ICT in social protection schemes:
Deinstitutionalising subsidy-based welfare programmes

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Abstract

Purpose: while the potential of information and communication technology (ICT) for poverty reduction is widely recognised, limited knowledge exists on its use in the social protection schemes devised for the world's poor. Drawing on the institutionalist vision of IS development and organisational change put forward by Avgerou (2000), we propose that computerisation of these schemes entails two processes, namely the progressive affirmation of ICT innovation and a shift in the programmes' organisational structure, which moves from a subsidy-based model to one grounded on direct cash transfers. We illustrate how the role of ICT in anti-poverty schemes results from concomitance of such processes.

Design/methodology/approach: the paper draws on a study of the Public Distribution System (PDS), the main food security scheme in India, as it is being computerised in the state of Karnataka. Following an interpretive case study methodology, it investigates the ongoing computerisation of the Karnataka PDS through a combination of back-end and front-end technologies, based on biometric recognition of the programme's users.

Findings: our data reveal that transformation of the PDS results from the simultaneous processes of institutionalisation of ICT innovation and deinstitutionalisation of the extant state-led subsidy scheme, in favour of a leaner social protection system centred on cash transfers to beneficiaries. This illustrates the point that ICT innovation is intertwined with the decline of an extant social welfare structure and the rise of a new one, based on the direct transfer of benefits.

Originality/value: the paper offers a new theoretical perspective to illuminate the computerisation of anti-poverty programmes, a phenomenon that affects the entitlements of millions of poor people on a global scale. In parallel, it draws practical implications for countries embarking on the digitalisation of their social protection schemes.

1. Introduction

Discourse on the use of information and communication technologies (ICTs) in poverty reduction has acquired importance in the global development agenda (Heeks, 2014). Emphasis on the poverty-reducing potential of ICTs comes with increasing reliance on social protection as means to tackle poverty and unemployment. The notion of anti-poverty programmes includes all social protection schemes devised for the world's poor including food insecurity, unemployment, lack of sustainable livelihoods and other consequences of poverty (Devereux & Sabates-Wheeler, 2007). The role of such programmes in the pursuit of the United Nations' Sustainable Development Goals emphasises the idea that they can effectively contribute to global poverty reduction (Ghosh, 2011; Barrientos & Hulme, 2016).

The last decade has seen a sharp increase in digitisation of anti-poverty programmes, in all their phases from design to delivery (Devereux & Vincent, 2010; Vincent & Cull, 2011; Aker et al., 2015). This occurs in multiple forms: at a back-end level, departments in charge of poverty alleviation automatise their functions, to streamline early phases of programme administration. At a front-end level, recognition of programme users is automatised to prevent leakage and ensure the correct delivery of entitlements. In its different shapes, the computerisation of social protection schemes is a fundamental trend in present-day global poverty reduction.

While computerisation is diffusing in these programmes specifically, limited knowledge exists on the role it plays within them, which limits our understanding of a phenomenon that is reshaping global efforts of poverty alleviation. While theoretical perspectives on the theme are rarely explicitly articulated, three dominant visions can be identified: one considers technology as a tool for implementation of social safety schemes, adopted mainly in the search for greater effectiveness. Another one views technology as an enabler of greater "development" outcomes, such as the accountability of governments for service provision to poor people. A third perspective, centred on the notion of surveillance, focuses on the perverse effects of ICTs in social protection, highlighting new forms of injustice to which beneficiaries are subjected.

Nevertheless, and problematically for the study of anti-poverty programmes, such perspectives do not openly contemplate the institutional context in which these programmes are placed. In the literature on ICT for Development (ICT4D), where socially embedded perspectives (Avgerou, 2008; Madon, 2009) acquire primary importance for understanding reality, no established account exists of how anti-poverty ICTs respond to the institutional forces in which they are immersed. Not recognising such forces mutes a substantial part of the context in which social welfare technologies are developed, limiting the observer's ability to make sense of the problem beyond instrumental perspectives. This leads us to ask, what institutional roles are played by ICTs in social protection schemes?

To conceptualise such roles, we rely on a theoretical vision that places institutional forces at its core. Our work starts from Avgerou's (2000) institutionalist perspective, viewing information systems (IS)

development in concomitance with the organisational change that ICT contributes to. In Avgerou's theorisation, change is not confined to IS development, but occurs along with *deinstitutionalisation* of previously dominant organisational structures, transitioning from bureaucracy to new market-based organisational types. Drawing on such perspective, we propose that computerisation of anti-poverty schemes entails two simultaneous processes: one of institutionalisation of IS development, and a parallel one of deinstitutionalisation of the previous, subsidy-based structure of schemes.

We illustrate this view through a study of the Public Distribution System (PDS), India's largest food security net, as it is being computerised in the state of Karnataka. The PDS, a programme based on subsidisation of primary necessity goods to poorer households, has been computerised on an end-to-end basis: a back-end process (development of a database of users and supply chain monitoring) is supported by a front-end involving biometric tracking of transactions with beneficiaries. Through an interpretive, qualitative case study of the Karnataka PDS, we illuminate the roles played by processes of IS development and organisational change in the scheme's evolution.

Framed with an institutionalist perspective, our study transcends the narrative of technical progress that pervades governmental accounts of PDS transformation. From field interviews, institutionalisation of ICT in the PDS appears to come with a move towards deinstitutionalisation of an extant state-led subsidy scheme, in favour of a leaner social protection system based on direct cash transfers to beneficiaries. These two processes come together in explaining change, and result in a new social welfare system whose foundational architecture is deeply transformed. Such vision illuminates blind spots in ICT for social welfare programmes, bringing out the institutional context that extant conceptualisations omitted.

The paper is structured as follows. Section 2 reviews the literature on ICT usage in social protection schemes, illustrating the three core perspectives on this. Section 3 presents the institutionalist view devised here, and the two simultaneous processes that it entails. To illustrate such view, Section 4 explains our methodology and Section 5 presents our case study of the PDS in Karnataka. Section 6 details the parallel processes of computerisation of the PDS and deinstitutionalisation of the subsidy system underlying it, and section 7 discusses our theoretical contribution. Section 8 concludes.

2. ICT in social protection schemes

Over the last two decades, developing nations have increasingly adopted ICTs to streamline public governance processes. The study of computerisation of anti-poverty programmes is relatively recent in the field of e-governance for development, called for by widespread diffusion of ICT usage in the design and implementation of social safety nets (Bussell, 2012; Pritchard et al., 2013). This has generated a novel sub-domain of e-governance, in which the ICT artefact plays a central role within social safety schemes that are pivotal to poverty reduction.

Social safety nets, protecting the poor and vulnerable against livelihood risks, have acquired a key role in anti-poverty agendas worldwide. Against their perception as "social welfare programmes" aimed at short-term emergency assistance, a transformative agenda for social protection (Devereux and Sabates-Wheeler, 2007) emerged, framing anti-poverty schemes as means to economic security on the long term (Ghosh, 2011; Carswell and De Neve, 2014). This involves examination of the effect of social protection on the ability of beneficiaries to access their entitlements, given the class relations and political context in which programmes operate (Pattenden, 2011; Maiorano et al., 2016). In this respect, anti-poverty programmes are seen as part of wider social policy agendas, reflecting the development policy context in which they are implemented.

Rather than sitting firmly within the IS field, literature on computerisation of social safety schemes is interdisciplinary and largely not characterised by explicit theoretical perspectives. Three dominant, implicit visions of ICT in such schemes can be identified, differing in the breadth of the general object to which computerisation is related. A first view, resembling Orlikowski and Iacono's (2001) vision of a "tool view" of technology, conceives ICT as a means to the implementation of social welfare schemes, adopted in the search for better outcomes in their functioning. This view emerges in studies of cash transfer schemes shifting from physical delivery to mobile money (Devereux & Vincent, 2010; Aker et al., 2015), and of humanitarian assistance programmes becoming automated (Vincent & Cull, 2011; Gelb & Clark, 2013). Rural employment guarantee nets, requiring reliable recognition of workers, are moving to biometric identification (Bhatti, 2012; Muralidharan et al., 2016), studies of which observe ICT as a tool for better targeting of social welfare schemes.

A "tool view" of ICT does not imply that technology works successfully towards its role, and effectively includes multiple pieces that problematise the ability of computerised systems to do so. In their study of automated cash transfers in Malawi, Devereux and Vincent (2010) highlight the risks along the potential benefits, especially observing dangers of political manipulation and diversion of technologies from their original purposes. Similarly, works on automated payments for India's programme of rural employment guarantees (Bhatti, 2012; Masiero & Maiorano, 2018) problematise the politicisation of such schemes, highlighting the risk of capture by ruling elites and its negative consequences on the entitlements of beneficiaries. Despite the critical visions implicit in some of these studies, they are grouped by an attitude to technology as a tool that reflects the views of governors behind artefacts.

Complementing this view, a different perspective frames computerised social welfare schemes as means towards greater "development" outcomes, such as the objectives of global food security and poverty reduction reflected in the SDGs. In this perspective, the immediate goal of well-functioning anti-poverty schemes is instrumental to the proper functioning of the bureaucratic machine, enabling broader goals of poverty reduction. Leveraging the idea of ICT as means to reduce discretionality of street-level bureaucrats (Bovens & Zouridis, 2002), studies of automated social protection purport it as a means to build a more effective state, whose capabilities for delivery of anti-poverty services are augmented. A

more effective anti-poverty state uses *legibility* of citizens, obtained through ongoing processes of datafication of anti-poverty schemes (Masiero & Das, 2019), to build inclusive frameworks for service provision, leveraging biometric technologies that match users with their entitlements under each programme (Gelb & Decker, 2012).

Contesting the positive-enabler view of digital social protection, a third vision illustrates its potential to disable such goals, by mistargeting efforts or enacting perverse dynamics within programmes. The lens of *surveillance*, conceived as the collection of personal data for "influencing or managing those whose data have been garnered" (Lyon, 2001: 2), supports conceptualisations of digital anti-poverty schemes as means to profile the poor and vulnerable, inscribing them into top-down control structures rather than providing effective entitlements. The surveillance lens, rooted in the field of data and security studies (Martin et al., 2009), has become especially entrenched with social protection with the rise of biometric anti-poverty programmes, which connect each recipients' biometric credentials to her entitlements. While advocates see this as a means to ensure services to recipients, research in the fields of surveillance and data justice (Taylor, 2017) observe the implications of this phenomenon, which turns the poor into subjects of a form of biometric profiling (Eubanks, 2018) that ends up reinforcing existing inequalities and potentially exacerbates them (Milan & Trere', 2019).

The surveillance lens results into multiple problematisations, reflected in the theorisation of data injustices that especially affect recipients of anti-poverty programmes (Masiero & Das, 2019). First, making programmes conditional to biometrics means confining the right of social protection to those enrolled in biometric databases, therefore excluding all those unable or unwilling to enrol in these. The poor need to "trade" their credentials for the subsidies to which they are entitled (Srinivasan et al., 2018), as the system is designed to exclude all those who do not appear as enrolled. This form of data injustice may result in the discontinuation of service provision to non-enrolled users, which puts their social security at risk (Hosein & Whitley, 2019).

Another injustice reflected by research on digital social protection is that of mistargeting, which is the diversion of anti-poverty provisions away from entitled users (Drèze & Khera, 2017). Enrolled citizens who fail to authenticate at the point of delivery are left out, causing exclusion errors that add to those generated by erroneous poverty determinations in programmes. This turns technology from an enabler into a 'disabler' of the programme's goals, where failure in digital authentication leads to the impediment of delivery, potentially with limit-case consequences such as the hunger deaths attributed to failed biometric authentications in India (Khera, 2019). By illuminating technology's role in this, such works problematise its ability to lead to the construction of more inclusive anti-poverty schemes.

The three perspectives offer different views of what technology does to social protection programmes. But none of these openly engages the institutional context, and more at large the web of institutional forces in which social protection technologies arise. This, even in critical visions like that inspired by a surveillance lens, causes a separation of the discourses of technology and institutions of social

protection, which leaves researchers without an understanding of the institutional processes behind computerisation. Aware of this gap, we suggest a fourth view on the role of ICTs in social protection, framed through the institutionalisation processes that accompany the development and use of IS.

3. A fourth view: An institutionalist perspective

Our contribution presents the evolution of ICT in social protection as the result of two processes, one of institutionalisation of ICT innovation and one of deinstitutionalisation of a previous organisational structure. Here we present our theoretical framing, which we then apply to social protection schemes.

3.1. Institutionalisation and deinstitutionalisation processes

The foundations of institutional theory are grouped by a common concern with the problem of perceived organisational irrationalities, seeking to understand why organisations adopt regularities that a technical rationality alone cannot explain (Avgerou, 2000). Institutional theory develops the conceptual tools to make sense of practices that become established, based on apparently not-fully-rational processes through which something becomes taken for granted, "part of the furniture" (Silva & Backhouse, 1997). The behaviour adopted by organisations, the theory sustains, is articulated around practices that become consolidated and normalised through processes of institutionalisation.

Given the conceptual ambiguity that characterises the theory, Scott (2001: 49) seeks to provide clarity by defining institutions as "multi-faceted, durable social structures, made up of symbolic elements, social activities, and material resources". An institution is defined by a taken-for-granted character (Jepperson, 1991), whose nature as established entity lead it to be unquestioned in society (Avgerou, 2000). Flowing from the notion of institution, the process of institutionalisation is defined as one in which "an order or pattern becomes accepted as a social 'fact'" (Avgerou, 2000: 236), thus acquiring the legitimised, taken-for-granted nature of institutions.

The evolution of institutional into neo-institutional theory (DiMaggio & Powell, 1991) has led to the introduction of new concepts in institutionalism. Among these is the notion of *deinstitutionalisation*, which Oliver (1992: 563) defines as "erosion or discontinuity of an institutionalised organisational activity or practice". The concept emerges in response to the observation that not all institutions persisted over time, and some of them were more or less gradually dissipated as a result of progressive delegitimation of their role. To make sense of this Oliver (1992) called for greater analysis of deinstitutionalisation, a call followed by several works in the field of organisational studies (e.g. Erakovic & Powell, 2006; Rorrer, 2006; Dacin & Dacin, 2008; Maguire & Hardy, 2009).

Nevertheless, as noted by Nicholson & Sahay (2009: 332), IS researchers primarily use institutional theory to understand persistence of given practices or processes. Fewer works focus on the opposite process, for which an established institution is eroded and loses its legitimacy over time. But as Nicholson & Sahay (2009: 333) continue, it is important that IS research focuses on making sense of deinstitutionalisation, as the dissipation of extant practices may have long-lasting consequences on sociotechnical systems (Dacin & Dacin, 2008). As a result, if it is clear that different mechanisms can combine to form a process of institutionalisation (Avgerou, 2000; Noir & Walsham, 2007), then it is also important to understand the anatomy of a process of erosion of such practices.

To understand the antecedents of deinstitutionalisation we follow Nicholson and Sahay (2009) and Sahay et al. (2010) in drawing on Oliver (1992), who provides a taxonomy of the reasons why practices become vulnerable to erosion or rejection over time. Oliver's taxonomy comprises of (1) the antecedents of deinstitutionalisation, (2) the factors that influence its pace, and (3) its constitutive processes, in terms of dissipation or outright rejection of a given practice. Figure 1 provides a schematic representation of Oliver's model.

[Figure 1 here]

On antecedent factors, these have three natures according to Oliver (1992: 557): political pressures arise when a practice loses its political legitimation, resulting in dissensus around it. For example, a company's new management may not approve practices in contrast with its philosophy (e.g. dress codes), resulting in dissipation of these. Functional pressures are generated when something ceases to generate its previous instrumental value, hence losing its functional justification. Social pressures emerge when the social environment of the organisation generates dissensus around a practice, generating more or less open incentives for change. As in Oliver (1992: 575), social pressures include increasing normative fragmentation, disruptions to the organisation's historical continuity, changes in laws or societal expectations, and structural changes to the organisation or its environment.

In terms of pace, Oliver theorises *entropy* and *inertia* as capable of, respectively, accelerate or decrease the pace of deinstitutionalisation. In some organisations, the propensity to rapid change (entropy) is what motivates a rapid evolution, in which sources of dissensus are rapidly translated into the erosion of an established organisational practice. In other cases, the opposite is true: if there is inertia, the organisation experiences pressures, but it takes longer to convert them into change. While constructed with the private enterprise in mind, this argument holds for the public sector, as entropy and inertia may as well be the features of governmental organisations.

Finally, the constitutive processes of deinstitutionalisation range, according to Oliver (1992: 557), from a slow process (dissipation) to the outright rejection of a practice, which happens for example when a

company's management decides for such practice to be discontinued. Studies of deinstitutionalisation have elaborated on cases of both natures, for example Nicholson and Sahay (2009) report on a case of dissipation in which old ways to do export policymaking in Costa Rica are replaced with new practices. Other cases, in which an extant routinary practice is discontinued (Erakovic & Powell, 2006), offer examples of outright rejection as constitutive of deinstitutionalisation.

To sum up, institutional theory offers concepts to make sense of both institutionalisation (a process for which practices become taken for granted) and deinstitutionalisation, meaning the delegitimation and subsequent discontinuation of practices that were institutionalised before. To build our theoretical lens, we observe the dynamics that occur when processes of institutionalisation of ICT act in concomitance with deinstitutionalisation of an organisational structure.

3.2. Avgerou (2000): institutionalisation of IT and deinstitutionalisation of bureaucracy

As noted by Currie and Swanson (2009), IS research is undergoing a revival of institutional theory, which allows to bring to light the institutional dynamics of interest to the field. This revival features, however, few studies of deinstitutionalisation (Nicholson & Sahay, 2009; Sahay et al., 2010) which reveal how this occurs in practice. In this landscape, Avgerou (2000) suggests that it is the combination of two processes that explains a phenomenon, and that the institutionalisation of one practice should be observed along with the concomitant erosion of another one.

The two processes outlined in Avgerou (2000) have different natures but happen at the same time and involve the same organisational unit. The former, ICT institutionalisation, sees the increasing legitimacy of IS innovation as a means to rationalise the multiple activities of the firm. The latter points to a reverse dynamics and highlights how extant organisational structures, especially bureaucratic structures, are deinstitutionalised over time. In the case of Pemex, what is deinstitutionalised is the old form of organising, a bureaucracy that evolved into a market structure seen as more dynamic and responsive to the needs of the firm. Organisational change happens at the same time as ICT innovation but follows a different process at a very different stage of institutionalisation (Avgerou, 2000: 238).

Thus in this perspective, rather than just a process, it is the concomitance of institutionalisation of IS innovation and dismantling of older structures that explains the organisational evolution of the firm. We find this argument illuminating for two reasons: first, as it takes into explicit consideration the time factor that Oliver (1992) mentions, suggesting that processes of different natures can intertwine in the same time span. Second, as it explains the paradox (Noir & Walsham, 2007) of the self-sustaining force of ICT innovation, which persists and indeed grows stronger during organisational transformation. We hence find value in the idea that two institutional processes of different natures can operate together.

Therefore, while Avgerou's (2000) argument is constructed for a state-owned company, we seek to understand whether similar dynamics may be happening for ICT in social protection. In this domain, as development literature illustrates, the affirmation of ICTs is being accompanied with what seems a gradual erosion of subsidy-based structures, hence determining a radical change in the functioning of social protection schemes.

3.3. ICT and social protection: an institutionalist perspective

It can be argued that the processes identified above, of ICT innovation and deinstitutionalisation of an extant organisational form, find a parallel in the evolution of social welfare programmes. Just as firms have a history of technological modernisation, anti-poverty schemes have become increasingly computerised, and technology acquires the instrumental role that informs the perspectives outlined in Section 2. We have already seen how ICT innovation is seen as tool for programme improvement or enabler of greater outcomes in virtue of its novel ubiquity in social protection schemes. Even the third perspective, which raises concerns of surveillance, admits that ICT has become "the way" social welfare is organised and delivered.

What is less contemplated in the literature is instead the process of organisational change with which ICT is intertwined. According to literature on anti-poverty programmes, social welfare schemes can acquire many forms according to national contexts, conditions and populations (Devereux & Sabates-Wheeler, 2007; Devereux, 2016). But to understand organisational change in anti-poverty schemes, two main forms of programme delivery – subsidies and cash transfers to beneficiaries – need outlining. Among all forms of social safety nets, these two are the main means to deliver benefits targeted to a section of the population:

(1) *Subsidies* come in the form of financial incentives on goods and services (Saini et al., 2017). In countries adopting anti-poverty schemes, many governments subsidise the price of primary necessity goods with the expressed intention of making them affordable for the poor. In the case of programmes targeted on an income basis, subsidies make it possible for low-income families to access important goods such as food, cooking gas, kerosene, or fertilisers. The cost equals the fiscal expenditure of the state, and consequences may emerge for the economy in terms of prices and broader macroeconomic trends (Gulati & Saini, 2015).

(2) Differently from subsidies, *cash transfers* involve the transfer of a sum directly on a recipient's bank or post office account (Aker et al., 2015). According to development studies scholarship, there are at least three reasons advocating cash transfers over subsidy schemes. First, economic evidence shows that subsidies risk being regressive, i.e. benefitting richer strata of the population in a greater way than poorer ones. Secondly, price subsidies can distort markets in ways that ultimately hurt the

poor, affecting for example income distributions (Gulati & Saini, 2015) and food price inflation (Saini et al., 2017). Third, supply chains involving subsidised products are heavily affected by leakages, meaning illicit diversions of goods away from intended beneficiaries.

For all these reasons, development studies scholarship is witnessing a transition from subsidies to cash transfers in anti-poverty schemes (Devereux, 2016). In several instances of countries that adopt anti-poverty schemes, cash transfers are associated to a more reliable form, which does not distort the economy and results in more secure delivery of benefits. A recent report by the Indian Ministry of Finance (Government of India, 2015) puts it in these words:

> (…) technologies that enable the state to better target and transfer financial resources to households expand the set of antipoverty tools the government has in its armoury. These technological innovations have renewed political, policy and academic interest in the potential of direct cash transfers to help the poor. Recent experimental evidence documents that unconditional cash transfers – if targeted well – can boost household consumption and asset ownership and reduce food security problems for the ultrapoor.

All these notes suggest that, in the social protection world as well as in the private sector, an old subsidy-based structure is leaving way to a newer one, based on direct transfers to the poor. Extant accounts do not separate ICT innovation in anti-poverty schemes from organisational changes, such as the move to direct transfer of benefits. This leads us, following Avgerou (2000), to suggest the existence of two processes, one of ICT institutionalisation and one of deinstitutionalisation of a subsidy-based structure, which the Indian case presented here illuminates.

4. Methodology

We draw on an interpretive case study (Walsham, 2006) of the computerisation of the PDS, a large social protection programme, in the southern Indian state of Karnataka. The PDS, a food security net that subsidises primary necessity items for the Indian poor, aims to improve the nutrition and general social welfare conditions of poorer households. The PDS is being digitised at a fast pace across India, providing a typical example of the processes of anti-poverty programme computerisation that we sought to research. We chose Karnataka as the state was an early mover in piloting a biometric PDS, where computerisation extended to the front-end stage of user recognition.

Our research began in early 2014, at a time in which the importance of computerising anti-poverty schemes was being articulated in the Indian political debate. At that time Karnataka was piloting a state-level form of biometric PDS, whose transformative nature triggered our research attention. In a first documental phase (January-August 2014) we reviewed the literature on the PDS in Karnataka, its main problems and the technology developed to solve these. While for the history of the PDS we resorted to academic literature (e.g. Mooij, 1998; Mooij, 1999; Khera, 2011a; Khera, 2011b), to form an understanding of its ongoing computerisation we used an array of web and media sources and made

contact with a senior official, formerly the state Secretary of Food, Civil Supplies and Consumer Affairs, who extensively briefed us on the biometric PDS that was introduced under his office.

In a second, explorative phase (August-September 2014), we visited a set of *ration shops* which were piloting the new biometric system. Ration shops are the physical spaces where entitled users receive subsidised goods under the PDS, and access to them allowed us to directly witness the functioning of the new biometric programme. During ration shop visits conducted in the districts of Bangalore, Tumkur and Kolar we combined observation of biometrically-mediated delivery with interviews with ration dealers, shop staff, and beneficiaries collecting their monthly rations. In this phase we also visited three of the Authorised Wholesale Dealers (AWDs), known as *godowns*, where PDS foodgrains are stored, to observe their computerised accounting system and conduct interviews with their staff.

In a third, in-depth research phase (September 2014-April 2015), we have used insights gained in the earlier phases to increase the specificity of our questions on the programme. Our interest focused on (1) the technology developed to computerise the scheme and (2) the development policies with which the ongoing technological transformation was being intertwined. To understand these, we conducted more visits to ration shops as well as to the Food, Civil Supplies and Consumer Affairs Department, the state's National Informatics Centre in charge of computerisation, and workers of civic and political organisations concerned with the PDS and food security. In this phase we also interviewed technology campaigners active in the promotion of Aadhaar, the biometric database which over the following years would have taken over as interface of national social protection.

In the years 2016-2018 the computerised PDS became based on Aadhaar, which gradually replaced the pilot schemes conducted at the state level. Since our initial study we monitored the programme's evolution through secondary sources, a synoptic list of which is provided in Appendix 1. One of the authors has conducted follow-up visits to the ration shops between 2016 and 2018, while the other returned to the field in 2018 for a new project on the Aadhaar-based PDS. In addition, both authors have followed the web-based documentation provided by the Unique Identification Authority of India (UIDAI), especially monitoring release of UIDAI documents on the entrenchment of Aadhaar in anti-poverty systems. All this material enriched our knowledge of the digitised programme, generating insights on the new computerisation of the scheme and its underlying policy agendas.

The narrative method, based on content analysis of respondents' narratives (Riessman, 2008), has informed our interview conduct and analysis. We follow Riessman, based in turn on Mishler (1986), in defining the interview as a co-constructed situation, in which respondent and interviewer share power in the construction of meaning. The narrative is led by the interviewee and it is the respondent who chooses the order of narration of events, as well as the importance attributed to each. Designing interviews as co-constructed "narrative events" has allowed us to maximise respondents' input and obtain rich descriptions of their interpretations of the phenomena we aimed to understand.

So articulated, the research produced detailed accounts of the infrastructure of the biometrically enabled scheme and the development policies gravitating around it. We have analysed these in terms of the institutional forces illustrated in section 3, centred on ICT innovation and organisational change. Below we first offer a brief description of the computerised PDS with a focus on Karnataka, and then move on to conducting the analysis in terms of institutionalisation of ICT innovation and deinstitutionalisation of the subsidy-based structure of the scheme.

5. Case Study

5.1. The Indian Public Distribution System

The PDS is the main food security net in India. It has the purpose of providing primary necessity goods (mainly rice, wheat, sugar and kerosene) at subsidised prices to below-poverty-line (BPL) households, thereby improving their nutritional levels and welfare. Foodgrains are reallocated from surplus to food-deficit states through a redistribution system governed by the Food Corporation of India (FCI), a central government agency that buys goods from private producers at the minimum support price and redistributes them to all states based on theoretical requirement (Tritah, 2003).

The PDS network is articulated into *ration shops*, as the amount of subsidised goods is rationed for all households on a monthly basis. In Karnataka, foodgrain entitlements at the time of fieldwork meant no subsidy allocated to the above-poverty-line (APL), whereas a below-poverty-line (BPL) household was entitled to 8 kg. of rice if one-member, 16 kg. if two-member, and 24 kg. from three-member on, at the highly subsidised price of one rupee per kg. While not entitled to foodgrain subsidies, the APL are entitled to a limited subsidy on kerosene. Households classified as Antyodaya Anna Yojana (AAY), applicable for the poorest of the poor, are entitled to 29 monthly kg. of subsidised grains, irrespective of family size.

As India embarked on a structural adjustment programme in the early 1990s, the PDS was put under the scrutiny of international financial institutions. The system was deemed to be ridden with leakage to the non-poor, which resulted in "meagre transfer at exorbitant cost" (Radakrishna & Subbarao, 1997). This informed the move, in 1997, to a targeted system where entitlement is related to poverty status, and aimed to households termed as BPL or AAY. Since state governments have high discretionality in scheme implementation, PDS provisions vary on a state basis: some have opted for a less narrow targeting in which the APL still benefit from a subsidy. Others, including Karnataka, have removed APL foodgrain subsidies, or left them at very low levels.

5.2. State Specificities: The PDS in Karnataka

In an all-India perspective, the Karnataka PDS is known for high utilisation and impact (Khera 2011a). Historically Karnataka adopted pro-poor measures even before targeting, especially in 1985 when 40% of the population became entitled to a "green card", which allowed them greater subsidy based on economic vulnerability (Mooij, 1998). The same pro-poor rationale is maintained today: the Anna Bhagya Yojana Scheme, presently regulating subsidies in the state, enforces food subsidies only for the BPL and AAY. As a result of the implementation of the National Food Security Act (NFSA) in 2013, the Anna Bhagya Yojana scheme has been modified to include ragi and jowar, millets that are staple food for many Karnataka regions whose nutritional content is higher than rice and wheat.

Despite its relatively good functioning, the Karnataka PDS is deeply affected by leakage, a problem diffused in the PDS nationwide. As commodities flow from FCI and private producers to wholesale dealers, and from there to ration shops, a high share of goods is lost in the process, causing losses that amounted to 46.5% of PDS goods across India in 2013 (Drèze & Khera, 2015). Rates of leakage are alarmingly high, to the point that programme reforms are being debated even in Karnataka, where the loss (estimated at 32.4%) is significantly below the Indian average (Gulati & Saini, 2015).

Against this backdrop, computerisation of the PDS has the main purpose of combating leakage. This phenomenon is part of a causal pattern: the double pricing of goods (subsidised on the PDS, but not on the market) fosters diversion of commodities by selling them on the market, to illicitly appropriate the price difference between the two. Illegal diversion of PDS goods through such "rice mafia" is framed as the main issue in the programme. To deal with it, the Digital India initiative of the current central government has made it mandatory for all states, on a gradual basis, to computerise the PDS.

5.3. The Computerisation of the Karnataka PDS

In 2005, the Government of Karnataka started computerisation of the PDS. The first step was that of constructing a database of all entitled users, ration cards (household-based documents of entitlement to the PDS) would then be assigned on the basis of computer records. On this basis, three modules (an updated database, a tracking system, and a ration shop interface) were constructed. These three modules constitute the composite ICT artefact that we studied in 2014-2015.

Module 1, known as Ahara (meaning "food" in the local language) is the database itself, in which the details of all ration card holders in the state were stored. Ration cards, assigned to all households, specify poverty status and are displayed by recipients when getting commodities at the ration shops. Construction of the database was initially problematic, after outsourcing to a private vendor did not sort the expected outcomes. In 2009, "temporary ration cards" were released without proper verification of the identity or entitlement of applicants, as a result virtually all citizens were granted access to the system (Justice Wadhwa Committee for Karnataka, 2010). The government took the problem seriously, and in 2010 it set up a system to verify ration card validity. To have their cards confirmed, urban

households would have to provide a RR number (signifying a valid electricity connection), whereas rural ones would need to provide their property identification number.

Module 2 (Financial and Stock Accounting System – FIST) is a software for supply chain monitoring, aimed at checking PDS transactions that occur before goods reach the ration shops. The FIST software is utilised by AWDs and monitors one of the nodal points of the programme's supply chain. More specifically, the software registers the amount of goods that AWDs receive every month, and the amount that is collected monthly by every ration dealer. The monthly amount of goods assigned to each ration shop is based on the theoretical requirement, determined through the number and status of ration cards registered and the closing balance, meaning the goods left in stock at the end of each month. All data are entered in the system by AWDs, who access it through personal logins.

Finally, Module 3 is a physical interface which, at the time of the pilot, consisted in a weighing-cum-point of sale machine located in the ration shops. As they bought rations, users were identified through their ration card number, which was entered first, and their thumb impression. As they provide these details, the machine recognised the user, and displayed their card number and entitlement on the screen. As the ration dealer weighed commodities, the machine's speakers announced, in local language, the type and quantity of goods being sold, and a bill was printed for the transactions. In this way, the machine controlled the last mile through two simultaneous mechanisms: it prevented non-entitled users from access (through biometric control) and prevented ration dealers from cheating on amounts and prices of entitled goods (through the scales and speakers).

[Table 1 here]

Changes occurred over the last four years have been predicated on the introduction of Aadhaar, India's biometric identification database, as a primary means of access to the PDS. Launched by the UIDAI as a means to streamline social welfare for the nation's poor, Aadhaar confers a 12-digit unique number to all residents who enrol, upon capture of biometric parameters (ten fingerprints and iris scans) thereby used for recognition. In March 2016 the Indian Parliament approved the Targeted Delivery of Financial and other Subsidies, Benefits and Services act, most known as Aadhaar act. The Aadhaar act provides legal backing to the seeding of extant state databases, such as Ahara, with Aadhaar identity numbers, making identification at the ration shop predicated on recipients' registration into the system.

As a result, in the Aadhaar-based PDS that ensued, a new type of Aadhaar-enabled point-of-sale machines was introduced in all ration shops. These machines follow the same principle of the previous ones, with two main differences: first, biometric identification is not made through Ahara alone, but through the Aadhaar central database with which Ahara is seeded. Therefore, when the beneficiary authenticates at the ration shop, their unique Aadhaar credentials are recognised, and matched with

poverty status as determined by Ahara. Second, the new Aadhaar-enabled machines do not include a weighing scale, as commodities are weighed on a separate device.

6. Analysis

History of the Karnataka PDS illustrates a process of institutionalisation of ICT innovation, combined with deinstitutionalisation of the subsidy-based structure that originally characterised the scheme. To illustrate this, we first elicit the factors that underpinned institutionalisation of the ICT-based PDS, then the pressures (Oliver, 1992) behind deinstitutionalisation of its original form.

6.1. Institutionalisation of ICT innovation in the PDS

In response to our question on the rationale for computerising the PDS, state officials have detailed different reasons behind the introduction of the new biometric system. The overarching idea lay in the need to "rationalise" the system through the effectiveness and accountability brought in by digitising key operations. In one of our first interviews, the former Secretary of Food, Civil Supplies and Consumer Affairs explained how ICT was seen as "the main route" to PDS improvement, developed to act on those issues that prevented correct delivery to the poor. In the years 2009-2010, the Karnataka PDS witnessed a burgeoning increase in ration cards, caused by outsourcing of the card release process to a private firm which proved unreliable:

> We have had to take [the firm] to court for that […] they released ration cards without properly verifying applicant details. So lots of people claimed food from the ration shops every month, with those "temporary ration cards" overflooding the whole system. Our choice of introducing [a biometric interface] was made to prevent such things from happening again, to ensure that one card matched one unique household and that such household was entitled to receive the benefits. (Senior official, August 2014)

This vision, then resulting into the biometric recognition scheme piloted in the state, brings to light the view of a technology-based solution to address the main issue in the programme, meaning the fake identities that prevented a proper delivery of goods. The same vision is reflected in Aadhaar, whose purpose as framed by UIDAI is that of ensuring that only those entitled can access their benefits. From pilot projects, using state-based databases such as Ahara, the vision of ICT as a de-duplicator of users became entrenched in the PDS, becoming the consolidated way of delivering the scheme. At present, as it emerged in the visits conducted in 2018, Aadhaar is mandatory for PDS authentication, and the routine of Aadhaar-based recognition is the unquestioned practice of transaction in the ration shops.

In the current system the ration dealer, instead of simply checking a paper-based document, needs to perform the biometric recognition to which delivery of goods is conditional. When authentication fails, they are not allowed to bypass the system and perform the transaction manually, a practice that we instead witnessed multiple times when we observed the pilot project in 2014-2015. As argued elsewhere

(Ramanathan, 2014; Yadav, 2016), the mandatory subordination of the PDS to Aadhaar authentication puts the non-recognised into serious predicament, as issues of fingerprint illegibility (or malfunctioning in the machine-server connection) result in denial of PDS rations. In one of our visits to ration shops in Tumkur, we witnessed an entire family failing to authenticate at the shop, with the ration dealer being only able to recommend that they visited the District Office to seek a solution.

How has a historically paper-based scheme become so pervasively ICT-driven in a short time? As observed in Walsham and Noir (2007), legitimation of practices occurs through different factors, related to the technology and the environment in which it operates. In our research, three main elements have emerged as drivers of the establishment of biometrics as "the way" to perform PDS authentication.

First, the context in which the programme operated made it prone to a popular quest for change. Since our first observations the PDS came across as a scheme affected by serious issues, which hampered the proper delivery of goods to beneficiaries. Reports of malfunctioning were frequent among recipients, as well as issues related to access and quality of the foodgrains supplied: recipients interviewed in Kolar district told us they fed PDS rice to cattle, due to low quality of the foodgrains provided. But especially frequent were the reports of theft and cheating from ration dealers, who were identified – by users and officers alike – as the main "guilty part" for leakage. Several recipients manifested open mistrust towards the local ration dealer, pointing out occasions in which foodgrains had "run out" or they were sold lower quantities than their assigned entitlement.

This situation, observed in our first exploratory visits in 2014, mirrors multiple traits of the performance of the PDS outside the state. Research reports on the PDS invariably identify leakage as a serious and systematic problem, particularly concentrated in some states but affecting all India (Saini et al., 2017). While researchers dissent on the size of leakage and the pace of its reduction (e.g. Gulati & Saini, 2015; Drèze & Khera, 2015), the issue of diversion on the private market is widely recognised as the main impediment to the programme's good functioning. Even though Karnataka ranks better than the Indian average (Khera, 2011a), perception of the PDS as leaky discourages offtake from recipients, generating perverse incentives to seek illicit means of access such as black markets and fake ration cards.

Secondly, this context of programme fragility provided a fertile ground for innovation. In particular, it set the background for the diffusion of biometrics, a technology depicted as tackling exactly the issues of diversion that the programme experienced. The association of biometrics to an ideal "problem-solver", observed since our first interviews with staff and government officers, is articulated into precise sub-elements portraying it as "the best" technology for the leaky PDS. Discourse around this is articulated into the three streams of prevention of misappropriation by users, prevention of misbehaviour of ration dealers, and prevention of the back-end diversion of foodgrains. These are specified as follows:

Preventing misappropriation of PDS goods from the non-entitled. As noted above, dual prices provide an incentive to diversion across the whole supply chain, especially for APL citizens who may wish to

access the system even if not entitled. The core assumption is that citizens excluded from the PDS may increase leakage of goods from the system by trying to access the subsidised commodities. This would reduce the amount of goods available to those entitled, with the risk of ration dealers becoming unable to serve all BPL/AAY households. This, in the framing provided by government officers, is a side effect of the reservation of the system to the poor, and biometric recognition of users at the point of sale is constructed as the one way to prevent misappropriation from happening.

Preventing misbehaviour of ration dealers. As noted above, ration dealer misbehaviour is perceived as a core cause of illegal diversion of goods. Ration shop owners can cheat customers in two ways: lying on quantity/price in transactions (selling fewer commodities at prices higher than those on the PDS), or pretending having "run out" of goods, while selling them privately at market prices. The biometric point-of-sale machine is constructed to prevent the first type of behaviour, making every transaction correspond to a unique identifier and right entitlement. But the system is also built to impede the "having run out of goods" claim, as the stock of the next month cannot be collected if sales from the previous month are not accounted for, a process that only happens with biometric verification.

Preventing the back-end diversion of foodgrains. While weighing-cum-point of sale machines control transactions in the ration shops, the software for finance and stock accounting (FIST) is built to ensure the monitoring of transactions from FCI/private producers to wholesale points, and then from these to ration dealers. The FIST system has been designed and reportedly implemented by NIC Karnataka, but awareness among AWDs was still limited at the time of fieldwork – in fact, we have visited godowns whose staff had never seen or utilised the accounting interface. Yet while drawbacks may persist at the back-end level, users only see the last-mile technology through which ration shop transactions occur, which is openly depicted as a means to combat back-end diversion.

The vision of biometrics as capable to prevent misappropriation of goods, combat misbehaviour of ration dealers, and prevent the back-end diversion of foodgrains offers strong legitimating elements, which explain the rapid establishment of the biometric PDS. As described by Avgerou (2000) in her case study of Pemex, the technology quickly became "taken for granted" in the programme, and users started welcoming it as a means devised against the problems that hampered their ability to access goods.

On top of these factors, Aadhaar entered the system after the establishment of UIDAI, and especially after the Aadhaar act provided legal backing for incorporation in the PDS. A third legitimising element, whose visibility has increased over time, lies in the central government's push for Aadhaar enrolment, backed by discourse that identifies the database as means to optimise welfare delivery through unique identification. The same logic of deduplication, earlier reflected in pilot schemes, is now the object of a national project that constitutes the largest biometric identification database ever created. In UIDAI's discourse, Aadhaar is constructed as a primary means to improve social welfare:

> The lack of identity is especially detrimental for the poor and the underprivileged, the people who live in India's "social, political and economic periphery". Agencies in both the public and private sector in India

usually require a clear proof of identity to provide services. Since the poor often lack such documentation, they face enormous barriers in accessing benefits and subsidies (…) a project of this scale has not been attempted anywhere in the world, and requires an innovative model, distinct from what we have witnessed in identity systems so far anywhere in the world. (UIDAI, 2010: 6)

Discourse of this type, legitimising Aadhaar's establishment *per se*, has grown stronger with the pervasiveness of Aadhaar-based authentication, which is now required for the quasi-totality of public services in India. Reinforced by a Supreme Court order in September 2018, the construction of Aadhaar as core gateway to public services makes it the main channel of access to the state, sustained by the rhetoric of improvement which justifies its ubiquitous implementation. As of June 2019, 88.9% of the adult Indian population is enrolled,[1] and Aadhaar authentication is framed as the normal means to access public welfare programmes like the PDS. Its entrenchment in the scheme, as well as in other systems of social protection, is constructed as "the way" to access social benefits.

The context provided by fragilities in the programme, the systematic representation of biometrics as an effective problem-solver, and the affirmation of Aadhaar as gateway to national services concur to explaining the progressive, but visible institutionalisation of an ICT-based PDS. A programme that ran for decades on paper procedures is now enabled by biometric authentication of users, reflecting the idea of "institutionalisation of ICT innovation" as theorised in Avgerou (2000). Concomitance of these factors underpins institutionalisation, giving rise to a procedure that occurs unquestioned throughout the state's ration shops.

6.2. Deinstitutionalisation of subsidy-based welfare schemes

As we noted, national development policies are experiencing a global trend characterised by general abandonment of subsidy schemes for cash transfers. Where this happens, the transition between the two systems involves an erosion of the previous structure, which leaves room to a new form of social protection (Barrientos & Hulme, 2016). This amounts to deinstitutionalisation of subsidy schemes, in favour of a leaner structure that should maximise programme effectiveness. Cash transfer policies are indeed built to be free from economic distortion, and curtail leakage opportunities by delivering social benefits directly on users' bank accounts (Devereux, 2016).

Allegedly fraught with leakage connected to subsidies, the Indian social protection system is following this route, with the central government identifying the root cause of PDS leakage in the subsidy-based structure characterising it. Since our first interviews with state officials, the view that the problem is to be sought in subsidies has been made manifest, as in the words of a senior official:

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[1] https://uidai.gov.in/images/state-wise-aadhaar-saturation.pdf, accessed 29 July 2019

> The structure based on ration dealers […] is not the optimal solution. In a near future, we will not need the ration dealers, but will be able to give money to beneficiaries directly. (Senior Official, August 2014)

The government finds, at the same time, a solution in the alternative based on direct benefit transfers, which inform a new way to structure anti-poverty systems. After many hints in public policy, the central government's intention to start a move of this type has been openly expressed, as stated in the 2014-2015 Economic Survey report:

> Cash transfers can also augment the effectiveness of existing anti-poverty programs. By reducing the number of government departments involved in the distribution process, opportunities for leakage are curtailed […] in addition to net fiscal savings, income transfers can compensate consumers and producers for exactly the welfare benefits they derive from price subsidies without distorting their incentives. (Government of India, 2015: 64)

The idea was initially formulated in theoretical terms, without real measures to put it in practice. But while Aadhaar can provide a short-term fix to the PDS, it is now being entrenched in the project of a system that delivers benefits directly on users' bank or post office accounts. The use of ICTs for this purpose is explained in the policy report by Saini et al. (2017):

> The Indian Government has identified a unique opportunity in using Information and Communication Technology (ICT) based solutions to streamline its inefficient, ineffective, and expensive subsidy operations. By bringing all subsidies, mainly food and fertilizer subsidy, under the ICT platform, the government aims to make its subsidy operations and delivery mechanisms transparent, efficient, and effective. (Saini et al., 2017: 5)

As it is devised, the planned transition results in deinstitutionalisation of an old structure in the terms suggested by Oliver (1992), meaning delegitimation and erosion of an established practice. As such, we use Oliver's model to make sense of the antecedents and pace of transition.

Narratives collected from PDS recipients point primarily to social pressures, which in Oliver (1992: 575) include "disruptions to the organisation's historical continuity" and "structural changes" to the organisation or its environment. What disrupts the continuity of PDS functioning is in the first place the mistrust expressed by certain beneficiaries, directed towards ration dealers who are blamed for not always delivering the full amount of rations or not doing so in time. As a PDS user told us near a Bangalore ration shop, not even biometrically-enabled machines provide a secure solution to theft:

> We never know exactly how much rice we will receive. I feel that the ration dealer is still giving me fewer foodgrains (than what is due), but I have no way to check if it is so.

In other words, the biometric system controls the buyer's identity, but still leaves room for the ration dealer to tamper with the quantities delivered. This limits accountability to recipients, who are instead held to account for being who they claim to be (authentication) and being genuinely entitled.

These critiques find, however, a limit in the fact that the PDS, notwithstanding its drawbacks, is the main food security scheme to which our interviewees are used. This explains why, to our question on whether they would welcome a new scheme in its place, the overarching response is negative, due to the yet unclear consequences of a new social welfare model. The routine of queuing monthly at the ration shop, collecting their goods at subsidised prices, plays an important role for recipients, who overwhelmingly prefer that to the move to a system whose lineaments are still unspecified. While this, at least in Karnataka, constraints users' willingness to engage in protest, mistrust towards ration dealers pushes towards a structural change in the system's architecture.

Yet, the question as to why ration dealers would be *more corrupt* than any other actor is unanswered. Its response reveals two functional pressures, which Oliver refers to as "technical or functional considerations that compromise or raise doubts about the instrumental value of an institutionalised practice" (1992: 571). A first functional pressure lies in the evolution of the political economy of the scheme: a consequence of the 1997 shift away from a universal system was the uptake of a policy of narrow targeting, excluding the APL (estimated as 79% of the population in Karnataka)[2] from food subsidies. As a result, the customer basis of ration shops shrunk dramatically, leading to severe consequences on the sustainability of their businesses. As noted by a ration dealer in Tumkur district,

> A ration shop business is not sustainable with only the revenues from PDS. People [ration shop owners] either sell other commodities too, or have another business […] If there is no alternative, they just sell goods on the market. (Ration dealer, September 2014)

Accounts like this reveal the hardship of sustaining a ration shop business today. When the system ceased to be universal, a massive wave of ration dealers' suicides was registered (Suchitra, 2004), due to impossibility to repay debt or make a living with the ration shop's income. Designers of the new system have conceived the biometric PDS to monitor especially these actors, knowing that their dire economic condition acted as incentive to diversion. But by doing so they provided a measure that is short-term in nature, as it does not engage the fundamental issue that pushes ration dealers to black markets.

Another functional pressure operates in the scheme: India, and Karnataka too at the state level, has a targeted system with narrow criteria for BPL status and reservations to BPL/AAY. Our respondents however raised multiple doubts on the social justice implicit in such criteria, especially in terms of their ability to include needful households. As it was brought up in a visit to a Bangalore-based NGO, the very definition of BPL is problematic: numerous households, while living in dire economic conditions, are not "poor enough" to meet the criteria for receiving subsidies from the state. This point is reflected in Swaminathan's (2008) data, which bring to light a problem of exclusion of households that are close

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[2] State-wise poverty estimates for India are available at https://www.prsindia.org/theprsblog/poverty-estimation-india, accessed 29 July 2019

to the poverty line, but fall short of the BPL criteria. Biometric recognition surely acts on inclusion errors, but is not designed to combat the structural problem of exclusion.

Mistrust towards ration dealers, persistence of leakage, and the functional issues presented by the PDS are all reflected in a set of political pressures, termed by Oliver (1992: 558) as factors that erode "political agreement on the value or validity of an infrastructure". The PDS has been supported by Indian political forces for many decades, which explains its persistence since it was first established in 1965. Yet the first weeks of our fieldwork already envisaged a governing vision that sought to avoid the regressiveness, economic distortion, and leakage proneness that characterise subsidy schemes (Government of India, 2015). Such vision constructed the PDS as structurally suboptimal, resulting in leaky and ineffective delivery of benefits, and helped deflect other issues, such as increasing field-level staff vacancies or failure of higher bureaucracy in working out effective delegation mechanisms, to the margins and outside the popular discourse.

Political pressures became more explicit in the first year in office of the central government (formed by the National Democratic Alliance coalition in 2014) in power during our fieldwork.[3] The 2014-2015 Economic Survey released by the national Ministry of Finance completely revised the role of subsidies in anti-poverty policy: in spite of the country's decades-long architecture of subsidised schemes, the document clearly outlined its limitations, taking a clear position for alternatives that would result in lower leakage-proneness and distortion. Influencing decisions at the state level, the line of action specified in the document informed the direction of anti-poverty policy, outlining the government's choice to move from subsidies to direct benefits.

[Table 2 here]

Table 2 summarises pressures in the terms of Oliver's (1992) taxonomy. Popular wariness of ration shops, the persistence of incentives to black market diversion, and exclusion of needful households due to narrow targeting are conflated in an open anti-subsidies discourse, fostering political pressures for a new system. The recent India Budget (2019) states the intention to achieve it, actively bending Aadhaar's technology to the creation of a direct transfer system.

Beyond antecedents, Oliver's (1992) model further illuminates the nature of this process, in terms of the pace it has acquired and its constitutive traits. In terms of pace, Oliver's notions of entropy and inertia refer to organisations that either change rapidly (entropy), or take long times to translate ideas for change into reality (inertia). In the case observed here, transition has yet to happen: while cash transfers in the place of PDS are being piloted in three states (Chandigarh, Puducherry and Nagar

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[3] A government led by the same coalition is in power at present, re-elected with large majority in May 2019.

Haveli), subsidies are still in place in most states. While this recalls Oliver's (1992: 557) notion of inertia, the slow pace of change can be explained with the difficulty of dismantling a fifty-year-old system, with structures in all states and deep entrenchment in recipients' lives.

Secondly, Oliver (1992: 557) explains the difference between dissipation of a practice, and outright rejection in favour of a new practice that suddenly replaces the previous one. As we refer to a vast governmental system, whose change requires concerted action of numerous agencies, we illuminate the reasons why the case is one of gradual dissipation rather than sudden discontinuity. Dissipation, as observed in other studies of eroded practices (Nicholson & Sahay, 2009), is sustained by the formation of popular dissensus which gradually erodes the legitimation of practices. Social, functional and political pressures contribute to the formation of dissensus, creating a situation in which the support accorded to a subsidy-based programme ceases to exist.

[Figure 2 here]

Figure 2 summarises our analysis, showing its two core processes in parallel. This is illustrative not just of concomitance, but of the teleology implicit in the scheme: biometrics, now established as "the way" to run it, is constructed as a functional step for transition to cash transfers. The role of Aadhaar, which on the short term is that of improving the PDS, on the long term is that of creating conditions for replacing it with a direct benefit scheme, fulfilling the political pressures of the government.

Important for doing so is the ICT infrastructure devised for the national poverty management system. Such infrastructure, referred to as "JAM Trinity" (Jan Dhan Yojana – Aadhaar – Mobile Payments) is the acronym of three schemes: Jan Dhan Yojana, a programme aimed at providing a bank account to all low-income families, Aadhaar which provides a unique identity to residents, and mobile payments, which are becoming diffused as a standardised means for transactions. As the Economic Survey reports, the JAM Trinity will "wipe every tear from every eye" through the passage to cash transfers:

> If the JAM Number Trinity can be seamlessly linked, and all subsidies rolled into one or a few monthly transfers, real progress in terms of direct income support to the poor may finally be possible. The heady prospect for the Indian economy is that, with strong investments in state capacity, that Nirvana today seems within reach. It will be a Nirvana for two reasons: the poor will be protected and provided for; and many prices in India will be liberated to perform their role of efficiently allocating resources in the economy and boosting long run growth. (Government of India 2015: 65)

This, and not a short-term fix to the programme's technology, is framed by the central government as the real objective of the system. The process of ICT innovation may seem a simple improver of the programme, but is in fact the function of an organisational change that wants to transform the system for the whole nation, deinstitutionalising the subsidy scheme in favour of cash transfers. Combined with

the technological manifestations of this overarching purpose, this process explains the role of ICTs in social protection, revealing the teleological intent behind it.

7. Discussion

Our analysis illustrates an ongoing process of institutionalisation of ICT innovation, combined with one of deinstitutionalisation of the subsidy structure of a social protection scheme. This makes the point that ICT innovation, frequently constructed as a simple streamliner of anti-poverty schemes, plays an active role in the architectural transition from subsidies to cash transfers. Such transition has direct effects on the entitlements of recipients and their ability to access them.

The study brings about two orders of implications, the first one regarding deinstitutionalisation and the analysis of the pressures leading to it. The second one pertains to computerisation of anti-poverty programmes, based on the case of Indian social protection discussed here.

7.1. Deinstitutionalisation and its pressures in IS studies

Theoretical implications relate to IS literature on deinstitutionalisation, especially the part of it that uses Oliver (1992) to conceptualise its pressures. We find particular value in the dynamic aspect of Oliver's model, which builds stories of institutional transformation by tracing the pressures behind it. The ability to taxonomise such pressures and their combinations leads to trace the root causes of delegitimation, presenting clear narratives of how the process occurred. Following Nicholson and Sahay (2009) and Sahay et al. (2010), we reaffirm the value of Oliver's model in mapping the sources of dissensus that result in organisational change.

Two more points, less prominent in IS literature, emerge in our analysis. First, the pressures in point – which Oliver's model does not put in relation with each other – are interconnected, resulting in several interactions among different pressures. In our case, it has been social and functional issues in the PDS to generate political pressures, leading the government to push for the dissipation of the existing anti-poverty structure in favour of another one. Therefore we submit that, in using Oliver (1992) to map sources of deinstitutionalisation, relations among pressures need to be conceptualised, with a view to trace the causal combinations that they result in. An instance of this use of Oliver's model is in Currie (2009), who explains the transition of UK healthcare to a market-based system through the evolution of relations between functional and normative pressures (Sahay et al., 2010).

Furthermore, analysing pressures of deinstitutionalisation also leads to form an understanding of the sources of legitimacy of the new institution. In the case of the PDS, the pressures leading away from subsidies are mirror images of the pressures to adopt cash transfers, if they are not the same altogether. From a functional point of view, cash transfers solve the issues of leakage and exclusion that cause

pressures for leaving the PDS, while from a social pressures perspective these eliminate the need for intermediaries which users have limited trust in. Even more clearly, political pressures against subsidies are exerted by the same actors who endorse cash transfers, so that delegitimation of one system coincides with legitimation of the other. This invites, as parts of the organisational studies literature (Erakovic & Powell, 2006; Rorrer, 2006) do already, to observe pressures for delegitimation of a practice in terms of the new one they propose in its place.

In addition, other studies of deinstitutionalisation (Nicholson & Sahay, 2009; Sahay et al., 2010) focus mainly on the first component of Oliver's (1992) model, which taxonomises the different pressures. Notwithstanding the crucial importance of this part, the model also serves to understand the pace of the process, and its nature as dissipation or rejection of a practice. We have used Oliver's model to understand why India's transformation of social protection is being relatively slow, viewing strong political pressures in juxtaposition to the complexity of dismantling an old system, deeply rooted in the nation and in beneficiaries' lives. We have further qualified our case as one of dissipation, arguing that an outright rejection of subsidies – meaning a sudden implementation of cash transfers – would have likely sorted very different effects. We sustain that, in applying Oliver's model, components of entropy/inertia (pace) and dissipation/rejection (nature) are equally important in tracing the anatomy of deinstitutionalisation.

Finally, the analysis shows the importance of a pluralistic perspective in making sense of pressures for institutional transformation. Our picture of the PDS and its proposed dissipation is based on multiple actors' views, ranging from beneficiaries and workers of the system to its designers and governors. These combined visions informed our view of the programme, at the same time mapping the limits that cause a slow and difficult process of transformation. In addition, having observed the programme since its pilot project of digitisation has allowed us to follow the evolution of pressures, leading us to note, with Currie (2009), that the evolutionary process is a core component in narrating stories of deinstitutionalisation.

7.2. Computerisation of anti-poverty programmes

As we noted, it is common practice for nations to computerise their anti-poverty programmes with the idea of streamlining them. A recent revealing instance is the government of Kenya, whose launch of the Huduma Namba scheme – a national identification project structurally similar to Aadhaar – postulates biometric recognition as the one way to effective and secure delivery of social benefits.[4] The ongoing wave of biometric authentication projects diffusing in developing countries (Nyst et al., 2016) aims to fill the identification gap, due to which people are not known to the state and hence cannot be recognised as service recipients. In virtue of an underlying vision of ICT as streamliner of social protection, computerisation is diffusing in anti-poverty programmes, with electronic government projects that use it to structure their social welfare reforms.

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[4] http://www.hudumanamba.go.ke/, accessed 29 July 2019

At the same time, our analysis has demonstrated that ICT innovation plays a deeper role, consisting in fostering an institutional transformation that has direct effects on recipients' entitlements. A shift to cash transfers in India means radical restructuring of anti-poverty programmes, whose economic rationale has been defended in interviews by government officers. The problem is the extent to which recipients support the transition, as our data display substantial hesitation from them. As noted in the analysis, interviewees revealed a firm preference for preserving the PDS, and substantial concerns surrounding the uncertainties associated with adoption of a new scheme.

In line with this point, studies of cash transfers in India denoted a systematic preference for food rations, already before pilot projects were started (Khera, 2014; Chanchani, 2017). Now that pilots are underway, studies conducted on cash transfer states reveal dichotomous perspectives: a study by ICRIER (2018) argues in favour of cash transfers, showing their effectiveness in reducing food insecurity and nutritional imbalances. But other surveys reveal fundamental problems of distribution: the Abdul Latif Jameel Poverty Action Lab (J-PAL) shows that, in a survey of the three pilot states, less than 60% of the cash is getting into the hands of beneficiaries (J-PAL, 2018). These different narratives make it important to understand whether transition is really beneficial, considering its logic and the infrastructural constraints experienced by beneficiaries across the nation.

The same question may be asked for other countries, in the light of the global trend towards the adoption of direct benefit transfers in anti-poverty policies. If the adopted transformation turns out to be beneficial for recipients and the economy alike, a move to direct benefits instead of subsidies is to be welcome in development policy. But the Indian case, and the specific concerns raised by development economists (Drèze & Khera 2017; Khera 2018) on the transition, lead to suggest that perspectives on this are at best mixed, and the option that constitutes a first-best for some aggregate national level economic indicators may not be the best one for all. Doing away with existing welfare schemes means eliminating parts of them (such as the safe, material nature of subsidies) that are highly valued by recipients.

Another side of the debate pertains to biometrics, which in India has acquired the status of pervasive technology in accessing services. Biometric identification through Aadhaar, hailed as guarantor of access to the anti-poverty system, is being associated by some with an image of effectiveness in government's provision of social protection programmes. Such a strong public image is part of the reason for the massive nationwide enrolment rates in Aadhaar (Drèze & Khera, 2017; Masiero, 2018), amounting to the largest biometric scheme in the world. This in spite of India's infrastructural constraints, which further concurs to set Aadhaar apart from all other biometric identification schemes (Breckenridge, 2019).

Yet Aadhaar presents multiple substantial concerns, which featured strongly in our study of the PDS. Issues of exclusion from welfare schemes, conditionality of universal rights to biometric registration, and failure to tackle dependency on ration dealers show the claimed "success" of Aadhaar in other

proportions, generating questions on its capability to lead to accountable anti-poverty schemes. Several scholars openly flag its exclusionary effects (Ramanathan, 2014; Khera, 2018), including works that illustrate the "data injustices" that the system results in (Masiero & Das, 2019). In response to claims such as those by the current World Bank's Digital Identity initiative, which postulate biometrics as part of "the solution" to global poverty, these accounts use field data to illustrate how the computerisation of user populations may result in large unintended effects.

This leads us to suggest that biometric systems may not be inherently good, and their implications can also be perverse and exclusionary as in our case. Observing biometric systems in their proportions, we suggest an approach to anti-poverty policy that balances narrow targeting with checks for inclusion, to ensure that all entitled users have access to the benefits that laws prescribe for them.

8. Conclusion

Drawing on Avgerou's (2000) institutionalist perspective, the paper has illustrated two simultaneous processes in the computerisation of a large social protection scheme. As our analysis revealed, this results from a process of institutionalisation of ICT innovation, combined with an underlying process of deinstitutionalisation of the subsidy-based welfare structure of the programme. ICT innovation, here represented by the shift to a biometric PDS, is shown to be functional to the radical transformation of the programme, which needs to undergo deep changes in its organisational structure.

This has important consequences for countries that computerise their social protection systems with a view to streamline existing anti-poverty structures. The point we make is that the role of ICT innovation is substantially deeper, informed as it is by an organisational transformation that affects recipients' entitlements and their access to these. If the SDGs are to be pursued through well-designed systems of social protection, this role of ICTs should be taken into account in devising programme architectures to be non-exclusionary and responsive.

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Appendix: Core Secondary Sources

Public Distribution System in India:

PDS Portal of India: https://pdsportal.nic.in/

Food Corporation of India: http://fci.gov.in/

Government of India – Department of Food and Public Distribution: https://dfpd.gov.in/index.htm

Karnataka Food, Civil Supplies and Consumer Affairs Department: https://ahara.kar.nic.in/

Karnataka Food and Civil Supplies Corporation Ltd: http://www.kfcsc.com/

Justice Wadhwa Committee Report on PDS:
https://www.prsindia.org/uploads/media/Food%20Security/Justice%20Wadhwa%20Committee%20Report%20on%20PDS.pdf

Dr. R. Balasubramaniam Report on PDS in Karnataka: http://www.graam.org.in/wp-content/uploads/2015/11/PDS-Q-and-A-handout.pdf

Aadhaar-based Public Distribution System:

Digital India Portal: https://www.digitalindia.gov.in/

Unique Identification Authority of India: https://uidai.gov.in/

World Bank Digital Identity (India case studies): https://id4d.worldbank.org/research

Omidyar Network: https://www.omidyar.com

State of Aadhaar Report: https://stateofaadhaar.in/

Union Budget: https://www.indiabudget.gov.in/

GSMA Report on Aadhaar: https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/03/gsma-aadhaar-report-270317.pdf

Spreading JAM across India's Economy: https://www.indiabudget.gov.in/budget2016-2017/es2015-16/echapvol1-03.pdf

Wiping Every Tear from Every Eye: The JAM Number Trinity Solution:
https://www.indiabudget.gov.in/budget2015-2016/es2014-15/echapvol1-03.pdf

Media sources – Covering PDS and Aadhaar-based Implementation

Times of India: http://timesofindia.indiatimes.com/

Indian Express: http://indianexpress.com/

The Hindu: https://www.thehindu.com/

Hindustan Times: https://www.hindustantimes.com/

Deccan Herald: https://www.deccanherald.com/

Business Standard: https://www.business-standard.com/

Economic and Political Weekly: https://www.epw.in/

Live Mint: https://www.livemint.com/

Scroll.in: https://scroll.in/

The Wire: https://thewire.in/