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# Pathways toward digitalization in Social Protection and Labor (SPL) service delivery

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# Pathways toward digitalization in Social Protection and Labor (SPL) service delivery

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**Abstract**: This paper offers three key contributions to the existing literature. Firstly, it reviews the use of technology across each phase of delivering social protection and labor (SPL) benefits and services. Secondly, it reviews evidence on potential outcomes arising from digitalization initiatives, and identifies factors and conditions that facilitate successful design and implementation. Lastly, the paper outlines a conceptual framework for different digitalization pathways. This framework distinguishes between: (1) the progressive digitalization of analog core SPL architecture; (2) 'leapfrogging' innovations, which use novel digital approaches from the outset in contexts where SPL provision is nascent and traditional core architecture does not exist; and (3) the use of supporting technologies that may be helpful in their own right but neither contribute to, nor rely on, the digitalization of core SPL architecture.

**JEL:** D60, D70, D80, H41, I38, O35, O38, O51, O52, O53, O54, O55, O56 and O57

**Keywords**: digitalization pathways; digital social protection; digital technologies; digitalization initiatives; SPL delivery; core SPL architecture; supporting technologies; leapfrogging innovations.

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## Acronyms

| | |
|---|---|
| AI | Artificial Intelligence |
| CAPI | Computer-Assisted Personal Interviewing |
| CCT | Conditional Cash Transfer |
| CNAF | *Caisse nationale des allocations familiales* [France] |
| CBSS | Crossroads Bank for Social Security [Belgium] |
| CV | *Curriculum vitae* |
| EESSI | Electronic Exchange of Social Security Information [EU] |
| EFC | Errors, Fraud and Corruption |
| EU | European Union |
| GIS | Geographic Information System |
| GIZ | *Deutsche Gesellschaft für Internationale Zusammenarbeit* |
| G2P | Government-to-Person |
| HSNP | Hunger Safety New Programme [Kenya] |
| ICT | Information and Communication Technology |
| ID | Identification |
| IPC-IG | International Policy Centre for Inclusive Growth |
| IRRS | Intelligent Rehabilitation Recommendation System [Republic of Korea] |
| ISAS | Integrated Social Assistance System [Türkiye] |
| ISSA | International Social Security Association |
| IT | Information Technology |
| JSCI | Job Seeker Classification Instrument |
| KYC | 'Know Your Customer' (regulations) |
| LEAP | Livelihood Empowerment Against Poverty [Ghana] |
| NDVI | Normalized Difference Vegetation Index [Uganda] |
| P2G | Person-to-Government |
| PDS | Public Distribution System [India] |
| PIN | Personal Identification Number |
| SISBEN | Sistema de Selección de Beneficiarios para Programas Sociales [Colombia] |
| SMS | Short Message Service |
| SPIAC-B | Social Protection Inter-Agency Cooperation Board |
| SPL | Social Protection & Labor |
| UNICEF | United Nations Children's Fund |
| UNU-EGOV | United Nations University Operating Unit on Policy-Driven Electronic Governance |
| USSD | Unstructured Supplementary Service Data |
| VAT | Value Added Tax |

# 1. Introduction

Recent years have seen rapid growth in the use of new technologies for the delivery of social protection and labor (SPL) programs and services. While the pace of adoption has varied between countries, the general trend of increasing digitalization has been evident across low, middle- and high-income economies, and in relation to wide-ranging aspects of service delivery (ISSA, 2019; Lindert et al., 2020). The trend has further accelerated since the onset of the COVID-19 pandemic, when many governments embraced socially distanced mechanisms at an unprecedented scale and speed (Gentilini, 2022; Lowe, 2022). Yet with so much rapid innovation, there has been little opportunity to take stock of the digitalization initiatives that different governments have pursued to date – and what pathways they might seek to follow from here.

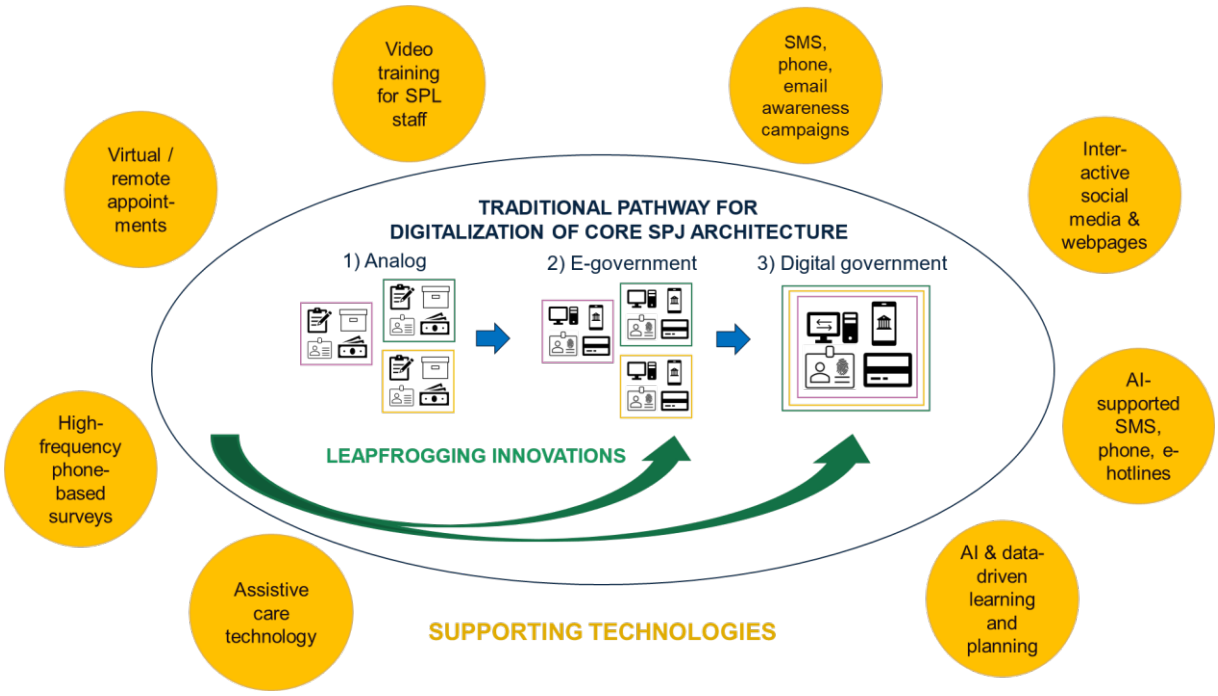
By drawing on a review of global experiences and evidence from low-, middle- and high-income countries,[2] this note is intended to reflect on these questions. First, what are some of the existing and emerging ways in which technology is being used to digitalize SPL service delivery? Second, what is known about the results of these initiatives, in terms of the benefits and challenges that they may bring? Third, under what conditions do these benefits or challenges arise; that is, what factors determine whether different types of digitalization initiatives are successful? And fourth, how might we think about the sequencing of digitalization initiatives, and the different pathways that governments are – or could be – following to maximize potential digitalization gains?

While governments could follow a wealth of different approaches to digitalize SPL delivery, this note aims to draw on the evidence reviewed to develop initial thinking on a conceptual framework for different digitalization pathways. The framework highlights a key distinction, outlined in more detail in the closing section of the paper, between innovations that contribute to the development of core SPL architecture – thereby forming a pathway for digitalizing the SPL system – and innovations that might be considered 'supporting technologies': standalone components that can be added or removed without relying on, or interfering with, core information systems. While potentially very helpful in their own right, such innovations are supplementary to, rather than fundamental for, the digitalization of core system architecture.

In some countries, however, 'core system architecture' does not yet exist even in non-digital form, as SPL provision is itself nascent. In these contexts, a different pathway might occur. Rather than starting first with manual or paper-based systems and approaches that are subsequently transformed by digitalization, technology could be used from the outset to identify, enroll, and provide services to recipients. These countries may thereby 'leapfrog' straight to digital systems and approaches, instead of first developing the traditional (manual, in-person) mechanism. If designed and deployed in a strategic manner, these leapfrogging innovations may be combined in a way that ultimately helps to build core social protection architecture – thereby resulting in the development of a largely digital SPL system. However, such a process is not a given. Unless a concrete system-strengthening strategy is in place, leapfrogging innovations can easily remain fragmented, serving as useful innovations in their own right, but not necessarily resulting in meaningful progress towards system-wide digitalization. Figure 1 outlines the conceptual framework for this thinking.

[2] The scope of the review was global, and country examples are included from all regions and income levels. However, for reasons of brevity, the aim was to highlight particularly innovative uses of technology in state systems (across social assistance, social insurance and active labor market programs), as well as to present evidence from those that have been rigorously studied. This means that for certain (though by no means all) aspects of delivery, there tends to be more content from high-income countries, which typically have somewhat larger and longer-standing ranges of digitalized SPL programs.

**Figure 1 Pathways toward digitalization of SPL services**




We return to this framework in the paper's closing section (Section 5), to provide further definitions for different digitalization phases and pathways, and to sketch out our thinking in more detail. Before that, we review the evidence that guided our conceptual thinking, highlighting what is known about the different uses of technology across the SPL delivery chain (Section 2), the outcomes that digitalization has produced (Section 3), and the factors shaping successful or unsuccessful outcomes (Section 4).

## 2. The role of digital technologies in SPL delivery

In many countries, technology now plays a large – and growing – role in SPL service delivery. Digitalization has occurred at all phases of the SPL delivery chain,[3] both through new uses of data and through the transformation of business process with novel technological devices and platforms (Barca, 2022; Lindert et al., 2020). Indeed, as discussed at various points in this section, digitalization has sometimes even disrupted the very chronology of the traditional delivery chain, by allowing multiple stages to be completed simultaneously, reversing their order or removing the need for them altogether.[4] Below we outline some of the main examples of digitalization in each phase of delivery, before discussing what is known about the results of such innovations in Section 3.

[3] As outlined in Lindert et al. (2020), the traditional social protection 'delivery chain' consists of several key phases: (1) outreach, to promote awareness and understanding among the intended population; (2) intake and registration, to gather information on people's characteristics, needs, and conditions; (3) assessment, to profile those characteristics, needs, and conditions; (4) enrollment, to determine whether those profiled meet program eligibility criteria and what benefits and services they should receive, and to notify and onboard them into the respective programs; (5) the actual provision of those benefits and services; and (6) the management and monitoring of participant operations (including their compliance with program requirements, grievances and appeals, reassessment of their needs over time, and exit decisions, notifications and case outcomes). The performance across these delivery systems can be managed and monitored at the program level, as well as for the social protection system overall.

[4] For example, in data-driven identification approaches, existing data is used to select people who should receive a program, and they are then invited to register, having already had their needs assessed and eligibility determined.

## 2.1. Outreach

Instead of being restricted to in-person or physical leaflet distribution, social protection agencies can now conduct awareness campaigns using digital technologies, through **SMS, calls, messaging apps (such as WhatsApp), emails, television, radio podcasts and social media announcements**. While many such examples were evident before the pandemic, the COVID-19 response dramatically increased their prevalence, given the reliance on socially distanced communication channels to mitigate contagion risks. In Bhutan, for example, the *Druk Gyalpo's Relief Kidu* cash transfer scheme received widespread publicity though television, radio, press and social media, while in Colombia, television and social media advertising was found to be an effective strategy for informing the public about the new cash transfer scheme (*Ingreso Solidario*), with social media-based outreach being particularly valuable for reaching younger people (García et al., 2022). In the European Union, the pandemic prompted public employment services to step up their outreach through Facebook and Twitter, as well as LinkedIn and YouTube (ETF, 2021). Awareness campaigns may be conducted en masse or in a targeted fashion, with new sources of data (such as satellite imagery, mobile phone use records, web, social media and financial services data) all offering possibilities for identifying priority neighborhoods or households to contact in targeted outreach exercises (Aiken & Ohlenburg, 2023; Barca, 2022)

Digital platforms can also serve as valuable information sources for the public to search for information on social protection programs – serving as an alternative to traditional in-person or printed resources in libraries, health facilities and other public services. Popular digital information sources may include **online search engines,** government or news agency **websites, apps or social media pages** or **virtual hotlines** (phone call, SMS/messaging apps, email or Skype). Call centers are not as widespread as websites (91 percent of 74 social security institutions reported having websites in 2022 (ISSA & UNU-EGOV, 2022), compared to 58 percent with call centers); even so, the reliance on them notably increased in most countries during the pandemic. For example, in Germany's Public Employment Service, demand increased from 100,000 to 2 million calls a day in 2021, requiring a twenty-time expansion of capacity. Digital outreach platforms often also benefit from applications of **Artificial intelligence** (AI) to improve virtual responses to public queries, such as intelligent chatbots, voice-based interactions on automated call helplines and automated processing of email queries. In Austria, AI is used by the social insurance agency to automatically dispatch emails to the required department, with up to 93 percent accuracy (ibid.).

## 2.2. Intake and registration

Technology has supported intake, registration and assessment processes in a wide range of ways. First, digital aides, such as computer-assisted personal interviewing (CAPI), or video training for survey enumerators, have increasingly supported the (otherwise manual) collection of new registration data at local offices and through door-to-door 'census sweeps'. For example, in one registration drive for the *Listahanan* social registry in the Philippines, **computer-aided data collection** was deployed, using 13,000 android tablets (principally in urban areas where internet connections were stronger for data submission (Lindert et al., 2020). Four thousand five hundred laptops were purchased and equipped with specialized applications that enabled supervisors and coordinators to monitor enumerators' schedules and progress, as well as to complete spot checks and automated validation to identify inconsistencies. The project also benefited from the creative use of **video training materials** for the 39,000 field workers involved in the data collection. These materials enabled consistency of messages, concepts, and protocols, as well as quality controls (ibid.).

Beyond these digital 'tweaks' to manual strategies, **digital approaches to registration and assessment** are increasingly being used as a primary strategy to enable applicants to apply for programs ('on-demand registration') or to help administrators identify and/or assess potential participants ('administrator-driven identification').

## On-demand digital registration

On-demand registration is now facilitated through various digital channels including applications through a **website**, by **email**, with a **phone-based messaging** system (such as USSD,[5] SMS or WhatsApp) or – less commonly - using a **mobile app.**[6] Digital on-demand mechanisms were relatively widespread for social insurance and labor market programs globally – and were growing in popularity – prior to and since the onset of the pandemic (Chacaltana et al., 2018). However they were not commonly used for social assistance in low- and middle-income countries – until the pandemic – because fiscal concerns deterred governments from encouraging 'on-demand' access, digital capacity and access was insufficient among the target user population, and/or there was limited coverage of the foundational ID systems typically used to authenticate digital on-demand applications (Barca & Hebbar, 2020; Lindert et al., 2020). During the COVID-19 crisis, web-based or email applications became the dominant means of registering new participants for social protection responses to COVID-19, with IPC-IG (2021) documenting 233 cases of web-based or email applications in Latin America, Asia and Africa, compared to only 104 cases of manual self-registration and 48 cases of phone-based registration.

As well as providing a platform to enable on-demand registration, digital innovations are also being used to try to make on-demand registration easier and quicker for applicants to navigate and for service providers to process. For example, in Greece, the online application for the Social Solidarity Income was designed to be interoperable with other administrative systems, enabling **automatic completion of various questions on the form** by drawing on existing data (Lindert et al., 2020). **Intelligent chatbots** help guide applicants through the application process (as, for example, in Estonia) (ibid.), while **AI-based image recognition** may be used to help process application documents (as in Finland's social insurance scheme and in Belgium's Auxiliary Unemployment Benefits Fund – although the latter was not perceived to be particularly beneficial given challenges processing paper forms with Optical Character Recognition) (ISSA, 2020). **Digital identification** (often including biometric data) is frequently collected upon registration, thereby serving as the basis to ensure that entries are unique, that people can be matched across databases to subsequently verify their eligibility, and that their identity can be authenticated for future access.

## Administrator-driven identification using data from across government and beyond

Data-driven innovations are also transforming strategies for governments to proactively identify and register (potential) participants.[7] Social protection agencies' own databases are becoming increasingly advanced, with **digitized social information systems** (including social registries[8] and social security databases) offering increasing functionality and ever-

[5] Phone-based messaging systems often rely on USSD, or Unstructured Supplementary Service Data – a global system for mobile communications protocol that is used to send text messages (Rosencrantz, 2020). It is like SMS (Short Message Service), but it establishes a real-time communication between the phone and another device (for example a network/server), enabling users to interact directly by making selections from various menus. As such, queries and answers are nearly instantaneous.
[6] Mobile app-based registration is in some ways a hybrid of an online and phone-based messaging system, requiring a smartphone and internet connection to register but intended to be more mobile-friendly than website portals.
[7] This phase often overlaps with the assessment and eligibility determination phases below, as the information used to identify potential participants may be the same information that assesses their profile and determines their eligibility for a scheme.
[8] Social registries support the registration process for social benefits and services, and enable information processing to assess their needs and conditions. They may form one component of a broader social information system, which also includes the

larger repositories of information to identify potential participants for scheme expansion or new programming. In the most advanced scenarios, more than 70 percent of the population has been registered, as in the social registries of Argentina, Chile, Colombia, the Dominican Republic, Pakistan, Peru, the Philippines, Saudi Arabia and Uruguay (Grosh et al., 2022). Although keeping this information up to date has often been a challenge, it may nevertheless be considered a useful starting point for administrators to identify potential new caseloads. During the COVID-19 pandemic, social registries or databases of existing program participants were used as a key input for registering people for emergency support in over 100 cases, though this almost always had to be complemented by additional registration methods to address exclusion issues (Barca & Wodsak, 2020; Beazley et al., 2021; IPC-IG, 2021).

Whether on a regular basis or as an ad hoc measure for a particular program, social protection agencies may **exchange data with other government agencies**, to enable them to identify potential participants or assess applicants.[9] The databases consulted may include the civil registry, ID or voter databases, tax databases, land, vehicle, disability and national health insurance registries, or state utility provider databases. In a survey of 74 social security institutions in 64 countries, exactly half said that they exchanged data with at least one other government entity, and sometimes many more (ISSA & UNU-EGOV, 2022). In Türkiye, the Integrated Social Assistance System (ISAS) pulls data from 28 different public institutions, while Chile's social registry draws on data from 43 state agencies and exchanges data with 345 municipalities as part of a growing social information system (Barca, 2017; DCI, 2022a) – see Box 1.

participant operations management system (POMS, also known as the 'beneficiary operations management system', BOMS). The latter contains the registries of recipients for individual or multiple programs, and supports the processes of enrollment, benefit and service provision and ongoing management and monitoring of provision for those program participants.

[9] Depending on the context, these databases may not cover the full population and may therefore be a poor mechanism for identifying low-income or other marginalized individuals; however, when combined with other data sources (such as on-demand registration), they may be an effective mechanism for 'targeting out' groups with certain characteristics (such as formal sector workers, or more affluent households), who may be more likely to feature in tax, land, vehicle and other state databases (Barca, 2021).

### Box 1 Chile's expanding social information registry

Chile's social information registry was launched in 2011 and has since evolved and expanded to cover 8.7 million households (approximately 98 percent of the population). The registry is central to an ambitious social protection system that includes 114 programs implemented by 10 ministries. It consolidates several databases, including the Household Social Registry and the Integrated Beneficiary Registry (both owned by the Ministry of Social Development and Family), as well as databases from other entities like the National Disability Register, the Register of Vehicles, the Income Tax Payment Register, and Civil Registration, among others. The registry also includes information from the social emergency information system, which assesses needs and delivers social assistance in response to shocks.

While the Household Social Registry was initially populated with census sweeps and other active data collection, it now relies extensively on use of existing administrative data and on information provided by citizens at the local level. A key success factor for such interoperability was the existence of near-universal ID numbers and birth registration (both of which cover 98 percent of people in the country). Data governance criteria to standardize documentation, data dictionaries and metadata across the various government entities were also crucial, to ensure improvements in the quality of data for cross-government exchange. This interoperability also required both appropriate IT capacity and legal frameworks to be established, including agreements between the Ministry and the 345 municipalities in the country.

More recently, since 2019 Chile has also been rolling out a Local Social Management platform, a unified platform for all municipalities to manage service users' access to relevant social programs in practice. This was intended to overcome the challenge that the various social protection programs provided by national, regional and local government entities have different rules and processes for accessing and participating in these programs, many of which were not well coordinated. This meant that residents often had to go from one office to another to find the benefits and services that matched their needs. With the Local Social Management platform, municipalities can offer a 'one-stop shop' for a resident to access all relevant social programs, and social workers have a standardized 'integrated case management' approach for developing and referring to the package of programs that may be relevant to that resident. In 2022, the Local Social Management platform was available in 214 of the 345 municipalities, supporting over 2.5 million people.

Source: DCI, 2022a; World Bank & Case Compass, 2022

In a few pioneering cases, systems for **cross-country electronic data exchange** are also being set up, as in the case of the Electronic Exchange of Social Security Information (EESSI) that aims to facilitate fast, secure and accurate data sharing between social security institutions across the European Union (European Commission, 2022). This became operational in January 2019, and by March 2022 it had enabled 8 million inquiries on social security entitlements to be handled, thereby improving the portability of benefits (ibid.). This is further supported by the piloting of a 'European Social Security Pass' (launched in March 2021), which was designed to offer a digital app solution for the rapid cross-border verification of social security coverage and entitlements (ibid.)

As well as exchanging data with other governments or government agencies, recent years have seen growing interest in the potential to **exchange data with non-governmental entities** (such as private companies or civil society organizations) to help identify participants for social protection schemes. More advanced cases may draw on non-traditional datasets such as 'big data'[10] – with particular value in contexts where current government data, and capacity to collect new data, are limited. In Kinshasa, Democratic Republic of Congo, the government's COVID-19 urban cash transfer response was targeted first by identifying priority neighborhoods using **satellite images and spatial analysis** (relying on indicators such as

[10] 'Big data' refers to data sets that are too large or complex to be dealt with by traditional data-processing application software.

annual flooding, housing density, settlement materials, and availability of waste collection facilities) (Bance et al., 2021). In partnership with the four largest telecoms companies, the government then used **mobile phone use data** from the priority neighborhoods to identify and exclude mobile phone users who used smartphones, purchased data plans, or spent more than $5 combined on voice/data/SMS (users meeting these criteria were expected to be wealthier and therefore less suitable for the poverty-targeted scheme). The remaining mobile phone users were then sent bulk SMS messages inviting them to register for the scheme with their basic information. Meanwhile, in Costa Rica, satellite imagery was used to identify particularly vulnerable neighborhoods, which were then prioritized for a traditional (in-person) registration drive to expand the coverage of the social registry (Aiken & Ohlenburg, 2023).

## 2.3. Assessment of needs and conditions

As well as relying on data from the many different sources discussed above,[11] social protection agencies are also experimenting with new data analysis techniques during the assessment phase, thereby further adapting the ways that participants' needs and conditions are evaluated.

In place of traditional **socio-economic assessments** (such as proxy-means test questionnaires to assess household consumption or assets), **machine learning algorithms** have been applied to new datasets to try to identify needs based on indicators that are considered proxies for assets or income. In Colombia, the method for assessing poverty in the SISBEN social registry has incorporated credit ratings agency data into its predictive algorithm since 2016, drawing on information on loan amounts, credit cards and phone usage (Aiken & Ohlenburg, 2023). In Canada, machine learning models were applied to 10 million records of unstructured text data to identify 2,000 vulnerable Canadians who should qualify for Guaranteed Income Supplement, a low-income old-age cash benefit (ISSA, 2020). In the GiveDirectly-led rollout of the *Novissi* cash transfer scheme in rural Togo, a machine-learning algorithm was used first to identify the poorest districts (using satellite imagery, as well as connectivity data from web/social media sources) and then to identify the poorest people within those districts (from mobile phone records); the algorithm had been trained to recognize patterns of poverty in 'big data' by matching it with traditional survey data (Aiken et al., 2021; Aiken & Ohlenburg, 2023). Researchers note the potential for transaction data from mobile money and digital payments services to feed into assessments of household income, particularly for populations poorly covered by tax databases, but highlight that the accuracy of such methods needs to be further assessed, and such approaches would likely be best adopted to complement static sources of poverty data with high-frequency insights (Aiken & Ohlenburg, 2023).

In relation to **unemployment risk assessments, statistical profiling** is also being used to predict the likelihood of becoming long-term unemployed in a manner that aims to be more objective and standardized than staff members' own assessments (Loxha & Morgandi, 2014). The new profiling models typically rely on econometric analysis of job seekers' demographic, socioeconomic and labour-related data. For example, Australia uses a Job Seeker Classification Instrument (JSCI) that assesses job seekers' long-term risk of unemployment based on statistical analysis of their responses to a profiling questionnaire; historically the JSCI was completed through a phone or in-person interview with an employment service advisor, but more recently, it has also been piloted as an online tool for self-completion by the

[11] As noted at the beginning of the section, digitalization has the potential to disrupt the structure of the traditional delivery chain, for example because new data sources can be used to assess the profile of households or communities before they have even registered for or been registered by the social protection agency. This means that there is significant blurring/re-ordering of the intake/registration and assessment phases.

job seeker (Government of Australia, 2021). Statistical profiling systems have also been used in public employment services in Finland and Ireland, although in Denmark, Germany and Switzerland, such approaches were piloted but not institutionalized (Lindert et al., 2020) (see Risks section for a discussion on this).

While not currently common in social work, some social services agencies are also trialing the use of statistical profiling tools to contribute to **social risk assessments** (Lindert et al., 2020). In Pennsylvania, United States, predictive analytics modelling with integrated data has been used to identify reports of child abuse where the child is likely to need to be removed from the home. The aim was to supplement caseworkers' standard clinical assessments with a **Screening Tool** that identifies 100 risk factors, using data from various other social services, welfare, housing and health services, as well as birth, autopsy, employment, jail and court records. In Nottinghamshire, UK, the council has been trialing a **predictive analytics 'early warning system'** to identify older people at risk of needing residential care. The system analyzes health, social and environmental indicators in existing health and social care user data to highlight residents at risk of losing capacity for independent living (NHS & NCC, 2020).

To prepare for and respond to covariate shocks, new data sources or analytical tools are increasingly being used to inform **hazard risk assessments** and associated social protection programming responses. For example, **disaster maps** such as those produced by the Facebook-owner Meta use social media data to analyze changes in users' mobility, electricity access and network connectivity. These maps have been used as rapid inputs into humanitarian needs assessments following wide-ranging natural hazards, from hurricanes in Puerto Rico and fires in the US, to floods in India and volcanic eruptions in Indonesia (Aiken & Ohlenburg, 2023). Meanwhile, the World Bank, the United Nations, the Red Cross, Microsoft, Google and Amazon have developed an AI-based **Famine Action Mechanism** to better anticipate famine and in turn to mobilize early funding to mitigate its effects (Bowen et al., 2020). At country level, Uganda is using earth observation data to predict drought and thereby implement early, proactive social protection responses (GIZ & ADB, 2021). In the Dominican Republic**,** the **Vulnerability to Climate Hazards Index** generates a household-level assessment of vulnerability to shocks and climate change, based on questionnaire data on households' dwelling and labor income, as well as proximity to sources of environmental risk. These data are then used to inform appropriate response programming when shocks are expected or have recently hit (UNDP-UNEP, 2018, in Bowen et al., 2020).

## 2.4. Enrollment

### Determination of eligibility and benefits

**Automated decision-making** is increasingly being relied on to help determine who should be enrolled in social protection programs, or what support they should receive – where previously such decisions were based entirely on staff members' analysis and conclusions. For example, in the UK, an automated **'Real Time Information' system** has been used to determine the support people should receive via the Universal Credit scheme, using data on monthly earnings and incomes, employment and family composition to predict the required level of benefit payments (including data drawn from other agencies' databases) (van Lancker & van Hoyweghen, 2021). In the Republic of Korea, the Workers' Compensation and Welfare service has supported over 2,600 injured workers with its AI-based Intelligent Rehabilitation Recommendation System (IRRS) since its launch in early 2020 (ISSA, 2022). The IRRS selects injured workers with the potential to be active and designs a tailored rehabilitation service package for them, using a rule-based filtering and case-based reasoning methodology that was developed based on a decade's worth of administrative data from nearly 100 million

workers. The **AI-generated rehabilitation plan** is finalized in consultation between the worker and rehabilitation experts.

In instances of covariate shocks, **automatic triggers** are also increasingly being used to inform program eligibility and benefit levels, for example when program expansions or benefit increases are directly triggered by social or environmental changes detected through satellite imagery or other novel data sources. In Karamoja, Uganda, it is intended that satellite data and anomalies in the Normalized Difference Vegetation Index (NDVI) should serve as automatic triggers for scaling up the Northern Uganda Social Action Fund cash-for-work program as an early response to drought (Bowen et al., 2020; Aklilu et al., 2021). The NDVI estimates the condition of vegetated areas on a 14-day basis. When there is an anomaly in the data, cash-for-work payments are designed to be triggered, allowing recipients to mitigate or absorb potential drought impacts.

### Notification of enrollment and onboarding

As in the case of outreach and registration (Sections 2.1 and 2.2), **digital communication channels** have been key for facilitating new ways to notify and onboard people into social protection schemes, reducing the number of in-person interactions required to complete the enrollment phase. There are countless examples of this worldwide; one innovative case is from Jordan, where a messaging platform known as RapidPro was used to identify, notify and onboard 200,000 new recipients into a pandemic cash assistance scheme, including remotely supporting them to open mobile wallets to receive the payments (UNICEF, 2021). RapidPro is a tool for two-way communication via SMS, WhatsApp, Viber and Messenger, which can be used to inform recipients of their eligibility for support, confirm their identities, answer any questions from the recipients and provide them with step-by-step instructions for remotely opening a mobile wallet (if the recipient did not have one already). UNICEF was able to monitor recipients' progress in registering for the program and opening accounts through a continuous exchange of data with the Central Bank of Jordan and mobile money companies. In the first five days of implementation, the number of participants with active mobile wallets increased from 18,000 to 80,000 (ibid.).

## 2.5. Provision of benefits and services

### Benefit provision[12]

**Back-end payment administration processes**[13] are now almost universally automated, with few if any countries continuing to manage these processes manually or through Excel spreadsheets (Lindert et al., 2020). For actual distribution of payments to service users (sometimes called 'first-mile' or 'last-mile' provision), there is a growing trend towards the use of **electronic instruments for government payment provision**, as opposed to cash-in-hand or paper-based mechanisms. In low-, middle- and high-income countries, the majority of government payment recipients are now paid into a bank, mobile money or other financial

[12] While benefits can be both cash and in kind, we primarily focus here on the provision of cash payments, as this is the area where digitalization has been most prominent. Although they are distinct in practice, we also discuss the payment of pension or insurance contributions here (by citizens, into government or private pension or insurance schemes) as there is significant conceptual overlap with the payment innovations evident in the provision of government payments to citizens.

[13] This refers to processes that are only visible to program administrators, relating to the disbursement of payments from their original sources (such as ministries of finance) through to the agency that is ultimately responsible for providing to the service user (Lindert et al., 2020).

account[14] – a trend which was accelerated during the pandemic when the majority of cash transfer responses were paid digitally (Gentilini, 2022).[15] However, it is important to note that payment service provision can be digitalized to varying degrees. At a basic level, payments may be distributed digitally to recipients but then immediately 'cashed out' on receipt[16] – in many ways making them akin to physical cash distribution in practice and in the impacts on service users. In more advanced cases, payments may be distributed into fully functional digital accounts, where the money may then be electronically spent or saved by recipients, if the recipients are no longer bound by a cash-based economy and have access to the infrastructure required to engage in digital transactions and savings.[17]

Digital payment instruments span a wide range of mechanisms. **Direct bank transfers** are a common mechanism, as for example in India, where deposits into recipients' biometrically authenticated bank accounts are now the main delivery mechanism for over 450 schemes, covering more than 900 million people (Sengupta, 2021). **Mobile money** payments have been particularly popular in sub-Saharan Africa, for both social assistance and social insurance programs (particularly those trying to increase contributions by informal workers into pension-like savings accounts, as in Ghana, Kenya, Uganda and Rwanda) (Guven, 2019). Togo was able to launch its first large-scale cash transfer scheme during the COVID-19 crisis by relying entirely on mobile money to pay over 500,000 recipients between April and June 2020 (Government of Togo, 2020). Mobile-based innovations also include payments into **digital wallets** – accounts that are linked to a financial institution but accessed on mobile-based apps or platforms. For example, in Colombia, Banco Davivienda's *Daviplata* app has been used to transfer funds to more than 900,000 recipients of *Familias en Acción*, Colombia's largest social assistance program (Lindert et al., 2020). Other forms of electronic payment – such as **smartcards, ID cards, one-time pins and e-vouchers** – are also widely used in social protection, particularly social assistance schemes. For example, during the pandemic, PIN codes were sent to recipients of emergency assistance in Argentina, Namibia and Guatemala to enable them to withdraw cash from ATMs without having to use cards (Beazley et al., 2021). In Dominican Republic and Panama, emergency transfers were delivered electronically to people's national IDs, which were then used as payment instruments to exchange the funds in local shops (ibid.).

**'Blockchain'** technologies (also known as Digital Ledger Technologies) are also being used in a few cases to support governments with benefit provision.[18] For social insurance, the

[14] Eighty-four percent of those receiving government payments in high-income countries are paid into accounts; in low- and middle-income countries, the average is 67 percent. In all contexts the figure is pushed upwards by public sector wage payments, whereas other types of government payments (such as social assistance and pension payments) are generally less likely to be paid electronically. Even so, most people receiving government social assistance or pension payments in middle- and high-income countries (although not low-income ones) are paid electronically into accounts (Demirgüç-Kunt et al., 2022). Data from the Social Insurance Agency Diagnostic (SIAD) similarly show notable progress in the proportion of social insurance benefits paid by direct deposit; while a few countries (such as Micronesia, Romania and Moldova only pay around half of benefits by direct deposit: many countries pay over 95 percent of benefits by direct deposit, including various lower-income countries (such as Nepal, Ghana, Uganda and Jordan)

[15] From an analysis of a subset of 155 social assistance responses to COVID-19 across 58 low- and middle-income countries, at least 132 schemes (across 50 countries) used digital payments (World Bank, 2022a).

[16] This may be an intentional design decision, for example where one-time pins or e-vouchers are deemed more feasible or desirable than digital accounts, or where digital accounts are set up only with limited functionality, thereby requiring the recipient to cash the transfer out within a short window of receipt. However, such cash-out practices are also common in relation to all the electronic instruments described in this sub-section, where transfers are made into people's accounts and designed to be spent or used electronically, but recipients still opt to quickly cash them out, because they largely still operate in cash-based economies, or lack access to or familiarity with digital financial infrastructure.

[17] For more information on different models of G2P payments, see chapter 6 of Lindert et al. (2020) or World Bank, CGAP and G2Px (2022).

[18] Blockchain is a 'peer-to-peer, immutable, transparent, de-centralized, distributed digital ledger', meaning it is akin to a pushed online book of transactions that are recorded virtually immediately, cannot be altered and can be viewed by anyone. There are limited examples of blockchain being documented in state social assistance schemes, in part due to concerns about the high energy and financial costs of blockchain storage requirements, as well as data security concerns and scalability challenges (World

government of Saudi Arabia has piloted the use of blockchain to implement sickness certificates to workers to enable them to access their sickness benefits (ISSA, 2019). Blockchain has also been used for social health insurance, to coordinate doctors' prescriptions, pharmacy provision and insurance reimbursement, as in Estonia where blockchain has been used to coordinate e-prescriptions (ibid.). For social service delivery in Australia, National Disability Insurance Agency funds provided to people with disabilities for purchasing support services were programmed using blockchain tokens (Tran & Ponomarev, 2018). This allowed the expenditure of these funds to be monitored and where necessary restricted, in line with the terms of the individual participants' plans (ibid.).

## Service provision[19]

Broadly speaking, service provision is being digitalized in three main ways, in relation to both social and labour services. First, technologies are increasingly being used to **enhance the provision of traditional, in-person services**. For example, in Sweden's IT support for Advanced Care in the Home scheme, nurses and care staff were encouraged to access digital guidance for client visits and to communicate electronically with other providers serving the client using **touchpads and digital learning platforms** (OECD, 2016). Many public employment services now complement their traditional training for job seekers with digital courses – some of which are also focused on developing participants' digital skills. For example, in Morocco, a hybrid online and in-classroom upskilling program known as 'Take IT Forward' focused on providing **digital skills training** to young jobseekers, with the aim of increasing their employability in the booming ICT sector (ETF, 2021).

Second, technology has also been used to **replace certain in-person services with virtual provision**, thereby reducing the time and travel costs for service providers and users. Some countries were already providing services virtually prior to the pandemic; for example, Norway already provided the option for jobseekers to **meet with advisors via phone or Skype** (Breit et al., 2019), while in Sweden, much of their employment service provision was digital prior to the pandemic (ETF, 2021). However, virtual services were often expanded during the pandemic, as face-to-face interaction increased contagion risks. For example, Sweden is now also offering a **digital interviews platform**, where jobseekers and employers are linked directly to one another for video calls through the public employment service system. Paraguay, Peru, Mexico, India, Germany, France and Estonia all began offering improved **online job matching services or job fairs** during the COVID-19 crisis (Avila, 2021; ETF, 2021). Furthermore, '**digital public works'** schemes have in some cases shifted to remote working and/or focused on improving digital skills and community infrastructure, as in Austria, where a large-scale program of digitalization of public archives has been implemented, targeting workers with disabilities (ETF, 2021). In relation to social services, the Girls Empowering Girls mentoring service in Uganda shifted to **call-based mentoring** in place of in-person engagement; this shift was undertaken relatively easily as the program had previously issued a mobile phone to each participant (Doyle et al., 2021). In Paraguay, the family support work component of the *Tekopora* social assistance program for vulnerable

Bank et al., 2022); however there are several studies of pilots in non-governmental organization (NGO) programming, for example Oxfam's UnBlocked Cash program in Vanuatu (Food Security Cluster, 2021) and WFP's Building Blocks scheme in Jordan and Pakistan (Universite de Geneve & i2i Hub, 2019).

[19] In the SPL context, 'services' refers to a set of actions and activities that support people to overcome certain vulnerabilities for overall improved well-being, and that generally do not involve transactions of goods (Lindert et al., 2020).

households was replaced during the pandemic with a **WhatsApp-based training event** known as *Tekopora Te Acompaña*[20] (de Miranda et al., 2021).

Finally, governments are increasingly exploring the feasibility of **using new technologies to replace staff activity** for certain aspects of service provision, where human discretion is not deemed critical. For example, Denmark rolled out **assistive care technology** to help clients with daily toilet visits, eating, and moving across floors (OECD, 2016). In Japan, '**social assistance robots'** have in some cases been used to offer companionship to the elderly for therapeutic purposes (ibid.) In the UK, some local social care agencies are working to develop the functions of **Amazon's 'Alexa' device**, to complete certain carer tasks that would previously have required an in-person domiciliary visit (Wright, 2021). Functions that are being developed include prompting clients to take their medicines, enabling them to communicate with their caregivers through recorded messages, connecting them to the local authorities' directory of services, and facilitating remote control of settings in the home (lights, thermostats and so on) (ibid.). In France, the public employment service developed a **deep learning-based recommender system** that helps jobseekers to find relevant applications and tools based on their personal situation in the 'Employment App Store' (emploi-store.fr) (Pieterson, 2019). Similarly, in the Flemish Region of Belgium, the public employment service has used deep learning to improve vacancy matching through a 'Neural Network' model that aims to detect patterns in job vacancy texts and jobseekers' CVs, and then matches them based on these similarities (ibid.).

## 2.6. Participant operations management[21]

Technology is also playing a growing role in the ongoing management of participants' data and their corresponding receipt of benefits or services. Innovations such as **online and app-based portals** have also **improved users' own ability to view, use and update their data** profiles, with 46 percent of social security institutions reportedly having mobile apps for clients (although the functionality of these apps varies) (ISSA & UNU-EGOV, 2022). Such apps also enable users to manage and pay into accounts for contributory schemes more easily; for example, in Mexico, a mobile app (*AFORE Móvil*) was launched in 2017 to make the Retirement Savings System more accessible to the population. By 2018, *AFORE Móvil* had been downloaded more than 725,000 times, and more than 15,000 self-employed workers had opened accounts using the app (FIAP, 2018).

Technology also **enables agencies to manage and update participants' data** (and subsequently their benefit or service packages) in a semi- or fully automated manner, where they previously had to rely on manual intervention or paper-based notifications. The most advanced cases of digitized data management allow for seamless, regular updating of participants' social protection records through **high interoperability** across government databases. In Estonia, the digital Population Register is integrated with – and therefore able to help update - databases from over 900 organizations via the 'X-Road' integration layer and e-ID system (World Bank, 2018b). Among many other functions, this allows the social health insurance scheme to be updated daily with information on new births, deaths and other changes in the population, with people being automatically added or removed as needed. At

[20] Between May and October 2020, participating families were sent messages with text, audio clips, images and videos, on the topics of food and nutrition, income and work, health and self-care, education and learning, housing and environment, and participation and coexistence. Eighty percent reported forwarding the content on to friends and relatives (de Miranda et al., 2021).
[21] This phase is also sometimes called Beneficiary Operations Management (as in Lindert et al., 2020). This phase covers the management and monitoring of provision at the participant level, including management of their data, monitoring conditionalities and addressing any grievances.

an advanced stage, this type of interoperability can allow for **integrated case management**, enabling social workers to identify, refer to and monitor provision from a package of services that is uniquely tailored to each service user – as with Chile's Local Social Management platform (see earlier, Box 1).

Improved database interoperability and automated procedures are also changing the **participant monitoring process**. For example, data for monitoring participants' compliance with the terms of conditional cash transfers (CCTs) may now be **electronically collected and/or shared** with the social protection agency (for example by using a software app in Indonesia's *Program Keluarga Harapan* scheme, or using tablet devices in Pakistan's *Waseela-e-Taleem* CCT) (Lindert et al., 2020). In Türkiye, the ISAS information system's **interoperability with other databases** allows it to draw data on CCT participants automatically from the ministries of education and health to verify compliance, reducing the time taken for compliance verification from two to three months down to just a few hours (ibid.).

**Grievance redress mechanisms** are now also drawing on digital communication channels and innovations to process queries. Whereas previously users often had to submit complaints or appeals in person or by post, now **online, email, phone, app, SMS, and other messenger-based systems** exist to lodge such grievances. In Türkiye, the toll-free hotline 'Alo 144' is used for complaints and queries regarding any social assistance scheme receiving over a million calls per year. It uses Voice-over-Internet-Protocol technology to process the calls and can contact any local office regarding a grievance. There is also an online portal that clients can use to submit any complaint, request, appeal or suggestion, and appeals must be resolved within 15 days by law (Lindert et al., 2020). In Indonesia, one of various functions of the *Mobile JKN* app is to collect and process complaints regarding the social health insurance scheme (ISSA, 2018).

## 2.7. Social protection system and program monitoring, evaluation and learning

Beyond the management and monitoring of individual cases, technology is also providing new ways to assess and refine program- and system-level performance.

Digital processing and publication of payment records can help **monitor program expenditure**, as in Togo's emergency cash transfer response to COVID-19, where **electronic reconciliation** of transactions was conducted by a private auditing company on a daily basis and **digital dashboards** were simultaneously updated for internal and external stakeholders to see the number and amounts of payments made (Lowe et al., 2021). By serving as a shared immutable digital ledger of transactions, **blockchain** technology can also track funds as they pass through the program chain, from the initial funder right through to the final recipients. While there are relatively few documented examples of this from social protection systems, there are various examples from non-governmental programs, as for example in Kazakhstan, where UNICEF has experimented with the use of blockchain-based smart contracts for digital cash transfer implementation through the open-source platform *Digicus* (UNICEF, 2021). *Digicus* simulates business rules and releases funds to implementing partners in a streamlined and transparent manner, in accordance with the agreed project milestones that are digitally programmed into the smart contracts (ibid.). Technology is also playing an expanding role in monitoring error, fraud and corruption cases in recipient data. Where the identification of such cases previously required human monitoring and intervention, **digital detection systems** can now be used to automatically flag or investigate potential cases. In India, simple rule-based

controls were combined with various AI tools[22] to identify potential errors, fraud or corruption (EFC) in the National Health Insurance Scheme. In Moldova, the use of a statistical profiling model was able to detect cases of EFC with 90 percent accuracy, compared to 68 percent for a process based only on inspectors' experience (Lindert et al., 2020). In the Republic of Korea, **smart audit algorithms** are applied to big data on a range of socio-economic, health behavior, health care usage and long-term care variables, to predict healthcare facilities with a high likelihood of fraudulent claims (ISSA, 2022). Meanwhile, in Bolivia, **automated SMS messages** are sent to recipients of a UNICEF cash transfer scheme after distribution, to ask if the correct payment was received and to verify the bank report (UNICEF, 2021).

Technology is also broadening the options for **monitoring and evaluating program outcomes**. On the one hand, **advances in the collation and analysis of administrative data** from different sources have expanded options both for routine monitoring and for more complex analysis and impact evaluations (Barca et al., 2023). On the other hand, new data sources facilitated by technological innovations offer further possibilities for continuous assessment and standalone evaluations, removing the need for more costly or labor-intensive in-person surveys and interviews. In India, **high-frequency phone-based surveys** have been conducted with recipients of a cash transfer scheme for farmers in the State of Telengana, to test the impact of continuous, phone-based monitoring on scheme performance (Muralidharan et al., 2021). These high-frequency phone-based surveys have also been widely used by the World Bank since 2011 to track population welfare, including extensive use during the COVID-19 crisis (World Bank, 2022d). Meanwhile, in rural Kenya, researchers are exploring options for evaluating cash transfers' effects on household welfare using only high-resolution **satellite imagery and deep learning** methods (Huang et al., 2021). In the trial, changes in household welfare are being evaluated based on satellite-derived changes in housing quality, which are assessed with a deep learning model and compared to the effectiveness of traditional field-based survey approaches (ibid.). In Colombia, '**big data' on mobile phone users' mobility** patterns from network operators were combined with administrative data from the social registry to evaluate the effects of COVID-19 cash transfers on social distancing, going well beyond the type of outcomes that governments are typically able to assess in their performance assessments (Barca et al., 2023).

Finally, new information sources and processing mechanisms are also changing the way that social protection agencies **learn and refine current approaches and plan future programming**. In New Zealand, the Integrated Data Infrastructure combines data from government agencies, Stats NZ surveys, and non-government organizations to have a more complete picture of population outcomes and thereby improve the quality of social policies and programs; the dataset is publicly available in anonymized form, to stimulate further research and learning (Government of New Zealand, 2018). In Costa Rica, a new platform for social policy design combines a machine learning-based proxy means test and an interactive visualization tool to simulate and thereby consider the effects of different programming decisions (Ohlenburg, 2022). In Italy, the AI-based Excelsior information system provides national-level **forecasting data** on labor market trends, occupations and company needs, thereby improving the active market programming of the public employment service (ETF, 2021). In Indonesia, **satellite imagery data** (for example, on roof material and housing density) are being processed with AI to predict poverty in the wake of the COVID-19 crisis, which will then inform the country's social assistance programming (UNICEF, 2021).

[22] These tools include: (1) facial landmark detection to verify that a new registrant/claimant's image is of a genuine person and not a duplicate; (2) document analysis to verify the genuine nature of a medical claim, using object character recognition (OCR) and natural language processing to convert the claim document image into text and then to identify fraud patterns in the text data; and (3) network analysis to spot duplicated claim patterns across the entire National Health Insurance System.

Meanwhile, in the wake of the 2018 Palu tsunami, humanitarian agencies used **mobile phone use data** (call detail records) to understand the population's displacement patterns, which was then used to allocate staff and resources and to inform the programmatic response (GIZ & ADB, 2021). In India, **GIS data** combined with scientific and socio-economic data, are used to inform public works project planning, based on climate conditions and analysis of geotagged assets created under the program (ibid.).

# 3. Potential outcomes

Rigorous evaluations directly studying the effects of digital interventions on social protection provision are still limited in number. Robust evidence on the likely benefits of digital interventions therefore comes largely from a handful of experimental studies, mainly relating to innovations in social assistance and occasionally social insurance schemes.[23] Beyond this, evidence has come from observational studies in which users or providers of a broader array of services have been asked for their perceptions of the new digital system (sometimes in direct comparison with the non-digital alternative).

## 3.1. Potential dividends

Across the evidence base, digital approaches to SPL delivery have been associated with various potential benefits, including:

| | |
|---|---|
| For service users, the potential to: | (1) improve the user experience of accessing SPL services;<br>(2) improve the impacts that SPL programs or systems generate for service users. |
| For service providers, the potential to: | (3) enhance the accuracy and transparency of service provision;<br>(4) lower costs and increase efficiency;<br>(5) improve the data available to providers, thereby supporting improvements to service design and delivery. |

### 1) Better user experience accessing SPL services

Several studies have indicated that digitalization can help improve the ease, quality and extent of access to social protection services, at least for users who already had some familiarity with digital channels.

First, digital mechanisms can **save participants time, costs and aggravation**, by minimizing the need for lengthy in-person interactions, reducing the distance to access provision, and cutting down wait times and delays. For example, following the *Mobile JKN* app's introduction in Indonesia, the average number of participant visits to the social health insurance agency's offices declined by nearly 70 percent (OECD OPSI, 2018). In Türkiye, applications to the ISAS information system only requires the submission of one document (the ID) instead of 30 documents, and the time taken to apply for social assistance was reduced to a matter of minutes (down from a fortnight or even up to a month) (Lindert et al., 2020) (DCI, 2022b). Even if travel is still required, access to digital channels is often **easier, safer, less stigmatizing**

[23] This note focuses on state-led social protection systems, and the evidence is largely limited to this remit. However, in relation to certain technologies such as AI and machine learning, there is very little evidence from government usage to date, so the note also draws on evidence from NGO programs that in many ways target a similar audience to social assistance schemes.

**and more flexible** than previous manual alternatives. For example, in India, public works participants spent around 20 percent less time collecting their wage payments through biometrically authenticated smartcards compared to physical cash disbursement (Muralidharan et al., 2016). In a study in Machakos Country, Kenya, cases of hijacking reportedly declined because of the digitalization of the *Inua Jamii* cash transfer (Odera et al., 2020). In both the US and Brazil, the use of debit cards for social welfare payments was welcomed by recipients because paying for items with these cards enabled them to blend in with other customers using regular bank debit or credit cards (Oliviera et al., 2018, in Grosh et al., 2022).

These convenience **benefits lead many service users to prefer digital approaches** to manual or in-person options. In Poland, 61 percent of social insurance users preferred the online service to visiting an in-person branch, with an even higher rate (91 percent) among those aged 18-45 years (Owczarczyk & Lazurek, 2021). In a mobile payments trial for the Primary Education Stipend Program in Bangladesh, 79 percent of recipients preferred the mobile approach, primarily due to the reduced travel requirements and greater flexibility about when to collect the money (Gelb, Mukherjee, et al., 2019). A similar proportion of participants (80 percent) preferred electronic to manual distributions in the mobile payment trial in Ethiopia's Productive Safety Net Programme, due to the increased proximity, flexibility and speed in the collection of payments, among other factors (USAID & FHEthiopia, 2018).

Digitalization may also facilitate **better access to social protection for specific under-served populations**, by making services more accessible, providing additional participation channels and highlighting underrepresented groups in disaggregated monitoring data (as discussed further at the end of Section 3.1)**.** For example, informal business owners tend to use mobile money more often than the rest of the population, so registration or payment via mobile mechanisms may more effectively facilitate their inclusion (Davidovic et al., 2021). The *Ejo Heza* Long-Term Savings Scheme in Rwanda (which uses SMS registration and payments) succeeded in expanding to nearly one in four working-age adults, 87 percent of whom are in the informal sector, only three years after its launch (Guven & Jain, 2023; World Bank, 2022b). Digital mechanisms may also support small-scale or household employers to register their workers in social insurance schemes. In Uruguay, offering a mobile app and various digital payment channels for employers to register domestic workers for social security helped reduce contribution evasion from 60 percent in 2006 to 24 percent in 2017 (ILO, 2019).

Digitalization may also play a particular role in facilitating service expansion in certain time periods, notably in **strengthening access during times of crisis**. Cross-country analysis from the COVID-19 response suggests that where governments relied on digital databases and data exchange to identify the population, their emergency social protection programming reached on average 51 percent of their population, while countries that had to undertake new data collection to identify participants typically reached only 16 percent of the population (World Bank, 2022f). Responses also tended to be faster in countries that could enroll using pre-existing data, had social registries with more than 15 percent population coverage, had already established electronic payments in their routine programming, and had better digital infrastructure in general (ID, mobile phone and bank account coverage, and mobile and internet networks) (Beazley, Marzi, et al., 2021).

## 2) Enhanced SPL impacts on service users

Although less rigorously evaluated, there is also evidence that in certain cases, digital approaches to social protection may go beyond improving access for service users to also improving the outcomes that programs subsequently have on those users.

First, shifting to digital benefit provision in social assistance programs has in a few instances been associated with **improved wellbeing, and even reduced poverty** among digital recipients. In part, this may reflect the time saved by participants, which can then be spent on more productive activities (Aker et al., 2016). It may also relate to an increase in the amount of assistance reaching or being spent by the intended recipients. In India, the digitalization of wage payments in the MGNREGA public works scheme increased the average earnings received by participants by 24 percent, in part due to reduced opportunities for leakage (Muralidharan et al., 2016). Improved wellbeing outcomes may also result from the higher levels of digital inclusion attained by participants receiving support through digital channels. In South Africa, the addition of a hybrid LinkedIn training component to a traditional job readiness training program increased participants' employment rate by 10 percent, likely because of their improved digital networking skills (namely their ability to use LinkedIn to learn about prospective employers, as well as their use of online profiles and referrals to boost their credentials in the eyes of prospective employers) (Wheeler et al., 2021).

Digital approaches may also help to improve wellbeing by **strengthening capacity to cope with shocks**. As discussed above, digitalization can in some cases enable quicker or more reliable delivery during times of crisis; given the importance of rapid and reliable payments to protect household consumption in times of shocks, the increased speed and reliability of digital delivery may in turn help translate to stronger household resilience. In Bangladesh, routine scheme recipients with access to digital payments during the COVID-19 pandemic were found to suffer lower losses to consumption and income than counterparts relying on manual cash distribution, which may in part reflect the fact that digitized distribution was less disrupted than manual provision during lockdowns (as well as the fact that digital recipients had higher incomes than manual recipients to begin with) (Shonchoy et al., 2020).

At household level, it is hoped that the increased financial inclusion that digital delivery (specifically digital payment provision) aims to promote will lead to increases in wellbeing and resilience. Evidence of this happening in practice is still patchy. Digital social protection payments have certainly **increased access to financial accounts** – and at the same time have strengthened the business case for financial and telecommunications services providers to extend their offer to underserved populations (Iazzolino, 2018). In low- and middle-income countries, around one in four people with a financial account (excluding mobile money) first opened the account to receive a government payment (Demirgüç-Kunt et al., 2022). However, increased account access has **often failed to translate into meaningful improvements in inclusion**. Many recipients of digital social protection payments immediately 'cash out' the transfers and do not use their accounts more broadly or access any wider financial services (Davidovic et al., 2021), as in a Bangladesh study, where over 90 percent of mobile money recipients cashed out the full transfer and virtually none used the account for any other reason (Gelb, Mukherjee, et al., 2019).

That said, there are a few indications that digital social protection has the potential to promote somewhat broader financial inclusion, where digital and financial infrastructure is sufficiently advanced, and where recipients are paid into fully functional accounts that they can use on affordable terms (accompanied by support and guidance as required). In low- and middle-income countries, 70 percent of those who receive government transfers or pension payments into an account reported using it to make a digital payment, and around half had used it to store money (Demirgüç-Kunt et al., 2022). In some cases, digital innovations in social protection provision may also **enable social protection recipients to build up their savings more easily**. When debit cards were provided to *Oportunidades* recipients who already had a bank account in Mexico, this helped them increase their savings (overall and in the formal financial system), by reducing the transaction costs of accessing money and of monitoring

their accounts, which also helped them build their trust in the banking system (Bachas et al., 2021). In Kenya, informal workers who received weekly SMS reminders to contribute to their *Mbao* pension plan more than doubled their contributions relative to those who received no reminder (Akbas et al., 2016).

Relatedly, there are also indications that digital social protection – particularly electronic payments and digital home care – can sometimes improve users' wellbeing by **empowering users and increasing their autonomy**, particularly for those whose voice or agency is sometimes limited (although technology can sometimes also serve to replicate this marginalization, as discussed in Section 3.2). In relation to social services, assistive technology and digital home care in Denmark and Sweden have helped older people and those with disabilities to feel more capable and autonomous (OECD, 2016). In relation to social transfers, much of the research has focused on the potential for digital payments to help address unequal gender norms and practices. In Madhya Pradesh, India, when female public works participants were paid directly into their own bank accounts and received training on account use, this increased their future participation in both public and private sector employment. It also led them and their husbands to have a more positive view of women undertaking paid work, particularly in households with otherwise lower rates and acceptance of female employment (Field et al., 2021).

### 3) Greater accuracy and transparency of services

As well as the recipient impacts above, the digitalization of social protection has in several cases also been linked to more accurate and transparent service provision. Firstly, some studies of digital assessment approaches have indicated their ability to **assess the needs of (potential) participants more accurately** than traditional approaches – though the evidence base is both nascent and mixed, as discussed further in Section 3.2 (Aiken et al., 2021; Desiere et al., 2019). In public employment services, rigorous studies of a statistical profiling model in Switzerland have shown it to be more accurate than caseworkers' judgement in identifying jobseekers who require additional support due to their risk of long-term unemployment (Lechner & Smith, 2007; Arni and Schiprowski, 2015, in Desiere et al., 2019). Similarly, for a social assistance program in Togo, a machine-learning approach using mobile phone data was found to be more accurate than any viable alternative – although importantly, this method was only effective when the machine-learning method was employed, as a more basic phone data-driven assessment (without any machine learning) was little better than random allocation (Aiken et al., 2021).

Digital approaches may also help improve the accuracy of service provision by **removing duplicate, 'ghost' or unintended recipients and ensuring that more of the support reaches intended participants.** This may be achieved through data checks when developing participant lists, as in Türkiye where up to 10 percent of social assistance benefits were found to be duplicates when the new digital, integrated social assistance information system was implemented (DCI, 2022b). Improved accuracy may also occur through verification during the benefit delivery phase; in the Public Distribution System in the state of Andhra Pradesh, India, shifting to biometrically authenticated smartcards for public works and social security pension payments resulted in a 41 percent reduction in leakage (Muralidharan et al., 2016). Enhanced accuracy may also result from the application of digital monitoring tools, which are often able to detect (and thereby deter) error, fraud and corruption with higher rates of effectiveness than staff-led monitoring. In Moldova, the use of a statistical profiling model was able to detect cases of error, fraud and corruption with 90 percent accuracy, compared to 68 percent for a process based only on inspectors' experience (Lindert et al., 2020).

For all the reasons above, and because they can render the users and provision of services more visible, digitalization has sometimes also been associated with **increased transparency and accountability** of provision. Digitalization of all stages of delivery can enable live or near-live tracking of each stage of delivery, which can be more readily shared, as in Togo's *Novissi* digital cash transfer program where daily payment reconciliation data fed into a publicly visible online monitoring platform that aimed to help ensure transparency and build trust in the new scheme (Lowe et al., 2021).

## 4) Lower costs and increased efficiency

By improving efficiency and reducing the transaction costs of social protection delivery, technology also has the potential to generate fiscal savings that can be directed towards increasing or enhancing other aspects of service provision.

First, technology can help **free up staff time**, **enabling more effective allocation of resources.** Some AI innovations have started to demonstrate the ability to respond to basic user needs more efficiently, allowing expert staff time to focus on more complex interactions. For example, the intelligent chatbot used by Uruguay's social insurance scheme for domestic workers is able to deal with 97 percent of inquiries, leaving the remaining 3 percent for expert staff (ISSA, 2020). The use of electronic administrative systems can also reduce the number and duration of in-person interactions required by social protection agency staff. In Uganda's National Social Security Fund, an SMS platform and electronic statements reduced the number of walk-in customers by 30 percent in 2013-2014, freeing up staff time for other administrative tasks, while also improving customer satisfaction (ILO, 2019). Tapping into existing data sources for assessment, planning and monitoring, rather than relying on new manual data collection, has also helped improve operational efficiency, and thereby reduce service costs. In India, the timeframe needed to plan public works projects has reduced from three months to one month thanks to the automated analysis that combines GIS imagery, scientific and socioeconomic data, and geotagged mapping of existing public works assets to understand the current landscape (GIZ & ADB, 2021).

Along with wider efficiencies, these staff-time savings from digital provision can translate into quantifiable **reductions in the transaction costs of delivering support** (despite high upfront costs). For social service delivery, the replacement of some in-person home visits with remote 'telecare' has helped cut down employee commuting and travel time and costs, thereby freeing up resources for activities requiring additional attention (Eurofound, 2020). Meanwhile, for social assistance schemes, the administrative costs of *Bolsa Familia* in Brazil fell from 14.7 percent to 2.4 percent of the total amount disbursed after shifting to bank transfers and consolidating several social benefits into one payment, while in Indonesia, the administrative costs were cut from 4 percent to 0.75-2 percent of the total amount disbursed when using e-vouchers instead of in-kind distribution (Banerjee et al., 2022; Pickens et al., 2009). In Moldova, paying social assistance recipients via MPay instead of cash has reduced the liquidity pressures on the State Social Insurance Budget. Previously the entire volume of cash needed to be transferred upfront (even if not all collected at the same time), meaning the Ministry of Finance sometimes had to sell securities or use other financial instruments (such as short-term bank loans) to finance this liquidity deficit, all of which came at a sizeable cost to the state budget (World Bank, forthcoming – Moldova case study).

As well as improving the efficiency and allocation of staff time, digitalization has also in some cases helped save the state money by **reducing financial losses to leakage, errors, fraud and evasion**. In Argentina, the World Bank supported the government to save $143 million over an eight-year period after ID-enabled data exchange between 34 social program databases revealed substantial inclusion errors and subsequent removal of ineligible

participants; this was one of the World Bank's notable early successes supporting effective digitalization of service delivery (Lindert et al., 2020). In Poland, using e-payments for social insurance contributions reduced the number of incorrectly marked payments by 99.9 percent in just one year (from 271,000 down to 346) (Owczarczyk & Lazurek, 2021). Similarly, in Fiji the 2016 introduction of an online portal for employers to report their social security declarations considerably reduced errors in contributions – and helped strengthen public finances by increasing contribution compliance (to 98 percent of due payments in 2017) (ILO, 2019)

## 5) Better data for improved decision-making

Where digital approaches have improved the traceability of social protection delivery or facilitated better quality data or analytical tools, they have also sometimes been associated with providing higher-quality information that can improve policy and program decision-making (Hare & Parekh, 2020; Barca et al., 2023). For example, in Andhra Pradesh, India, the government combined **'real-time' monitoring** of electronic administrative data on digital public service delivery with high-frequency phone surveys, to continually improve service performance (Gelb, Mittal, et al., 2019). These data are used both to refine strategies at program level, and to address individual complaints (ibid.).

Better data access and quality can also enable services to be **monitored more meaningfully for specific sub-groups and against relevant benchmarks**, such as coverage, inclusiveness, adequacy and timelines – with relevant actions taken to address sub-par performance (Barca et al., 2023). For example, in Moldova, data from the administrative database that supported a new guaranteed minimum income program were linked with the nationally representative Household Budget Survey to assess coverage, thereby illustrating for example very low coverage of Roma populations and of 1-2 person households with no children, and very high coverage of large families with children, compared to national statistics. These concerns were subsequently explored by qualitative research enabling the issue to be addressed via ad-hoc policy measures (Barca et al., 2023; Barca & Carraro, 2013). The comparative performance of social assistants across the country was also measured using administrative data, enabling low-performing assistants to be provided with additional training as well as meetings to explore the causes of the delays (ibid).

Advanced data analysis may also be used to **simulate potential changes** in program design or delivery, to determine the potential impact of programming or policy adjustments relative to continuation of the status quo (Barca et al., 2023). Such data may be collected through pilots and testing, as for example, in Indonesia, where iterative program adjustments have frequently been trialed and tracked using administrative data, and then intentionally and directly used to inform policy and programmatic decision-making (Alatas et al., 2021; Banerjee et al., 2018; Barca et al., 2023). Data may also be combined from existing sources, as for example in actuarial modelling for social insurance systems, which typically combine economic, demographic and employment data with administrative information about system participants (Barca et al., 2023). These models can be used to estimate the effects of current programming and potential reforms on future scheme coverage, sustainability and adequacy of benefits, thereby enabling informed decisions to be taken in the present regarding impacts that will only be realized decades in the future (ibid.)

## 3.2. Potential risks and challenges

Across the evidence base, digital approaches to SPL delivery have also been associated with four main potential risks and challenges: (1) data protection and privacy violations; (2) exclusion concerns and restrictions on access; (3) reduced effectiveness in certain cases for service users and/or service providers; and (4) sustainability challenges.

Examples of factors that can help mitigate these risks and challenges are discussed in Section 4. For further guidance and examples of the steps that different countries have taken to overcome these concerns in practice, please see 'Applying the Principles for Digital Development in Social Protection', a recent guide developed by the Digital Convergence Initiative[24] and endorsed by the Social Protection Inter-Agency Co-operation Board,[25] as well as the 'Implementation Guide – Good Practices For Ensuring Data Protection And Privacy In Social Protection Systems', published in 2022 by SPIAC-B and GIZ.

### 1) Data protection and privacy violations

Many of the digital approaches outlined in Section 2 entail **the collection, storing and processing of large amounts of sensitive data**, often about highly vulnerable populations and through new partnerships with private companies (such as software developers, mobile network operators and financial service providers). In some cases, data is collected specifically for operational purposes (for example for identification, registration, or monitoring); in other cases, 'incidental data' is also generated (for example as a by-product of digital payments or home care), with the potential to reveal the locations, contacts, conversations or routines of service users through their mobile phone records, financial transactions or smart device data. This creates dilemmas over data ownership as well as potential for data misuse, unless digital arrangements are accompanied by the development and consistent enforcement of legislative frameworks that ensure the protection and privacy of service users.

In practice, data protection **regulations and frameworks do not yet exist in many countries, or have severe gaps** (UN, 2019; Wagner & Ferro, 2020)**.** For example, among the 46 least developed countries, only half have data protection and data privacy legislation, while in Africa and Asia only around 60 percent of countries have such legislation (UNCTAD, 2021). Where laws now exist, they were often developed *after* major digitalization projects were undertaken, sometimes because of violations during the project rollout. In India, for instance, data protection frameworks had to be strengthened after security breaches in the *Aadhaar* biometric ID rollout. In some cases, regulations may exist but guidance on their implementation may not keep pace with the rapid evolution of new technologies being piloted or used in the social protection sector. In the UK, social workers have expressed concern about the lack of guidance on protecting users' data when providing them with new AI-based home care devices (such as Amazon's Alexa) (Wright, 2021). A sudden increase in digital approaches during the COVID-19 pandemic increased data protection risks and cybersecurity threats, at the same time as attention to and regulation of such concerns was often distracted by the urgent crisis unfolding (Davidovic et al., 2021; Madianou, 2020; Masiero, 2020).

[24] The Digital Convergence Initiative (DCI) is a joint effort by Global Partnership for Universal Social Protection to Achieve the Sustainable Development Goals (USP2030) members, governments, development partners, civil society organizations and private companies to create integrated and interoperable social protection information systems.

[25] Co-chaired by the ILO and the World Bank, the Social Protection Inter-Agency Cooperation Board (SPIAC-B) is an inter-agency coordination mechanism with representatives of over 20 international organizations and bilateral institutions. It was established in July 2012 at the request of the G20, with the aim of enhancing global coordination and advocacy on social protection issues and coordinating international cooperation in country demand-driven actions.

Without robust protections in place, there is **evidence of data being misused by governments undertaking digital social protection initiatives**, as documented in Lowe (2022). 'Mission creep' or 'function creep' can occur, whereby digital platforms or the data generated through them end up being used for purposes beyond their stated scope, potentially creating unforeseen consequences for service users (Jacobsen, 2015; Privacy International, 2022). In more malign cases, the adoption of digital IDs or data-driven approaches to social protection service delivery could even be used for discriminatory purposes.

There are also rising concerns about **private sector partners taking advantage of digital social protection data or approaches for commercial gain**. In the social care sector, some social workers and researchers have questioned whether contracting of global tech companies' infrastructure may threaten the wellbeing of older adults in care, given the misalignment between the interests of these corporations and of state social services (Wright, 2021). This echoes earlier concerns in the social assistance sector regarding the commercial partnerships behind digital welfare payments (Iazzolino, 2018; Pasquale, 2015). Tensions have sometimes surfaced between the state's efforts to incentivize the extension of financial service infrastructure to historically neglected populations, versus the need to ensure that the data of social protection recipients are wholly protected from inappropriate commercialization (Gronbach, 2020).

Users of social protection – and particularly social assistance – services have also seen their data **exploited by scammers and other criminals**, **with particular risks for digitally and financially illiterate populations**. In the US, the Federal Trade Commission reported a 3,000 percent increase in identity theft complaints related to government benefits in 2020 (US Government, 2023). In Brazil, at least 18 fake apps referencing *Auxilio Emergencial* (the government's largest COVID-19 assistance scheme) were identified in the app Play Store (Rizzi, 2022). As in some contexts women have less familiarity with mobile and financial services, they have experienced heightened risks of digital fraud, as in Côte d'Ivoire, where women were more likely to lose money to phone scams than men (16 percent of women, compared with 12 percent of men) (Demirguc-Kunt et al., 2022).

## 2) Exclusion and restrictions on access

The most obvious challenge of digitalizing social protection and employment services is the substantial risk of exclusion that digital approaches entail.

Many of those most in need of SPL services are among the most marginalized in society, and therefore **the most likely to lack access to the underlying digital assets required to benefit from digital delivery**. One billion people worldwide lack official **proof of an identity** (Desai et al., 2018). Those disadvantaged by gender, ethnicity, income and geographic inequalities are particularly likely to be unregistered.[26] While 83 percent of adults in low- and middle-income countries had a **mobile phone** in 2018, this figure varied greatly for certain groups; for example, in Pakistan, men are nearly three times more likely than women to have a mobile phone (Klapper, 2019). 30 percent of adults in low- and middle-income countries do not have a **financial account** (with a bank, financial institution or mobile money provider), and the proportion is even higher for those who are poorer, younger and female (World Bank, 2022c). Furthermore, even when adults have access to digital IDs, mobile phones or financial accounts, **digital and financial literacy** tend to be more limited among socially and economically vulnerable populations in low-, middle- and high-income countries alike. In

[26] For example, 45 percent of the poorest residents in low-income countries lack an official ID (compared to 28 percent of the richest quintile); rural residents are 10 percentage points less likely to have an ID compared to urban dwellers; and nearly one in two women in low-income countries also lack this document (compared to 30 percent of men) ((ID4D, 2019; Global Findex-ID4D, 2019).

addition, there are many gaps in the **wider infrastructure** required to reliably make use of digital devices (such as electricity, internet and mobile networks, and financial service provision), further hindering consistent access to digital services.[27]

Where social protection and employment services have failed to adequately adjust for these high rates of digital and financial exclusion and gaps in existing infrastructure, growing reliance on digital approaches has furthered hindered access for marginalized individuals and groups.

There is evidence of **digital approaches potentially hindering people's initial access** to social protection schemes. The most extensive evidence on this comes from social assistance schemes, from wide-ranging geographies. In the state of Jharkhand, India, the introduction of biometric authentication to access the Public Distribution System (PDS) increased exclusion rates by 50 percent among households that did not have a digital ID connected to their PDS account (who were also among the poorest and least educated in the study) (Muralidharan et al., 2020). In Bolivia, indigenous people were particularly likely to face challenges accessing emergency *Bono Universal* payments due to their lack of ID numbers, as well as their distance from financial access points (Venturini, 2021). Meanwhile, in Kinshasa, Democratic Republic of Congo, a mobile phone-based identification approach in the rollout of the COVID-19 emergency cash transfer led to lower registration rates among women (who comprised only 38 percent of recipients) (Bance et al., 2021).

Even where traditionally excluded individuals do succeed in registering for social protection, digitalization often means they face **hefty time, travel or 'gatekeeper' costs to collecting benefits in practice**. In a recent study comparing mobile money to direct bank transfers in the *Bhata* social pension in Bangladesh, only 31 percent of female recipients were found to own a phone and only 22 percent were literate (compared to 44 percent and 34 percent respectively for male recipients), which increased their reliance on others – and the unofficial fees that they had to pay – to access the transfers (especially mobile money transfers) (Glynn-Broderick & Koechlein, 2021). In Colombia, those receiving VAT Compensation by mobile money were twice as likely to experience delays as physical cash recipients, while older and rural recipients of *Ingreso Solidario* experienced difficulties collecting digital payments due to limited financial literacy and access to cash-out infrastructure (García et al., 2022; Londoño-Vélez & Querubín, 2022).

**Technological failures on the part of service providers** have proven another barrier to access, and are often most commonly experienced among populations with weaker access to digital devices and infrastructure. In Rajasthan, India, 25 percent of PDS recipients require three to four attempts at biometric authentication before they can access their benefit, and 4 percent are unable to do so in a timely manner at all (Gelb et al., 2017). Biometric authentication failures are higher for older people, daily wage laborers and farm workers whose fingerprints are worn away over time, and significant challenges are also faced by people with disabilities (Allu et al., 2019; Barca et al., 2021). In Colombia, complaints about mobile money were significantly more common than for physical cash disbursement, especially in remote areas with weak or unstable cellular connectivity (Londoño-Vélez & Querubín, 2022).

Beyond the technological failures above, there are also concerns that the new data-driven identification and monitoring methods for social protection can **replicate or even amplify**

[27] Nearly half of the world's population do not have regular access to the internet, and around 750 million people lack electricity. Financial services infrastructure remains weak in many areas, particularly in rural locations; 50 percent of the population in India, Indonesia, Pakistan, Bangladesh, Tanzania, Kenya and Uganda live more than five kilometers away from the nearest financial access point, compared to only 10 percent of the urban and 20 percent of the peri-urban population (Unnikrishnan et al., 2019, in Kumaraswamy & Negre, 2022)

**existing discrimination within social protection systems**. On the one hand, poor quality data may be shared more widely across agencies through new interoperability arrangements, replicating exclusion across multiple programs. On the other hand, increasing reliance on machine learning-based approaches may heighten exclusion and discrimination: far from being bias-free, such approaches simply reproduce at scale the biases within the algorithms and datasets that are used to train them, unless specifically trained to do otherwise (Considine et al., 2022; Eubanks, 2018). As an example, AI-enabled profiling by the Flemish public employment service used ethnicity as a proxy indicator for predicting jobseekers' risk of long-term unemployment; this more than doubled the likelihood of jobseekers born outside Belgium being misclassified as 'high risk', even for those who subsequently found employment (Desiere et al., 2019). As digital data trails grow into a more common input determining social protection eligibility, women or other disadvantaged groups may face exclusion or misclassification due to lower rates of phone ownership, fainter representation in datasets that are used to train algorithms, data quality issues, or a misunderstanding of the relationship between how marginalized groups use their phones and their socioeconomic status (Rizzi, 2022).

### 3) Reduced effectiveness

In part due to the challenges outlined above, some studies have found little evidence of digital social protection delivery out-performing existing approaches. At times, flaws in the conceptualization, design or implementation of digital reforms have been associated with *less* effective social protection provision,[28] in relation to several of the areas discussed in Section 3.1.

First, and as indicated above, **access for some service users may be worsened** by digitalization initiatives, due to the exclusionary factors mentioned above, as well as the delays that can be associated with establishing or gaining access to digital systems.[29] These access challenges can sometimes lead to clear participant preferences for traditional over digital approaches. In France's public employment services, 61 percent of jobseekers report a preference for face-to-face interaction, and only 18 percent prefer using the internet (Eurofound, 2020). To register for Chile's social registry (the gateway for over 100 services and programs), 69 percent of users preferred to attend an office over online registration (in a 2017 survey, reported in MDS & World Bank, 2018).

Secondly, **digitalization may have negative effects on certain service user outcomes**. Inconsistent or costly access to provision may reduce the overall effectiveness of the support provided, or remote digital provision may prove a poor substitute for the type or quality of services previously available. For example, the shift to some forms of remote social care support in place of in-person visits has reduced social workers' ability to detect potential changes in a service user's personal situation or home surroundings (Eurofound, 2020). In public employment services in France, Italy, Spain and the UK, staff reported feeling that digitalization had led to the loss or standardization of social relationships with service users (Peña-Casas et al., 2018). Ultimately, these examples of the costs borne by service users indicate the potential **risks of 'over-digitalization'** or of pursuing digital approaches for the wrong reasons, without keeping the necessary focus on service users' concerns and without

[28] While some of the studies may have highlighted performance issues that occurred during the early roll-out phase of new initiatives, many of the concerns identified here relate to issues that are intrinsic to digital approaches and likely to persist on a sustained basis, unless they are carefully considered and addressed.

[29] For example, in both Nigeria's and Malawi's COVID-19 response, plans to support urban residents through new digital approaches were announced in April 2020 but were not implemented until the following year, in part due to delays distributing mobile phones and registering mobile money accounts for recipients (in Malawi) and challenges establishing secure arrangements for mobile phone record sharing and bank account verification (in Nigeria) (Lowe et al., 2021; Lowe and Bastagli, 2021).

recognizing that technology simply cannot – and should not – replace the 'human' side of social work (Lowe, 2021; Barca 2022).

For service providers too, digitalization may not always produce better results. Whether because it is yet to be sufficiently developed or because of innate flaws in design, several studies assessing the performance of nascent digital tools such as statistical or AI-based profiling have found them to be **less accurate** than the targeting or assessment approaches currently being used. For example, Switzerland's public employment service piloted several statistical profiling tools but did not proceed to national rollout as they were not accurate enough, and consequently were poorly accepted by caseworkers (Arni and Schiprowski, 2015, in Desiere et al., 2019). Even with high-quality data, statistical modelling cannot capture the type of information that caseworkers can gather through in-depth interviews and other qualitative assessment methods (for example information on applicants' motivations, attitudes to work, and behavioral traits) (Loxha & Morgandi, 2014). In the social assistance systems of some countries, such as the UK and Australia, errors have emerged from fully automated approaches to benefit determination (designed to match up data on households' incomes, composition and employment in order to predict benefit payments), leading to overpaid benefits, which participants then had to find a way to repay – often with great difficulty due to the irregularity of their incomes (Millar & Whiteford, 2020). Even in the best of scenarios, where machine learning approaches have demonstrated some increase in accuracy over traditional methods of targeting like proxy means testing, such gains in precision have overall been characterized as 'marginal at best' (Grosh et al., 2022)

In addition, technology does not necessarily improve transparency – and at times can actually **obscure accountability**. 'Faceless' provision, and the outsourcing of service delivery to tech intermediaries, can leave service users unsure where to turn, and unable to hold governments to account, when issues arise. When biometric authentication was introduced in Pakistan's BISP program, technical challenges were common (affecting a quarter of participants) yet only 40 percent of those who experienced a biometric error were guided on the steps to resolve it (Gelb et al., 2020). As discussed earlier, unofficial fees charged by digital 'gatekeepers' may emerge as a new leakage channel for participants attempting to register for or access funds. 'Black box' algorithms determining eligibility and benefit levels leave both applicants and service providers unable to explain – or confirm the validity of –selection decisions. Some of the procurement processes and data-sharing agreements between governments and financial and digital service providers have at times been criticized for lack of transparency, particularly during the COVID-19 crisis when partnerships were formed in haste (Madianou, 2020).

Finally, several studies have **questioned the overall cost-effectiveness** of digital social protection approaches (Wright, 2021; UN, 2019). There is a tendency to overlook the substantial ongoing 'hidden' costs**,** including those involved in supporting service users to navigate digital platforms. In France, 75 percent of social workers stated that they needed to do tasks online on behalf of service users, almost all on a frequent basis (Davenel, 2016, in Eurofound, 2020). In trials of smart devices in adult social care services in the UK, the technology provider's suggested solution to a 'small' technical glitch was for carers to visit each of the 300 service users and manually adjust their devices (Wright, 2021). Where the efficiency of digital approaches has been rigorously assessed, in several cases, the costs were found to outweigh the savings – as in the UK's abandoned pilot of blockchain technology for social welfare payments in 2016 (Nikolova, 2018; Ohlenburg, 2020). In other cases, researchers have argued that the alleged savings from digitalization initiatives have occurred principally due to reductions in recipients' access or service quality, rather than genuine improvements in efficiency (Eubanks, 2018; UN, 2019). In more sinister cases, sceptics maintain that 'quick tech fixes' are distracting from the urgent need to address complex social

issues in a more meaningful manner, through long-term systemic investments in strengthening social protection systems (ibid.).

### 4) Sustainability

Just as short-termism in some cases has promoted excessive focus on 'quick tech fixes' over longer-term social investments, a failure to plan for the sustained maintenance and usage of 'flashy' new tools and systems has also sometimes undermined the sustainability of digital solutions themselves.

First, governments may face **challenges recruiting and retaining the necessary talent** for such initiatives. Globally, demand for people with the skills and experience for developing information systems, mobile apps, AI tools, biometric authentication, and other digital services often outweighs the supply of such expertise (Barca & Chirchir, 2019; Ohlenburg, 2020; Hersey, 2019). In lower income economies, recruitment and retention is harder still, as the governments in those countries frequently cannot compete with the salaries offered by international companies to attract the available talent. Even if technical services are largely outsourced by government agencies rather than completed in-house, the government must still be able to recruit and retain leaders with the knowledge and expertise to manage complex digital projects – which has proven an obstacle for digital public infrastructure projects across the board (Ganapathy et al., 2022)

In part because of the above gaps in expertise, digitalization initiatives have **at times lacked the long-term vision and strategy** to facilitate or finance their sustained implementation (World Bank, 2022a). For example, siloed initiatives promoted by individual donors or agencies may be conducted in parallel, or without feeding into the development of the country's broader digital public infrastructure (Ingram & Dooley, 2021). The long-term costs of maintaining and upgrading digital assets may be poorly appreciated (ibid.). Early decisions on technical development may result in the purchasing of tools or systems that are inappropriate for larger-scale or longer-term use, as for example in the early phase of Ghana's Livelihood Empowerment Against Poverty (LEAP) program registry (Chirchir & Kidd, 2011). In other cases, governments may suffer from 'vendor lock-in' where there is little possibility of changing providers or terms of service, due to having signed restrictive contract terms or having purchased a proprietary software option (where the company retains ownership of the application and is the only one able to make changes to that product) (ibid).

Finally, digitalization is often treated as a technical activity, but long-term viability can be thwarted by **inadequate domestic political buy-in**. In many countries, the initial phase of digital social protection reforms has been promoted, and in some cases also financed, by non-government stakeholders, including multilateral institutions, bilateral aid agencies and global foundations. While typically launched in partnership with state officials, political commitment to use and maintain new tools and systems over time has sometimes proven absent (Kidd et al., 2021; Gelb et al., 2020; Mason et al., 2020).

## 4. Determining factors

Whether the benefits outlined in Section 3.1 are achieved – and the potential risks and challenges in Section 3.2 minimized – will depend primarily on the way in which a specific digitalization initiative is designed and implemented. But more broadly, the initiative's success is also determined by the external conditions in place in the context where it is delivered. These factors relate to the conditions found: (i) in the government; (ii) in the user population; and (iii) in the wider infrastructure on which the digital mechanism relies.

## 4.1. Conditions in the government

Many of the key factors that determine the effectiveness of a digital social protection initiative relate to factors under the remit of the government as a whole, namely the legal and institutional frameworks in place, technical capacity and digital public infrastructure. All of these require funding to develop; however, even where adequate financing is available, digitalization projects will not be successfully rolled out unless there is sufficient political will within and across key government stakeholders.

First, the **robustness of legal and regulatory frameworks** helps determine whether users are effectively protected against the potential harm and risks involved in the digitalization of social protection. As data collection and data-sharing activities become more advanced, stronger data protection laws are needed. For example, in Estonia a comprehensive legal and regulatory framework provides a trustworthy foundation for offering 99 percent of public services online in one of the most digitally integrated societies in the world. Privacy is recognized under the country's constitution, and operationalized in the Public Information Act, which sets out: (1) the conditions for accessing and refusing to provide public information; (2) public information for which access is restricted; (3) the conditions for establishing and administering databases; and (4) the mechanism for state and administrative supervision of access to public information (World Bank, 2018a).

### Box 2 Improving data protection and privacy practices in social protection systems

With the increasing reliance of digital approaches in social protection systems, there has been growing attention to the need for better guidance for policymakers and practitioners. This led to the recent production by the Social Protection Inter-Agency Cooperation Board (SPIAC-B) of a data protection and privacy guide. The guide sets out good international practices that could serve as a reference and inspiration for national data protection laws and as a framework for social protection programs. It also contains step-by-step guidance and practical measures for implementing data protection and privacy principles in social protection programs, and for respecting individuals' rights to data protection.

*Source:* Wagner et al., 2022

The effectiveness of new digital decision-making tools and systems (such as AI-based algorithms) is also enabled – or hindered – by the state of the legislation permitting their usage, and the legal recourse for appeal regarding such decisions. Where this legal foundation is assessed to be lacking, governments may be forced to retract or modify such systems. In the Netherlands, the District Court of the Hague ruled in February 2020 that the laws and practices underpinning the government's AI-based system for detecting potential welfare fraud were not compliant with the right to privacy outlined in the European Convention on Human Rights, forcing the system to be discontinued (Rachovitsa & Johann, 2022). Financial service regulations also determine how well consumer protection, financial integrity and financial stability are maintained in the rollout of digital payments, as well as the accessibility of such payments, particularly for people with limited access to documentation, identification or proof of income (Davidovic et al., 2021). While some countries (such as Peru and Colombia) already had simplified and remote 'Know Your Customer' (KYC) regulations in place before the pandemic, others (such as Cote d'Ivoire, Mali, Togo, Thailand, and Jordan) made such regulatory changes during the COVID-19 response, to enable digital payment of emergency assistance into new accounts (World Bank, 2022f).

The strength of **governance and institutional arrangements** (including the existence, accountability and performance of institutions responsible for leading, coordinating and independently overseeing such projects) helps determine how effectively digitalization projects advance in line with the required legal provisions. In research on the digitalization of social care in Lithuania, the lack of an institution responsible for leading those initiatives was felt to be a key factor constraining their progress (LRT, 2017, in Eurofound, 2020). By contrast, in the Estonian example given above, a single institution (the Information System Authority) has a clear mandate to lead the development of national IT systems, and to ensure the sustainable operations of a secure e-state.[30]

**Coordination** among and within different levels and sectors of government also shapes the performance of digital social protection initiatives, often facilitated by national and sector-level digitalization strategies (although such strategies were not common until recently, even in high-income countries) (World Bank, 2022b; OECD, 2016). In a study of the use of AI-based outreach in social protection services in various countries, a thoughtful strategy specifying how new technologies can be adopted to bring services closer to citizens was deemed central to the extent of initiatives' success (ISSA, 2021) Conversely, local authorities in the United Kingdom identified an urgent need for a national strategy for using technology in social care settings, as the lack of such a strategy made it difficult for agencies to assess and advance possible digital approaches (Wright, 2021).

While the legal and institutional arrangements provide the frameworks for digital government activities, designing and implementing such initiatives is greatly facilitated – or hindered – by the **ability of government officials** to initiate and maintain them. At the national level, the availability of appropriately skilled administrators, contract managers, systems engineers, data scientists, cybersecurity specialists, as well as IT maintenance staff, can help develop an overarching digital government strategy and establish the cross-government systems underlying digital innovation at sector level (World Bank, 2022a). In Togo, the *Agence Togo Digital* has been set up to recruit the required skills and capabilities to lead the country's digital transformation, to ensure that different government systems are interoperable, and to enhance the value of available data across sectors (Behsudi, 2022).

At the sector level, the existence of teams with appropriate skills and expertise also influences how effectively digitalization initiatives are developed and implemented (or contracted out) (ISSA, 2020; Ruggia-Frick, 2016). For example, in Canada, the introduction of an AI-based model to identify recipients of the Guaranteed Income Supplement was deemed possible only thanks to multidisciplinary teams with data scientists and business experts, who ensured that appropriate tools were selected and effectively used (ISSA, 2020). However, this kind of collaboration between different fields can prove challenging, as illustrated by the roll-out of data-driven innovations in the Republic of Korea's National Health Insurance Service, where ICT professionals and social health insurance specialists reportedly faced difficulties understanding each other (ISSA, 2022). For frontline officials, provision of effective training and guidance can directly facilitate successful implementation of digitalization initiatives. In France, less than 10 percent of social workers reported receiving training with digital social services and only 30 percent reported being able to help users increase their own digital skills (Davenel, 2016, in Eurofound, 2020). Similarly in England, local authorities identified a

[30] The Estonian Data Protection Inspectorate serves as the supervisory authority for protecting constitutional rights to data privacy under the Data Protection Act, the Public Information Act and the Electronic Communication Act (World Bank, 2018a). Furthermore, a Personal Data Usage Monitor portal exists to offer each resident comprehensive oversight of when and how their data has been used by the government, and to enable them to contest any unauthorized data access (ibid.)

pressing need for an independent national advisory service that can provide expertise and guidance on the effectiveness of care technologies (Wright, 2021).

Alongside the laws, institutions and human resources, the availability and quality of **digital public infrastructure**, such as ID systems, government-to-person (G2P) payment systems, and government-run platforms for data exchange**,** also plays an essential role in determining the feasibility and effectiveness of many digital social protection initiatives. Countries such as India (see Box 3) and Singapore have actively sought to bring these various aspects of public infrastructure together at scale through 'digital stacks' (digital systems for ID, payments and data exchange) which facilitated social protection delivery both prior to and during the pandemic (ID4D & G2Px, 2022).

Box 3 'India Stack'

India Stack is a set of application programming interfaces (APIs), open standards, and infrastructure components that allow Indian citizens to obtain a range of services digitally. It comprises interfaces between the *Aadhaar* digital ID system, the Unified Payments Interface (UPI), the Data Empowerment and Protection Architecture (DEPA), e-Sign, and Digi-Locker, among others, enabling the public and private sectors to build their services on top of these digital layers. The various components of the Stack have been continuously developed since the first element (*Aadhaar* Digital ID) began to be rolled out in 2010, initially for the purpose of strengthening social welfare service delivery. Certain components have attracted criticism for data protection and exclusion concerns (see Section 3.2). However, the Stack has also been credited with significantly streamlining the delivery of public services, enabling over 67 billion digital identity verifications and facilitating around 2.8 billion real-time mobile payments every month (worth INR 5.47 trillion).

*Source:* Carrière-Swallow et al., 2021; IndiaStack, n.d.; World Bank, 2022a

Where components of public infrastructure have been lacking, digitalization initiatives have been challenging to roll out. For example, without widespread and inclusive access to ID systems and civil registration, countries have struggled to roll out digital registration or data-driven identification of social protection participants – or to accurately implement and monitor benefit and service delivery. The lack of a foundational national-scale ID system in the Philippines was perceived to severely hinder the options and process for rolling out the Social Amelioration Program (SAP) emergency cash transfers during the COVID-19 pandemic (Kawasoe, 2022). In Nigeria too, attempts to shift from inefficient agricultural subsidies to targeted digital cash transfers were unsuccessful due to both inadequate ID systems and limited connectivity (Gelb et al., 2020). Conversely, in Chile and Türkiye, near-universal ID numbers and birth registration were identified as key enablers for developing digital social protection information systems, which themselves proved invaluable for rolling out assistance during the pandemic (DCI, 2022a, 2022b; Gentilini et al., 2020).

Clearly, the public infrastructure and institutional capacity mentioned above will require substantial funding to develop. Yet even where financing is available to ensure all the above conditions are in place, digitalization initiatives will still fall short if there is inadequate **political will** for roll-out. For example, in Bolivia, multifaceted political resistance was deemed the major barrier hindering the shift from in-kind subsidies to digital cash transfers (Gelb et al., 2020). By contrast, in Chile, the political leadership and consensus around the importance of digitalizing social protection registration, case management and monitoring was a key driver

of the many ministerial-municipal agreements signed and subsequent actions taken to implement the proposed digital information system (DCI, 2022a).

Other studies exploring the success factors behind digital social protection information systems have also highlighted the importance of securing **genuine buy-in** from the necessary stakeholders before, during and after the roll-out of digitalization initiatives. In Belgium, the ability to secure the support of wide-ranging stakeholders was critical to facilitate the implementation of the Crossroads Bank for Social Security's (CBSS) interoperable information system (which exchanges data across 3,000 social sector actors, and enables the automatic approval of most social benefits and subsidies in the country) (DCI, 2022c). This support was achieved by promoting the mutual benefits that the system aimed to achieve (such as providing users with a better and more efficient service) rather than focusing on one-sided or controversial goals (such as fraud detection) that could alienate certain stakeholders. Political support was also secured and maintained by ensuring that the new initiative respected the autonomy of participating institutions, and distributed tasks through consensus rather than adopting an overly centralized approach (ibid). In the state of Karnataka, India, the project team responsible for the interoperable *Kutumba* information system secured buy-in from the various departments involved in the system through a series of one-to-one meetings in which they collectively agreed how the system could work. This built on **strong existing inter-departmental relationships** which had been formed through two decades of successful e-governance projects. This demonstrates the need both to heed the lessons from past experience, and to consider the conduciveness of the wider political landscape in which 'technical' innovations are being developed (DCI, 2022d).

## 4.2. Conditions in the user population

The success of digitalization initiatives directly reflects whether target users have **access to digital devices and networks, and at least a base level of literacy to use them** (Gelb et al., 2020). The absence of such conditions can severely undermine attempted digital reforms; for example, in Zambia, the inability of some farmers to use PIN codes and ID numbers was one of the factors hindering attempts to replace in-kind fertilizer subsidies with digital cash transfers (ibid.).

Since base levels of digital and financial inclusion may not always be at optimal levels for the populations supported by social protection systems, digital social protection initiatives are generally more effective if accompanied by **measures to promote greater access to and familiarity with digital and financial services** – and if non-digital options are available for service users who are poorly served by digital approaches**.** Examples of such measures include intensive onboarding, digital and financial literacy training, and ongoing support with new digital systems (Gelb et al., 2020). In France, the National Family Allowances Fund (CNAF) has a multi-pronged digital inclusion strategy to support the approximately 25 percent of service users that they have identified as having difficulties using digital tools. The strategy includes: (1) monitoring to detect digital exclusion situations; (2) supporting clients to use digital channels, for example through training workshops and coaching service users by phone; (3) developing a nationwide network of partners that can provide more intensive digital skills support and connecting users with these partners; and (4) implementing tailored responses for different user groups and keeping phone and in-person services available for alternative access (ISSA & UNU-EGOV, 2022). In a survey of 74 social security institutions in 64 countries, 31 percent saw free or subsidized digital skills training as a particularly effective mechanism to support the required skills development in the general population (ibid.).

More broadly, guidance from ISSA and UNU-EGOV (2022) recommends the development of **specific digital inclusion and digital skills training initiatives for marginalized populations**, including women, minorities and indigenous communities, migrants, refugees, seniors, persons with disabilities, and low-income households. Frontline service providers and call center staff can be trained to act as facilitators of digital service options and digital skills development. Service users may also benefit from opportunities to test online service offers in supported settings, and short instruction videos and clickable demos of key services should be provided, with accessible, targeted messages for marginalized service user groups. These initiatives and materials can be delivered both directly to marginalized users and through partnerships with libraries, community centers or civil society organizations representing excluded service user groups. The usage of the digital systems themselves, and the complementary initiatives and materials, should be actively monitored, to determine if they are meeting the threshold required to develop the necessary access and skills among formerly excluded populations.

### 4.3. Conditions in the wider infrastructure

Strong networks of **mobile/internet coverage, electricity and financial services** (with broad and accessible coverage in the areas being targeted) enable better participant access to mobile, electronic or online delivery channels, and support providers to effectively offer services through such channels. For example, in Estonia 100 percent coverage of digital mobile phone networks was a core prerequisite for the country's digital transformation over the last two decades (OECD, 2019). For electronic payments, last-mile cash-out networks of access points are particularly important (branches, ATMs, and bank agents; or mobile money agents). During the pandemic, countries that used digital payment methods had a higher penetration of ATMs, commercial bank branches and agents per capita (World Bank, 2022f). But even where formal bank systems were limited, many countries were able to leverage mobile money payments if they had advanced mobile money agent networks (for example, in Kenya and urban Togo) (Davidovic et al., 2021). Innovations from fintech companies have also facilitated G2P expansion – such as GCash, Wave Money and GrabPay in Philippines, Myanmar and Malaysia (ibid.).

In some cases, it may be possible to incentivize improvements in the wider ecosystem as part of the digitalization rollout – for example, when government agencies negotiate with financial service providers to increase agent presence in underserved communities as part of a G2P program rollout (for example, in Kenya, both for the long-standing Hunger Safety New Programme (HSNP) and during COVID-19) (McKay and Mduli, 2020, in Davidovic et al., 2021). In these cases, it is important to ensure that the contractual arrangements provide adequate incentives for this expansion, as recipients may otherwise be frustrated by the absence of accessible cash-out points or network/liquidity failures when attempting to withdraw their funds (as documented in the trial of digital pension payments in Andhra Pradesh, India) (Gelb et al., 2020).

## 5. Looking forward

As shown throughout this paper, digitalization has occurred at all stages of SPL service delivery, with innovations in technology and data usage growing both in number and in range. These digital innovations have had diverse impacts on both service users and providers. Digitalization has at times led to marked improvements in people's experience of accessing SPL services, and on occasion has enhanced the effects of those services on users' wellbeing, resilience, financial inclusion or sense of autonomy. For service providers, there are clear

potential gains to be generated in terms of enhanced accuracy and transparency of service provision, reduced costs and heightened efficiency, and better availability and quality of data to inform and improve SPL design and delivery.

Yet the downsides of digitalization have also frequently been evident. Without careful mitigating measures, SPL digitalization can result in violations of the privacy and protection of service users' data, as well as heightened exclusion or barriers to access for a subset of the population – often the most vulnerable individuals, who tend to have the lowest levels of digital access and literacy. For service providers too, the results of digitalization initiatives have not always lived up to expectations, with the adoption of new technologies or data-driven processes sometimes weakening agencies' ability to effectively support or identify priority users, obscuring accountability, or failing to produce the necessary returns to justify high upfront costs. The sustainability of digitalization initiatives has also proved a challenge, whether due to inadequate stakeholder buy-in, lack of long-term vision, or difficulties maintaining the necessary expertise, hardware and software required to support and scale such innovations.

While the success of digitalization initiatives will above all depend on the specific features of their design and delivery, the effects of technological and data innovations also depend substantially on the broader context in which they are implemented. Some of the key contextual enablers fall under the government's remit, including the legal and institutional frameworks in place, the state's technical capacity, digital public infrastructure, and political will to make the necessary investments in developing and using effective digital approaches. Other enablers relate to the conditions among the user population. This includes the extent to which users have – or are supported to obtain – the necessary access to and familiarity with digital devices and networks. A third set of enablers relate to the wider infrastructure in place to support digitalization initiatives, namely the networks of mobile and internet coverage, electricity and financial services.

## Pathways toward digitalization

Many of the enabling factors discussed above and in Section 4 are beyond the control of the SPL ministry, relating instead to the country's infrastructure, population and government more broadly. Optimal conditions for digitalization are therefore more likely to be secured through cross-government action than within a social protection silo. Consequently, countries that have pursued digitalization of SPL services within the context of a broader, **whole-of-government digital transformation** project have been at a strong advantage – as for example in the Estonian model. Wherever possible, it will therefore be beneficial to consider SPL digitalization within wider government strategies for the digitalization and development of citizen-centric services.[31]

That said, there are also many cases in which SPL agencies or programs have themselves been the **pioneer of, or test case for, digital government**, meaning they preceded rather than followed whole-of-government digital transformation. In India, for instance, social welfare was the initial focus to test the potential application of the *Aadhaar* digital ID system for public service provision (which became the first component of India's broader Digital Stack).

Furthermore, whether as part of a wider whole-of-government digital transformation project or as a standalone sectoral initiative, there has also been **variation in the way that SPL**

[31] For further guidance on whole-of-government transformation and development of citizen-centric services, please refer to World Bank (2022e).

**ministries and agencies have combined or sequenced** the adoption of digital innovations within their SPL system(s). While every country's pathway will of course be unique, there are two broad pathways that governments appear to have followed to digitalize their core SPL architecture – notably their social information system, which serves as the foundation for registration, assessment, enrollment, benefit/service provision, participant operations management, and program and system monitoring (Lindert et al., 2020). These 'traditional' and 'leapfrogging' pathways for system digitalization are discussed below, alongside a category of innovations known as 'supporting technologies', which involve the adoption of digital approaches that do not relate to the digitalization of core social protection architecture itself.

### A) The traditional pathway: Progressive digitalization of core social protection architecture[32]

The starting point in the traditional digitalization pathway is the 'analog' system historically used for SPL delivery – an (often-fragmented) combination of paper-based, manual and in-person mechanisms and approaches. From there, SPL agencies pursuing the traditional digitalization pathway typically transition through two further stages to eventually produce a consolidated digital system of core social protection architecture. The two digitalization shifts in this pathway are as follows:

- **Analog → e-Government**. First, new technologies may be applied to separate analog systems or processes, for example by digitizing individual databases for social protection programs or digitizing each scheme's back-end payment administration. The resulting stage is known as **'e-government'**, in which analog administrative functions or systems have been digitized, but generally in a fragmented and disconnected manner. Just as the (non-digital) core architecture took time to develop, so too the digitalization of this architecture is likely to occur gradually, with different components being digitized at different speeds and points in time.

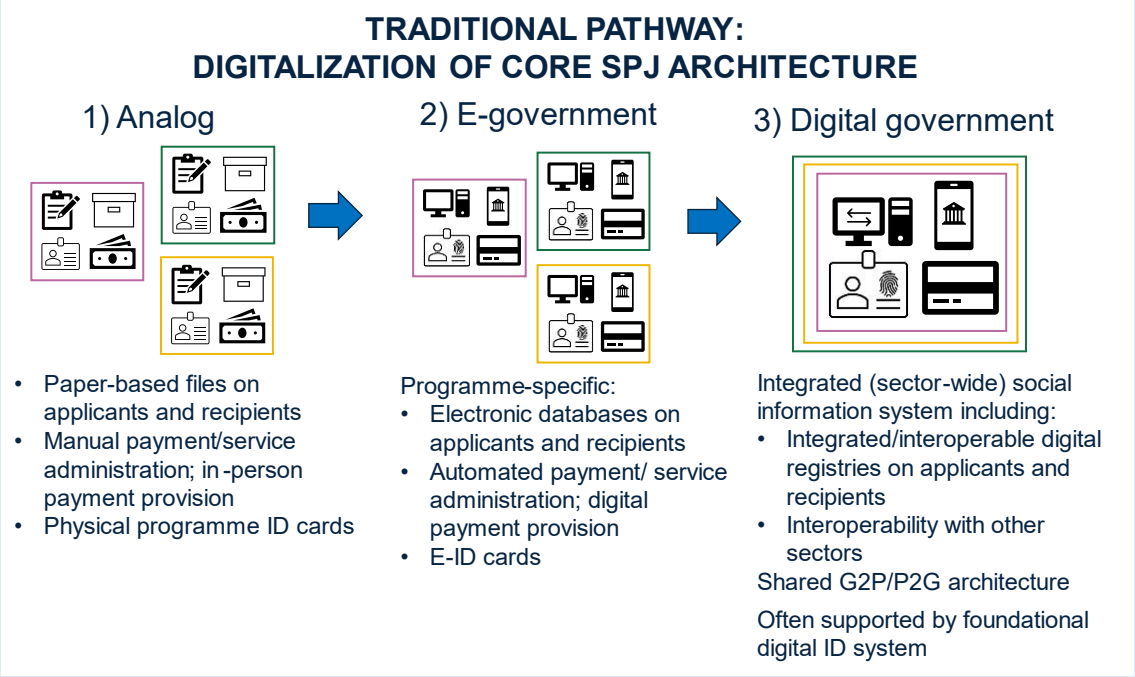
- **E-Government → digital government**. In some cases, governments may then move to more extensive reliance on technology for SPL delivery, known as '**digital government'**. In this phase, SPL agencies develop consolidated digital systems and re-design their business process, to become 'digital-by-design'. Rather than individual programs developing and operating independent electronic databases or mechanisms, a sector-wide – or at least a multi-program – strategy may be implemented to digitalize core delivery systems in a coordinated manner.

  Moving into this 'digital government' phase will typically result in the gradual development of shared digital architecture for SPL services. For example, an interoperable information system may develop in which databases of different SPL programs are either centralized or able to seamlessly communicate, for intake, enrollment, participant operations management, and monitoring purposes. Shared G2P/P2G architecture may also develop for more efficient payment service provision across different programs, which in some cases may even result in coordinated payment of multiple benefits.

These phases in the traditional digitalization pathway are illustrated in Figure 2 below.

[32] The three-stage pathway discussed here builds on existing framework for Digital Transformation of the Public Sector, outlined in World Bank (2020), applying it to the SPL sector.

**Figure 2 Digitalization of core SPL architecture**




*Source: Authors, based on World Bank* (2020) *framework for the Digital Transformation of the Public Sector*[33]

The digitalization of core social protection architecture through the traditional pathway will generally require the conditions discussed in Section 4 to be relatively well developed. For example, it is not possible to move to effective digital-by-default delivery systems without adequate legal and institutional frameworks, digital and financial services infrastructure (including digital public infrastructure), digital government capacity, and digital access and literacy among the user population – as well as the political will for the system-level reforms that such initiatives entail.

That said, it is important to note that many of these conditions can, and will, be further developed as digitalization progresses. Legislation and institutions may need to be continuously tweaked to keep pace with new reforms or emerging risks. Likewise, digital infrastructure, and the population's ability to use it, may improve as a direct consequence of SPL digitalization – for example, financial service providers may be incentivized to expand their operations for formerly marginalized populations as a result of large-scale SPL contracts, and less digitally literate groups may be supported to access and use digital devices and accounts as a result of the assistance and mentoring that they receive through an SPL program.

Box 4 below illustrates the pathway that the Government of Ukraine has followed to digitalize its core SPL architecture. For further information see the full case study in this series (World Bank 2023a, forthcoming).

[33] The World Bank (2020) framework also shows a final stage of transformation – GovTech – in which a whole-of-government approach to digital transformation is adopted to drive the development of universally accessible citizen-centric public services and simple, efficient and transparent government systems. Since this diagram relates to the digital transformation of government as a whole, it remains beyond the control of individual SPL agencies; we therefore focus here only on the part that is within the SPL sector's scope/remit. The World Bank's GovTech framework was itself directly based on OECD (2019) presentation of digital transformation in Digital Government Studies.

### Box 4 Ukraine's pathway towards digitalizing core SPL architecture

Ukraine inherited its social protection system from the former USSR, like many other post-Soviet countries. The system was large and diverse but entirely paper-based, requiring people to submit physical applications with extensive supporting documents that often took multiple in-person appointments to source. On the provider side, paper archives made the system cumbersome, expensive and vulnerable to corruption.

Over the years, the government has taken various steps to digitalize this system. First, they moved from an analog to an e-government system of back-end administration, digitizing their databases and archives. From 2014, more resources began to be put into whole-of-government transformation, led by the newly created State Agency for Science, Innovation and Information, which has since transformed into the Ministry of Digital Transformation. A 2014 law provided for centralized access to data from various institutions' registers (in compliance with data protection measures) using an information system known as '*Vulyk*'. In 2016, the *Trembita* software platform was introduced to enable rapid and secure exchange of citizens' data across different registries, modelled on Estonia's X-ROAD data exchange platform. In 2017, the state network of 'single window' administrative service centers[34] became connected with the *Vulyk* information system, enabling employees to quickly process citizens' requests for documentation and for registration in public and social services. More than 150 state and local government bodies are now connected via the *Trembita* platform, as well as more than 50 electronic information resources.

Since 2019, the next phase of digitalization has focused on enabling citizens to access public services entirely remotely, based on the "state in a smartphone" concept. This has been a key development in the effort to develop a digital social protection system around the user's needs. In early 2020, the Ministry of Digital Transformation officially launched the DIIA digital identification platform, which is available via a mobile app and web portal. More than two million users downloaded the DIIA app within the first two months, although further uptake then stalled due to fears of personal information leaks and state surveillance, as well as digital infrastructure, literacy and access gaps (some of which have been addressed, while others remain a concern). However, in late 2020, the user base tripled, when – as part of the social protection response to COVID-19 – the government set up a registration and payment process via DIIA for the first time.[35] Citizens who needed help could apply for support in DIIA and, after checking their application, could then receive a digital payment on their bank card. Identity verification takes place on the DIIA platform using an electronic digital signature or BankID.

Today, citizens can access a vast range of services for individuals and businesses via DIIA, including many social protection schemes (such as child and family benefits, pensions, social insurance, subsidies, unemployment benefits and preferential state mortgages). Submitting documents takes a few minutes, receiving results on most services takes one to five days, and the services are free of charge. At the end of 2021, the DIIA portal included 72 services, and the mobile app facilitated access to 15 digital documents and 9 e-services. DIIA also contains a Government Services Guide so that citizens can learn about all state services, including those not yet available via the digital platform. Citizens who do not have a computer or smartphone can still access DIIA with social workers' support through DIIA centers, which have been established within the network of administrative service centers. These centers also continue to offer access to social protection through traditional 'in-person' applications.

Following the full-scale Russian invasion in February 2022, the Government of Ukraine has further developed the functions and services available through DIIA, including many social protection programs

[34] These centers aim to facilitate citizens' access to wide-ranging public services through a single office, where citizens can receive support and advice from trained personnel, and request and receive approvals for state administrative and social services. At the end of 2021, there were over 800 offices in the administrative service center network.
[35] DIIA was also used to monitor compliance with voluntary self-isolation after COVID-19 exposure and to organize and provide records of vaccination, providing important further stimulus for its uptake.

(providing assistance for those whose property has been damaged, who have been internally displaced, who live in de-occupied territories, or who are hiring or housing conflict victims, or creating jobs or starting businesses in wartime conditions). DIIA also provides information and a consultation chatroom for Ukrainian refugees in other countries. All DIIA services are available worldwide: as of 2021, digital documents in the DIIA mobile app also carry the same legal force as paper documents. By August 2022, the number of DIIA mobile app users had reached 18 million people.

*Source: World Bank (2023a, forthcoming).*

## B) 'Leapfrogging' digital innovations

While many countries have developed digital social protection architecture by following the digitalization pathway outlined in Figure 2 above, there are also cases where governments had not yet established social protection programs or delivery systems in any substantial 'analog' form, meaning there was no paper-based, manual or in-person starting point from which to develop. In these cases, some governments, such as the Democratic Republic of Congo or Togo (see Box 5) have immediately leapfrogged to 'digital-by-default' delivery, using technology to identify, enroll and pay social protection benefits through digital channels. Their inability to rely on traditional core social protection architecture means that their digitalization initiatives have often relied on novel delivery approaches, for example using data held by non-governmental actors, machine learning techniques and SMS registration to identify and enroll new participants, or using mobile money payments in lieu of traditional payment distribution mechanisms.

In some cases, these 'leapfrogging' innovations may be combined in a way that ultimately builds core social protection architecture (moving into the third stage of the Figure 2 diagram). However, this is not a given. 'Leapfrogging' innovations that aim to substitute for the lack of a prior system may remain fragmented and may not necessarily result in progress towards any system-wide digitalization, unless a concrete system-strengthening strategy is in place.

By definition, 'leapfrogging' innovations can occur even when traditional social protection infrastructure is not in place. However, even if the 'standard' legislation, institutions, capacity and infrastructure do not exist, ad hoc or alternative arrangements must be present to a certain degree for the innovation to succeed. For example, many of the payments-related leapfrogging innovations have only been able to occur thanks to advanced mobile money infrastructure, access and regulations, in lieu of traditional financial services and systems. Data-driven approaches to identification and enrollment have relied on data among wider government or non-governmental actors; a robust legal basis and appropriate oversight for these new forms of data usage and sharing are still fundamental. Furthermore, where traditional infrastructure, capacity and institutions are underdeveloped, the need for political will and pockets of digital government expertise to develop and drive forward leapfrogging innovations becomes even more important.

### Box 5 Togo's leapfrogging innovations and the pathway to digitalize the SPL system

Like in many other countries in the region, Togo's social protection delivery was at a nascent stage before the pandemic. There was no national social registry to locate vulnerable households, and the small-scale manual cash transfer scheme under the Ministry of Grassroots Development covered only 4 percent of the population, in a limited number of villages. However, through various novel approaches, the government was able to develop and deliver a new digital cash transfer scheme with unprecedented speed and scale to support citizens experiencing some of the worst effects of the COVID-19 crisis, forging a potential pathway to leapfrog from minimal prior delivery – even in analog form – to a digital social protection system.

Known as the '*Novissi*' program, the digital cash transfer scheme was launched in April 2020 and initially supported around 580,000 informal workers in urban areas whose incomes were affected by the pandemic containment measures. For the rollout, a new USSD registration platform was created, through which one in three adults, 1.3 million people, applied in the first three weeks of the scheme. Upon verification of eligibility, payments were disbursed almost instantly via mobile money. For monitoring and feedback, a new toll-free phone helpline was established, an electronic daily reconciliation of transactions was conducted by a private auditing company, and online program dashboards were created to provide transparency to internal stakeholders and the public on program performance.

In a later phase, the program was expanded to the poorest rural districts, again drawing on novel methods for delivery, in partnership with GiveDirectly and a team of independent researchers. As the government did not have up-to-date poverty data to identify the poorest districts and individuals, a machine learning algorithm was trained to identify poverty in the local context using satellite data and mobile phone use data, combined with poverty estimates from household surveys. Through this model, the poorest individuals - 750,000 mobile subscribers with a daily consumption of $1.25 or less – were identified. People living in the poorest districts were then invited to apply via SMS and, if their daily consumption was below the $1.25 threshold, they received their first payment immediately into a mobile money account (an existing account or a pre-created one by the Central Bank in coordination with mobile money service providers).

In total, the program has registered around 1.6 million individuals in its database and provided $34 million in assistance to more than 920,000 vulnerable people – around 1 in 4 of the adult population. More broadly, *Novissi* is also seen as having provided the proof of concept for the development of a digital, heavily mobile-based social protection system, with the new Togo Digital 2025 Strategy setting a goal to digitalize public and social services (including all government-to-citizen and citizen-to-government payments) and to provide all residents with easy and cost-effective access to high-speed internet and mobile devices. Combined with various other projects to develop digital government capacity and digital public infrastructure (notably a national biometric ID system), the government aspires to develop a digital social registry that can aid in identifying and supporting the most vulnerable, drawing on *Novissi's* lessons. Ultimately, the Ministry of Digital Economy and Digital Transformation aims to use technology to bring citizens closer to public administration and to reset expectations about the timeliness, transparency, quality and effectiveness of public service provision. In pursuing this vision, the key will be to ensure that in leapfrogging towards technology's benefits, the challenges and risks outlined throughout this paper are not overlooked.

*Source:* Aiken et al., 2021; Behsudi, 2022; Lawson, 2022; World Bank, 2023b

### C) 'Supporting technologies'

Beyond the digitalization of – or digital substitutions for - core social protection architecture mentioned above, there are also various cases in which agencies or programs have begun to introduce standalone digital innovations: innovations that can be trialed or rolled out without requiring the social information system to have been digitalized in a substantial way. For example, even where core digital social protection architecture is not yet in place, governments can undertake mass or even targeted digital awareness-raising initiatives, operate interactive social media and webpages, and offer phone and online hotlines (with or without AI innovations) to respond to queries. They may conduct virtual or remote appointments, and introduce assistive technology into social care provision, without necessarily requiring recipients to be registered in a digital information system. Likewise, they may undertake high-frequency phone-based or online surveys for monitoring and evaluation purposes, or use AI and data-driven methods to inform their learning and processes – all without having any digital system in place to register, enroll, support or manage the provision of services for SPL recipients.

Supporting technologies may be introduced as 'digital add-ons', focusing only on the subset of the user population who have good digital access and, in many cases, contracting technical service providers to operate the digital platforms or mechanisms. This may reduce the extent of digital infrastructure, devices and literacy required by the user population, although of course it still requires non-digital options to continue to be provided at the necessary scale to support all users who are not well-covered by the new digital option. Within government, supporting technologies may require a lower level of technical capacity than the digitalization of core social protection architecture (in part because some of the digital functions may be more easily outsourced), but a certain level of expertise will still be needed to conceptualize, manage and monitor implementation of the initiative. In addition, while supporting technologies of course require a legal basis for their implementation (including to protect incidental or anonymized data generated in the process), they do not necessarily require governments themselves to collect, store and process new individualized data in social information systems, or to collect or deliver payments to service users. Consequently, several of the legal foundations mentioned in Section 4 may not be as complex to develop – although there will still be a need for governance and institutional arrangements to be in place to oversee successful implementation of such measures.

These 'supporting technologies' can bring many useful benefits, potentially triggering fewer challenges than in system-level digitalization initiatives. However, they are not part of the core architecture, so should not be confused with true system digitalization.

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Ultimately, the digitalization of the SPL system requires a long-term strategy to maximize the potential benefits of digitalization and to mitigate the various risks and challenges outlined in this paper. This strategy must also recognize that the pathway to digitalizing SPL systems does not – and should not – mean digitalizing provision for all users and in all aspects of delivery. Even with targeted efforts to expand digital access and literacy among the population, there will likely remain a subset of service users who will be unable to benefit from digital approaches, requiring the continued provision of manual or in-person alternatives. Furthermore, there are some aspects of SPL delivery where technology simply cannot substitute for the human contact, support or discretion that a social worker can bring. As in all aspects of digital government, in the pathway towards digitalizing SPL delivery, technology should only be applied as a means to an end – with the end being better provision for service users – and not as an end in itself.

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## ABSTRACT

This paper offers three key contributions to the existing literature. Firstly, it reviews the use of technology across each phase of delivering social protection and labor (SPL) benefits and services. Secondly, it reviews evidence on potential outcomes arising from digitalization initiatives, and identifies factors and conditions that facilitate successful design and implementation. Lastly, the paper outlines a conceptual framework for different digitalization pathways. This framework distinguishes between: (1) the progressive digitalization of analog core SPL architecture; (2) 'leapfrogging' innovations, which use novel digital approaches from the outset in contexts where SPL provision is nascent and traditional core architecture does not exist; and (3) the use of supporting technologies that may be helpful in their own right but neither contribute to, nor rely on, the digitalization of core SPL architecture.


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