a unique-id based authentication system called Aadhaar, which relies upon fingerprint biometrics to authenticate people at the point of service, ie. ration dealerships that distribute subsidized food to the poor, and rural bank branches or banking correspondents that enable people to access their bank accounts from remote areas.

Biometric fingerprint failure unfortunately emerged as the most significant source of error in the Aadhaar based authentication process for both PDS as well as for cash withdrawal, during the lockdown. People facing such errors were unable to get access to their entitled food rations and went hungry. The reasons for biometric failure have been well documented, from machine failures to illegible fingerprints and also possible changes with the age of people, and it raises the question therefore about why was Aadhaar built to use biometrics in the first place?

Biometrics were originally deemed essential in Aadhaar for de-duplication so that nobody could have more than one Aadhaar card. No studies have however been published by the government on the efficacy of fingerprint biometrics for de-duplication, and a paper in fact claims a high false rejection rate if biometric de-duplication is indeed implemented [3]. Clearly if biometrics do not help with the one use-case that motivated its use then there is no need for it, even simple smartcard-based solutions could have been used for point-of-service authentication. Several states did suspend biometric-based authentication for PDS during the lockdown, further corroborating the limited value of the technology.

Technology design can disempower citizens and reproduce inequalities

Who understands and wields a technology is a key driver to determine whom the technology empowers and whom it disempowers. With cash transfers announced by the government, banking correspondents using Aadhaar-enabled POS machines were critical to deliver banking services to people at their doorstep. However, widespread cases of fraud also arose aided by design peculiarities of the POS machines. The machines are administered by the agents and there are no displays or audio notifications that inform the beneficiaries of the transactions actually being performed after the beneficiaries have authenticated themselves. It was therefore easy for the banking correspondents to underreport to customers the amount of cash that could be withdrawn by making false verbal claims that an inactive-account fees had been applied, and pocket the difference. Some went even further by telling customers that their bank account has been deactivated while all the time the accounts were functional and withdrawals were successfully conducted. A beneficiary-centric design of the POS machines could have

empowered them. For example, audio enabled POS machines which speak out each and every transaction, explain the error codes in simple terms, and suggest appropriate actions in the case of failure, could help level the power imbalance between the banking agents and consumers.

The same principle is applicable even with ration shops, where the dealer clearly has opportunities to misquote problems to the beneficiaries. The dealers are known to falsely claim a shortfall in stock and not give full units of food to the people. The beneficiaries have no way to check and have to go with whatever the dealer says. By placing technology in the hands of the dealer – technology that the beneficiaries do not understand – the inherent power differential between them gets sharper and can manifest itself in other dealings between them. Technology should rather be designed for the weakest stakeholder in the ecosystem [4]. If the ration dealer wants to claim a shortfall then the technology could mandate that they record an oral testimony right there at the point of service to confirm the shortfall and also raise a complaint upstream in the PDS system which can be audited by the food supply department.

Further, entirely different technologies can be envisioned that would rather empower the weak and plug PDS quantity fraud. Technologies that inform people through SMS or IVR or other means about stock deliveries that have happened at their ration shops, about the correct number of units due to them, about grievance redressal mechanisms to raise complaints, and resolve them, can go a long way in this direction of empowering the weak. Even non-technological solutions in some states of having the ration shops operated by the community, with support from women SHG (Self Help Group) networks, have gone a long way.

Technology may be poorly designed

Organized sector workers in India having an income below a certain threshold are mandatorily registered under the PF (Provident Fund) scheme, which is a financial social security scheme to which both the employer and the worker contribute monthly installments. During the lockdown, the government allowed people to make additional withdrawals from their PF accounts, but countless workers were unable to withdraw because of mismatches in their details such as the spelling of names in their PF account did not match the name in their bank account, or Aadhaar, or similar mismatches in their date of birth, dates of employment, mobile phone number, etc. The workers were unable to make these corrections because the PF (Provident Fund) IT system only allows employers or ex-employers to make these changes. Employers were however hardly responsive to such issues because they did not have strong incentives to correct errors on behalf of their workers. It also did not help that many workers did not even know that their PF is being deducted, or what is their PF account number, or the procedures to withdraw funds. It was clearly not hard to conceive of a setup where the workers were well informed of these deductions by sending them SMS messages, mentioning the PF account number on their pay-slips, and a user-facing system so that workers can fix the errors on their own, rather than rely on employers.

Even well-designed technology can miss opportunities for citizen empowerment

To provide quick employment to those rendered out of work, the MNREGA scheme for rural employment guarantee has emerged has a strong fallback mechanism for unskilled labourers. The MNREGA MIS (Management Information System) is highly impressive, housing details of each worker, their job card, works done, attendance, payment status, etc, all query-able in almost real-time over the web. The people doing MNREGA work are however unable to use online systems to check their accounts, and need to rely on help from others. The MIS thereby serves largely an accounting function to keep track of various works and payments, or initiate new works and payments, and has ultimately remained as a system for the administration rather than for the workers. The workers continue to face issues with registering their demand for work, tracking payments, and raising grievances. This is a significant missed opportunity in making citizen-friendly government systems. IVR or app-based interfaces could be easily implemented through which workers can access their own work history or payments [5], and it should be a rightful enhancement so that workers can easily check if the work being done by them is being correctly logged, they are getting their due wages accordingly, and they can demand for new work when they need it.

Technology may fail to empower people due to last-mile infrastructure limitations

While there was nothing faster than direct bank transfers to provide instant cash relief to people who were suddenly left without any income, the limited physical penetration of banking infrastructure in rural areas prevented people from easily getting hold of the cash. There was massive overcrowding seen at the few functional bank branches, highlighting the fact that financial digitization cannot happen without scaling up of the physical and human infrastructure of banking services [6]. People had to walk far to their banks and wait for hours in the line, often to return empty handed when the Internet at the banks did not work. While such issues have been highlighted in the past as well, such as a failed government pilot in Jharkhand, and problems with maintaining active bank accounts by people, yet cashless payments are being adopted by more and more government schemes, even as the penetration of banking and ATM infrastructure is slowing down in rural areas. Such examples highlight the fallibility and insufficiency of technology from solving access problems, yet little effort is seen in developing appropriate processes to handle cases of errors, misuse, and technology failure.

Technology can amplify discrimination and distrust among people

The Indian government released a contact-tracing mobile app called Aarogya Setu and mandated its use among several people such as migrant workers who returned in large numbers from the cities to their rural homes when they were left out of work in the cities. Migrant workers however faced widespread discrimination in their villages due to fear of transmission of the virus, and these dynamics reflected in the adoption of Aarogya Setu. While the app was strongly accepted by local residents who saw the surveillance as being useful for them, many others expressed reservation in using the app for fear that if they do come out as at-risk or infected then they could be carried away to badly run isolation centers or the entire household could be confined from movement and their families too would face discrimination in the community. It is therefore important to realize that technology does not operate in a vacuum, it is used by people situated in particular contexts and the use is shaped by perceptions of trust among people with one another and with the technology. If this environment has trust deficits then the technology might enhance these deficits to alienate people from the technology and also from one another. Even worse, it could be used as a tool by malicious actors to deepen the deficits and mistrust. Concerns about ambiguous data privacy policies of contract-tracing apps, and doubts about their usefulness, as highlighted by many, further outlines additional pathways through which trust is disrupted when the sociological context of technology deployment environment is ignored.

Technology can be marketed to serve misguided objectives

Aadhaar was clearly conceived as a system to reduce inclusion errors in welfare schemes, ie. deny welfare benefits to those who don't deserve them, and marketed likewise as a means to plug leakages. Such leakages of unauthorized access to welfare benefits are however a minuscule fraction of leakages by the ration dealers on quantity fraud, or exclusions errors caused to millions of families who were denied ration benefits for having remained without ration cards even during this period of great need. Had the focus been on reducing exclusion errors then there would be little reason to formulate a solution like Aadhaar. In fact, even with Aadhaar, a simple analysis of the logs can reveal beneficiaries for whom biometric re-registration or name correction may reduce avoidable exclusion errors, but such steps have not been taken by the government, rather the narrative that still persists is the need to reduce inclusion errors rather than exclusion errors. This is a misguided objective that seems to only justify the need for Aadhaar, but is otherwise not really relevant.

What drives the adoption of technologies that further disempower the weak?

These reasons of poorly thought through technology design, ignorance of the actual operational context, contrived problem statements, and inappropriate management of the socio-technological interface with mishandling of failure cases and wider public communication, are seen recurring

again and again. The latest wave unleashed is of AI-inspired technologies in areas such as assessing of credit-worthiness of low-income people using mobile call-data-records, risk-scoring for criminal recidivism, performance assessment of human resources across a large range of industry sectors, etc. These are all enthusiastically embraced by many governments, but all such applications are fraught with the same risks and may end up disempowering the weak.

This clearly raises the question that with such grave issues in vast technological systems that enable access to welfare benefits for millions of people, how come disempowering technologies are widely adopted by the state? Why are these technologies not fixed to minimize harm? Several theories can explain this, one being that governments have a strong belief in high-modernism, of technology having the potential to control and make legible its citizens which can aid in national security, targeting of benefits, tax collection, etc. This urges the state to look for solutions that ensure compliance and catch misbehavior, but not to look for solutions that ensure inclusive access and equitable distribution. Another theory is around capitalism's need for constant technological innovation [7], which seeks out new markets, including marketing technologies to the state. If the customer is the state and not the beneficiary, then capital will build technologies for the state and not the beneficiary; and further it will exercise a strong influence in the uptake of these technologies by projecting them as silver bullets that can solve the state's concerns. In India too, the government's desire for technology that facilitates centralization has been cleverly serviced by capital's ingenuity to provide such technology [8]. In fact, the common preference of both the state and capital to control and predict populations may explain their mutual agreement on convergence towards greater centralization of technology. Such a flawed mindset of governments for the wholesale adoption of disempowering technologies needs to be rejected by its citizens. As technologists building many such technologies, we should also reconsider contributing towards their design in the first place [9].

References

[1] Graeber, D. 2006. *Dead Zones of the Imagination: On Violence, Bureaucracy, and Interpretive Labor*. The Malinowski Memorial Lecture.

[2] Moitra, A., et al. 2016. *Design Lessons from Creating a Mobile-based Community Media Platform in Rural India*. In International Conference on Information and Communication Technologies and Development.

[3] Mathews, H.V. 2016. *Flaws in the UIDAI Process*. In Economic and Political Weekly, 51 (9).

[4] Duquenoy, P and Thimbley, H. 1999. *Justice and Design*. In International Conference on Human-Computer Interaction INTERACT.

[5] Vivek, S., et al. 2013. *Airavat: An Automated System to Increase Transparency and Accountability in Social Welfare Schemes in India*. In Information and Communications Technologies and Development.

[6] Vivek, S., et al. 2018. *Are Technology-enabled Cash Transfers Really "Direct"?* Economic and Political Weekly, 53 (30).

[7] Harvey, D. 2003. *The Fetish of Technology: Causes and Consequences*. Macalester International, 13 (7).

[8] Sen, A. et al. 2019. *An Attempt at Using Mass Media Data to Analyze the Political Economy Around Some Key ICTD Policies in India*. In International Conference on Information and Communication Technologies and Development.

[9] Seth, A. 2019. *A Call to Technologists*. Manuscript: http://www.cse.iitd.ernet.in/~aseth/call-to-technologists-2019.pdf.