

4. MAIN STEPS AND CHALLENGES IN DESIGNING AND IMPLEMENTING SOCIAL PROTECTION INFORMATION SYSTEMS

The more a system is integrated across several programs and databases from other government and non-government organisations, the more potential there is for complications and challenges. This section focusses on the main pillars in designing and implementing a social protection information system, outlining what these challenges are and how countries have set out to overcome them. In doing so, it focusses primarily on information systems underpinned by social registries (see Section 2.3.2) — as:

- a these are increasingly becoming the most popular approach
- b many of the lessons that apply to social registries also apply to integrated beneficiary registries (partly as these have some overlaps).

4.1 Administrative and institutional aspects

4.1.1 Governance and institutional arrangements

The more complex and interlinked the overall system for data and information management, the more difficult institutional arrangements are to establish and conform to, as there are significant transaction costs to coordination (e.g. managing complex cross-program and sector arrangements). The ultimate challenge is to get different stakeholders to share their data, especially in light of legal restrictions (e.g. data privacy) and existing power relations (information is power). Managing an integrated and centralised social registry can also lead to errors being propagated across programs that have common points of entry, and risks stifling creativity and responsiveness. There may also be fewer checks and balances as many of the core functions are centralised, as well as information asymmetries (World Bank and UNICEF 2013).

Most countries implementing integrated systems tackle these challenges by ensuring that ultimate responsibility for coordinating and managing the national registry and related software lies with an agency or unit with sufficient independence from those managing social protection programs and high enough in government to effectively coordinate with other stakeholders. Best practice has included the creation of inter-ministerial committees and ensuring regular interaction between all the stakeholders involved — ideally driven by one or two strong champions within the lead ‘social development’ ministry.

The position of the unit is vital, but so too are vertical and horizontal integration across a wide range of stakeholders. As Baldeon and Arribas-Banos (2008) warn:

... institutional arrangements across different government agencies, formal agreements between the programme and local governments, and service level agreements between the programme and service providers are essential to achieving the objectives of the [Social Safety Net] programme.

This is even more the case when integrating across programs and sectors. Best practice dictates that a clear process is needed to identify relevant stakeholders and formalise their roles and responsibilities. This could be through legally binding agreements, carefully designed incentives and mutually agreed terms of reference. It is also essential to draft legal frameworks to ensure confidentiality of data collected (a common practice across all Latin American countries — Azevedo, Bouillon and Irrázaval 2011) and address any other legal restrictions on data-sharing.

Formal agreements are not always enough, however, and not necessarily easy to reach. Best practice dictates the need for an ongoing bargaining/negotiation process aimed at demonstrating to and clarifying to each stakeholder 'what is in it for them'. In order to achieve this, countries have successfully implemented in-depth needs assessments (e.g. mapping information needs and synergies) and participatory planning processes (e.g. Kenya, Indonesia, Malaysia). Annex 2 provides some examples of the questions it could be useful to ask to inform design.

4.1.2 Decentralisation: an added layer of complexity?

Country administrative structures and levels of decentralisation affect integration of data and information management overall. The main trade-off is that, while local governments are most likely to understand the socioeconomic situation of the population they serve and best placed to collect and update data for the registry, they might have more incentive to facilitate access to social protection programs to those who are not necessarily deserving (to win votes and build contacts), given that the budget is managed centrally (Azevedo et al. 2011). Local governments in countries implementing integrated social registries have also shown resistance to change (low ownership and buy-in), feeling disempowered by the centralised process.

So how to ensure buy-in and support while maintaining consistency and control at national level?

Based on the study of six countries that had implemented a social registry in Latin America (Argentina, Brazil, Colombia, Costa Rica, Chile and Mexico), Irarrázaval (2004) notes that in no country is the design of the system³⁷ itself devolved to sub-national level. Several countries, such as Brazil, Chile and Colombia, devolve implementation aspects while maintaining verification and validation of data control (Azevedo et al. 2011). In Brazil, the quality of this process is guaranteed by providing financial incentives to municipalities (Box 8). In Malaysia and Indonesia, the active involvement of decentralised units of government has been considered essential to the success of the system (ensuring ownership and buy-in).

A further strategy to ensure buy-in is to provide 'value-added' incentives to local units of government, sharing data and tailoring reports/analysis to their needs and allowing the use of consolidated data for local programs (as in Indonesia and Brazil, for example). Countries adopt different strategies for securing access to consolidated data to decentralised levels of government. The type of strategy developed depends on consideration of factors such as established formal agreements; the sophistication of the software application granting user access; and the possibilities for transmitting data (for example, the presence of reliable internet at decentralised level).

37 This includes defining information requirements for the social registry (and related questionnaire) and formalising the main procedures to establish the registry (Irarrázaval 2004).

Box 8: Problems with and solutions to decentralised management of a social registry — Brazil's Cadastro Único

As a result of the division of tasks between municipalities, Caixa and the Ministry of Social Development, Cadastro Único offers these advantages:

- » A 'big-picture' view of national coverage and policies, due to the ministry's privileged position within the executive power of central government
- » Local accuracy for targeting, since 'tricky' implementation is carried out by strong and traditional structures, with fairly sound knowledge of the social needs of local people.

This decentralised system is strengthened by formal performance-based financial incentives — based on a decentralised management index (Índice de Gestão Descentralizada, or IGD) — provided to municipalities to encourage them to implement with quality. Financial incentives are regulated by law and based on set criteria, including the need to continuously update the registry.

Despite these and other advantages, the Cadastro Único's decentralised structure faces some challenges, including:

- » Difficulties in preventing influence from, and monitoring the sensitivity of the registry's targeting to, local political disputes. To counteract this, government has:
 - focused on increasing public awareness of citizens' rights to be included in the Cadastro Único and overall targeting criteria³⁸
 - adopted a system of internal and external audit institutions from the public sector (Rede Pública de Fiscalização), and a toll-free telephone number linked to a grievance resolution mechanism that is at the public's disposal
 - imposed a Cadastro Único geographical targeting limit for each municipality
 - Created a system for cross-checking data with other central government databases (formal labour market, social pensions and other social policy databases) and a household and personal data assessment which estimates inclusion error incidence by municipality.
- » Low enforcement capacity between levels of government. This challenge is partially mitigated by the 'adherence pacts' municipal government must sign with Cadastro Único. There are no sanctions or appeal mechanisms to resolve possible disagreements, however, so these are dealt with case by case.

Source: Mostafa and da Silva (2007).

4.1.3 Staff availability, capacity, training and retention

Staffing is particularly important for managing complex integrated systems and institutional arrangements. Issues revolve around staff availability, capacity, training and retention.³⁹ At central level, it can be difficult for public administration to attract and retain highly qualified staff with the right combination of strategy, management, analysis and IT skills⁴⁰ — especially as these are skills that command significantly higher salaries in the private sector. At decentralised levels, managing a national social registry can be particularly challenging in contexts where there is no established network of local staff (e.g. social assistants in each community). Moreover, it may be difficult to promote a culture of sharing and problem solving (especially where different institutions and

38 For example, the simple selection criteria for Cadastro Único and Bolsa Família (its main user) have greatly increased the transparency and therefore accountability of the registry process. The more complex the targeting criteria, the less easy the process.

39 In Malaysia, the high turnover rate among officers involved in eKasih implementation was considered one of the biggest implementation challenges. Among the main reasons were promotion, relocation and retirement.

40 For example, the literature studying failure of information systems in developing countries discusses how the success of data integration processes can be bolstered by 'hybrid' figures at central level who 'understand both context, organization, and work processes of their sector and the role of information systems. As such, they can bridge the contexts and assumptions of both technical designer and business-oriented user' (Heeks 2002). This hints at the important fact that creating a social registry is not a task that can be solely led by IT consultants specifically contracted for the task.

units within each institution have different incentives and are not used to working collaboratively) and to avoid 'overwhelming' staff with changes linked to integration (e.g. 'larger role').

Different countries have strategies in place to deal with these issues (Azevedo et al. 2011; OPM 2015a; WWP 2016b), all of which centre around the idea that one-off training is never sufficient. Strategies include:

- » Defining capacity as critical and budgeting for it, based on a detailed capacity assessment
- » Continuous approach to training and capacity building:
 - developing manuals and continuously enforcing their use (Brazil, Colombia, Costa Rica and Mexico)
 - hosting capacity-building days and ongoing training (Brazil, Chile, Iraq, Lebanon, Palestine and Turkey)
 - training 'back-up officers' for smooth change management and adopting a training of trainers approach (Malaysia)
 - conducting thematic working groups (Kenya) and 'good practice workshops' across different locations (Moldova)
 - conducting online education and online consultations (Chile)
 - ensuring capacity transfer in consultant contracts (Kazakhstan) and adopting a long-term vision for capacity development and training
- » Rewarding and involving staff (financially and 'emotionally')
 - defining performance standards, monitoring compliance and rewarding good practice
 - ensuring all staff are aware of the ultimate vision and benefits of an integrated system (for example, include this in training curricula)
 - ensuring all staff are somehow involved in the participatory planning process and have mechanisms to provide feedback on their role (frustrations, suggestions) within the integrated system (i.e. ensuring all staff have a stake in final outcomes).

4.2 Operational and implementation aspects

4.2.1 Collecting data (intake and registration)

Systems that generate information are only as good as the data entered. Also, each piece of information collected adds an additional cost and makes information management more complicated and, potentially, less effective (Chirchir and Kidd 2011). At the same time, of course, one of social registries' primary roles is to provide in-depth information for the purpose of determining access to social sector programs (whether means tested or categorical). So what data to collect? And how best to collect it?

What data to collect

Best practice is to manage the amount of data collected by keeping data focused on core objectives (e.g. for social registries: determining eligibility and program needs) and managing pressure from other institutions (e.g. during a participatory planning process, when each will be interested in different aspects). Villalobos et al. (2010) suggest:

... four key questions should be answered, preferably at design stage: (i) which data are registered? (ii) what are the data registered for? (iii) how are the registered data used? (iv) who uses the data?

The amount of data ultimately collected varies widely across countries and depends on program requirements. Universal (non means-tested) programs, for example, will have much lower data requirements, as Box 6 on Thailand's national health insurance registry demonstrates. Data requirements of conditional programs, on the other hand, are larger. Box 9 provides some examples of the main types of data collected for social registries used for the determination of eligibility.

Importantly, certain categories of data may be more contentious than others when it comes to data privacy and security concerns (see Section 4.3.1). Whether obtained unduly by third parties or used unduly by government (e.g. ‘surveillance state’), information on citizens’ identity, address, health, asset-holding and bank accounts (among other things) could easily be abused if sufficient safeguards are not ensured, as discussed extensively in Hosein and Nyst (2013).

Box 9: Information typically included in a social registry

The exact amount and type of information collected depends on country needs and context. However, social registries typically include:

- (a) **information on identity and household composition** such as name, birthdate, gender, relationship with household head, marital status, unique identifiers such as a national or functional⁴¹ ID number
- (b) **socioeconomic information** such as self-reported and/or verified information on incomes for each household member, education, employment and disability status of each individual
- (c) **information on housing and assets** such as housing characteristics (e.g. type of housing material, connection to water, electricity), self-reported and/or verified information on assets
- (d) **information needed for implementation of transfers** such as postal address, contact phone number, nominated recipients, bank account number (if relevant to payment modality), receipt of any further assistance
- (e) **other information** depending on the registry’s purpose and use, such as access to services, health, food security status, registration with employment agencies, social insurance number.

An example (in English) of Brazil’s Cadastro Único data collection form is available at socialprotection.org. Examples (in Spanish) of Chile’s Registro Unico de Hogares data collection form and manual are available on the Ministry of Social Development website.

Source: Adapted by author based on Leite et al. (2017).

How to collect the data

For countries setting out to populate a social registry, three main data collection options exist, as described below. Countries with mature registries tend to combine the three approaches to varying degrees and, in doing so, reap the benefits of each (e.g. Turkey, Argentina and Chile).

The first two approaches use a questionnaire-based process (paper based or online) widely described in the literature (Grosh et al. 2008; Castaneda and Lindert 2005; Villalobos et al. 2010). On-demand registration relies on households going to a local welfare office to register and apply for benefits. Modern approaches to on-demand registration include the use of online applications or mobile phone apps (e.g. Argentina, Chile and Australia). Census survey registration entails a labour-intensive approach by which all households in an area are interviewed at selected intervals. In some cases, as in Indonesia, only households that have been predetermined as poor (based on existing data) are interviewed.

The third approach, which is increasingly being used by mature social registries (defined in this report as virtual social registries), is the integration of data from existing databases, including — potentially — a country’s civil registry, tax registry, land registry, education and health MISs. Adequately used, such an approach can greatly reduce the need for direct data collection through the two methods described above (which remain necessary in some form or another as it is unlikely that existing administrative databases can provide the wealth and breadth of information needed for determination of eligibility, except in the case of universal transfers).

41 A functional ID number is one that covers population subsets and is introduced in response to a demand for a particular service or transaction (such as voter registration) (Gelb and Clark 2013).

Table 8 highlights the relative advantages of the three approaches, suggesting when and where each may best be suited. It should be noted, however, that:

- » several variants on these ‘pure’ categorisations exist. For example, three of the programs informing Kenya’s ‘Single Registry’ (an integrated beneficiary registry) collect data using a ‘periodic’ on-demand approach: public meetings are scheduled yearly in each community where households can come and register (see Annex 1, Case study 4). In this case, the advantages in terms of up-to-date data may not apply. Similarly, very few countries adopt a full census sweep when collecting data for their social registry: households interviewed are only those that are predetermined as likely to be poor (based on existing data or community validations)
- » costs and capacity permitting, countries often combine approaches to reap benefits of each.

Table 8 Relative advantages and disadvantages of survey, on-demand and data-sharing data collection approaches

	Relative advantages	Disadvantages	Best suited
On-demand application approach	<ul style="list-style-type: none"> » Lower total costs due to self-selection of non-eligible out of registry process (interviewing fewer non-eligible households) » Dynamic, ongoing entry and easier to update (including changes linked to life-cycle events) » More democratic nationally — everyone has the right to be interviewed at any time » Permanent process helps build and maintain administrative and logistical structures 	<ul style="list-style-type: none"> » Poor may not participate because they lack information, fear stigma and face other barriers to access (illiteracy, distance, disability etc.) » Costs can be higher if social workers must verify (via home visits) information provided » Can be a slow process, involving long queues and bureaucracy » Requires large network of staff at local level » Unlikely for people to report positive changes to household conditions » Does not allow for easy collection of household’s GIS geo-referenced data 	<ul style="list-style-type: none"> » In areas with low or moderate poverty/eligibility » In heterogeneous areas » When registry is well known or well publicised (and outreach campaigns encourage applications in poor areas) » When people have higher education levels » Where a network of social protection offices is available at local level or municipal staff are well trained to perform the registration function (to minimise travel for applicants)

	Relative advantages	Disadvantages	Best suited
Census approach	<ul style="list-style-type: none"> » Better chance to reach the poorest and other vulnerable groups, who are less informed and more stigmatised (less likely to apply) » Lower marginal registry costs (per household interviewed) due to economies of scale with travel » If conducted often enough, there is a higher chance of capturing positive changes to household conditions (less likely to be reported) » House check conducted during survey process (no misreporting assets etc.) 	<ul style="list-style-type: none"> » Periodic surveys can lead to static/inflexible registries — especially if target population is linked to life-course events (pregnancy, children 0–3 etc.) » Members of eligible households may not be home or respond when the survey is conducted » Costly in areas with many non-eligible households or where households are very dispersed » Re-registration very costly and often postponed beyond recommended 2 years 	<ul style="list-style-type: none"> » In areas with high poverty rates (more than 70%) and/or high poverty density » In homogeneous areas (rural areas and urban slums) » In areas with relatively stable poverty dynamics » With new registries (programs), particularly when a large program needs to start quickly » For registries that also want to keep a record of near-poor and non-poor households (e.g. to be targeted in case of an emergency or linked to social insurance schemes)
Virtual data integration/sharing from existing databases	<ul style="list-style-type: none"> » Less burden of proof and application time for citizens » Lower data collection costs overall » Data-sharing arrangements for data collection can lead to further integration down the line » Easier to ensure information is up to date (ongoing) and linked to life-cycle events (e.g. pregnancy, birth) » Easier to prevent fraud and potentially inclusion errors (instant verification of data) 	<ul style="list-style-type: none"> » Requires additional and complementary data collection (information from existing databases will not be sufficient) » Requires some form of unique identifier, most usefully a national ID number » Could exclude households who do not have access to national ID (poorest and most vulnerable) » Financial and transaction costs to setting up adequate integration » Risks to data privacy and of 'surveillance state' » Quality of other databases may not be adequate 	<ul style="list-style-type: none"> » Where high-quality administrative data already exists » Where there is a wider shift towards e-government » Where data can easily be linked using national ID or other unique identifier » In contexts with higher levels of formality (e.g. data describes reality)

Source: Adapted and integrated by author from Castaneda and Lindert (2005), World Bank 'How-To Note' on Enrolment, and Eurofound (2015).

Note: This table focuses on registries facilitating access to social assistance programs alone (not social insurance).

Beyond considering the relative advantages of the three data collection approaches described above (or how they could usefully be combined), countries deciding to set up a new social registry should also carefully assess whether there is a need to 'start from scratch' or whether existing data sources — including existing program MISs — could help in the process. This depends on a country's historical trajectory and existing administrative or program databases.

The overarching principle is to collect as much data as possible from existing databases whenever this is possible, to avoid duplication of efforts. For example, Pakistan's Watan smartcard program successfully provided reconstruction grants to families severely affected by the 2010 flooding, based on the National Database and Registration Authority (NADRA) database (Hunt et al. 2011; Malik 2014).

4.2.2 Updating data

With social registries, one of the most contentious issues is updating data — especially if the registry is used for determining eligibility across programs. For a registry to be fully effective it should aim to offer:

- » dynamic inclusion of newcomers (e.g. migrants, newborns)
- » dynamic exclusion of those who have passed away
- » dynamic management of transitory shocks (e.g. natural disaster, crop failure, unemployment, sickness, pregnancy).

Given the nature of poverty and vulnerability, any system that bases targeting on a static snapshot will likely face serious challenges in providing support to those most in need, especially when the snapshot is seriously outdated, which is the case in many countries with a social registry. For example, in countries primarily collecting data based on a census survey approach (see Section 4.2.1) scheduled updates are set far apart (e.g. two years in Costa Rica; three years in Colombia, Indonesia and Mexico) and the deadlines for updating are often not met because of budget and logistical problems.

To try to establish an ideal timing for updates, Costa Rica carried out a sample study to determine the length of validity of variables used for targeting. The conclusion was:

... the variables associated with income and occupation have a higher dynamism and ought to be updated every 1 to 1.5 years, while the variables associated with housing and ownership of goods have a lower dynamism, so that an updating every 3 to 3.5 years is recommended (Irrázaval 2004).

These are context specific and should be considered conservative estimates in countries affected by high economic volatility. Nevertheless, it is important to acknowledge that different types of data have different time validity, meaning that during re-targeting not all indicators need to be collected (use of a reduced form).

Best practice comes from countries where technology permits online updating through integration of data from other sources. This could be done:

- » from local to central level: systems that allow municipalities and lower implementation levels to update information on individual households whenever they are notified of changes (needs some level of control as this poses a risk)
- » from other administrative databases: data in the social registry is linked to all its 'feed' databases at pre-selected intervals (ideally daily). For example, one key resource is the civil registry, which can be used to update information on household births, deaths and ages
- » directly from citizens: any change to household conditions can be communicated directly by citizens either online or on mobile apps (e.g. in Chile and Australia).

These options have also been implemented using a 'batch-sending' approach (log of changes sent by email in batches), although this is less flexible and more labour intensive.

Countries with on-demand data collection approaches are more likely to be able to continuously update information on existing beneficiaries and enter information on potential beneficiaries. However, it is less likely that households will report a positive change to their living conditions, leading to a potential increase in inclusion errors over time. Best practice comes from South Africa, where key data are checked and updated every time a beneficiary makes contact with local SASSA offices for any reason (by phone or in person).

4.2.3 Transforming data into information

The characteristics of high-quality information include accuracy, correctness, currency, completeness, and relevance to the business processes it supports (Baldeon and Arribas-Banos 2008). However, ensuring data within social registries fulfil these requirements is lengthy and costly, especially if there is no unique ID (see Section 4.2.4). Moreover, even complete, high-quality data have no value unless they can be converted into information that is useful for making decisions and improving programs (Villalobos et al. 2010) and policy. The risk with social registries is that they may generate 'data overload': too much information that is not available at the right time and in the right format and is therefore not effectively used.

Transforming data into information — a task that is performed by the tailored software application discussed in Section 2.5 — requires multiple steps and coordination at intra- and inter-institutional levels (Villalobos et al. 2010; Azevedo et al. 2011). The main steps are:

1. Verification: subjecting data to an external verification process that can be implemented in person, through a random supervision process or by comparing it to other administrative data manually or electronically. This is especially the case in countries where a national identification system provides a backbone unique ID for each citizen (e.g. data can be cross-checked with the civil registry), but is also possible where this is not the case (see Section 4.2.4)
2. Validation: checking completeness of data, applying internal consistency checks, checking for duplication, ensuring contents and formats (such as conformity of names and ID numbers to the defined data dictionary) and ensuring the length of fields and content structure for aggregation and reporting is standardised. The objective is to obtain a clean and correct dataset
3. Processing and analysis: aggregating/disaggregating, organising and analysing data so as to extract meaningful information (indicators, tables). This is linked to step 5 below and can be partly pre-coded by the social registry's tailored software application
4. Updating: making sure the database does not present a static snapshot of household situations, thereby ensuring currency (see also Section 4.2.2)
5. Reporting and disseminating: designing and generating reports based on the data in the system, for effective decision-making and management at various levels of program administration.

The importance of adequate reporting is too often disregarded, as is the development of an overarching M&E framework to report against.⁴² For example, despite its being operational since 2001, only in 2012 did Brazil start developing detailed reports for the managers of social policies, based on a new unified registry information consultation, selection and extraction tool (CECAD)⁴³ (WFP 2016a). Best practice to ensure reporting and use of data across government includes (OPM 2015a):

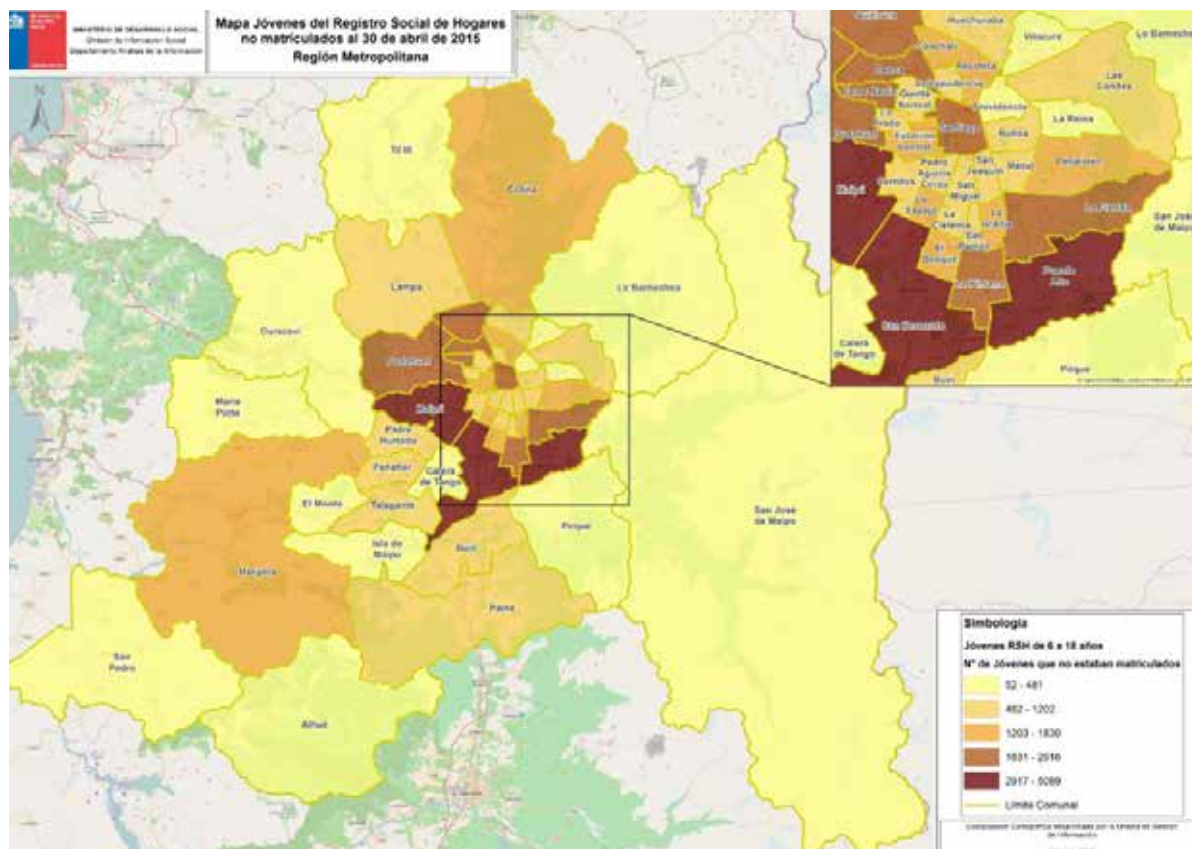
- » Clearly identifying data needs and reporting requirements of each actor and catering to those (including granting relevant access)
- » Developing a relevant and timely reporting system (e.g. a module within the software application), informed by constant testing by data users
- » Providing adequately disaggregated data, catering to the planning needs of local governments and other data users

42 This topic would require additional research.

43 Since its launch in 2012, the CECAD has been upgraded several times. Currently (2016) it receives around 500,000 visits and a total of over 2 million queries a month.

- » Presenting reports in easy-to-read formats (e.g. dashboards, charts and graphs)
- » Using GIS and geo-referenced data where possible (e.g. in Uruguay, Indonesia, Chile, Brazil)
- » Publishing aggregate key data trends on a relevant institutional website, to engage citizenship more widely (e.g. Indonesia)
- » Encouraging data-sharing with a wide range of actors, including research institutions and universities.

Figure 8 Example of Chile’s geo-referenced reporting system



4.2.4 Linking databases: need for a unique identifier

Registration and eligibility processes require documenting and authenticating⁴⁴ a potential beneficiary’s identity (Samson 2006).⁴⁵ Yet ‘under-documentation is pervasive in the developing world’ due to absent or patchy civil registration systems (Gelb and Clark 2013).

When collecting information for a single social protection program, identifying beneficiaries can be approached on an ad hoc basis, using whatever documentation is available (in some cases names and surnames of household members suffice⁴⁶). When attempting to integrate programs across and outside the social protection sector, however, a unique ID number for individuals is needed to link registry information with other systems and programs (Castaneda and Lindert 2005; Baldeon and Arribas-Banos 2008). In Latin America, for example, the absence of a unique national ID number has been a key stumbling block in the development of integrated systems, according to Castaneda and Lindert (2005). Yet the linkage of a national ID system with social protection provision is not free of controversy, as summarised in Table 9.

44 Providing identification responds to the question ‘Who are you?’. Providing authentication responds to the question ‘Are you who you claim to be?’.

45 See also validation discussion in Section 2.4.3.

46 Note that this does not provide authentication, unless biometric data is collected too.

Table 9 The opportunities and challenges of linking a national ID number to social protection provision

Opportunities	Challenges and risks
<ul style="list-style-type: none"> » Enables instant integration of different programs and sectorial databases (acts as unique identifier), potentially improving service delivery » Can provide online, cost-effective, ubiquitous authentication services across a country, e.g. for data verification (ensuring uniqueness — 1:n; and identity — 1:1) » Can act as a data source, with information on all citizens (e.g. names, addresses), thus helping to identify vulnerable groups or persons » Facilitates an audit trail down to the recipient of social assistance, thus increasing transparency and accountability while reducing program leakages and fraud » Can complement financial inclusion initiatives and enable access to and reduce the costs of financial services — e.g. enables e-payments to beneficiaries (fulfills know-your-customer requirements) » Can support integration of payment systems and other services across programs » Can help to ensure more integrated policy-making (cross-sectoral, with focus on the same households) and portability of benefits across the country 	<ul style="list-style-type: none"> » Few lower and middle income countries have 100% population coverage within their National ID database » The most vulnerable and disadvantaged individuals are often those without a national ID, because of lack of information and direct (e.g. fees), indirect (e.g. transport) and opportunity (time) costs » Certain categories of populations could be systematically excluded from the national ID and therefore social protection provision, most importantly non-citizens, migrants, indigenous people and minors (e.g. street children) » Risky in contexts with no legal framework for privacy and where governance is poor — privacy concerns, while perhaps not manifested initially, will likely increase over time⁴⁷ » ID projects can have large initial capital costs that are not justified by needs in terms of social protection provision » Where biometrics are involved, requires an ad hoc approach for categories that cannot be easily registered (e.g. fingerprints for very young and very old)

Source: Adapted by author from Gelb and Clark (2013) and ISPA (2016).

Note: Many of the 'opportunities' could also be guaranteed by other robust functional ID systems.

Unsurprisingly, those most likely not to have such ID are most often the poorest and most vulnerable. So how to ensure linkage of databases in the absence of an existing ID system and unique identifier? Country experience suggests the following avenues (Castaneda and Lindert 2005; Gelb and Clark 2013; Gelb 2014; OPM 2015a):

- » Building a business case for a national ID system as an important pillar for delivery of social services, working alongside national registry offices on a common effort to register individuals, particularly in remote or poor areas where lack of identity documentation and numbers is prevalent. This could include:
 - i. assessing the effectiveness of a national ID system, evaluating pros and cons (see for example Table 8) and investing in a feasibility study as part of data and information integration planning.⁴⁸ Estimates on costs of large ID programs run from 3 to 15 US dollars per head⁴⁹
 - ii. incorporating civil registration as a key objective of a social protection program. Examples are Kenya's Cash Transfer for Orphans and Vulnerable Children, Kenya's Hunger Safety Net Program and Uganda's Social Assistance Grants for Empowerment program, where beneficiary households are given easy/free access to national ID⁵⁰
 - iii. registering households for National ID during registration for the social registry. In Lesotho, for example, this was done during registration for the Child Grant Programme
 - iv. incorporating social protection as a key objective of civil registration and national ID efforts. See Pakistan's experience described in Box 11 below

47 It should be noted in this context that several high-income countries, most recently France, have not allowed for integration across their civil registry and social protection system because of privacy concerns.

48 Such a study would clarify objectives, benefits, costs and contextual constraints and set out a clear road map.

49 See Gelb 2014 for more details.

50 A controversial example comes from the Dominican Republic, where a program aiming to register poor citizens de facto stripped citizenship rights from many residents of Haitian extraction — see the International Justice Resource Center website.

- v. taking advantage of national events such as elections to register all citizens. This has been done in Bangladesh, Benin and Democratic Republic of Congo, for example
 - vi. sharing costs of setting up an ID system among government agencies to justify investment
 - vii. linking the ID to other desirable services. For example as part of the rollout of a comprehensive ID system, Aadhaar (see Box 10), India's government is opening bank accounts. In Pakistan, NADRA achieved registration by promoting a range of wider benefits (ability to perform haj pilgrimage, access to bank accounts and other services etc.)
- » Considering the relative effectiveness of other existing functional ID systems (e.g. voter registration, birth registration)
 - » Generating another functional 'unique number' to substitute a national ID number and complement existing functional IDs. The most famous is the US's social security number, a strategy also adopted in Brazil,⁵¹ Mauritius, and Mexico, for example. However, the common practice of assigning new numbers as people apply (a new number for each questionnaire) could lead to potential problems with duplication, as in Colombia
 - » Designing formulae or 'algorithms' that combine a number of variables to create a comparable identifier across databases in the government sector. For example, Brazil's 'match key' variables consist of name, mother's name, date of birth and codes from selected documents,⁵² while in the Philippines probability models for matching data are based on birthdates and other identifying data
 - » Rejecting those who do not have an ID number, as Brazil did in the early phases of the Cadastro Único. However, this is not a viable strategy for an inclusive registry.

Box 10: India's Aadhaar and its involvement in social protection

Aadhaar is a 12-digit individual identification number issued by the Unique Identification Authority of India (UIDAI) on behalf of the Indian Government, following the collection of demographic and biometric information. Any individual, irrespective of age and gender, who is a resident in India and satisfies the verification process can enrol for Aadhaar free of cost. In 2016, over 1 billion people had been registered for Aadhaar (almost 80 per cent of the population).

Aadhaar serves as a proof of identity and address, anywhere in India. It also helps to provide access to basic services including banking (promoting financial inclusion) and mobile phone connections. Most importantly for social protection, Aadhaar enables a wide variety of service-enhancing functions that are slowly being rolled out by government. These include:

- » removing duplicates and reducing leakages by linking beneficiary records with Aadhaar. This has reportedly already resulted in savings of 1 billion US dollars per year following use for India's fuel subsidy program (see report at livemint.com and Barnwal (2015) at www.med.uio.no). Aadhaar is also being tested to monitor attendance within the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) cash-for-work scheme and the Sarva Shiksha Abhiyan (SSA) program promoting universal primary education
- » better reach and targeting, ensuring inclusion of those without proof of ID
- » reducing cost of delivery by using direct payment to Aadhaar-linked bank accounts of beneficiaries
- » enhancing accountability and traceability of service delivery to beneficiaries
- » potentially better engagement with residents through self-service and online applications.

Recently other countries, including Russia, Morocco, Algeria and Tunisia, have shown interest in the Aadhaar model.

Source: Aadhaar website, UIDAI (2012), Barnwal (2015).

51 See for example Brazil's 'social identification number' (unique number for each registered person).

52 Note that cross-checks across databases using these algorithms as a unique ID are not 100 per cent accurate.

Box 11: Pakistan's NADRA and its involvement in social protection

The government of Pakistan started issuing national identity card (CNIC) numbers to its citizens in 1973, and the National Database and Registration Authority (NADRA) was officially instated in 2000. Rapidly increasing registration rates were achieved, in part, by incentivising women to register by making clear that if they were poor they would be eligible to receive a subsistence grant from the Benazir Income Support Programme (BISP). Similarly, citizens were told that identification could make them eligible for emergency programs and eligible to vote.⁵³ Registration was eventually established as a prerequisite for accessing a number of other services such as obtaining passports and utilities connections. Outreach to remote areas and mountainous regions was achieved by setting up motorcycle and man-pack (on foot) registration units. Between 2008 and 2013, approximately 30 million Pakistanis got their ID cards free of cost. To date, approximately 98 per cent of the entire population is covered in NADRA's foundational database.

In 2010 Pakistan experienced flash floods affecting over 20 million people. NADRA set up 131 registration sites near the disaster-hit areas. If people had lost their ID cards, these were re-issued free of cost. This registration process was then used to disburse the Citizens Damage Compensation Program (CDCP), distributing 77 billion rupees to 2.84 million families. For the targeting of the BISP program, NADRA data was used as a cross-check to help verify data collected and determine eligibility, while NADRA technology and partnership is also supporting e-payments.

Source: Malik (2014); Honorati, Gentilini and Yemtsov (2015); NADRA website.

4.2.5 Integrating operations and services

As discussed in Section 1.2.3, one of the ultimate aims of integration of data and information management should be to improve citizens' experience of and access to social protection programs. However, integrating operations and services across the social protection spectrum requires very high levels of capacity and institutional coordination and may not always be feasible. For example, individual programs may be reluctant to relinquish control over their operations.

This section briefly discusses the key operations — beyond determination of eligibility — that could usefully be integrated and managed nationally (providing more detail is beyond the remit of this paper). Importantly, the challenge posed in order to achieve these is institutional and organisational, not technological.

Communications

Adopting an integrated approach to social protection entails providing clear, transparent and non-contradictory information to citizens on their rights and responsibilities in relation to the services they may or may not be entitled to. A national registry could potentially aid this process by rationalising access to and receipt of social programs, ensuring one point of contact and source of information.

Registration

Integrating the approach to registering potential beneficiaries of social protection programs — as is the case for social registries — can have large impacts on citizens (ensuring ease of access etc.), as discussed already in Section 1.2.3. This is in line with best practice advocated by the ILO in developing single-window services.

53 When data from NADRA was cross-checked with the voter roll, it was found that this 'included 15 million voters without identities; 9 million duplicates (some individuals had registered more than 23 times!); and 13 million invalid identities. These 37 million voters — nearly 45 per cent of the voter roll — were expunged from the system, with the aid of the Supreme Court to ensure that this was done in accordance with legal procedures. The voter lists were augmented with 36 million missing ID cardholders who became new eligible voters. These voters had received their ID cards in the last three years or had possessed ID cards earlier but were missing from the previous electoral rolls' (Malik 2014).

Updating registration information for ongoing assessment of eligibility

As discussed in sections 4.2.2 and 4.2.4, a key area where integration could generate benefits for the administration of social protection programs is the possibility of continuously updating citizens' registration information. This would allow the system to continuously re-assess eligibility for a wide range of programs, especially universal categorical ones. For example, by cross-checking information from the social security system and civil registry, the system could flag households eligible for child benefits, pensions or unemployment insurance. This would enable a government to provide immediate protection when needs arise, but also to 'exit' households who are no longer eligible (age cut-offs, death etc.). Countries moving in this direction include Mauritius, with its twinned registry, Argentina, Chile and Uganda.

Payments

Integrating payments can be difficult where existing programs have different payment mechanisms and providers (e.g. banks, post offices, postal banks, private agencies and manual mechanisms such as armed vehicles). However, Brazil, Turkey and Chile (see Annex 1) show that this level of integration is possible where adequate coordination is in place and the integrated software application is linked to the payment service provider. In Kenya, such integration is also increasingly in place thanks to the role of Equity Bank and Kenya Commercial Bank, and to a 2013 presidential directive mandating the digitisation of all government payments. For example, the country's Single Registry now supports the verification of the beneficiary list through pre-payroll and post-payroll checks (Mwasiaji 2016).

M&E systems

Ensuring M&E processes are integrated across the multiple schemes operating in a country ensures economies of scale and scope while also allowing for an integral vision of social protection policy, which can support planning. A social registry can be an ideal tool to achieve this, if data from individual programs is linked back to the registry. Integrated beneficiary registries are set up with this objective, as Kenya's experience in setting up its Single Registry has shown (see Annex 1).

Grievance mechanisms

Grievance mechanisms for social protection are under-used and under-perform in most countries. International best practice points to the need for an overlapping and interlinked grievance system that includes program-specific mechanisms, government or ministry-level mechanisms, independent grievance mechanisms (such as ombudsmen and public enquiries) and legal redress institutions. Moreover, it is generally accepted that it is more effective to resolve complaints at the point of service delivery where information and transaction costs are the lowest (Barca, Brook and Notosusanto 2012).

For these reasons, it is clear that integration of grievance mechanisms across programs is problematic when different programs have different structures and different capacities to respond. Nevertheless, there could still be economies of scope and scale — and benefits in terms of transparency and ease of access — from integrating the overarching grievance procedure (e.g. setting up a national hotline that redirects program-specific queries while also using a network of highly trained staff at local level as first points of access). Several countries are moving in this direction (e.g. Indonesia, Kenya), creating a module within their tailored software application focusing on grievance management; but not enough evidence is available to date.

Case management

Each beneficiary accessing a social protection program comes with a particular history and set of needs that are not necessarily all addressed through standard program operations. An integrated social protection case management system would follow each individual 'case', ensuring that people's needs (children, disabled people, the elderly, vulnerable households etc.) are assessed on a continuous basis and addressed (a) within existing programs (e.g. providing guidance, information and support) and (b) by linking beneficiaries to a wider set of complementary services available within the country (through some form of referral system). Integrating such a system across programs may pose challenges when case management needs differ.

Conditionalities

Social protection programs sometimes impose conditions on beneficiaries, such as school attendance, health check-ups and training. In theory, full integration could make it more efficient to monitor these conditions. For example, integrating the education ministry MIS could provide timely data on attendance. This is a highly complex process from an institutional and data management point of view, which is why only Turkey has succeeded in making this process entirely virtual (see Annex 1); standard practice is to adopt batch-sending processes.

4.2.6 Using data for determining eligibility⁵⁴

One of the primary roles of social registries (as opposed to integrated beneficiary registries — see Section 2) is to support the gateway phases of intake/registration and determination of eligibility across social sector programs.

Many social registries⁵⁵ score or rank households registered based on their levels of poverty and vulnerability at central level, to avoid political interference. The outcome is a compiled list of potentially eligible households or a ranked list of all households. This output can then be shared with individual program implementers or decentralised counterparts, who use the national list as a basis for eligibility determination and often adapt it to their purposes by:

- a. adding further criteria: for example, pregnant women or people aged 65 and over
- b. validating lists provided: for example, publicising the list in the community and giving 30 days for people to object, calling a community meeting or conducting household visits
- c. choosing what percentage of households ranked nationally are to be included: for example, only the poorest 10 per cent.

This two-tiered targeting approach enables a common methodology to be developed across programs while maintaining the flexibility needed by individual programs or decentralised units of government to target specific household types.

In other cases the full dataset from the social registry is shared with user programs, meaning the social registry only integrates intake/registration, not eligibility determination.

However, the risks an integrated approach to intake/registration and/or determining eligibility poses go beyond those faced by individual social protection programs, as any mistake can lead to exclusion from multiple social sector schemes.

For example, integrated intake/registration could lead to systematic exclusion of certain households because of problems with:

- » data collection: e.g. low take-up for on-demand systems, biased coverage for census survey systems, political interference at local level
- » data/administrative requirements: e.g. lack of an ID card

An integrated process for determining eligibility could similarly be problematic if the eligibility formula does not accurately capture those in need or if the national approach to determining eligibility does not adequately reflect local poverty profiles – a big challenge in large and diverse countries (e.g. Indonesia, Brazil).

Approaches used to mitigate these risks have included (OPM 2015a):

- a. institutionalising a validation process within communities, at registration. However this is time-consuming and can be counterproductive if validation results are not integrated into the system
- b. enabling two decision-making layers. In Turkey, for example, data determines eligibility but human decision (following household visit) prevails. Central level then validates local decisions, performing spot-checks on discrepancies with the central targeting index

54 A full discussion on targeting is beyond the scope of this paper. It is treated extensively in the literature (Coady, Grosh and Hoddinott 2004; Castaneda and Lindert 2005; Slater and Farrington 2009). This paragraph is a brief overview of how integrated targeting is used in practice for individual programs.

55 In some cases, the full dataset from the social registry is shared with user programs.

- c. having in place a functional grievance mechanism for complaints and appeals, e.g. a toll-free line (problematic if this does not translate into changes in targeting decisions)
- d. ensuring, through tailored communication strategies, that people understand targeting (e.g. to increase take-up and registration).
- e. including parameters relating to local context (urban/rural, services available etc.), as is done by SISBEN in Colombia.

4.2.7 Using data for emergency response

The literature on the topic of shock-responsive social protection clearly articulates the use of national social registries, containing information on both potential and current beneficiaries, for the scale-up of interventions in case of a humanitarian emergency (IEG 2012; Kuriakose et al. 2012; McCord 2013; Ovadiya 2014; Bastagli 2014; OPM 2015b and 2016). For example, in the aftermath of covariate shocks, a country's social registry could be used as an immediate solution to identify households in need of assistance, enabling a combination of the following (OPM 2015b):

- » Vertical expansion: Increasing the benefit value or duration of existing programs, either by adjusting transfer amounts or by introducing extraordinary payments or transfers. This assumes the target population of ordinary social protection is the same as for post-emergency transfers.
- » For example, at program level, one-off ad hoc payments or temporary increases to transfer sizes have been used post-crisis in Chile, Vietnam, Brazil, Mexico, Bangladesh, Lesotho and the Philippines (OPM 2016).
- » Horizontal expansion: Adding new beneficiaries to existing programs, either by extending geographical coverage, by modifying entitlement rules or by relaxing existing requirements.

For example, at program level, Bolsa Família in Brazil and Oportunidades in Mexico expanded to reach a million more beneficiaries after the Triple F⁵⁶ crisis, in Brazil's case by relaxing the eligibility criteria (Bastagli 2014). In Kenya, the HSNP has introduced a shock-response component that expands horizontally to an additional temporary caseload in the early stages of a food crisis as part of the national drought management response. This is done thanks to an initial exercise that census-registered all households in the HSNP counties, issuing them with bank accounts. The emergency payment was first triggered in April 2015 and has been released twice since, in May and August 2015 (OPM 2016).

- » Piggybacking: Using the existing data and administrative framework, but introducing a new ad hoc intervention.

For example, in Pakistan the flood-response CDCP was in a strong position to respond to crisis thanks to NADRA's database (Bastagli 2014; Malik 2014). Similar piggybacking approaches have been adopted in Uruguay (through Integrated Information System for the Social Area) and Lesotho (through the National Information System for Social Assistance) and are currently being discussed in Mongolia.

However important the role of social registries may be in this context, it is important to stress that they are not always fit for the role of supporting horizontal expansion or piggybacking. This is because of the very nature of emergencies, which can affect households across the social spectrum and shake up the poverty profile of affected areas.

The key factors determining usefulness of existing social registries for shock-responsive purposes include the following (bearing in mind the privacy and security concerns outlined in Section 4.3.1):

- » Representing a large enough snapshot of a country's population. This is only the case where either (a) a census survey is applied to all households (not only those who have been pre-identified as poor, as for example in Indonesia) or (b) data exchange from administrative data sources populates the registry with relevant information on all citizens
- » Including information for both current beneficiaries (e.g. those who have been ranked as poor and selected as eligible for social assistance programs) and potential beneficiaries (e.g. the near-poor). This is not the case for integrated beneficiary registries, for example

56 The food, fuel and finance crisis that began in 2008.

- » Containing data that is useful and relevant to assess contextual vulnerabilities after a shock. For example, this may not be the case for those registries that primarily aggregate data from existing administrative sources (e.g. data on consumption levels, food security, asset ownership). On the other hand, geo-referenced data could be particularly useful. Collecting relevant information may require early collaboration with the country's disaster management authority and humanitarian agencies
- » Containing up-to-date information — i.e. having a frequent, strong and valid data-updating strategy in place. As discussed in Section 4.2.2, this may be especially the case for on-demand data collection systems, which update data on an ongoing basis.

4.3 Technological requirements

As with program MISs, when integrating data more widely across the social protection sector (and beyond) the overall technological set-up poses risks and challenges. In an integrated environment, data and information management should therefore consider these technological requirements — while also acknowledging that technology alone does not ensure good information management.

4.3.1 Information privacy, back-up and security

Determining eligibility for social protection programs requires substantial amounts of personal information to be gathered from potential beneficiaries, including sensitive data on health, income, assets and housing. This poses the risk of misusing or losing such information,⁵⁷ potentially exposing households to further vulnerability (CaLP 2013; Hosein and Nyst 2013; APSP 2014). In integrated systems, this risk increases, especially as data is shared across multiple actors. Importantly, the right to information privacy is also embedded in the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights (ICCPR)⁵⁸ and ILO Social Protection Floors Recommendation 2012 (No. 202), which explicitly calls on states to 'establish a legal framework to secure and protect private individual information in their social security data systems' (paragraph 23).⁵⁹

Best practice shows that, where social registries or any level of interoperability are being developed, country laws should adhere to international data transfer and information privacy protocols, which legislate the collection, transfer and storage of information. This becomes even more important where data is shared across a public network and several institutions. Key laws that should be adhered to include the Council of Europe's Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, the United Nations Guidelines for the Regulation of Computerized Personal Data Files, and the OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data. Such practices are common in, for example, all Latin American countries.

Some of the most important principles and actions for the secure use of personal data within social protection programs are (CaLP 2013; OPM 2015a):

- » ensure informed consent of those who are sharing their data, explaining the nature of the data being collected, the purpose of collection, with whom it will be shared, and who is responsible for the secure use of their data⁶⁰
- » establish a mechanism to respond to any complaints or concerns citizens may have about the use of their personal data
- » regularly undergo information system audits to analyse, document and understand the flow of data, and develop risk mitigation strategies for potential risks arising from these flows

57 For example, data could be illicitly used for blackmail, identity theft, or marketing purposes.

58 Article 17 of the ICCPR, which reinforces Article 12 of the Universal Declaration of Human Rights, provides that 'no one shall be subjected to arbitrary or unlawful interference with his privacy, family, home or correspondence, nor to unlawful attacks on his honour and reputation'.

59 States that are parties to other United Nations or regional instruments such as the ICCPR, the American Convention on Human Rights and the African Union Principles on Freedom of Expression should also take into account their international obligations in the implementation of their national social protection floors.

60 Recent research in Kenya showed that this was often not the case (APSP 2015).

- » implement appropriate technical and operational security standards for each stage of the collection, use and transfer of beneficiary data to prevent unauthorised access, disclosure or loss
- » implement appropriate mechanisms to provide individuals with the right to access their personal data and correct it
- » enforce data back-up and protection protocols and guidelines, for example by
 - ensuring data users are trained on and aware of these issues
 - implementing user profiles on information system access, allowing for an audit trail
 - sharing data in anonymised and summary format except when needed
 - establish non-disclosure agreements for anyone who is granted access to data.

Specifically, back-up and security should conform to ISO 27001⁶¹ — an approach to managing confidential or sensitive information — so that it remains secure, confidential and with its integrity intact. In some pilot transfer programs (such as the Hunger Safety Net Programme in Kenya and Social Assistance Grants for Empowerment in Uganda), back-up and security systems are hosted in physically and logically secured servers at program level. But national programs sometimes outsource this security and hosting function. In Pakistan, for example, the Benazir Income Support Programme database is hosted by the National Database and Registration Authority. In South Africa, SOCPEN is hosted by the South African State Information Technology Agency (SITA).

A trade-off emerges when the need for data privacy conflicts with transparency and accountability. Several countries have solved this by making certain aggregate and anonymised datasets and data visualisations available to the general public. In Indonesia, for example, 16 of the 40 core indicators in the social registry are available online in aggregate format.

4.3.2 Developing and updating the tailored software application

The classic approach to software development involves an analyst documenting requirements and then passing these to a developer to integrate them into application software. However, developing a software application that fully and flexibly responds to changes in policy and procedure is paramount in this field (Heeks 2002; Villalobos et al. 2010; Saidulloev and Dersham 2013; Browne 2014). Country solutions — implemented in Brazil, Kenya, Mauritius and Malaysia among others — to guarantee such flexibility have included:

- » Conducting an in-depth needs assessment of the key software requirements based on existing business processes and projected user needs to inform the development of procurement terms of reference (aiming at a document that is not purely technical in its specifications — see also Annex 2).
- » Adopting iterative prototyping,⁶² whereby the system model is designed and used to customise and incorporate feedback from users. This tailors the system to suit the needs of those primarily involved in its use and enhances a sense of local ownership that is essential for success⁶³
- » Creating modular and incremental systems that leave space for ongoing input and changes on behalf of those responsible for managing use well beyond the design stage

61 ISO/IEC 27001:2013 is an information security standard published in September 2013 by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). Organisations that meet the standard may be certified compliant by an independent and accredited certification body on successful completion of a formal compliance audit.

62 Based on the design divisibility concept, meaning staff can learn from early, relatively small failures and not be overwhelmed by a single, whole-system design. 'Where design comes as this single whole, "big bang" implementation, opportunities for local improvisation are reduced and risks of failure correspondingly increase' (Heeks 2002).

63 This is not only functional but also helps reduce design—actuality gaps (whereby the designer believes they know what is best without understanding the user context) and hard—soft gaps (between rationality of information system design and political and behavioural actualities of developing-country organisations) (Heeks 2002). According to Peterson (1998), this can be particularly important in weak African bureaucracies characterised by personal and not procedural authority, in which information systems fail primarily because they outstrip government staff capacity to manage and exercise their power. Moreover, it is particularly important to follow the iterative prototyping approach in lower income countries because (a) individual social protection policy and programs are still at a relatively early stage of development and are still evolving; (b) individual social protection programs require significant strengthening of business processes, financial management and M&E systems; and (c) social protection institutions have differing capacity to engage in the development, implementation and maintenance of sector-wide systems.

- » Using open-source software and applying open-design principles, acknowledging the high costs of making changes to proprietary software and the risks of vendor 'lock-in'. For any other proprietary third-party software used, the suppliers should be asked to provide a perpetual and valid licence for a period of at least five years
- » Building in-house capacity to develop and update the software application, for example by ensuring that contracts have clear provisions to allow suppliers to hand over all the source code and technical documentation of the system without any preconditions.

Trade-offs are linked to overall design complexity. The more complex the functions performed by the application software, and the more data collected and linked, the higher the overall costs (because of a host of interlinked factors, including the need for adequate servers, software, data transmission channels and training).

4.3.3 Hardware infrastructure

The choice of hardware depends on the software used for managing information — and, of course, on a country's endowment. Overall, hardware should have adequate memory, disk space and processing capacity. A significant challenge many countries face is lack of availability of such infrastructure at local levels of administration. Where it is available, the hardware is sometimes not rugged enough to withstand extreme high or low temperatures, rain, dust and/or unreliable electricity supply. Hardware specifications should therefore be carefully defined.

4.3.4 Architecture and transfer of information

As discussed extensively in Section 2.5, a system that guarantees full integration within the social protection sector and beyond, in accordance with the right to privacy, would establish a direct and two-way link with several external databases using the most cost-effective and appropriate information and communications technology available in country (i.e. tailored to country context). This would enable data gathering from existing administrative sources and grant data access for external actors, including sub-national level staff and possibly other government and non-government actors.

The most common approach is to guarantee 'web-service access' online (e.g. via a virtual private network). However, this is not always possible in contexts with low penetration of internet, or where data sharing is problematic for other reasons. Many countries adopt 'hybrid' approaches, sharing data online where possible and using batch-sending approaches where not.

Some countries are experimenting with newly developed hardware and telecommunication systems that increase opportunities to handle large databases and information. Others have invested in network infrastructure readiness in key locations so as to be able to operate their software application remotely, as Box 12 describes for Malaysia. The new frontier is the use of tablets, smartphones and notebooks to access the central software application even in decentralised environments.

Box 12: Malaysia's eKasih social registry promotes bandwidth improvement

The lack of adequate network infrastructure was one of the key obstacles faced by the Malaysian government when developing its social registry, eKasih. While waiting for the government to implement its national broadband project, the eKasih management unit (ICU JPM) initiated its own network upgrading exercise in collaboration with the Malaysian Administrative Modernisation and Management Planning Unit. Network bandwidths for eKasih sites across the nation were upgraded from 64 kbps to a minimum of 256 kbps.

Source: ICU JPM (2013).

4.4 Costs, financing and political support

Building and running social registries and associated components is not cheap. In fact, evidence from Latin America indicates that ‘external financing appears to be a key element in allowing the initial disbursements needed for such systems’ (Azevedo et al. 2012). Examples from around the world support this. The World Bank has helped finance the establishment of systems (mostly through loans or technical support) in Brazil, Chile, Colombia, Uruguay, Pakistan, the Philippines (together with DFAT) and Indonesia (together with DFAT), among other countries, while Costa Rica received financing from the United Nations Development Programme and Kenya from the World Food Programme. There is a danger to such donor-driven ‘push’, as running social registries requires ongoing funding, especially to ensure adequate data updates (continuous on-demand registration or periodic census survey effort).

Overall, it is difficult to compare costs across countries, mostly because of the different ways in which costs are classified and calculated (see Box 13 for main categories), the different time reference periods and the different scope of each social registry.⁶⁴ In countries where there is overall ‘kick-off’ investment, these range between 90 million US dollars in Mexico, 83 million in Argentina, 17 million in Chile, 10 million in Colombia and Turkey, 3.6 million in Uruguay and 1.7 million in Costa Rica (Azevedo et al. 2012; WWP 2016b).

Box 13: Three main categories of social registry costs — examples from Latin America

1. Implementation/running costs. Average yearly implementation costs — including support and maintenance — have been estimated at between 0.2 million US dollars in Costa Rica, 0.5 million in Uruguay and Chile, and 9 million in Brazil (Azevedo et al. 2012; Irrarázaval 2004).⁶⁵
2. Data collection costs. The cost of interviewing households for the social registry, as a percentage of the total transfers made to beneficiaries, ranges between 0.5 per cent in Colombia and 1.6 per cent in Brazil (De la Briere and Lindert 2005). In Costa Rica, the cost of collecting and digitising data was estimated at 20 per cent of overall expenditure for the integrated system. In all countries, data collection costs varied largely between urban and rural settings. In Brazil, the average cost per application was 3.90 US dollars in urban communities and 14 US dollars in isolated communities. Costs ranged from 3.80 to 4.60 US dollars per application in Argentina; 1.80 to 2.70 US dollars in Colombia; and 2.80 to 6.90 US dollars in Chile (Azevedo et al. 2012).
3. Equipment, including hardware, software and servers. Few estimates are available for equipment, and the cost depends on initial endowment. In Argentina, equipment costs were estimated at 4.37 million US dollars between 1999 and 2006.

Source: Azevedo et al. (2012); WWP (2016b).

64 This results in different sources citing different figures, showing the need for a costing study to systematise information on this topic.

65 Estimated yearly running cost for support and maintenance for South Africa’s SOCPEN is approximately 37 million rand per year (2 million US dollars).

How can such investments be politically justified? And how can political buy-in be fostered more widely? Country experience to date has shown the importance of (OPM 2015a):

- » clearly articulating the need for integration in national development plans, national social protection policies and strategies, and other strategic documents (ideally embedded in legislation, as is the case in many Latin American countries)
- » fostering public debate on the benefits of integration (exposing international experience and developing research on country-specific advantages and possibilities), quantifying results where possible. This should include:
 - quantifying and communicating returns on investments (efficiency gains, economies of scale, value for money). For example Turkey has estimated and widely publicised the cost savings of prevented fraud, less paperwork and de-duplication, as well as showcasing the benefits to citizens ('time for application reduced from days to minutes, documents for application reduced from 30 to 1')
 - harnessing citizen support through active engagement, communication campaigns, media, and transparency of process
- » acknowledging, researching and addressing the political economy of building social registries, for example by identifying key bureaucrats in the system and top politicians and their connections (institutional and stakeholder analysis) to know where support and resistance are likely to come from
- » highlighting specific advantages/benefits for these stakeholders (e.g. data use and data-sharing potential), ensuring political buy-in and ownership across key ministries from the very start
- » ensuring government is part and parcel of design, development and implementation of the information system (e.g. source codes and technical documentation should be in the custody of government)
- » considering overall costs as capital or infrastructure investments, spreading them over a number of years (Turkey's 10 million US dollar investments were spread over three years).