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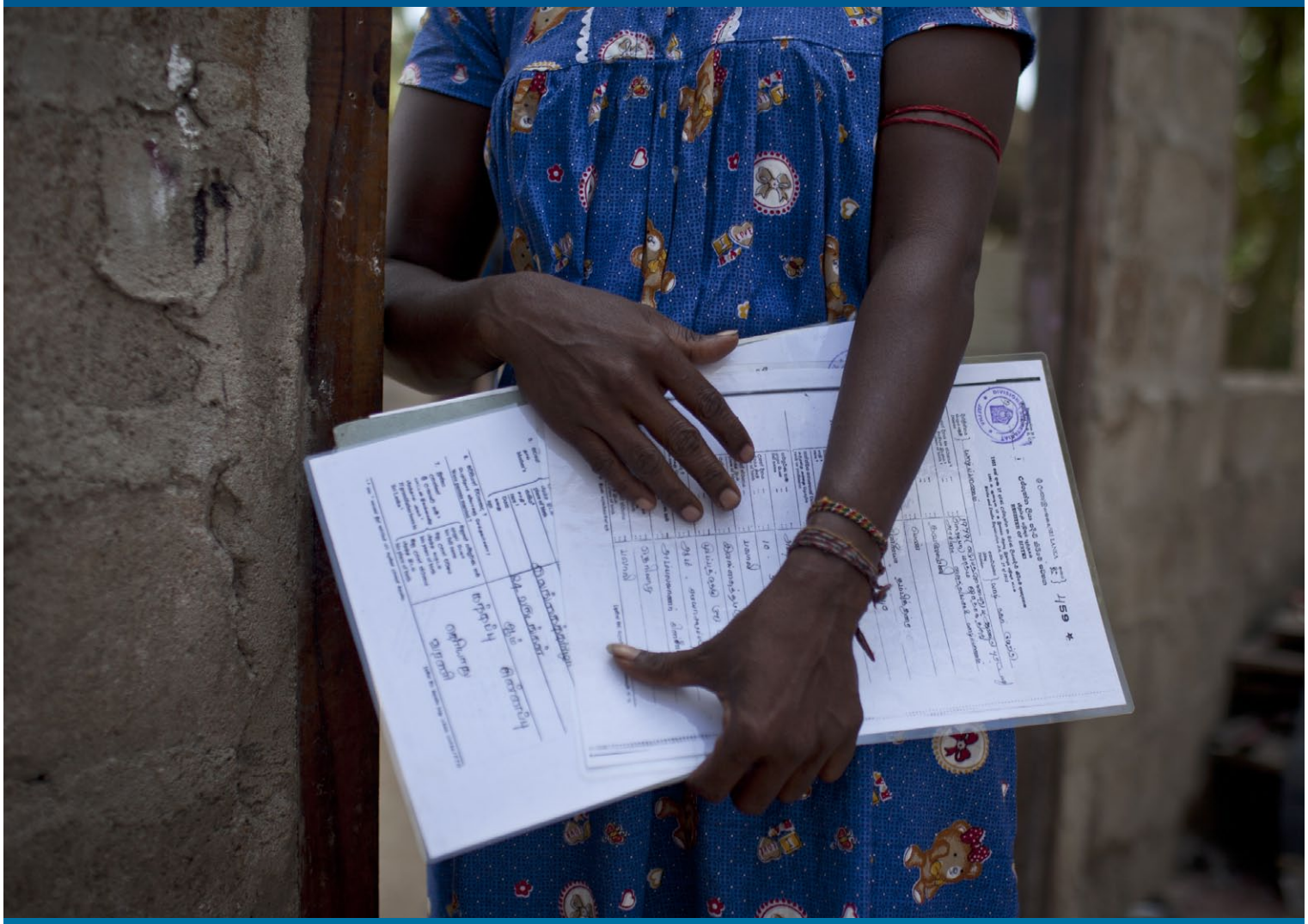

Single registries and integrated MISs: De-mystifying data and information management concepts

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Contents

Figures, tables and boxes

Abbreviations

DSD	Department of Social Development
FPS	*Ficha de Proteccion Social*
HSNP	Hunger Safety Net Programme
ID	identification
IMIS	Integrated Management Information System
ISAS	Integrated Social Assistance Information System
ISMS	information security management system
ISO	International Organization for Standardization
IT	information technology
MOUs	memorandum of understanding
M&E	monitoring and evaluation
MIDEPLAN	*Ministerio de Planificación y Cooperación*
MIS	Management Information System
NISIS	National Integrated Social Information System
OECD	Organisation for Economic Co-operation and Development
PPLS	*Pendataan Program Perlindungan Sosial*
SASSA	South Africa Social Security Agency
Socpen	Social Pension System
SITA	South African State Information Technology Agency
SIIS	*Sistema Integrado de Información Social*
SINTys	Tax and Social Identification System
UDB	Unified Data Base
UNICEF	United Nations Children's Fund
UPSPK	*Unit Penetapan Sasaran Penanggulangan Kemiskinan*

Executive summary

Key messages

> Integrating data and information management of social protection programs through a Single Registry and associated Integrated Management Information System (IMIS) can:
  - lead to more **equitable distribution** of resources based on objective and comparable information,
  - facilitate **oversight** of multiple schemes,
  - establish **links** with other services and sectors and **increase efficiency** of delivery by avoiding duplication of effort and enabling economies of scale.

> **Integration is mainly a policy issue requiring political and institutional arrangements rather than technical 'fixes'.** Successfully implementing such systems requires **strong political commitment to integration** within the social protection sector and beyond, as well as careful assessment of the country context and possible costs and trade-offs to centralising data and information management.

> Countries where developing a Single Registry and IMIS is most feasible are those:
  - with sufficient **staff availability and capacity** (including a network at local level);
  - where a **clear and high-level governance structure** can be created to manage the process and liaise with all relevant stakeholders;
  - where **adequate hardware and Internet connection** is available at central and local levels;
  - where there is a solid system for national identification (Civil Registry or social security number) that serves as a backbone for integrating data across different sources.

> The most important trade-offs to integrating data and information management include the **high costs of establishing such systems** (for which donor funding is often needed) and the **risk of excluding** households from multiple social sector schemes. These trade-offs are determined by institutional, operational and technological considerations. Depending on these, **"international best practice" may not be appropriate in every instance**.

> The **costs** of setting up and running a Single Registry and IMIS **vary largely across countries and can be high**. Depending on country context, implementation costs range between $0.2 and $9 million yearly; data collection costs range between $4 and $14 per application, and; development and equipment costs range between $1 million and $5 million.

Why is integration of data and information management important?

In recent years, global and national social protection policy has focused increasingly on systems, including integrating data and information management across programs. An integrated approach has policy and operational advantages:

> **Policy advantages** can include a more equitable approach to distributing resources based on objective and comparable information; increased responsiveness and inclusiveness of interventions, increased transparency and accountability; increased links to complementary services and sectors, and; increased knowledge on issues around poverty and vulnerability.

> **Operational advantages** include oversight of multiple schemes; reduced duplication (for example, of data collection) and efficiencies (for example, common payment system); reduced fraud by keeping track of who is receiving what; easier transition of beneficiaries between schemes as circumstances change; and potentially, more effective emergency responses.

Despite these advantages, it is evident that integration is mainly a policy issue requiring political and institutional arrangements rather than technical 'fixes', meaning that effective systems for data and information management cannot operate in a policy vacuum. In fact, the practical set-up of an integrated system depends on the key objectives being pursued through social protection policy in-country. Three main and overlapping objectives are:

> Integrating to have an **overview** of who is receiving what, **coordinating** interventions, facilitating planning and more generally providing combined monitoring and evaluation (M&E) across programs.

> Integrating to **consolidate targeting** processes so they serve multiple social programs. The rationale here—which has been acquiring weight internationally and has mainly been driven by the World Bank—is to minimise errors of exclusion and inclusion while increasing cost efficiency and transparency.

> Integrating data management to **integrate operations and services**. The strongest advocate of this approach is the International Labour Organization which has been promoting the concept of Single Window Services within the social protection sector and beyond.

What are the building blocks of an integrated data and information management system?

There is **confusion around the terminology used** to define and describe the specific information technology (IT) set-up for integrating data and information management at sector and cross-sector levels. For example, the terms MIS and database or registry are often used interchangeably. Also, while the literature often only refers to one concept (e.g. the 'Single Registry), two components are essential for integrating data management. These are:

1. The **database** where information on potential and actual beneficiaries is compiled—also called the '**Single Registry**'.[1]
2. The **application software** that allows for data to be systematised, transformed into information, linked to other databases (for example, program databases and MISs), analysed and used. This is the role of the **Integrated Management Information System (IMIS)**, which usually retains the name each country has chosen to associate to it (for example, 'Integrated Social Assistance Information System' in Turkey and 'Integrated System for Social Information' in Chile).

The specific set-up for integration needs to be linked to the overall objectives to be pursued by the system and country context. An ideal and fully integrated set-up is shown later in the report in Figure 3.

What key aspects are to be considered when establishing an integrated system for data and information management and related trade-offs?

When integrating information management in practice, a wide range of key crosscutting aspects are needed for a functional system. Table 1 summarises these.

1 This term has been chosen as it is the most commonly used in the literature. However, it should be noted that a Single Registry: a) is not necessarily 'single' as it does not often comprehend all social protection programs in a country and does not substitute individual, program-level MMISs; b) is not necessarily 'national' since social protection programs, and data collection for registration, are sometimes targeted geographically; c) does not necessarily entail a single process for targeting or unifying operations across programs.

Table 1: Key crosscutting aspects to consider for integration and related trade-offs

Dimensions		International best practice	Main trade-offs and further considerations
Administrative and institutional aspects	Governance and institutional arrangements	> Coordination and management is independent from the management of individual social protection programs (for example, independent agency) and is high enough in the government hierarchy to effectively coordinate with all stakeholders. > Clear identification of stakeholders and formalisation of their roles and responsibilities, possibly through legally binding agreements, carefully designed incentives and mutually agreed terms of reference.	> The more complex and inter-linked the overall information management set-up the more difficult the institutional arrangements are to establish and conform to (transaction costs to coordination). > Centralisation increases risk of errors being propagated across programs that have common points of entry, stifling creativity and responsiveness, and conducting fewer checks and balances, and information asymmetries.
	Administrative structure and decentralisation	> Decentralisation of implementation while maintaining design and control functions at central level (including verifying and validating data and targeting functions). > Shared consolidated data through web access with decentralised levels of government, though this is often impeded by technical and institutional constraints.	> While decentralisation guarantees local government involvement (the ones most likely to understand the socio-economic situation of the population they serve), local authorities might have stronger incentive to facilitate access to social protection programs to those not necessarily eligible.
	Staff availability, capacity, training and retention	> Incentives for attracting and retaining staff. > Design of: strong manuals and enforcing their use; capacity-building days and ongoing training; thematic working groups; online education, online consultations. > Need for a hybrid figure at central level that understands context, organisation processes and work processes of each sector and the role of information systems.	> Increasing complexity can lead to increasing difficulty in recruiting and training capable staff, including hybrid figures. > An integrated system ideally needs a network of staff at local level who can act as entry points. Establishing such a network can be expensive.
Operational/ implementation aspects	Collecting data	> Two main methods prevail—on-demand registration and census methods. Each has pros and cons. Best practice is to combine the two to gain maximum benefits from the pros. > Three ways to create a national comprehensive Single Registry: collecting data centrally; piggy-backing on data collection of one program; consolidating data from several programs.	> Each piece of information collected costs. It also makes information management more complicated and potentially less effective. > The adoption of one model or another mostly depends on the historical trajectory of social protection within the country and other country characteristics (for example, availability of local network of staff and density of poverty).

Dimensions		International best practice	Main trade-offs and further considerations
Operational/ implementation aspects	Transforming data into information	> The characteristics of high-quality information include accuracy, correctness, currency, completeness, and relevance to the business processes it supports. > This entails clear processes for verifying, validating, updating and reporting on data.	> Process can be lengthy and costly. > Without a unique identifier that can be used to verify data across databases there is much less potential for clean, updated data.
	Targeting	> Scoring and ranking of households based on their levels of poverty and vulnerability is completed at central level by the agency or unit responsible for the Single Registry to avoid political interference. > Program implementers use the national list as a base and adapt it to their purposes by: a) adding further criteria; b) validating lists provided; c) choosing what percentage of households ranked nationally are to be included.	> Systematic exclusion of certain types of households due to problems with data collection, in data requirements (for example, lack of an ID card) or in determining eligibility (for example, if the targeting formula does not accurately capture those in need). > Exclusion from multiple social sector schemes (one error affects all programs).
	Updating of data	> Scheduled deadlines for updating data through the census survey set for every two to three years (but often not respected). > Online integration of data from local to central level and integration of data with the Civil Registry. > Countries integrating on-demand data collection approaches with census approaches are more likely to succeed in continuously updating information.	> Any system that bases targeting on a static snapshot is likely to face serious challenges in providing support to those most in need. > The cost of continuous updating is high (especially if no local network of staff exists to manage on-demand applications). > Where no infrastructure (computer and Internet access) exists at local level, there is no possibility for updating online data. > Risks to modifying data in Single Registry based on programme decisions (un-transparent).
	Linking databases	> Some form of unique ID for individuals is needed to link Single Registry information and beneficiaries with other systems and programs. > The solution to providing such ID has included working with national registry offices, assigning social ID numbers and assigning new ID numbers for new applicants (risks of duplication).	> National ID numbers and social security numbers are not widespread in many countries. The countries that do not have such identification are most often the poorest and most vulnerable. This presents risk of exclusion.

Dimensions		International best practice	Main trade-offs and further considerations
Operational/ implementation aspects	Integrating services	> Services and operations that have been integrated include payments, grievances and conditionality enforcement. > Success to date has been mixed, though countries with an accountable external payment provider have a good track record.	> Such integration is only possible if the centralised structure can manage the additional burden of implementing program operations and the individual program structures are willing to give up control over these roles.
Technological aspects	Data Privacy	> Country laws should adhere to international data transfer and information privacy protocols, which legislate the collection, transfer and storage of information.	> The need for data privacy conflicts with transparency and accountability requirements.
	Architecture and transfer of info	> The Single Registry and IMIS should be centralised at national level but must be accessible and functional at sub-national level using the most cost-effective and appropriate telecommunication and computer hardware technologies available in-country.	> Cost of setting up infrastructure (the more complex, the more costly). > Technology alone does not ensure information management.
	Hardware	> Choice of hardware depends on the software used for managing information. Overall, it should have adequate memory, disc space, and processing capacity.	
	Backup and Security	> Must conform to ISO 27001—an approach to managing confidential or sensitive information—so it remains secure, confidential and with its integrity intact.	> Conforming to ISO 27001 has its costs.
	Developing and updating IMIS software	> Importance of iterative prototyping, whereby a system model is designed and used to customise based on feedback from users. This enables the system to be tailored to suit user needs and enhance a sense of local ownership. > Creating flexible, modular and incremental systems, based on the concept of design-divisibility.	> Costly, lengthy process: quick and/or cheap approach is to have an analyst document requirements and then pass these to a developer to integrate into the application software. This approach has a high chance of failure.
Costs and financing		> External financing appears to be key in allowing the initial disbursements needed for such systems. > Very difficult to compare costs across countries. Main categories are implementation costs, data collection costs and infrastructure costs.	> High costs that depend on complexity of system and country context.

Source: Authors' elaboration.

When is the development of a Single Registry and IMIS most feasible?

A key lesson learned from the study is that there are **multiple advantages of integrating data and information management**, especially if the overall policy environment is conducive to an integrated approach within the social protection sector and beyond. However, given the large financial costs involved (especially for data collection, where between $4 and $14 for each applicant is spent) and institutional challenges to be faced, it is essential that countries weigh up costs and benefits based on an assessment of their situation. The development of a Single Registry and IMIS is most feasible under the follow conditions.

Policy environment and budget

> National policy focused on developing a systems approach to social protection (aiming to achieve coordination and harmonisation to address the fragmentation limiting the effectiveness and impact of social protection policies and program).

> Strong political leadership advocating for reform and coordinating institutional actors.

> Sufficient capacity to identify and cost policy options, assess affordability and identify financing options.

> Budget availability and policy support to develop a Single Registry and IMIS.

Country context

> Existence of a solid system for national identification (Civil Registry or social security number) that can serve as a backbone for integrating data across sources (Single Registry and other government MISs).

> Existence of high-quality data collected by one social protection program or other large-scale data sources, if recent (e.g. piggy-back on data collection to avoid or reduce[2] cost of re-collecting).

Staff availability and capacity

> Highly trained and qualified staff, at a sufficiently high salary to guarantee retention.

> Sufficient network of local staff to act as an entry point for an on-demand application system (not necessarily staff belonging to the same agency or unit—for example, trained municipal staff or social workers can be sufficient).

> Staff open to change and not complacent.

Governance and institutional structure

> Existence or easy creation of an independent unit to take charge of managing the new system at a sufficiently high government level to effectively coordinate with stakeholders.

> Potential for strong institutional ties with other government bodies.

> Absence of parallel or competing structures for oversight of social protection policy.

2 In Indonesia, for example, the Census was triangulated with other data sources and used as a basis for selecting households to be interviewed.

Tools and infrastructure

Hardware (for example, computers and server)

> Some level of adequate hardware available at local levels (these can be purchased but this increases costs significantly).

> Existence of adequate servers (high-capacity computers) that can be scaled up to accommodate potential growth of programs (for example, a designated server room with reasonable physical and logical security that conforms to ISO 27001[3]).

Application software and database

> Potential to create a large database that is scalable, flexible and performs well.

> Clarity of functional requirements and technical specifications at policy level. Key questions—such as purpose, benefits, hosting and nature of users—should be addressed at the feasibility stage and agreed by all stakeholders.

> Availability of capacity to support and administer the software, database and network once the single registry and IMIS are established.

Transfer of data

> Ideally, Internet access is needed at all levels of implementation, including local (to build web-service access that greatly improves information flow).

> Clearly documented protocols that enable quality controls on information before it is submitted over the Internet or transferred by batch process.

3 Part of the growing ISO/IEC 27000 family of standards, this is an information security management system (ISMS) standard published in October 2005 by the International Organization for Standardization (ISO) and the International Electro-technical Commission. Its full name is ISO/IEC 27001:2005 – Information technology – Security techniques – Information security management systems – Requirements.

1. Introduction and conceptual framework

In recent years, there has been **greater focus on coordinating and harmonising systems for social protection**[4] (United Nations Children's Fund (UNICEF) and World Bank 2013; AusAID 2012; Azevedo et al 2011; Samson 2006). This has led to growing interest in and pressure on exploring ways to integrate data and better handle information management across social protection programs.

The scarce literature available uses different terminology to describe approaches to integrating information management at sector and cross-sector levels. The resulting confusion is compounded by difference countries using different systems and lack of clarity of some evidence.

This paper sets out to resolve some confusion by:

> discussing the advantages of integrated data and information management (Section 1.1)
> clarifying terminology and defining key terms (sections 1.2 and 1.3)
> developing a typology to help categorise experiences worldwide (Section 1.4)
> discussing models for integration (Section 2.1)
> explaining the IT architecture needed to integrate information management (Section 2.2)
> describing the main issues to consider when establishing an integrated system for data and information management, including trade-offs (Section 2.3)
> summarising the experience of establishing systems in three countries (Section Annex B)
> providing recommendations for countries considering integration (Section 3).

1.1 Why is a systematic approach for social protection important?

A joint 2013 note by UNICEF and the World Bank spells out that a systemic approach to data and information management for social protection can support providing 'a coordinated and harmonized response to the multi-dimensional vulnerabilities of individuals across a life-cycle', one that focuses on 'exploiting interactions across programmes and [is] mindful of establishing complementary incentives across programmes'.

Integration is a policy issue requiring political and institutional arrangements, not just technical arrangements. Indeed without integration, data management can create more problems than solutions.

The **advantages of an integrated approach** can be analysed from a policy and operational perspective (these sometimes overlap) (Chirchir 2012; Villalobos et al 2010; UNICEF and World Bank 2013, Azevedo et al 2011).

From a **policy perspective**, advantages include the ability to:

> apply a potentially more equitable approach to distributing resources based on objective and comparable information
> increase responsiveness and inclusiveness of interventions that can serve the chronic poor, serve those structurally vulnerable to poverty and respond to individual shocks, such as job loss, disability, childbearing, old age, or large crises (for example, natural disasters or conflict)
> increase transparency and accountability since program information can be more easily shared and compared

4 In this paper social protection includes non-contributory social assistance and contributory social insurance. However, evidence shows that single registries are almost only used to manage information for non-contributory social assistance.

> build a stronger link to institutional frameworks and wider social and economic policies[5]
> increase knowledge on poverty and vulnerability based on access to the large amount of information available.

From an **operational perspective**, advantages include the ability to:

> facilitate oversight of multiple schemes and report to policymakers responsible for social protection interventions
> avoid duplication of effort (for example, with data collection activities for targeting programs)
> establish a common payment system across all schemes, increasing efficiency and saving money
> avoid double dipping and better manage fraud, including by keeping track of who is receiving what
> enable beneficiaries to transition between schemes as their circumstances change
> establish more effective emergency responses (for example, by directing additional payments to social protection recipients in areas affected by an emergency for a limited period).[6]

However, several trade-offs exist when establishing integrated systems. These are discussed in Section 2.3 and compared against potential advantages in Table 5.

1.2 Background to this study: confusion in the terminology

Despite growing recognition that data and information management play a pivotal role in implementing social protection schemes, **terminology in the literature is confused**. The tendency is to use similar terminology when referring to systems that are radically different in focus, functionality, overall levels of complexity, maturity and sophistication and in the hardware and software used. Most importantly, while there is significant literature and agreement on the ideal set-up of program level Management Information Systems (MIS) (Grosh et al. 2008; Chirchir and Kidd 2011 – see also Annex A), there is scarce systematic evidence on integrated systems for data and information management.

For example, Samson's seminal manual on designing and implementing social transfer programs (2006), points to the advantages of a "single national registry" such as Brazil's *Cadastro Único* without questioning if it is really single (it is not in the strict sense of the term[7]) or what objectives such a registry can achieve. Castaneda and Lindert (2005) talk about a:

> … unified household information registry (or "*cadastre*") which includes all interviewed households … and serves to: (a) collect, record, and store updated and historical information on household characteristics and circumstances …; (b) verify and check the consistency of this information; (c) automatically screen for eligibility of specific programs by comparing household information with pre-established program-specific eligibility criteria (to create sub-registry beneficiary lists); and (d) provide needed information to support service planning and projections.

Castaneda and Lindert's paper focuses on targeting, so this is their focus when they use the term 'unified household information register'. However the word 'unified' can be misleading

5 'SP systems have the potential for maximizing outcomes and impacts if they are conceived as integral components of national development and poverty reduction strategies, linked with complementary programmes (e.g.: livelihood promotion, labour market and intermediation programmes, food security programmes, etc.) and macro policy determinants (macroeconomic stability, economic growth, etc.)". Organisation for Economic Co-operation and Development (OECD), 2009.

6 For example, Kenya's Hunger Safety Net Programme (HSNP) Phase 2. The program conducted a census of 378 000 households in the four semi-arid counties in which it operates. Kenya intends to open accounts for these households so during droughts donors and government can provide timely cash transfers. To do this, the HSNP MIS will link to an early warning system.

7 The term Single Registry is a misnomer in the case of the *Cadastro Unico*. It is not the only registry in Brazil. Other major social protection schemes, such as the Rural Pension and Continuous Cash Benefit, have their own databases and do not buy into *Cadastro Unico*'s targeting mechanism. Also, *Cadastro Unico* programs have their own independent MISs (Chirchir 2011).

in this context: what is being unified and what is not? Villalobos, Blanco and Bassett (2010) discuss the benefits of a "sophisticated MISs" that can "integrate the management of social protection systems", while Azevedo, Buillon and Irrazaval (2011) – in the most comprehensive publications on the topic available in Spanish – talk about "Integrated Systems for Social Information" (*Sistemas Integrados de Información Social*).

Beyond theoretical literature, it is interesting to assess the **grey literature which describes individual country experience** with integrating social protection information. Many terms are used to describe similar but not identical concepts, as shown in Table 2. For example, the acronym 'MIS' refers to integrated systems that integrate data across several programs, as well as systems for individual programs.

Table 2: Some of the most common terms used for intra and cross-sector information management

Country/source	Database	Associated system for integrated information management
Turkey—Ministry documents	Common Database (poverty inventory)	Integrated Social Assistance Information System
Iraq—Ministry Labour and Social Affairs	Central Beneficiary Database	Social Safety Net Information System
Lebanon—National Poverty Targeting Program documents	National Database of Poor Households	MIS
Kenya—Vision 2030 document and Chirchir (2012)	Single Registry	Single Registry Reporting System for Social Assistance (MIS)
Pakistan—Benazir Income Support Programme's National Socio-Economic Registry data sharing protocol	National Socio-Economic Registry—described as a 'Single Database	MIS
Bangladesh—World Bank Project Appraisal Document	Bangladesh Poverty Database	Ministry-wide MIS
South Africa—Social Pension System (SOCPEN) website	SOCPEN database	SOCPEN (though the NNISIS is under development)
Indonesia—database website and documentation	Unified Database	MIS (but not often explicitly mentioned)
Mexico—Gomez Hermosillo (2011)	Single Registry of Beneficiaries (*Padron Único de Beneficiarios*)	Integrated System for Information and Identification of Beneficiaries (*Sistema Integrado de Información e Identificación de Beneficiarios*)
Chile—Covarrubias et al (2011) and Azevedo, Bouillon and Irrazaval (2011)	Registry of Social Information	Integrated System for Social Information
Samson (2006)	Single National Registry	Not mentioned
Castaneda and Lindert (2005)	Unified Household Information Registry	Not mentioned
Irrazaval (2004)	Sole Registry of Beneficiaries (*Registro Único Beneficiarios*)	System for the Integration of Databases (*Sistema de Integracion de Base de Datos*)
UNICEF and World Bank (2013)	Common Beneficiary System	MIS
International Labour Organization—Single Window Services[8]	Single Registry	MIS

Source: Authors' elaboration.

8 Section 2.1.3 has more details.

1.3 Clarifying the confusion: defining the terminology for the study

Part of the confusion surrounding terminology is that 'database, 'registry' and 'MIS' are used interchangeably without reference to wider systems for integrated information management.

This paper uses these four definitions:

> **Database**—a system to organise, store and retrieve large amounts of data easily.

> **Registry** (a pre-ICT origin)—an official written record of names or events or transactions. In a computerised environment, 'databases' and 'registries' are overlapping concepts, but both are for storing and retrieving information.

> **MIS**[9]—a system that transforms retrieved data from a program's database (or in some cases, different databases linked to different modules) into information that can be used for efficient and effective management. To do so, computerised MISs are based on tailored application software that allows for input, process and output of information. In social protection literature, the term MIS is mostly associated with program-level information management systems.

> **Integrated system for information management**—refers to the broader system that enables the flow and management of information within and between social protection programs and sometimes beyond to other sectors.

The greatest confusion in the literature relates to this last concept, partly as integration of data and information management is a more recent trend that is dependent on a country's particular SP trajectory (see Box 1). To clarify that confusion, this study's starting point is the practical set-up of a typical approach to integrating information management, including its building blocks (Figure 1).[10] While the literature often seeks for one word to use when discussing the integration of data and information management, two 'components' are actually essential:

> **Database**, which houses comprehensive (i.e. not program specific) information on potential and actual beneficiaries (Section 2.2 discusses how this is achieved). The authors call this the **Single Registry**, the term most widely accepted in the literature.[11]

> **Application software**, which systematically transforms data into information, links it to other databases and analyses and uses the information. The authors call this the Integrated Management Information System (**IMIS**). Different countries apply different names to their IMIS. Turkey, for example, uses 'Integrated Social Assistance Information System' and Chile the 'Integrated System for Social Information'.

9 It should be noted that this term has been borrowed from the business world where it is defined as a 'system that provides information that organisations require to manage themselves efficiently and effectively'.

10 The figure focuses on a basic system where, for example, program functions such as payments or grievances are not centralised.

11 Adding a new word to the long list used in the literature would confuse matters further, so the authors have retained the most common terminology and clarified meaning where needed.

Box 1: Path-dependent processes for integrating information management

Terminology confusion also surrounds the path each country has taken towards integration. Whether gradual (setting up MISs and then trying to integrate fragmented efforts into a wider and integrated approach within the social protection sector) or immediate (designing and implementing a poverty database), each country tackles internal needs based on contextual constraints and opportunities.[12] The set-up of data and information management systems depends on a range of factors, including at program level and social protection or country level, as described here.

Program level

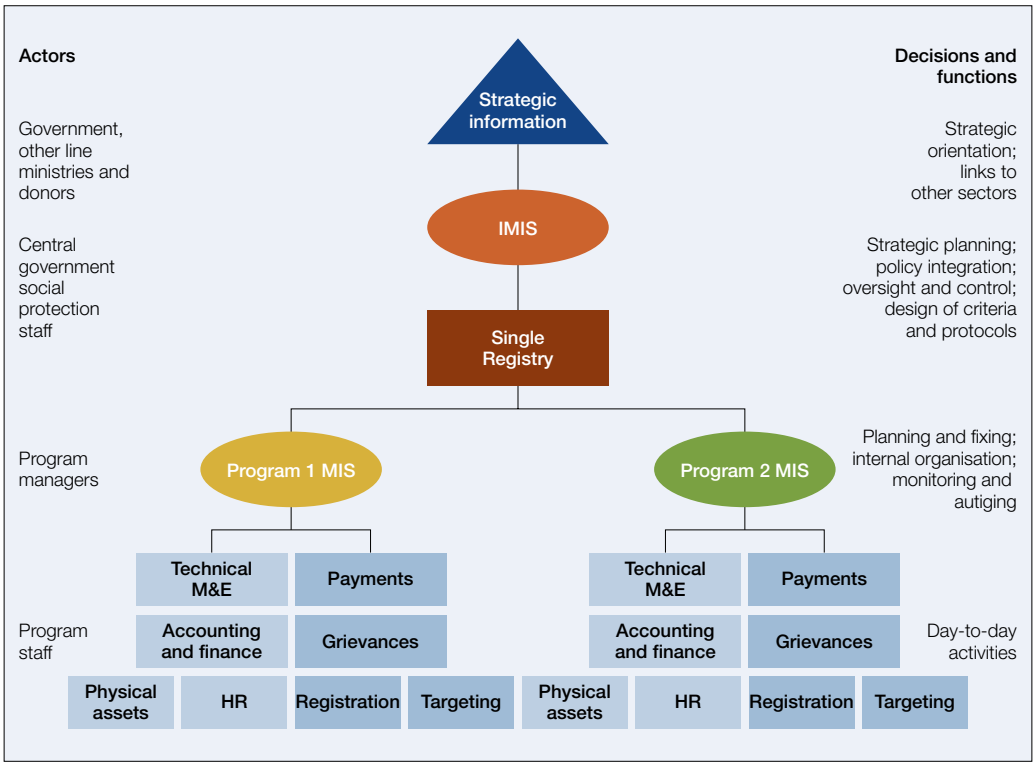
- program design, including set-up of key processes and functions:
  - mechanisms for identifying beneficiaries (targeted or not and type of targeting)
  - presence of co-responsibilities and conditions
  - payment system and grievance mechanism managed internally or through a third party
  - complexity of M&E system (reporting requirements)
- program implementation arrangements, including:
  - centralised or decentralised
  - data collection strategy (on-demand or census)
- MIS objectives and program business requirements, including:
  - whether designed to support internal program management, generate information for other programs or facilitate integrated and inter-institutional management.

Social protection sector and country level

- availability of funds for designing, creating and maintaining the system (from government or donors)
- availability of staff and staff capacity (including training needs)
- possibility for technological innovation (network connection and hardware infrastructure)
- possibility for links with other government systems, such as:
  - availability of a national ID to be used as unique identifier and tax databases
- specific institutional context, such as:
  - one or several ministries implementing the social protection program
  - government focus on performance-based management and e-government
  - broader government policy positions on social protection, including if:
    - it is seen as an entitlement
    - there is a policy push for an integrated approach.

12 This is inherent to the design of all MIS systems, even in the business sector, where, by its very nature, management information is designed to meet the unique needs of individual institutions.

Figure 1: Information needs of an integrated system for information management



Source: Adapted by authors from Lecuit et al, 1999. Figure 1 focuses on a basic system where, for example, program functions, such as payments or grievances, are not centralised.

Box 2 clarifies what a Single Registry is. The authors argue that it is a building block that helps achieve integration across social protection and beyond, depending on what databases, software and algorithms the registry links to. Its full potential is only unleashed when linked to an IMIS that is designed to exchange and integrate data from databases, transforming it into useful information. Section 2.2 examines this distinction further.

Box 2: Single Registry—what it is and is not

The phrase Single Registry is often used to describe different things. For this study, the authors clarify meaning.

What it is not

> It is not necessarily single since it often does not comprehend all social protection programs in a country and is not a substitute for individual MISs.

> It is not necessarily national since social protection programs (and data collected for registration) are sometimes targeted geographically.

> It does not necessarily entail a single process for targeting or unifying operations across programs.

> It is not just a list of beneficiaries (eligible people selected for social protection).

What it is

> It is a registry (organised into a database) of all people and households registered (interviewed if using a census for data collection or application submission with an on-demand approach).

> It aims to collect, record and store updated and historical information on individual and household characteristics and circumstances, and verifies and checks information consistency.

> It can be compiled and unified from the data collection of several programs or from a large data collection drive performed by one program which is then used by several other programs in the social protection sector (see Section 2.3.2.1).

> It can be linked to:

- a software application that acts as an IMIS
- an algorithm and system for targeting that uses data from the Single Registry to determine eligibility for individual programs (generating program beneficiary databases to be used in MISs)
- other databases managed by government bodies to enhance services and functions.

1.4 Developing a typology for the study

This study determines that **integrated information management** is the **broader system enabling the flow and management of information within and between programs in social protection and other sectors**. No matter how the system is set-up, the key factor is if data can be easily and usefully transformed into information and used for management purposes.

Two additional considerations are needed to develop a typology for data and information management:

3. Three levels of integration can be achieved:
   a. At **program level**, where information is managed through a program MIS. In its most basic construction, an MIS manages information and operations in a single social protection program. It is not connected with other systems and databases. Almost all MISs start off this way.
   b. Within the **social protection sector**, where information across programs is managed through a Single Registry and some form of an IMIS. The specific functions of the registry depend on its objectives and how the related IMIS is developed.
   c. **Across sectors** within a country such as when the interoperability of information is extended to other sectors (for example, health and education).

From a policy perspective, the greater the interconnectivity, the greater are the gains in efficiency and effectiveness of service delivery. **The key issue is the level of connectivity, interoperability and linkages between systems**, not the creation of a super-sized system.[13]

4. Several and often **overlapping reasons exist for the push towards integrating data and information management**, which influence overall use:
   a. Providing information for **coordination, oversight and M&E** for policy making. In practice, a consolidated Single Registry can oversee multiple programs, monitor and check for double dipping. Program operations continue to be managed through individual program MISs. An example of this approach is Kenya's National Safety Net Program, which can almost be defined as a data warehouse for integrated information management.
   b. Supporting **common targeting**[14] which aims to unify targeting for multiple social programs. This sometimes involves different thresholds and criteria for eligibility. This approach minimises exclusion and inclusion errors while increasing cost efficiency and transparency. In practice, it links the system for targeting households (to define eligibility) to the Single Registry of potential beneficiaries and then creates lists of beneficiaries for each program that are fed into that program's MIS and into other operations. This assumes that individual programs using the single registry buy into inclusion and exclusion errors of the ranking algorithm. This approach is principally set up to target social assistance sector schemes, as exemplified by Brazil's *Cadastro Único*, the Single Registry for the *Bolsa Familia* program.
   c. Supporting the integration of other operations and services, which aims to streamline services and/or operations within the social protection sector (such as payments, process for registration of beneficiaries and grievance processes) or beyond. In practice, this is achieved by linking several data sources using a unique ID.

The typology the authors propose combines these two categories:

1. **breadth of integration**—a continuum based on the breadth of scope and level of interconnectivity of the overall system for information management[15]
2. **depth of integration**—a rough categorisation of the systems' main purpose and use, recognising these most often overlap, are not necessarily sequential, and are not as clear-cut as a typology would typically believe.

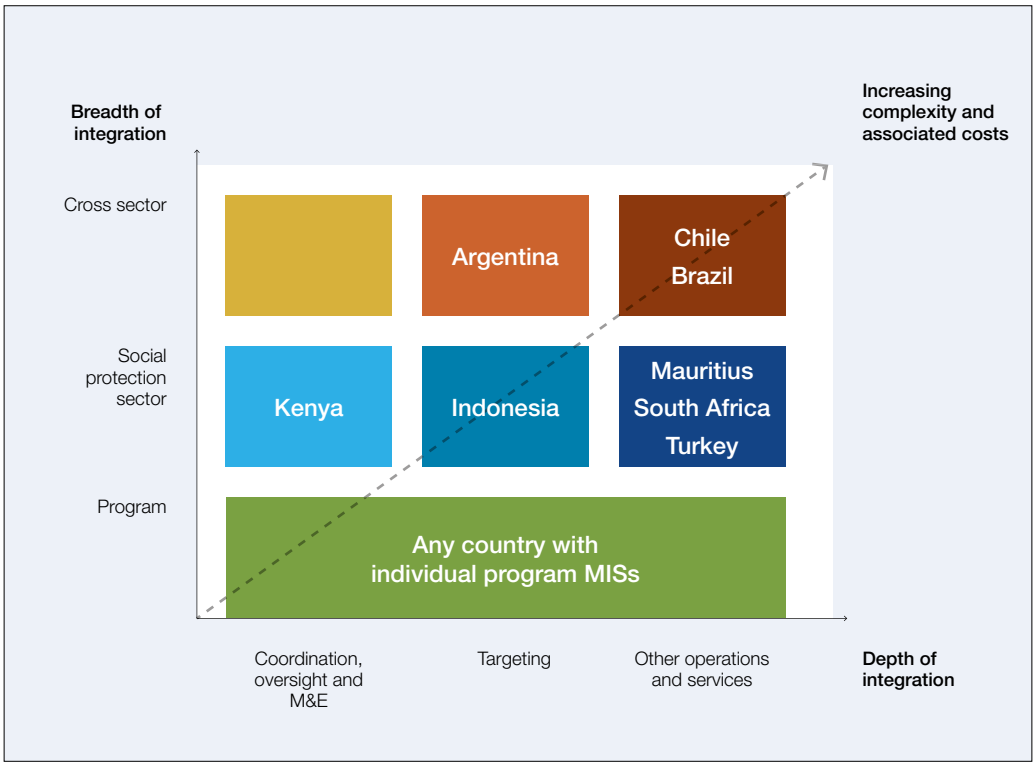
To help interpret this typology, the authors provide examples of countries that broadly fall into one category or the other (Figure 2).

13 A large whole-of-government information and communications technology system is unrealistic and risks being too complex to be useful. There is no single system within government. Instead, e-government, for the purposes of this paper, means a set of policies and frameworks that ensure interoperability of multiple government sector systems and use of IT to provide services to citizens.

14 The expression used by Castaneda and Lindert (2005) is 'unified household targeting systems'.

15 This continuum, in practice, represents the natural trajectory that many MISs follow over the years due to increasing program demands (complexity of management), increasing external pressure to share data (given the high costs of collection) and political economy considerations.

Figure 2: Data and information management typology—breadth and depth of integration



Source: Developed by the authors.

Four aspects are noted when considering this typology:

1. **These classifications are not necessarily mutually exclusive or sequential**. For example, a system attempting to integrate its targeting is likely to coordinate between different programs and some systems to generate useful M&E information.
2. **A sub-typology focusing on integration across social assistance programs alone is needed**. Most countries with an integration process do not integrate all programs falling under social protection. They may, for example, leave out labour market interventions and social insurance (Brazil's Segurança Social does this).
3. The **more complex an intervention the greater its information requirements**. Conditional cash transfers, for example, need greater integration of information with other sectors to operate (e.g. to monitor compliance).
4. A **natural trajectory** can occur as countries consolidate their social protection programs. When large data collection efforts are made by one program in a country, it is likely that government and donors will want to share that data with other programs to increase cost-efficiency, leading to higher levels of integration of data management. The World Bank and UNICEF (2013) observes that:

   … improving harmonization and expanding coverage are important second-generation issues in many countries [aimed at] synchronization across existing tools, programs, and policies to build consistent national systems that are well integrated both horizontally across programs and vertically between central and local actors.

2. Key issues emerging from the literature

2.1 Different models of integration: integrating what?

In reviewing the literature on integrating information management in social protection, three main models of integration emerged. Though often overlapping, they reflect a different conception of what the main objective of integrating information management is.

2.1.1 Providing coordination, oversight and monitoring and evaluation

The first key objective—shared by almost all integrated systems, although to differing degrees—is to integrate program registries to **develop an overview of who is receiving what, coordinate interventions, facilitate planning and more generally combine M&E across programs**. An added benefit is the ability to check for double dipping across programs (Box 3). National governments often push for this, eager to gain increased control over their social spending.

Box 3: Double dipping

Reducing the chance of double dipping (excluding ineligible households that have 'tricked' the system to receiving multiple benefits they are not entitled to) is widely cited as an important benefit of integrating information management across programs.

The cost-savings involved with preventing double dipping can be high, as exemplified by Iraq's new Social Safety Net Information System. By integrating beneficiary information across several programs, the system has allowed Iraq's Ministry of Labour and Social Affairs to identify duplicate (and sometimes triplicate) beneficiaries, excluding about 57 000 households out of 120 000 in Baghdad alone and resulting in savings of about US$18 million to the system's budget (World Bank, 2012a).

However, it should be noted that receiving multiple benefits is not problematic per se. This is the case in an integrated vision of social protection whereby different programs cater for different needs of households and individuals at different stages of life, complementing each other. This is the case in many high-income countries and could be important to explore for countries developing social protection strategies.

When the key objective is to oversee several programs, the **practical solution is to create a Single Registry linked to** an **IMIS** that helps to analyse and structure data into relevant reports, as in Kenya (Box 4). In some countries, including Rwanda, integrating data and management is defined as part of social protection policy and entails harmonising fragmented programs.

Box 4: Kenya: A central reporting system for five cash transfer schemes

Social protection policy in Kenya envisions that the country's Single Registry MIS will address two broad objectives: (i) increase harmonisation and consolidate fragmented schemes; and (ii) enhance the responsiveness of social protection initiatives to increase its capacity to quickly scale-up in response to rapid-onset crises.

To respond, Kenya has consolidated information from five of its social assistance program MISs into a Single Registry: the Hunger Safety Net Programme; Persons with Severe Disability Programme; Older Persons Cash Transfer; Urban Food Subsidy Programme; and Orphans and Vulnerable Children Programme. Information is analysed through a Single Registry Reporting System for Social Assistance, built to consolidate information across the four processes of the country's social protection programs: (i) targeting, registration and enrolment; (ii) payment; (iii) change management; (iv) complaints and grievances.

In practice, the Single Registry acts as a data warehouse that provides accurate analytical reports on the performance of the social assistance sector through the Single Registry Reporting System. For example, M&E indicators are embedded as standard reports produced by the Single Registry Reporting System.

2.1.2 Consolidating targeting

The second key objective, which has been acquiring a great deal of weight internationally and has mainly been driven by the World Bank focuses primarily on **consolidating targeting processes** by creating **unified household targeting systems** designed to serve multiple social programs, sometimes with differing thresholds for eligibility (Castaneda and Lindert 2005). The rationale for this includes:

1. maximising coverage of the poor by minimising errors of exclusion
2. minimising leakages to the non-poor by minimising errors of inclusion, to ensure more resources are spent on programs that use the household targeting systems that reach the poor
3. cost efficiency through minimising the cost of interviewing families by programs or agencies while ensuring the integrity of intake efforts
4. transparency in all aspects to enhance credibility and reduce fraud.

In practice, these systems are based on the two components, as stressed by Irrazaval (2004):

> **Single Registry**[16], which collects all information on current beneficiaries and potentially eligible households.

> **Index for targeting beneficiaries**[17], which helps select beneficiaries for programs from the Single Registry based on algorithms set in advance that can be modified when necessary.

A large majority of single registries around the world are linked to a targeting 'index' or algorithm, partly due to the strong push for technical support and financing provided by the World Bank. Box 5 gives an example of this and the **trade-offs of integrated targeting** are described in Section 2.3.2.3.

16 Translated from the Spanish *Registro Único de Beneficiarios*

17 Translated from the Spanish *Indice de Focalizacion de Beneficiarios*.

Box 5: An example of consolidated targeting: Brazil's *Cadastro Único*

The Brazilian database *Cadastro Único*—possibly the most famous Single Registry in the literature—was established in 2001 through a ministerial decree and has since evolved through continual improvement (including in initial phases duplicate IDs, uneven registration processes, unjustified exclusion of households due to software glitches, lack of access to data by key users and inflexibility to incorporate changes). Since 2004, official documents (decrees, norms, operational guidelines and manuals) have clarified the responsibilities and operational functions of the *Cadastro Único*, to increase transparency and improve coordination efforts.

The Single Registry, based on the initial data-collection effort of the *Bolsa Familia* program, now contains more than 21 million households and is used to target several different Social Safety Nets. This includes a program combining the supply of after-school activities with a conditional cash transfer and the national power bill rebate program. This consolidated process includes steps carried out by different institutional actors. The steps are:

- **Design** of the *Cadastro Único* and its components, led by the Ministry of Social Development.
- **Data collection and entry**, decentralised to municipalities specifically trained for this (formally scheduled every two years although households can apply on demand).
- **Database consolidation and management**, centralised by the operating agent, the *Caixa Econômica Federal* (*Caixa*), a federal bank on a performance-based contract with the Ministry of Social Development. *Caixa* is also responsible for generating the *Numero de Identificacao Social* (social identification number), a unique identifier for each beneficiary that is being mainstreamed across other ministries and programs and is responsible for software updates (*Cadastro Único* is now in Version 7.0).
- **Eligibility determination**, centralised by the Ministry of Social Development. Data from the Single Registry is automatically analysed based on the eligibility criteria specified in the *Cadastro Único* software, helping to generate the monthly beneficiary payroll (in practice, a sub-registry of beneficiary households).

Two other aspects are worth noting with *Cadastro Único*. First, the database is not single in that many programs falling under social protection are not included, most notably Brazil's *Segurança Social* which covers around 12 per cent of the population (with 13 million receiving the equivalent of minimum wage). Second, while consolidating the targeting system was the primary objective that led to *Cadastro Único*'s design, integration has been achieved in other areas, the most important of which is integrating payments through *Caixa*.

Source: De la Briere et al (2005); Lindert et al (2007); Chirchir, R (2009).

2.1.3 Integrating operations and services

The third key objective is proposed by those advocating for **integration of operations and services**. The strongest advocate is the International Labour Organization[18] which has been promoting the Single Window Service concept in the social protection sector and beyond.

According to proponents, families register in a single office at sub-national level where they are assigned a social worker who evaluates their needs and proposes an integrated package of programs. This aims to increase outreach; integrate social protection interventions with other sectors (for example, maternal and child health); link social protection to employment programs (for example, access to health care for those enrolled under public work programs); empower sub-national institutions involved in designing, administering and overseeing the Single Window Service; and facilitate overall coordination and M&E.

18 See http://www.social-protection.org/gimi/gess/ShowProjectWiki.do?wid=1024 for more details.

Proponents suggest the Single Window Service goes hand-in-hand with an integrated system for management of information. According to its website, the Single Window Service:

> … facilitates flows of information between SP, Employment services, local government, line ministries and departments, and the coordinating institution. Data is entered at the local level and transferred to an integrated management of information system at national level including a **single database on beneficiaries**[19] … [that is] updated regularly by the service providers [and is] a tool for monitoring and evaluation of the programs.

In practice this approach does not advocate that all functionalities and operations for all social protection programs should be managed through one database since this would be clumsy. Proponents prefer a **fast, integrated Single Registry that maintains information on beneficiaries for all programs and links to all program MISs and other relevant databases through tailored application software**.

However, some discussion on what functionalities, operations and services can be integrated across different social protection programs beyond initial registration through a single window is discussed in Box 6.

Box 6: What functionalities, operations and services can be managed through a Single Registry and IMIS?

Targeting and monitoring usually drive the need for integration. However, other social protection operations and services can also be integrated and managed through a Single Registry and IMIS, as discussed briefly here:

Grievance mechanisms

Grievance mechanisms for social protection are under-used and under-perform in most countries. On the demand side, this is mostly because of lack of awareness about entitlements, lack of awareness about the mechanisms themselves (linked to low socialisation) and unwillingness to complain due to embarrassment, gratefulness, fear of repercussions or mistrust in outcomes. On the supply side, these problems are compounded by grievance mechanism systems that are not tailored to the needs of those they intend to serve (such as the poor, illiterate and disabled), which could be due to physical distance, lack of adequate method to lodge complaints or lack of appropriate personnel (officials rather than those who can be 'trusted') (Barca et al 2012). Further, a large proportion of complaints are not responded to, creating more scepticism.

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.

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, given that most grievances are often linked to program targeting, it is essential to develop an integrated process for response that could be managed through a Single Registry and IMIS.

19 Own emphasis. Authors also mention single registry when referring to the same concept.

Box 6 continued

Payments (where relevant, e.g. cash transfers)

Integrating payments can be difficult since programs tend to have different payment mechanisms and providers. Social protection programs rely on various payment providers, including banks, post offices, postal banks, private agencies and manual mechanisms (for example, armed vehicles). However, Brazil, Turkey and Chile (Box 7, Box 10 and Annex B1 respectively) show that this level of integration is possible where adequate coordination is in place and the overall IMIS is linked to the payment service provider (in Brazil's case, *Caixa* has a large role in managing *Cadastro Único* software).

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, connecting school registries to the IMIS could provide timely data on attendance. This is a highly complex process from an institutional and data management point of view, which is why no country has fully succeeded in this. In Argentina, for example, SINTyS (the Tax and Social Identification System), only checks if a member of a household enrolled for unemployment benefit does not work. The system has not succeeded in monitoring other simple co-responsibilities. Mexico is the most advanced even though it only focuses on the *Oportunidades* program. Its integrated operational information software system scans and validates co-responsibility forms (272 million forms for health and 300 million for education every two months) and its education MIS is used for information on scholarships.

Updated registration information to assess eligibility

As discussed in Section 2.3.2.4, a key area where integration could generate benefits for the administration of social protection programs is the possibility of continuously updating citizen's registration information. This would allow the system to continuously re-assess eligibility for a wide range of programs. An integrated and up-to-date system could also flag beneficiaries who lose or gain eligibility for certain programs. 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 (acting as a safety net). Countries moving in this direction include Mauritius, with its twinned Single Registry (Box 8), and Argentina, through SINTyS (Box 9).

The International Labour Organization cites case studies illustrating this approach, including India's *Samajik Suvidha Sangam*, which operates in Delhi across nine government departments, Chile's *Chile Solidario* (Annex B1) and Pakistan's Benazir Income Support Programme, which offers complementary services to cash transfer recipients (Taieb and Schmitt 2012). The Chile and Pakistan programs also have a sharp focus on targeting although it could be argued that their primary objective is to guarantee service integration across sectors and streamline entry into the social protection system. Other examples of this integrated approach are found in South Africa (Annex B2), Turkey (Box 7) and Mauritius (Box 8).

Box 7: Turkey's Integrated Social Assistance Information System

Turkey's Integrated Social Assistance Information System (ISAS) is a process management and information system which carries out application, enquiry, decision making, delivery and monitoring phases of social assistance procedures. The project was launched in 2009 owed to a collaboration between the Ministry of Family and Social Policy, the General Directorate of Social Assistance and the Scientific and Technological Research Council of Turkey.

In practice, the ISAS enables the collection of applications on poor and vulnerable households from each of the country's 973 local Social Assistance and Solidarity Foundations and integrates them into the Single Registry. The ISAS links applicant data to other databases using web-service technology and uses that information to determine eligibility to social assistance programs. The system—which spans 14 institutions and connects 28 databases—allows central tracking of information[20] from application to delivery, including on banking and accounting. In 2013, 6.4 million households and 23 million people were enrolled in the Single Registry. In 2014, the ISAS is expected to reach its full functionality with the completion of the Module for Integration of External Users (giving access to local administrations and non-government organisations operating in the realm of social assistance) and a communications module (aimed at enabling citizens to access information on their status online).[21]

The specific aims of ISAS is to:

> create a common database (poverty inventory) in the field of social assistance
> transfer General Directorate of Social Assistance and Social Assistance and Solidarity Foundation procedures into an electronic environment
> enable local administrations to exchange data
> establish a household approach to social assistance by integrating necessary information
> develop a smart information system to help with the fair distribution of resources
> increase the effectiveness of social assistance decisions
> support social security policies with the information provided by the single data base
> provide knowledge sharing and active control between databases.

Overall, the system is updated every 45 days through links to other national databases (for example, the Turkish Labour Institution).

According to program documents, the ISAS has started to pay off its development costs. It has, for example, transferred all procedures to an electronic environment, saving the annual production of 96 million papers and avoiding 132 million Turkish Lira transportation and documentation expenses. Furthermore, it has prevented the need for an estimated 25 per cent of reiterated assistance, resulting in considerable savings that can be redistributed to the most-needy citizens.

Source: Program documents.

20 Information available from the system on each citizen includes everything from civil and employment status to benefits received and property owned.

21 The modules integrated into the system between September 2010 and October 2013 were: the Conditional Education and Conditional Health Assistances Module; Assistances Module; Resource Management (Accounting) Module; General Health Insurance Income Test Module; Module of Cash Donation for Widow Women; Module of Human Resources of Foundation; Module of 2022 Allowances; Home-care Allowances Module; Project Supports Module; and Module of Assistance for Needy Families of Private Soldiers.

Box 8: Mauritius's twinned Single Registry

The Single Registry in Mauritius and its associated IMIS is unique in its comprehensive approach to social protection. It links to schemes covering cash and in-kind social assistance, active labour market interventions and social insurance, in part through the country's advanced civil registration system.

The registry enables coordination across five ministries and operationalises the division between contributory and non-contributory schemes using a twinned registry. Each database is in a different place, but is linked using a high-speed cable connection. Online connection is guaranteed to 34 registration centres across the island and to the Ministry of Social Security and National Solidarity, responsible for overall coordination and M&E. All functions across all schemes are managed through the twin databases, from registration through to payments and grievances.

While the small size of Mauritius and favourable policy context make the twinning an exception, lessons can be learned on how processes can be streamlined and how technology can be used to trigger integration.

Source: Annex to Chirchir (2012).

2.2 Information technology set-up for integrating data and information management

Integration is a policy issue and not a goal that can be achieved through technical fixes. Nevertheless, it is important to examine the practical IT set-up of integrated data and information management systems.

As explained in Section 1.3, the most important distinction when looking at the architecture of an integrated system is between the:

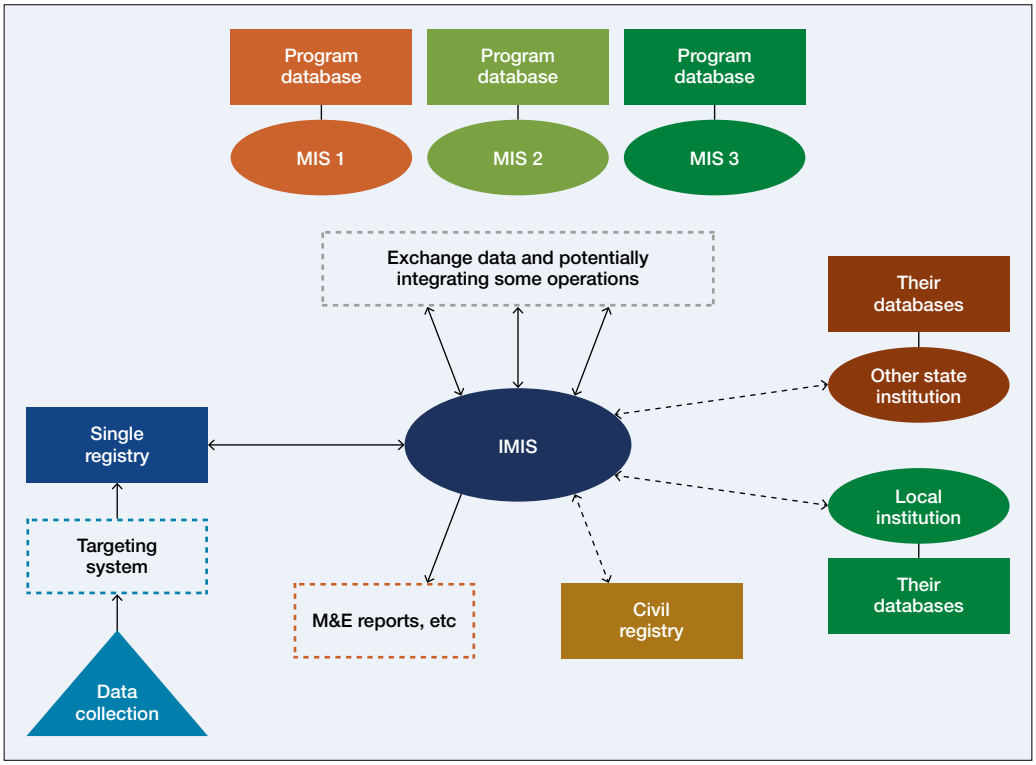
> **database** or Single Registry

> **application software or IMIS**[22], which facilitates the electronic exchange and integration of information coming from databases (different countries use different systems—Mauritius, for example, uses Oracle, South Africa uses Adabas and Kenya uses Microsoft's SQL Server database).

The **IT solution for integration must be strongly linked to the country context and overall objectives** of the system as discussed in Section 2.1. An ideal system that performed all functions discussed in Section 2.1 (guaranteeing breadth and depth of integration), would be structured as shown in Figure 3.

22 This could be called an MIS, but the authors have chosen not to because of the strong connotation of being a programme MIS.

Figure 3: Ideal information technology set-up for full integration of data and information management



Source: Developed by the authors.

From an IT perspective, other factors that should be considered in designing and applying integrated systems are discussed in Section 2.3.3.

In the context of recent pushes towards **e-Government, an IMIS for the social protection sector, linked to a Single Registry, is just one building block needed to ensure inter-operability of government sector systems**.

2.3 Key crosscutting aspects to consider for integration and related trade-offs

Many factors need to be considered when establishing a functional system for integrating information management. This section analyses these.

2.3.1 Administrative and institutional aspects

2.3.1.1 Governance and institutional arrangements

Most countries implementing integrated systems realise that ultimate responsibility for coordinating and managing a Single Registry and related software should lie with an agency or unit with sufficient independence from those managing social protection programs. This agency or unit needs to be positioned high enough in government to effectively coordinate with other stakeholders. In Argentina, for example, the SINTyS is managed by a specially created unit in the Cabinet of Ministries, which coordinates across sectors and levels. This allows for effective coordination with provinces (Fenocchietto and Pessino 2011). In Mexico, the unit in charge of the Single Registry was created within the line Ministry responsible for social development.

The position of the unit is vital, but so too is 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 so 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 et al 2012).

The more complex and inter-linked the overall information management set-up is (for example, Single Registry linked to Civil Registry and/or Tax Registry and/or service providers), the more difficult it is to establish and conform to arrangements. In 2012, for example, the Agency for Social Protection in the Seychelles had to sign a memorandum of understanding (MOU) with other six government departments to establish an IMIS even though the databases or registries involved were hosted by the Department of Information Technology.

Managing an integrated and centralised Single Registry **can lead to errors being propagated across programs** that have common points of entry, and risk stifling creativity and responsiveness. There may also be **fewer checks and balances**, as well as information asymmetries (UNICEF and World Bank 2013). Finally, **coordination costs money**, especially the transaction costs required to manage complex cross-program arrangements. Box 9 analyses Argentina's success in coordinating a complex system that holds information from 650 databases.

Box 9: Linking social protection provision to tributary data: Argentina's SINTyS

Originally created in 1998 through a decree, Argentina's SINTyS merges social and tributary data to improve the efficiency of social policies and the tax system. The system is unique for several reasons:

- It is set so each information provider is autonomous and owns its data. This means the SINTyS enables a continuous exchange of data from public and private databases rather than a centralised storage.[23] Overall, connections between the databases are logical, not physical. The SINTyS is not a Single Registry as defined in this paper, but an IMIS since it draws data from many sources.
- It is an on-demand system, with agencies submitting their databases and requests and the SINTyS delivering the information requested (for example, which beneficiaries are double-dipping or have a high income). Information providers sign confidentiality agreements and are assigned levels of access to ensure data protection. Since Argentina is a federal country with decentralised social policies, the SINTyS has signed agreements with each province.
- It is not a census, but rather enables continuous updating of information.
- It provides reliable information on citizens' income and assets that can be used for effective targeting.

The SINTyS sits in the Cabinet of Ministries. The Cabinet's overall coordination role is extensive and the result of long negotiations with private institutions, federal authorities and line ministries.

Source: Fenocchietto and Pessino (2011).

23 The system links more than 650 databases with five main databases forming the core.

2.3.1.2 Administrative structure and level of decentralisation

Country administrative structures and levels of decentralisation affect integration of data and information management overall. Based on the study of six countries that had implemented a Single Registry in Latin America (Argentina, Brazil, Colombia, Costa Rica, Chile and Mexico), Irrazaval (2004) notes that in no country is the **design** of the system[24] 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 10).

Countries adopt different strategies for securing **access to consolidated data** held by decentralised levels of government. The type of strategy developed depends on the 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).

The main **trade-off** when determining level of decentralisation is that, while local governments are most likely to understand the socio-economic situation of the population they serve, they might have more incentive to facilitate access to social protection programs to those not necessarily deserving (to win votes and build contacts) given that the budget is managed centrally (Azevedo et al 2011). This is why best practice points to a combined approach—decentralised implementation with adequate central control (Box 10).

24 This includes defining information requirements for the Single Registry (and related questionnaire) and formalising the main procedures to establish the registry (Irrazaval 2004).

Box 10: Problems and solutions to decentralised management of a Single Registry: Brazil's *Cadastro Único*

As a result of the division of tasks between municipalities, Caixa and the Ministry of Social Development(see Box 5), *Cadastro Único* offers these advantages:

> '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 faced by local people.

This decentralised system is strengthened by formal performance-based financial incentives—based on a Decentralized Management Index—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 update the beneficiary registry.

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

> Difficulties in preventing and monitoring the sensitivity of the registry to local political disputes. With this, central government needs to increase public awareness on the citizens' rights to be included in the *Cadastro Único* and overall targeting criteria[25], and audit local authorities from top to bottom. For example, the Ministry of Social Development uses 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. Other central government mechanisms used to guide and monitor inclusion and exclusion errors caused by the data collection process implemented by municipalities include: *Cadastro Único* geographical targeting limit for each municipality; central government database cross-checking (formal labour market, social pensions and other social policy databases); and a household and personal data assessment estimating 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, and so these are dealt with case-by-case.

Source: Mostafa and da Silva (2007).

2.3.1.3 Staff availability, capacity, training and retention

Staffing is particularly important for managing complex integrated systems and institutional arrangements. **Issues evolve around staff availability, capacity, training and retention.**

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

> designing incentives for attracting and retaining staff (Costa Rica)

> developing manuals and enforcing their use (Brazil, Colombia, and Costa Rica and Mexico)

> hosting capacity-building days and ongoing training (Brazil, Chile, Iraq, Lebanon, Palestine and Turkey)

> conducting thematic working groups (Kenya)

> conducting online education and online consultations (Chile).

25 For example, the simple selection criteria for *Cadastro Único* and *Bolsa Família* (its main user), has greatly increased the transparency and, therefore, public rights appropriateness of the registry process. The more complex the targeting criteria, the less easy the process.

Heeks (2002) makes an interesting point when discussing failure of information systems in developing countries. Heeks noted the need for a 'hybrid' figure at central level to guarantee the success:

> Hybrids 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.

With potential **trade-offs** to integration, increasing complexity can lead to increasing difficulty in recruiting and training capable staff, including with hybrid figures. Also, an integrated system needs local level staff to act as entry points. Establishing such a staff network can be expensive.

2.3.2 Operational and implementation aspects

2.3.2.1 Collecting data for the Single Registry

Systems that generate information are only as good as the data entered. Data quality or quantity is not the only issue. Each piece of information collected adds an additional cost and makes information management more complicated and, potentially, less effective (Chirchir 2012).[26]

Two main approaches are used to collect household information. Both 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). The amount of data collected varies widely and depends on program requirements.

The first approach is **on-demand registration**, which relies on households to come to a local welfare office to register and apply for benefits. The second is the census. Here, all households in an area are interviewed and information gathered is entered into a unified household registry.

Table 3 highlights the relative advantages of the two approaches, as determined by Castaneda and Lindert (2005). Countries with mature single registries tend to combine the two approaches and, in doing so, reap the benefits of each (for example, Annex B1).

26 Villalobos et al (2010) suggests that: '… four key questions should be answered, preferably during the program's design stage: (i) Which data are registered? (ii) What are the data registered for? (iii) How are the registered data used? and (iv) Who uses the data?.'

Table 3: Relative advantages of survey versus on-demand data collection approaches

	Census approach	On-demand application approach
Relative advantages	> Better chance to reach the poorest, who are less informed. > 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 households that graduate out of poverty, which is less likely to be self-reported.	> Lower total costs due to self-selection of non-poor out of registry process (interviewing fewer non-poor households). > Dynamic, ongoing entry and easier to update. > More democratic nationally—everyone has the right to be interviewed at any time. > Permanent process helps build and maintain administrative and logistical structures.
Best suited	> In areas with high poverty rates (more than 70 per cent) and/or high poverty density. > In homogeneous areas (rural areas and urban slums). > With new registries (programs), particularly when a large program needs to start quickly.	> In areas with low or moderate poverty. > 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).
Examples of use	> Colombia's Beneficiary Selection System for Social Program (SISBEN—El Sistema de Seleccion de Beneficiarios para Programas Sociales) (exhaustive surveying of pre-identified poor areas) > Brazil's Cadastro Único (quota-based surveying) > Chile's FPS (and every two years combined with on-demand) > Mexico in rural areas > Costa Rica in poor areas > Indonesia, census of poorest households from National Census > Pakistan, national census in urban and rural areas	> United States > Chile's FPS (combined with survey every two years) > South Africa > partial use in: > Mexico (urban areas) > Costa Rica > Colombia.

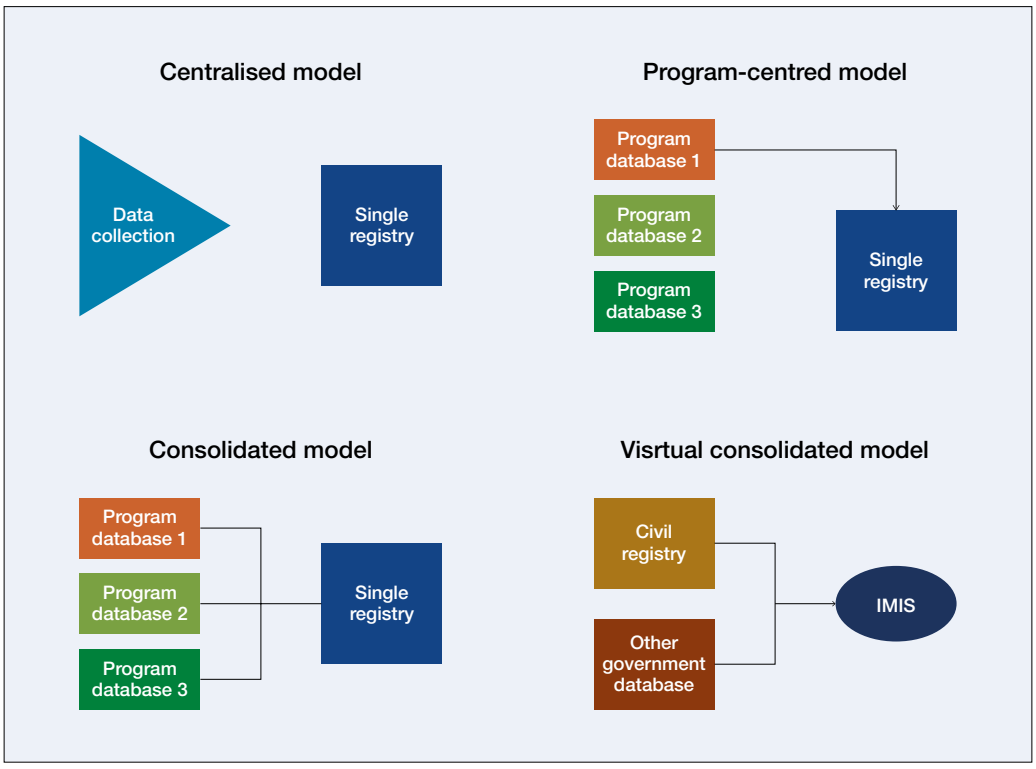
Source: Adapted by authors from Castaneda and Lindert 2005.

The four approaches to collecting data nationally and comprehensively for single registries are:[27]

1. **Centralised model.**[28] Data is collected directly for the Single Registry and not for specific programs. This model is used in countries such as Chile, Colombia, Costa Rica and Indonesia.
2. **Program-centred model.** Data is collected for the national program and other programs 'piggy-back' on that effort (in practical terms, this means the national program database serves as a Single Registry). This model is used by Brazil's *Bolsa Familia* program, Mexico's *Oportunidades* program in Latin America, *Bantuan Langsung Tunai* in Indonesia before 2011, and Benazir Income Support Programme in Pakistan.
3. **Consolidated model.**[29] Databases from several programs are linked to create a Single Registry. This model has been used in South Africa and, more recently, in Kenya.
4. **Virtual consolidated model.** Data is only consolidated virtually (through logical links established by the IMIS and not through a Single Registry. This model is used in Argentina (Box 9).

These four models are represented visually in Figure 4. The consolidated and virtual consolidated models, which require no additional data collection for the Single Registry, could also theoretically be based on data from a country's Civil Registry. However, this is only appropriate for programs targeting specific categories of people universally (for example, universal old-age pensions) since the information available in a Civil Registry is insufficient for poverty targeting.

Figure 4: Four approaches to collecting data nationally



Which model to adopt mostly depends on the **historical trajectory of social protection within a country**. When a program has collected a large amount of data, for example, it can make sense for other programs to access that data to avoid duplication of collection effort.

27 These observations are based on discussions with Ignacio Irrazaval, head of the Centre for Public Policy at the Pontifical Catholic University of Chile.

28 Irrazaval calls this the 'classic model'.

29 Irrazaval calls this an 'inter-exchanged database' model.

Similarly, if several programs have been collecting data nationally or if national databases can easily be accessed, it can make sense to consolidate this data and create a Single Registry. The 'centralised' model is only possible in countries with an explicit policy drive towards integration within the social protection sector, as is the case in Chile.

2.3.2.2 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). 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).

Transforming data into information requires multiple steps and coordination at intra and inter-institutional levels (Villalobos et al 2010; Azevedo et al 2011). The main four 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 to other administrative data manually or electronically.30 Integrated systems have huge advantages with electronic validation.
2. *Validation*: checking completeness of data, applying internal consistency checks, checking for duplication, ensuring contents and formats (such as names and ID numbers conform 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. *Updating*: making sure the database does not present a static snapshot of household situations, thereby ensuring currency (see also Section 2.3.2.4).
4. *Reporting*: designing and generating reports based on the data in the system, for effective decision making and management at various levels of program administration. This essential function is too often disregarded, as is the development of an M&E framework linked to the Single Registry.[31]

2.3.2.3 Using information from the registry for targeting purposes[32]

As explained in Section 2.1, not all single registries are created for targeting, though a large majority of countries with such registries have created some form of targeting algorithm to score and rank households based on available data. In many cases, this is based on proxy means test-based methodologies (Castaneda and Lindert 2005 for more details).

In the study countries, households are scored and ranked based on their levels of poverty and vulnerability at central level by the agency or unit responsible for the Single Registry, to avoid political interference.

The outcome is a compiled list of eligible households or a ranked list of all households. This output is shared with **individual program implementers who use the national list as a basis and often adapt it to their purposes** by:

a. adding further criteria (for example, pregnant women only, aged 65 years 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 to target specific

30 For this to be achieved, a unique ID needs to be in place for each individual and household. This is difficult to achieve without a national ID number or social security number being in place (Section 2.4.2.4).

31 This topic would require additional research.

32 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.

household typologies. However, the **risk** is the multiple exclusion from all social sector schemes of households not listed in the Single Registry or not classified as eligible that use the national targeting formula.

2.3.2.4 Updating the Single Registry

With single registries, one of the most contentious issues is updating data. This is especially problematic if the registries are the sole source of information for targeting across programs. 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 most countries with a Single Registry. Not only are scheduled updates set far apart (for example, two years in Chile and Costa Rica, and three years in Colombia, Indonesia and Mexico), the deadlines for updating are often not fully respected 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 that:

> … 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. (Irrazaval 2004).

These are, however, context-specific and should be considered conservative estimates in countries affected by high economic volatility.

Best practice comes from countries where **technology** permits **online integration** of data from local to central level. These countries have been experimenting with systems that allow municipalities and lower implementation levels to update information on individual households whenever they are notified of changes. In practice, this combines the census and on-demand approaches, as is the case in Chile. This approach can also use a 'batch-sending' approach (log of changes sent by email in batches), although this is less flexible and more labour intensive. Argentina's system is constantly updated through the links between its SINTyS and other databases (Box 9). One key resource for updating information is the **Civil Registry**, which can be used to update information on household births, deaths and ages.

Countries that integrate **on-demand data collection and registration approaches** with census approaches are more likely 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. Indeed, one aspect rarely discussed in the literature is the issue of **graduation** out of programs and how this can be tackled through data management. More research is needed on this topic.

2.3.2.5 Linking databases: need for a unique identifier

Registration and eligibility processes require documenting a potential beneficiary's identity (Samson 2006).[33] This is even more of an issue when attempting to integrate programs across and outside the social protection sector. A single, unique ID number **for individuals is needed to link registry information and beneficiaries with other systems and programs** (Casteneda and Lindert 2005; Baldeon and Arribas Banos 2008). The pros and cons of establishing national IDs are set out in Table 4.

33 See also validation discussion in Section 2.4.3.

Table 4: The advantages and disadvantages of adopting a unique ID number

Advantages	Disadvantages
> Can provide online, cost-effective, ubiquitous authentication services across a country. > Can complement financial inclusion initiatives and enable access to and reduce the costs of financial services. > Leads to social inclusion by identifying and recognising vulnerable groups or persons, and empowering beneficiaries. > Can aid targeting and delivery of services by enabling integration of different programs. > Facilitates an audit trail down to the recipient of a social allowance thus increasing transparency and accountability while reducing program leakages.	> May potentially create groups in a population (for example, those who have an ID number versus those who do not). > Depending on rollout, some vulnerable and poor segments of society may not see the importance in applying for an ID number and this may lead to exclusion. > Privacy concerns, while perhaps not manifested initially, will likely increase over time. > If not well managed, such large-scale projects may lead to corruption or adoption of proprietary and expensive technologies. > ID projects can have large initial capital costs.

Source: Gelb and Clark 2012.

Moreover, national ID numbers[34] and social security numbers (such as those used in the United States) are not widespread in many countries. Unsurprisingly, those most likely not to have such ID are most often the poorest and most vulnerable. 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) who suggest a few solutions:

1. **Working with national registry offices** on a common effort to register individuals (newborns and others), particularly in remote or poor areas where lack of identity documentation and numbers is prevalent. This approach is sometimes incorporated as a key objective of a social protection program. Examples include Kenya's Cash Transfer for Orphans and Vulnerable Children cash transfer, Kenya's Hunger Safety Net Program and Uganda's Social Assistance Grants for Empowerment program.
2. **Implementing initiatives to assign unique social identification numbers** that can be used to link information systems (for example, unified household registries for cash transfers, social security information systems and health information systems). This has been recently the case in Brazil, Mauritius, Mexico and Pakistan.[35]
3. Assigning **new numbers as people apply** (new number for each questionnaire), which leads to potential problems with duplication, as in Colombia.
4. **Rejecting those who do not have an ID number**, as Brazil did, for example, in the early phases of the *Cadastro Único*.

The disadvantages of requiring unique identifiers are apparent and large. Potentially dropping out of the system, for example, are the most poor and marginalised households of residents less likely to own a national ID card or be registered at birth.

34 National ID numbers are used as unique identifiers for social protection programs in Costa Rica and Moldova, for example.

35 Mauritius created its unique ID number (NID) in 1986 before setting up its social security system. The NID is used as a reference number in birth certificates and national ID cards and has four elements: surname, date of birth (six characters), place of birth (two characters), number on birth register (four digits, max 9999) and check digit algorithm. See also Annex to Chirchir, R. Kidd, S. (2011)

2.3.2.6 Integrating operations and services

Integrating operations and services is discussed in Box 5. Such integration is only possible if the centralised structure can manage the additional burden of implementing program operations, such as payments or grievance mechanisms, and if individual programs are willing to relinquish control over this.

2.3.3 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.

2.3.3.1 Information privacy

Best practice shows that 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: Council of Europe's Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data; United Nations Guidelines for the Regulation of Computerized Personal Data Files; and OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data. Such practice is common, for example, in all Latin American countries.

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 Single Registry are available online in aggregate format.

2.3.3.2 Architecture and transfer of information

The Single Registry database and the IMIS should be **centralised at national level**. However, they must also be **accessible and functional at sub-national level**, and possibly lower government levels, using the most cost-effective and appropriate telecommunication and computer hardware technologies available in-country. For example, some countries are experimenting with newly developed hardware and telecommunication systems that increase opportunities to handle large databases and information. Software applications can now be accessed using tablets, smart phones and notebooks—even in decentralised environments.

2.3.3.3 Hardware infrastructure

The choice of hardware depends on the software used for managing information. Overall, hardware should have adequate memory, disc 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.

2.3.3.4 Backup and security

Backup and security must conform to **ISO 27001**—an approach to managing confidential or sensitive information—so it remains secure, confidential and with its integrity intact. In some pilot transfer programs (for example, the Hunger Safety Net Programme Kenya and Social Assistance Grants for Empowerment in Uganda) backup 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 is hosted by the National Database and Registration Authority. In South Africa, SOCPEN is hosted by the South African State Information Technology Agency (SITA).

2.3.3.5 Developing and updating the software application for the IMIS

The classic approach to software development involves an analyst documenting requirements and then passing these to a developer to integrate them into application software. A better approach (adopted in Brazil, Kenya and Mauritius) is to adopt **iterative prototyping**, 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 which is essential for success. The literature stresses the importance of creating flexible, modular and incremental systems—based on the design – divisibility concept[36]—that leave space for ongoing input on behalf of those responsible for managing use. This is not only functional, it helps reduce design – actuality gaps (whereby the designer believes they know what is best without understanding users context) and hard – soft gaps (between rationality of information system design[37] 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 out-strip government staff capacity to manage and exercise their power.

2.3.3.6 Trade-offs

Trade-offs are linked to overall design complexity. The more complex the functions performed by the application software are, and the more data that is 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 sufficient training). Again, **technology alone does not ensure information management**. Even when well-designed reports are automatically generated, it is up to staff to use that information in a useful and meaningful way. With internal management, for example, it is useful for managers to understand program implementation, supervise processes, detect weaknesses and define actions. With external management, information is used to provide information on results, provide input for negotiation and ensure overall program accountability (Villalobos et al 2010). The way information is used and disseminated should be tailored to those involved (Lecuit et al 1999).

2.3.4 Costs and financing

Building and running MISs is not cheap. The same can be said about single registries and associated components. 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). In Argentina, for example, $54 million of the $83 million required was provided by the World Bank and the rest by the Central Government. The World Bank also significantly financed the establishment of systems in Brazil, Chile and Colombia, while Costa Rica received financing from the United Nations Development Programme.

Overall, it is difficult to compare costs across countries, mostly because of the different ways in which costs are classified and calculated, the different time – reference periods and the different scope of each Single Registry.[38] Three main categories of cost emerge, however:

1. **Implementation costs:** average yearly implementation costs have been estimated at between $0.2 million in Costa Rica, $5 million in Chile and $9 million in Brasil (Azevedo et al 2012; Irrazaval 2004).

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36 Design divisibility means 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).

37 "The tendency toward rationality in information systems design is reinforced by the rationality of the modernisation agenda that carries innovations from industrialised to developing countries. For them, the overall purpose of development is the creation of economic rationalism within Developing Country economic systems. IT is seen as a key tool in achieving this, and becomes part of a technically rational and technologically determinist agenda that focuses on the digital divide, on e-development and on IT infrastructure, according to Heeks, 2002.

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

2. **Data collection costs:** the cost of interviewing households for the Single 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 Brasil (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 in urban communities and $14 in isolated communities. In Argentina, costs ranged from $3.80 to $4.60 per application, in Colombia between $1.80 and $2.70 and in Chile between $2.80 and $6.90. (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 between 1999 and 2006. Chile spent an estimated $1 million to develop the *Servicio de Impuestos Internos* (SIIS), including costs for IT developers, hardware and consultants.

These separate costs result in overall 'kick-off' investments that range between $90 million in Mexico, $83 million in Argentina, $17 million in Chile, $10 million in Colombia and $1.7 million in Costa Rica (Azevedo et al, 2012). This shows that, despite the presence of economies of scale and efficiency gains from consolidating data collection activities across several programs, the overall cost of the Single Registry and its associated components strongly depend on system complexity.

3. Lessons learned and conclusions

3.1 Advantages of integration: experience and related challenges

Section 1.1 discussed the main advantages of integrating data and information management for social protection and beyond. Table 5 analyses key potential benefits, explores the extent to which these have been reached by countries with single registries and integrated systems for information management, and highlights main challenges faced.

Table 5: Experience in achieving potential advantages of integrating information management

	Potential advantages to integration	Experience to date and related challenges
Policy	More *equitable approach to the distribution of resources* based on objective and comparable information.	While consolidating targeting across programs can offer advantages, countries have been facing **several risks** that should be carefully considered. These include: > **Systematic exclusion of certain types of households** due to problems in data collection processes (for example, remote households), in data requirements (for example, lack of an ID card) or in determination of eligibility (for example, formula not capturing all of those in need). > **Multiple exclusion from all social sector schemes** (in a non-integrated system those not eligible for one scheme may be eligible for another). > **Potential stigmatisation** of households classified as 'poor' in the national data (belonging to smaller un-integrated schemes can be perceived as less stigmatising).
	Increased responsiveness and inclusiveness of interventions, able to serve the chronic poor and those structurally vulnerable to poverty, as well as respond to individual shocks or large crises.	This is **potentially the case when data is updated regularly and is capable of capturing dynamics around the poverty line (and transient poverty)**. Given that most countries struggle to update their single registries more than every two or three years (with an on-demand process sometimes running in parallel which will likely capture negative but not positive changes to household conditions), this potential benefit is not fully satisfied.
	Increased *transparency and accountability* as program information can be more easily shared and compared.	Increased transparency and accountability has been achieved by most countries implementing single registries and associated integrated systems for information management. However, the **extent to which this is achieved strongly depends on the institutional commitment of individual stakeholders and on the overall policy context**, not on technological set-up of the system. For example, where government is interested in establishing a social protection floor, pressure to share and compare data increases.

	Potential advantages to integration	Experience to date and related challenges
Policy	Increased *linkage to the complementary institutional framework* and wider social and economic policies in place.[39]	In practice, this is achieved by very few countries because often the **focus of integration is narrowly defined to include a handful of social assistance schemes**, not the wider spectrum of social protection policy (including social insurance and labour market interventions). Similarly, integration with wider government policies was often obstacled by weak institutional agreements between responsible bodies.
	Increased *knowledge on issues around poverty and vulnerability*.	This is one area where existing single registries and integrated systems for information management have hardly been used, even in best-practice countries such as Chile. This is partly due to **lack of analytical capacity**, partly to **internal incentives to focus on immediate implementation aspects** rather than long-term policy aspects, and partly to **lack of coordination with institutions such as universities and research centres**.
Operational	*Facilitated oversight of multiple schemes* and reporting to policy-makers.	This objective has been **successfully reached** in almost all countries where efforts towards integrated information management are in place. However, focus has mostly been on operational rather than policy aspects and in many cases **insufficient effort has been made to establish an integrated M&E system** based on single registry data.
	Avoidance of duplication of effort, for example in data collection activities for programme targeting.	This has been achieved in all countries, with related **cost savings**. However, in countries where this has resulted in a one-off data collection effort at given intervals (for example, two to three years) there have been serious **concerns regarding updating of data**.
	Establishment of a *common payment system across all schemes*, increasing efficiencies and saving costs.	This has only been the case in countries where the third party responsible for payments has had the **capacity and geographic coverage to guarantee this**. Brazil's approach to establishing performance-based agreements with *Caixa* (the bank in charge of payments) is considered best practice.
	Avoidance of double dipping and benefits to fraud or simply keep track of who is receiving what.	The focus in most countries has been on **avoiding double dipping and benefit fraud**, which **has been highly successful** in cases where national ID or social security ID numbers could be used to cross-check databases. Only rare exceptions (for example, in Chile) were using the integrated data from the Single Registry to keep track of who is receiving what across multiple programs (catered at different needs of beneficiaries).

39 'SP systems have the potential for maximizing outcomes and impacts if they are conceived as integral components of national development and poverty reduction strategies, linked with complementary programmes (e.g.: livelihood promotion, labour market and intermediation programmes, food security programmes, etc.) and macro policy determinants (macroeconomic stability, economic growth, etc.).' (OECD 2009).

	Potential advantages to integration	Experience to date and related challenges
Operational	Enabled *transition of beneficiaries between schemes* as their circumstances change.	Once again, potential gains to integration have not been fully reached in many countries. This is partly due to a **strong focus on avoiding 'double dipping'** across programs rather than the adoption of a life-cycle approach to social protection provision. It is also the consequence of **insufficient updating of data** to reflect ongoing changes of circumstances households face.
	Establishment of *more effective emergency responses*.	Several countries have been exploring this possibility, though no experience has been documented.

Source: Authors' elaboration.

3.2 Key lessons emerging from the literature

3.2.1 Policy

From a policy perspective, several lessons emerged from the authors' review of the scarce literature on this topic.

First and foremost, it was clear that achieving integration of data and information management is mostly a result of **coordination and political will**, rather than a technical 'fix' that helps rationalise governance of social protection programs. Countries without the internal drive to achieving a social protection floor or, more generally, countries without a systems approach to social protection are unlikely to succeed with information integration.

Second, the vast majority of efforts to integrate data and information management have **focused on a sub-set of interventions aimed at providing social assistance** to the poorest and most vulnerable households rather than integrating social protection as a whole and focusing on social insurance and labour market interventions. This is not a problem per se, but this should be acknowledged when discussing the topic (for example, single registries are not necessarily 'single').

Third, the **policy drive towards integration has been very often dominated by a focus on consolidating targeting** across several programs. The rationale for this has been strongly linked to the opportunities to maximise coverage of the poor and minimise leakages to the non-poor, to achieve cost-efficiency and transparency. While these objectives have been reached in several countries, it is important to **recognise the potential downsides to consolidated targeting**. Most importantly, this includes systematically excluding certain types of households (which would not happen if each scheme was adopted another mechanism) and multiplying exclusion from all social sector schemes (the potential beneficiary is 'all in' or 'all out').

Fourth, attempts to integrate information management should go **hand-in-hand with a policy aimed at civil registration of all households**. Social protection schemes can offer a great opportunity to reach out to households least likely to have a national ID.

3.2.2 Implementation

Several lessons emerge through implementation, as single registries and related integrated systems for information management are established.

With **institutional arrangements**, there are benefits to creating an independent unit to manage the new system at a sufficiently high government level to ensure effective coordination with all relevant stakeholders. This coordination is best achieved by identifying all relevant stakeholders and formalising their roles and responsibilities through legally binding agreements, carefully designed incentives and mutually agreed terms of reference. Importantly,

vertical and horizontal coordination should focus on acquiring data and securing access to consolidated information to other stakeholders (defining user rights for each).

The **administrative structure** for managing an integrated system depends on country context (for example, level of decentralisation, capacity of existing structures and capacity of staff). Many countries have adopted an approach by which overall design and guidance is centralised and specific implementation—most importantly data collection—is performed locally (for example, through municipalities). This approach has proved successful as it takes advantage of local know-how, creates buy-in from lower levels of governance while guaranteeing oversight and technical uniformity.

With the **data collection** strategy for the Single Registry, countries that have combined a census and on-demand approach have attempted to bridge the trade-offs between the two. This includes costs and reaching the highest number of households, as well as keeping information as updated as possible. Importantly, the model chosen by countries to create their Single Registry ('centralised', 'program-centred' or 'consolidated'—Section 2.3.2.1) depends on the historical trajectory of social protection in-country. No model is preferable over others *per se*.

One of the most important implementation issues when discussing integrated data management is **updating data**. A system that bases targeting on a static snapshot will likely face serious challenges in providing support to those most in need (especially given the transitory and often seasonal nature of poverty). Best practice, in this case, comes from countries that have achieved such a level of online integration between databases so updates in one immediately results in updates to the centralised system. The extreme example is Argentina's SINTyS, but Chile's SIIS is also ground-breaking in this direction. Most countries, however, lack such systems—with problematic consequences on the reliability of data used for targeting.

An interesting learning from an IT perspective concerns the importance of **updating the application** software of the IMIS using an iterative prototype approach, whereby a model of the system is designed and used to customise and seek feedback from users. This enables the system to be tailored to suit the needs of those primarily involved in its use and enhances a sense of local ownership that is essential for system success.

On a last note, evidence has shown that most countries have had to recur to external donor financing to cover the considerable **costs** of developing a Single Registry and its associated IMIS.

3.3 Conclusion: factors to consider when setting up a Single Registry and Integrated Management Information System

Overall, it is clear that what really matters when creating an integrated system for information management is the **level of connectivity, interoperability and linkages between different systems**, not the creation of a super-size, comprehensive social protection or government MIS that encloses all others. There is no ideal model. What matters is that the system chosen responds to a country's needs, is appropriate to its context and is affordable and sustainable.

The evidence shows that there are multiple advantages of integrating data and information management, especially if the overall policy environment is conducive to an integrated approach within the social protection sector and beyond. However, given the financial costs involved (Section 2.3.4), it is essential that countries weigh costs and benefits based on an assessment of their situation. Table 6 provides some guidance on the key issues to consider and evaluate.

Table 6: When is the development of a Single Registry and IMIS most feasible?

Dimension	When is the development of a Single Registry and IMIS most feasible?
Policy environment and budget	> National policy focused on developing a systems approach to social protection (aiming to achieve coordination and harmonisation to address the fragmentation that limits the effectiveness and impact of social protection policies and programs). > Strong political leadership advocating for reform and coordinating institutional actors. > Sufficient capacity to identify and cost policy options, assess affordability and identify available financing options. > Budget availability (and policy support) to develop a Single Registry and IMIS.
Country context	> Existence of a solid system for national ID (Civil Registry or social security number) that can be used as a backbone to integrate data across sources (Single Registry and other government MISs). > Existence of high-quality data collected by one social protection program or other large-scale data sources, if recent (potential to piggy-back on data collection to avoid or reduce[40] cost of re-collecting).
Staff availability and capacity	> Highly trained and qualified staff, at a sufficiently high salary to guarantee retention. > Sufficient network of staff at local level to act as an 'entry point' for an on-demand application system (not necessarily staff belonging to the same agency or unit—for example, trained municipal staff or social workers can be sufficient). > No resistance and complacency of staff to want to keep the system as it is (in other words, staff incentive to change).
Governance and institutional structure	> Existence or easy creation of an independent unit that is in charge of managing the new system at a sufficiently high government level to effectively coordinate with stakeholders. > Potential for strong institutional ties with other government bodies. > Absence of parallel or competing structures for oversight of social protection policy.

40 In Indonesia, for example, the Census was triangulated with other data sources and used as a basis for selecting households for interview.

Dimension	When is the development of a Single Registry and IMIS most feasible?
Tools and infrastructure	*Hardware (for example, computers and server)* > Some level of adequate hardware available at local levels (these can be purchased but this increases costs significantly). > Existence of adequate servers—high-capacity computers—that can be scaled up to accommodate potential growth of programs (for example, a designated server room with reasonable physical and logical security that conforms to ISO 27001). *Application software and database* > Potential to create a large database that is scalable, flexible and performs well. > Clarity of functional requirements and technical specifications at policy level. Key questions—such as purpose, benefits, host location and needs of users—should be addressed at feasibility stage and agreed by all stakeholders. > Availability of capacity to support and administer the software, database and network once the single registry and IMIS are established. *Transfer of data* > Ideally, Internet access is needed at all levels of implementation, including local (to build web-service access that greatly improves information flow). > Clearly documented protocols enabling quality controls on information before it is submitted over the Internet or transferred by batch process.
Policy environment and budget	> National policy focused on developing a systems approach to social protection, aiming to achieve coordination and harmonisation which, in turn, will address the fragmentation that limits the effectiveness and impact of social protection policies and programs. > Strong political leadership advocating for reform and coordinating other institutional actors. > Sufficient capacity to identify and cost policy options, assess affordability and identify financing options. > Budget availability (and policy support) to develop a Single Registry and IMIS.
Country context	> Existence of a solid system for national ID (Civil Registry or social security number) that can be used as a backbone for integrating data across sources (Single Registry and other government MISs). > Existence of high-quality data collected by one social protection program or other large-scale data sources, if recent (potential to piggy-back on data collection and avoid or reduce[41] cost of re-collecting).
Staff availability and capacity	> Highly trained and qualified staff, at sufficiently high salary to guarantee retention. > Sufficient network of staff at local level to act as an entry point for an on-demand application system (not necessarily staff belonging to the same agency or unit, but, for example, trained municipal staff or social workers). > No resistance and complacency of staff who want to keep the system as it is (in other words, staff incentive to change).

41 In Indonesia, for example, the Census was triangulated with other data sources and used to select households for interview.

Dimension	When is the development of a Single Registry and IMIS most feasible?
Governance and institutional structure	> Existence or easy creation of an independent unit to take charge of managing the new system at sufficiently high government level to effectively coordinate with stakeholders. > Potential for strong institutional ties with other government bodies. > Absence of parallel or competing structures for oversight of social protection policy.
Tools and infrastructure	*Hardware (for example, computers and server)* > Some level of adequate hardware available at local levels (these can be purchased, but this increases costs significantly). > Existence of adequate servers—high-capacity computers—that can be are scaled up to accommodate the potential growth of programs (for example, a designated server room with reasonable physical and logical security that conforms to ISO 27001). *Application software and database* > Potential to create a large database that is scalable, flexible and performs well. > Clarity of functional requirements and technical specifications at policy level. Key questions—such as purpose, benefits, hosting and nature of users—should be addressed at the feasibility stage and agreed by all stakeholders. > Availability of capacity to support and administer the software, database and network once the single registry and IMIS are established. *Transfer of data* > Ideally, Internet access is needed at all levels of implementation, including local (to build web-service access that greatly improves information flow). > Clearly documented protocols enabling quality controls on information before it is submitted over the Internet or transferred by batch process.

Source: Authors' elaboration.

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Annex A:
Program Management Information Systems

Management Information System, as a business term, involves *systems* that integrate activities through the exchange of *information* (orderly selected data) to perform *management* tasks such as planning, organising, coordinating and controlling. As strongly argued by Lecuit et al (1999): '… good knowledge management systems build on the strengths and successes of the organization while drawing lessons from earlier failures … they do much more than simply facilitate daily tasks.'

With program MISs for social protection schemes, the MIS performs a range of basic functions that enable the flow and management of information for key processes (Chirchir et al, 2011), including:

> identification of applicants through registration
> identification of beneficiaries through targeting
> compliance with conditions in conditional cash transfer and public works schemes
> management of appeals and grievance processes
> exit and graduation of beneficiaries
> production of payment lists
> reconciliation of payments.

As usefully summarised by the literature (Chirchir 2011; Baldeon and Arribas Banos 2008; Lecuit et al 1999), MISs include several components that, together, facilitate the capture, transfer, storage and processing of information. These are:

> **Staff** who manage all system functions and components. Staff not adequately trained or without required capacity can be a huge hindrance to the overall functioning of an MIS.
> **Governance and organisational structure** that provides the adequate business environment for an effective and efficient MIS (for example, institutional arrangements and service agreements, oversight, clearly defined roles and responsibilities).
> **Tools and infrastructure**, including:
  – **Application software** which facilitates electronic integration of multiple social protection scheme tasks and modules. For example, Mauritius uses Oracle, South Africa uses Adabas, and Kenya's HSNP and OVC-CT program use Microsoft's SQL Server database.
  – **Database** which allows a business to organise, store, and retrieve large amounts of data, typically in digital form.
  – **Computer hardware**, especially for capturing information, storing and processing it. Hardware requirements for storage and processing depend, to a large extent, on the size of the scheme. The type of computer technology used to capture data capture depends on the type of targeting and registration approach used. Mechanisms for transferring data from one part of the MIS to another. This can range from paper-based forms to high-tech telecommunications technology.[42]
  – **Mechanisms for transferring data** from one part of the MIS to another. This can range from paper-based forms to high-tech telecommunications technology.[43]

42 For example, with a census approach, in which all households are visited, more resilient technology is appropriate (personal digital assistant and mobile phones). If applicants visit registration centres, then laptops and desktop computers are more appropriate (Chirchir 2012).

43 The use of new transmission technologies should make it possible to send data directly from communities or districts to databases held in the capital city (Chirchir 2012).

Annex B: Case studies

Case study 1: Chile[44]

Chile's SIIS (integrated system for social information) is often cited as the most advanced example of integrated data management across the social protection sector and beyond. This case study explores the key characteristics of this well-established system.

Background

Social policy in Chile has been in constant development since the 1980s.[45] Economic prosperity in the 1990s led the government to reach out to the country's poor in a more systemic way, leading to what is now called the *Ficha de Proteccion Social* (FPS)[46], a survey used to identify poor households to be targeted for social assistance. The survey is administered at municipal level and has resulted in a Single Registry of potential beneficiaries which is the main source of information for the SIIS.

The system's framework and technical architecture is a consequence of a concept of poverty and vulnerability encompassing all risks associated with poverty across a lifecycle, including unemployment, precarious jobs, bad health and low levels of education. In this context, social protection is defined as encompassing policies and actions that help tackle these risks (*Ministerio de Planificación y Cooperación* or MIDEPLAN[47] 2008). Integration (within a sector and cross sector) is at the heart of the system.

Programs supported by the SIIS

Chile's social protection intervention is supported by two main pillars, designed to tackle poverty and vulnerability in an integrated way at two life-cycle stages (Taieb et al 2012; Covarrubias et al 2011):

1. ***Chile Solidario***, established in 2002, is aimed at households in extreme poverty. Other than more traditional monetary support through cash transfers[48], this program is innovative and personalised. Eacach household through a social worker assigned to it for 24 months[49] who provides information, referrals and assistance so household members can access complementary services[50] and link to employment and income-generating programs.
2. ***Chile Crece Contigo***, developed in 2006, follow children from pregnancy to four years of age. This program is coordinated by a committee of members from different ministries. It is presided over by MIDEPLAN and includes education, health, work and social security, and justice ministries that implement at local level.

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44 Most information used for this case study is based on a phone interview with Ignacio Irrazaval, Head of the Public Policy Centre at the Pontifical Catholic University of Chile, and on the book chapter co-authored by Irrazaval with Francisco Covarrubias and M. de los Angeles Morande', titled '*La efectividad de las redes de protección social: El rol de los sistemas integrados de información social en Chile.*'.

45 The first version of the CAS was already developed in the 1980s.

46 Translated, the first is 'Form for Socio-economic Characterization' and the current version is 'SP Form'.

47 The planning ministry of the Government of Chile.

48 The program also offers conditional cash transfers (*Bono de Proteccion Familiar*) for up to two years, an unconditional exit transfer (*Bono de Egreso*) for an additional three years, and more subsidies for particular categories of people within the household (for example, those under 18 years of age, more than 65 years of age and those with disability).

49 21 home visit sessions are organised with decreasing intensity after the first six months. The social worker and family members develop a strategy ('contract') based on a methodology that requires the family to meet 53 minimum conditions. These are grouped into seven pillars—health, work, education, family dynamics, housing, identification documentation and income (Taieb et al 2012).

50 Social assistance, health, education, housing, family support services, drug prevention and rehabilitation, technical help for people with disability and support for violent situations.

Beyond these two pillars, other programs are integrated into the overall social protection strategy through the SIIS. These include one that guarantees access to health services for key illnesses[51], universal access to education for children under 12 years of age[52], a system of social pensions[53], and other small programs for improving health conditions and employment opportunities and providing housing and judicial support (see Covarrubias et al 2011 for more details).

The SIIS is an essential part of Chile's social protection strategy because it contains all information on the State's provisions to beneficiary households and coordinates across ministries and levels of government. The following sections analyse how this is achieved.

Objective and institutional arrangements for SIIS

SIIS was established in 2008 through the Decreto Supremo N.160 which covers how personal data of potential and actual beneficiaries should be protected and how inter-institutional agreements should be regulated. Specifically, the decree dictates that institutions should exchange data with the:

> … objective of assigning and rationalising social benefits distributed by the State, as well as researching and designing policies, plans, programmes … based on the needs of those who administer such benefits, so as to promote a correct targeting of resources and the incorporation of beneficiaries in existing Social Safety Nets and ensuring access to better life conditions. (MIDEPLAN, 2007, art 4)

MIDEPLAN's Social Division performs key management and coordination of SIIS. MIDEPLAN determines the standards for data collection, storage, security and transmission. It underwrites legal agreements with 15 other state institutions, formalising the exchange of data (including rights and obligations for use and access to data[54]). Each institution is responsible for correct and accurate data. MIDEPLAN also signs agreements with Chile's 345 municipalities, which are primarily responsible for collecting data through the FPS form.

Data security and privacy

The information integrated by SIIS is mainly personal and regulated by Chile's Law No.19.628 on data privacy. This means, for example, that individuals must authorise state institutions to use their personal data or transfer it to third parties.

How SIIS is structured in practice

SIIS is a software application (a platform) linking many databases belonging to public entities through the Internet. It links to the Single Registry, the *Registro de Información Social*. This section analyses how the SIIS is structured.

Data sources

The key databases feeding into the SIIS are:

- Data from Chile's **Single Registry**, which stores and organises all information collected through the FPS form. In October 2008, more than 2.8 million families were surveyed (some nine million people) and included in the Single Registry.
- Data from ***Chile Solidario*** and ***Chile Crece Contigo*** MISs, linked through municipalities, including information on payments.

51 The prioritised list includes 56 pathologies (see Covarrubias et al, 2011 for more details).

52 This includes a system of scholarships and other support, such as for buying school materials and school meals.

53 Created in 2008, these pensions are for those without a formal pension and who belong to the poorest 40 per cent of the population. They cover both citizens 65 years of age and older and invalid citizens between the ages of 18 and 65 years.

54 Includes methods for access and data transferral, level of access, obligations on how data is used, content and periodicity of reporting.

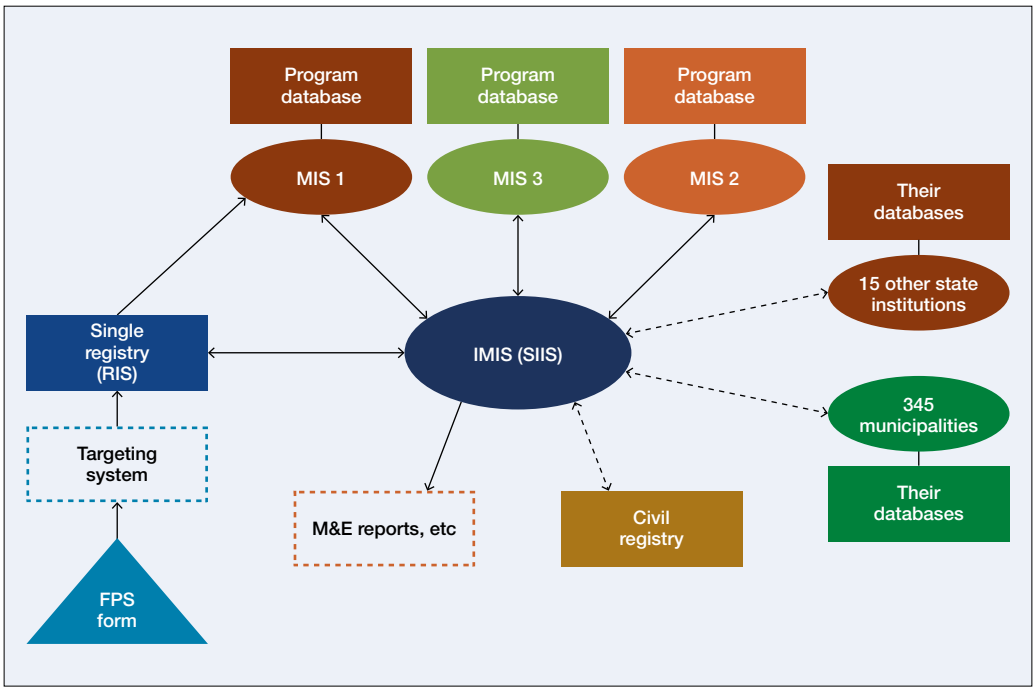
> Data from **databases of 15 state entities**.[55]

> Data from 345 municipalities.

> Data from Chile's Civil Registry.

At the time of writing, Chile is considering integrating its national registry of students and tax information from its tax agency (as is done in Argentina).

Figure 5: SIIS: overall structure



Source: Developed by authors based on Covarrubias et al 2011 and Irrazaval 2004. Boxes indicate databases.

The easiest way to explain how the data sources listed in Figure 6 are integrated is to visually represent them as a system. In Figure 6 the SIIS acts as a tie between many sub-systems and related databases.

How data is collected

SIIS data collection is collected in two ways:

1. Every two years a census is conducted using the FPS survey.
2. Continuous access to benefits or updated information is handled on request (on-demand) at municipality offices (officers are trained on this).

Overall, municipalities are responsible for data collection. For the 2007 survey cycle, some 3500 enumerators were trained at a cost of $5 per household in urban areas and $6 per household in rural areas.

55 Each of these institutions integrates multiple databases to the SIIS, depending on the key services they provide. For example, the National Corporation for Indigenous Development integrates nine databases and the National Agency for Schooling Support and Scholarships integrates 12 databases. For further details see pp. 27–28 in Covarrubias et al, 2011.

Data processing and targeting

After data is entered and validated (including cross-checks with the Civil Registry), it is used to target at central level. It[56] is analysed using a targeting formula (dotted rectangle in Figure 6) that calculates an overall score for each household, based on pre-set criteria. This score, recorded in the Single Registry with all relevant household information, determines program eligibility. Unlike other countries in Latin America, Chile's programs apply thresholds to eligibility based on specific objectives (for example, some focus on the most vulnerable 40 per cent and some on aspects of vulnerability such as housing).

How data is transferred

SIIS information is accessed in two ways:

> **Web service**[57] enables remote access by institutions with legal agreements with SIIS[58], without the need for common software. Data is transferred using XML language and HTTP protocol. Institutions can consult integrated data and SIIS can access institution databases to update data.[59]

> **Batch processes** involve contacting MIDEPLAN through a designed website and sharing information.

Institutions are given an **access key**—an identifier so information and functionalities can be shared.

Because both methods depend on the Internet, about 40 per cent of the 345 municipalities have faced significant access problems, despite effort to upgrade overall infrastructure (Covarrubias et al 2011)

How SIIS information is used

The best indicator on how well a system functions is actual use. On average, the SIIS is consulted 9800 times a day (online). Data accessed varies (Table 7).

Table 7: Standard information accessible through the SIIS

Geographic information	Personal information	FPS data	Presence in social programs
> region > province > municipality	> unique ID (RUN) > name and surname > sex > date of birth > nationality	> date of first application > number of household members > relationship to head of household > targeting score and date of calculation > decile and quintile of vulnerability	> receiving [name of program] benefit (Y/N)

Source: Adapted by authors from Covarrubias et al (2011).

56 Information centres around three themes: household economic status, household needs and economic risks faced by the household.

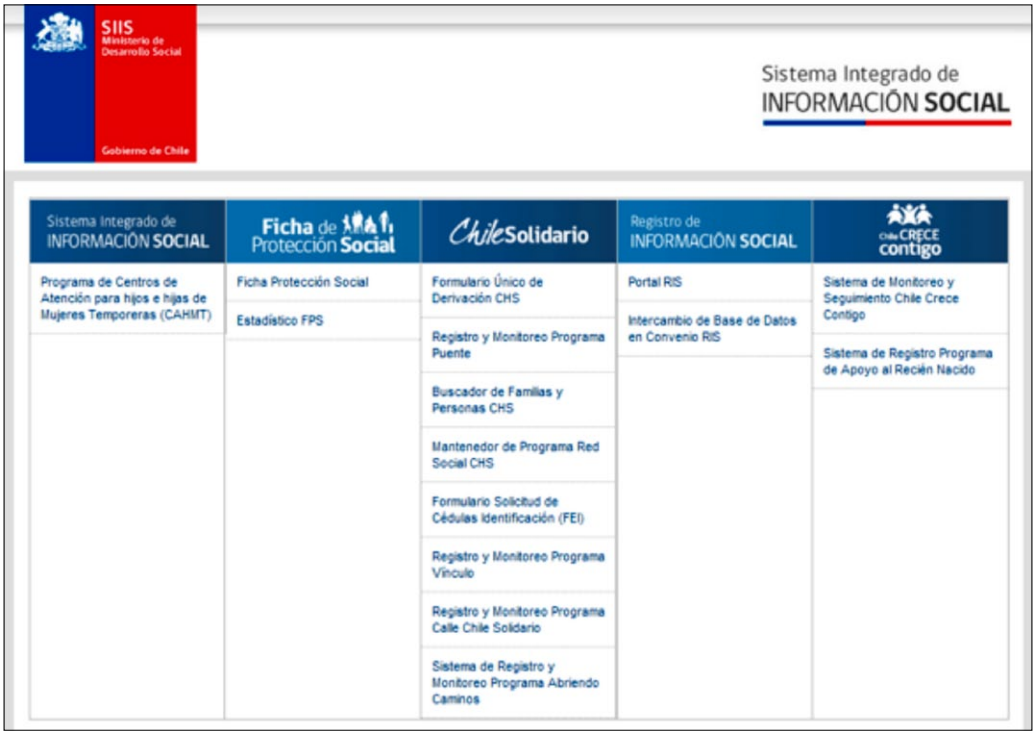
57 A web service is a method of communication between two electronic devices over the Internet. It is a software system designed to support interoperable machine-to-machine interaction over a network.

58 Only nine of the 15 institutions access the SIIS through the Internet.

59 Covarrubias et al (2011) notes that '… definition and design of the software and hardware components that are needed to implement and fully exploit such a system is not a minor task, not only because of the size of the system in terms of number of databases linked, number of users and types of transactions, but also because of the strategic importance of this information …'

The SIIS also has potential uses for beneficiaries. For example, municipalities can generate a document showing a household's FPS targeting score (including a barcode for security), which can be used to request public services. Beneficiaries can also ask for assistance from the 15 institutions that have legal arrangements with the SIIS without further proving eligibility.

Figure 6: Chile's *Sistema Integrado de Información Social*, available online



Main challenges and lessons learned

Keeping information updated

The main criticism around the SIIS is that its main data source is a Single Registry and is more static than intended (Covarrubias et al 2011).

Data is actualised daily by comparing it to the Civil Registry. Variables used to calculate eligibility scores (for example, schooling, disability and declared income) are only updated every two years. Households are asked to inform municipalities of updates, but it is unlikely they do so if their situation improves since this increases the likelihood of them losing benefits. Still, Chile's combination of census and on-demand application approaches helps capture changes in household conditions for the worse. This is not the case in many other countries.

Risk of excluding categories of individuals

The risk of excluding categories of individuals pertains to the targeting algorithm, not to the SIIS. However, an integrated system can lead to integrated exclusion.

Insufficient capacity at municipal level

While an online system has many advantages for facilitating instantaneous data exchange, municipalities are often not modern enough to fully integrate. The only solution is to buy adequate equipment, improve Internet access in remote areas and build staff capacity.

Not enough focus on research and monitoring and evaluation

Overall, the SIIS succeeds in targeting resources and identifying programs that can help vulnerable households. However, its full potential of becoming a databank for social researchers and institutions wanting to plan social interventions is still not realised.

Case study 2: South Africa

The Republic of South Africa's Department of Social Development (DSD), established in 1929, runs a comprehensive system of social assistance grants and processes 16 054 955[60] grants monthly. The cost is estimated to be 3.5 per cent of the country's gross domestic product. The grants are processed using a legacy information management system called SOCPEN, which started in the 1930s. South Africa is now setting its eyes on cross-sector integration. In 2006, it launched its NISIS to help eradicate poverty by using enabling technologies that support improved planning, targeting, coordination and delivery of anti-poverty statistics. To date, the new system has not succeeded.

Background

South Africa's social protection system is similar in two ways to the social security system in high-income countries—its programs are *means tested* and *national in coverage*. Responsibility rests with the DSD and South Africa Social Security Agency (SASSA). While DSD is responsible for policy, legislation and oversight, SASSA is in charge of program implementation.

Program supported by SASSA's integrated system for information management

SASSA manages grants through the integrated system for information management:

> **Aged**
  - *Old Age Grant*. Targeted at individuals 60 years of age and above and reaches almost 3 million recipients.
  - *War Veterans Grant*. Paid out to just under 600 Second World War veterans.

> **People with disability**
  - *Disability Grant*. For individuals between 18 and 59 years of age. Applicants must provide a medical assessment report confirming their disability. Coverage stands at just over 1 million.
  - *Care Dependency Grant (children)*. For children below 18 years of age who have disability. Applicants must provide a medical assessment report confirming their disability. Coverage is just over 100 000.

> **Children**
  - *Child Support Grant*. The largest grant and is targeted at children below 18 years of age. Currently reaches over 11 million children (estimated to be 60 per cent of the children in-country).
  - *Foster Child Grant*. Given to children with special care requirements. Currently reaches just over 500 000 children. The only grant in South Africa that is not means tested.

> **Supplementary**
  - *Social Relief of Distress Grant*. Temporary provision of assistance for people in calamitous situations who cannot meet their own or their families' most basic needs. Issued monthly for a maximum of three months. A three-month extension may be granted in exceptional cases.
  - *Grant in aid*. Paid as a top-up grant to those receiving other grants. Applicant must be in receipt of an Old Age Grant, Disability Grant or a War Veteran's Grant who need full-time attendance by another person. Currently benefits almost 72 000 people.

Objective and institutional arrangements of SOCPEN

SASSA is mandated by the South African Social Security Agency Act to: '… ensure the provision of comprehensive social security services against vulnerability and poverty within the constitutional legislative framework.'

60 Source: SOCPEN fact sheet, 31 January 2013. The current estimate of South Africa's population is 48 million.

SASSA has MoUs with other ministries and government structures and has succeeded in setting up online interfaces for data exchange with the Department of Home Affairs and PERSAL, the government pay-roll system.

How SOCPEN is structured in practice

SOCPEN runs on mainframes located at SITA. Its enterprise database, Adabas, manages more than 2300 concurrent users and has a register of more than 16 million beneficiaries.

The system operates throughout SASSA offices but cannot be accessed through the Internet for online application processing. Applicants must complete application forms in the presence of a SASSA officer and these are entered into SOCPEN which allows real-time tracking of progress and reduces problems of lost or misplaced forms.

Data sources

SOCPEN is a primary database for beneficiary information management. As shown in Figure 7, it is linked to other data sources, including:

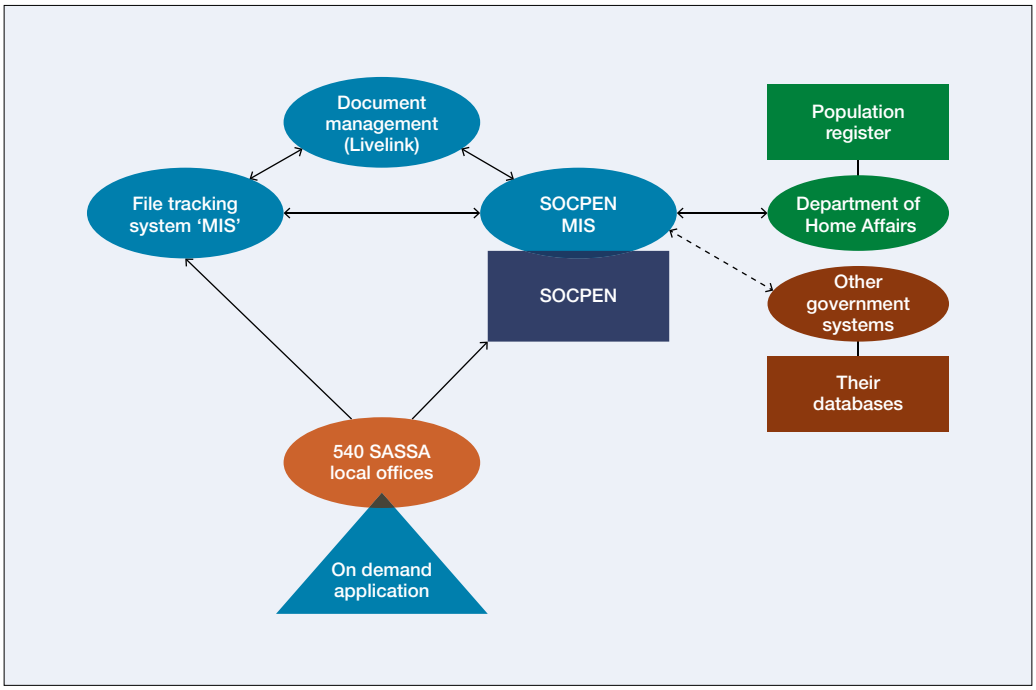
> applicants of the six social grants feeding into SOCPEN

> a file tracking system providing real-time information on the status of social grant applications

> Livelink, a document management system that scans and manages letters sent to grant recipients.

SOCPEN interfaces with other government MISs, the most important of which is the Department of Home Affairs and can provide real-time information from the population register. For example, when a death is reported, the information is conveyed to SOCPEN immediately leading to termination of payments. Data is also used to establish beneficiary status (for example, age cut-offs).

Figure 7: Overall structure of SOCPEN



Source: Developed by authors on the basis of Chirchir (2011).

An online interface has been established with PERSAL, to cross-check income data. Other adhoc data sources (not linked online) for this include: the Unemployment Insurance Fund; Government Employees Pension Fund; payroll system of the Defence Force; National Treasury

(to verify beneficiary banking details); Department of Basic Education's learner database; and special investigations unit (to identify fraudulent grants).

Innovatively, biometric systems are in place for beneficiaries to collect their money and prove their identity, including fingerprints and voice recognition.

Data collection

Given that SOCPEN is a demand-based system, by which potential beneficiaries apply to the program at local SASSA office registration points, the process of data collection and registration is ongoing, allowing for regular updating and re-certifying. Box 11 has more details on the social grants lifecycle.

Box 11: Social grants lifecycle, South Africa

The social grants lifecycle in South Africa stats with applications made on demand at local SASSA office registration points. Details captured include personal information, address, income, deductions, age and disability. Applications are screened with applicants identified and proof of income provided. If there is Internet access, grants officers enter details into SOCPEN. Legally, applications should be processed within 21 days. However, current initiatives aim to reduce turnaround time to 24 hours.

The next step is approval or rejection based on applicant information provided, and criteria defined for the means test. Applicants are informed of outcomes through notification letters.

Once notified, applicants are enrolled into the scheme. Then SOCPEN's payroll produces a payment schedule aggregated by provinces and payment service providers. SASSA uses three payment methods: bank deposits; hand delivery; and pickup from a post office.

SOCPEN monitors eligibility of approved beneficiaries. Routine maintenance certifies if beneficiaries are alive and updates the poverty status of existing beneficiaries. SOCPEN system ring-fences beneficiaries due for review and notifications are prepared. Those still eligible are reinstated, while those who skip reviews are suspended.

How information from SOCPEN is used

SOCPEN handles 2300 concurrent users. This is impressive for a legacy system that has consistently processed more than 16 million grants a month. Since social security implementation is handled by one agency, it can be argued that South Africa operates a 'single window' for processing applicants.

SOCPEN also:

> processes applications for the country's six social grants
> determines beneficiaries from the list of applicants
> maintains the payroll for the monthly 16 million plus grants
> automatically produces a list of beneficiaries to be re-assessed.

The system has limits, however. SASSA employees are the main users of the information kept by SOCPEN. Moreover, SOCPEN is not an organisation-wide system and so not all of SASSA's operations are computerised. Indeed, SASSA also has to maintain other operational MISs (for example, financial, human resource management, call centres and a geographic information tracking system).

Plans are underway to migrate SOCPEN to a graphical user interface while maintaining its robust database platform (Peterson and Appel 2012). The new system will integrate current services with compliance services, back-office functions and business intelligence services.

Further pushes for integration: the National Integrated Social Information System[61]

SASSA's plans to migrate to a graphical user interface have run in parallel with plans to integrate the social information needed by higher levels of government. This need originally came from the national War on Poverty Campaign launched in 2007 by the Office of the President after a 10-year review of anti-poverty services offered since Independence. The rationale for creating a new NISIS was to develop cross-ministry, anti-poverty strategies and gather information on the conditions of the poor. SASSA's on-demand system was insufficient for this since it does not have a complete profile of the poor. A feasibility study and proof-of-concept for NISIS were completed in 2009, financed directly by the Treasury.

Since then, as with most large conceptual ideas, NISIS's development has been a journey. In 2009, a formal partnership was established between the War on Poverty Campaign and the Department of Rural Development and Land Reform. The department took ownership of the project and has enabled the ongoing development of NISIS in support of its Comprehensive Rural Development Programme, which focused on household profiling and service referrals capabilities. The DSD was to lead overall coordination but it never did so, partly because NISIS had no institutional and legal framework and no structure. SASSA has been almost cut out, such that SOCPEN data has never been fed into the NISIS database. Similarly, the Treasury has not supported the project due to 'general scepticism over large scale IT projects' (Da Silva 2012).

As a consequence, some provincial governments are experimenting with playing a stronger role in coordinating the social policy within their remit, including North Cape and Mpumalanga provinces and in Johannesburg.

Despite any success at provincial level, the NISIS remains far from being what it set out to be. The DSD is trying to reconceptualise the NISIS to align it with departmental priorities and focuses on internal coordination and implementation of an integrated service delivery model.

Main challenges and lessons learned

SOCPEN

SOCPEN is stable, supports most grant operations and interfaces with some other government MISs to cross-check information and prevent fraud. However, it has its limits, including:

> reaching its ability to be customised and being overtaken by many technological changes
> processes producing substantial volume of paper and forms
> not being an organisation-wide system covering all SASSA operations
> positioning SASSA so it has to maintain other operational MISs, which is inefficient and leads to duplication of data storing (making reporting, monitoring and evaluation difficult)
> linking with other MISs but not always in real time
> not being set up to integrate data and information management, which means its overall focus is on managing operational processes for grant delivery rather than on policy coordination and oversight.

Despite these limitations, several lessons can be drawn from South Africa's experience:

> **Old is gold.** Even though it is a legacy system built on a non-graphical user interface based on mainframes, SOCPEN has delivered relatively well.
> **Support from SITA.** SITA plays a pivotal role in supporting and maintaining SOCPEN. In fact, SOCPEN is hosted on mainframes held at SITA. Retaining talented staff is a challenge. The government needs to build internal support mechanisms to run MIS system nationally, through a dedicated information and communications technology agency or a strong internal support team.

61 This section has been partly informed by discussions with an information technology consultant involved in developing NISIS.

National Integrated Social Information System

SOCPEN's problems have not been addressed by the NISIS, proving how lack of policy coordination and institutional arrangements are at the basis of IT failure, not the other way round. Issues include:

- **Lack of national DSD involvement and ownership**
  The provincial DSDs are sometimes deeply involved in the War on Poverty. At national level, involvement has been almost non-existent. The NISIS, therefore, is not always seen as relevant.
- **Slow profiling progress**
  Household profiling is a massive, labour intensive and logistically complex exercise which the War on Poverty or Comprehensive Rural Development Programme were not capable of performing (including because of lack of resources). This was compounded by increasing lack of interest from the Treasury and central government and no coordinating effort by the DSD.
- **Lack of service delivery**
  Several factors have led to lack of service delivery including: (i) excess focus on household profiling targets at the expense of service delivery; (ii) lack of focus and/or clarity on the services to be prioritised for delivery; (iii) limited coordination capacity and authority on the ground; (iv) close to non-existent coordination models and institutional arrangements; (v) no dedicated resources from line departments meaning programs compete against their department's internal priorities; (vi) absence of a clear political or legislative mandate necessary to marshal the line departments responsible for service delivery.

Case study 3: Indonesia[62]

This case study focuses on the recent creation of a database that unifies information for poverty targeting across Indonesia's largest social assistance programs. Although work is underway, this is an interesting example of the challenges countries face when attempting to consolidate and integrate data and information management.

Background

Te Basis Data Terpadu or Unified Data Base (UDB) was created to improve the targeting system of Indonesia's main poverty alleviation programs. Its initial proponent was the Vice President who wanted to reduce poverty by 8 to 10 per cent by 2014, as pledged by the President, stipulated in Indonesia's Midterm Development Plan (RPJM) 2009–14 and set out in President Instruction No 1/2010, National Development Priority.

> By using the updated data [of UDB], our poverty programmes can choose the right target with minimum data error and maximum benefit.
>
> Vice President Boediono in opening ceremony of the Regional Development Planning Meeting

Part of the drive towards improving targeting effectiveness was analysis of national socioeconomic survey data indicating that many poor families did not receive the social assistance they were supposed to. The UDB is expected to result in social assistance programs better complementing one another. For example, conditional cash transfer beneficiaries can also receive free health services. These objectives are in line with recent World Bank recommendations focusing on how current non-unified collection of initiatives may not be the most effective way to protect households (World Bank, 2012b).

62 Information for this case study was collected through key informant interviews with staff at *Tim National Percepatan Penanggulangan Kemiskinan* (TNP2K)—the National Team for the Acceleration of Poverty Reduction—and a phone interview with a representative formerly involved in establishing the country's UDB. The authors thank everyone who participated in the study.

The UDB covers 24 million households (96 million individuals) in more than 77 000 villages nationwide, making it one of the largest databases of its kind in the world.[63] The data is managed within the TNP2K, established through Presidential Decree No 15/2010.

Program supported by the United Data Base

At least five national programs use UDB data:

- ***Jaminan Kesehatan Masyarakat***—the national health insurance program financed by the central government for poor and near-poor families.
- ***Bantuan Siswa Miskin*** (literary scholarships for poor students)—provides transfers from central education agencies to students or schools once enrolment, attendance and other criteria are verified.
- ***Program Keluarga Harapan***—conditional cash transfer providing direct cash benefits conditional on household participation in locally-provided health and education services.
- ***Beras untuk Rumah Tangga Miskin***—rice subsidy program with the broad aims of strengthening food security and reducing the financial burden on poor and near-poor households.
- ***Bantuan Langsung Sementara Masyarakat***—a temporary unconditional cash transfer to compensate for the increase in fuel prices, designed to protect poor and vulnerable households from social-economic risks posed by changes in national economic policies.

To date, approximately 350 local governments have requested UDB data from TNP2, including for improving their targeting system of locally owned poverty reduction program. TNP2K has not yet conducted research on data use.

Institutional arrangements for the Unified Data Base

Within TNP2K, the UDB is managed by a special unit for targeting and poverty reduction called the *Unit Penetapan Sasaran Penanggulangan Kemiskinan* (UPSPK). It has 20 staff and is divided into three groups:

a. MIS/IT, to maintain data
b. operational, to provide technical assistance to ministries and local governments who want to use the data
c. research, focused on analysis of data and M&E.

One UDB limitation often cited by the UPSPK is the lack of 'formal' institutional arrangement—no regulation determining who is responsible for its management, how it will be staffed and funded, which programs use data and how, and who will collect and update data. This lack of formal institutional arrangement risks undermining the UDB's legitimacy and its systematic use and sustainability. It is also unclear where the UDB will sit after Indonesia's 2014 elections.

Data is collected by Statistics Indonesia, which has updated data every three years since 2005 (see Section 0 for more details). There are talks of building in-house capacity for data collection. This is due to the potential reputational risk for Statistics Indonesia if it is seen to be involved in selecting beneficiaries for social assistance programs, which could, in turn, potentially lead households to give false responses to important surveys and the population census (World Bank 2012c). As for use of data by individual programs, some ongoing initiatives and upcoming ministerial decrees aim to create a basis for each implementing agency to formalise how individual programs use the UDB. The results of these efforts are yet to be seen.

An important institutional arrangement is being pursued to integrate the UDB with the NIK (citizen identity number) managed by the Ministry of Home Affairs. To date, approximately 74 per cent of UDB data has been integrated with the NIK and results have been used in designing the *Kartu Perlindungan Sosial* or social security card. There is no further discussion on using this integrated data for wider national policy development.

63 Benazir Income Support Programme's poverty database in Pakistan includes information on 27 million households and 108 million individuals.

Data security and privacy

Of the 40 indicators in the UDB, which focus on socioeconomic and demographic characteristic of households, around 16 can be downloaded by the general public in aggregate form from the UDB website (http://bdt.tnp2k.go.id/). To regulate security and privacy of data, TNP2K uses existing laws and regulations, such as Law No 11/2008 on Information and Electronic Transaction and Law No 14/2008 on Public Information Disclosure. Data considered sensitive are only shared with other government institutions on request.

How the Unified Data Base is structured in practice

Data sources

Before the UDB was developed, poverty reduction programs used different criteria and data sources in determining beneficiaries, leading to duplication of effort and lack of consistency.

After the UDB was developed, it became the only source of data for poverty targeting in the country. The UDB is not linked with any other government database, though efforts are in place for linking it with the NIK.

Data collection

Statistics Indonesia is the main source of statistical data in-country. It regularly collects basic statistical data through the Census, Susenas national surveys[64] and Village Potential Surveys.[65] Given that no other agency was capable of collecting data nationally, it was natural for Statistics Indonesia to do so. The process leading to this decision had its challenges.

The first time Statistics Indonesia was tasked with systematically developing a 'census' of poor households (*Pendataan Sosial Ekonomi*) was in 2005, when the reduction of fuel subsidies led the government to develop a temporary unconditional cash transfer—the BLT—aimed at all poor households. Statistics Indonesia conducted another large-scale survey (*Pendataan Program Perlindungan Sosial*—PPLS) to update the data while the Government was preparing to implement a second round of BLT in 2008. This data verified information for the 19 million households listed in the 2005 BLT database (Tobias 2013).

The current UDB is based on new data collected in 2011 and developed to solve the mistakes of the 2005 and 2008 data collection rounds, which both had high exclusion and inclusion errors (mostly because they were implemented with limited time, resources and technical knowledge). A major improvement was collecting data from a significantly greater number of households: 24 million (40 per cent of the population) as opposed to 19 million. It would not be cost-effective to conduct a census of all households in-country, given that the UDB focuses on the poor and vulnerable. As a result, households interviewed were selected based on the 2010 Census.[66] Data was then triangulated with other sources including the Village Potential Statistics 2010, Susenas 2010, the 2008 PPLS database, program listings and local knowledge from communities about the poorest households.

The 2011 PPLS questionnaire collected information on the strongest predictors of consumption (poverty), while remaining two pages. Different government agencies implementing social programs were consulted so information collected would meet their needs. The cost of about 20,000 IDR (US$2) for each home interview—conducted by 120 000 Statistics Indonesia enumerators—is in line with international standards (Tobias 2013). So too is the comparison between data collection costs and annual program costs of the three largest programs, which amounts to less than 1 per cent (World Bank, 2012c).

The next PPLS update is scheduled for 2014 (three-year gap), but may be postponed due to upcoming elections.

64 National Socioeconomic Survey (SUSENAS) is conducted every two years.

65 Village Potential Statistics provide information about village characteristics for all of Indonesia.

66 This is a controversial decision and Indonesia is the only country in the world where such an approach has been taken.

Data processing and targeting

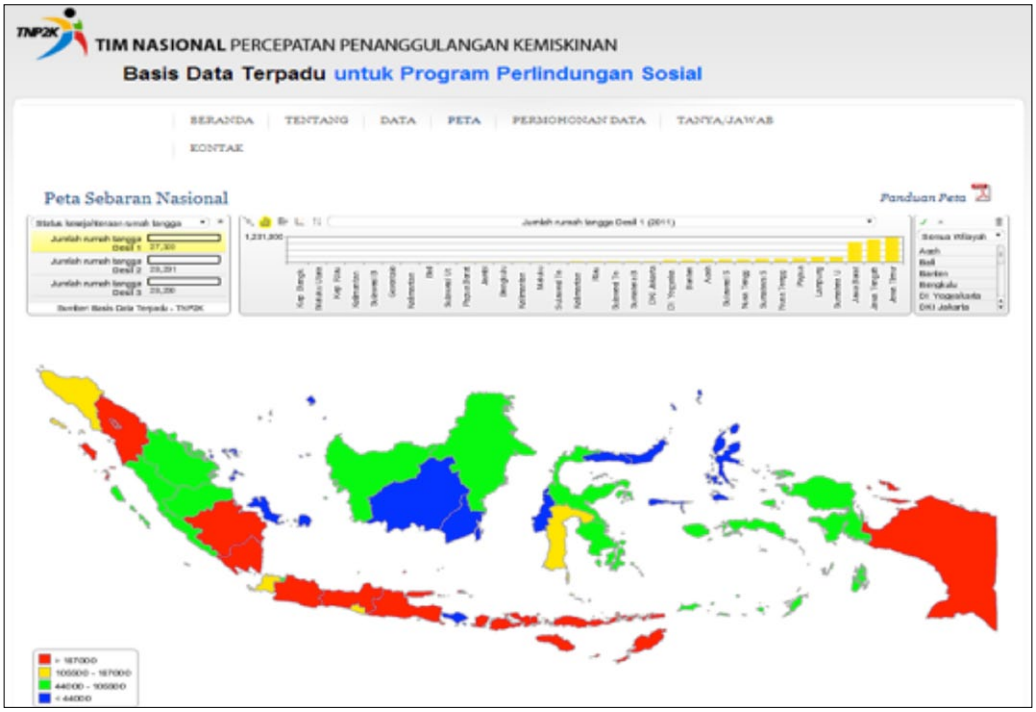
After the database is subjected to extensive validations and consistency checks (never comparing with other databases though), Statistics Indonesia transfers the dataset to TNP2K's National Targeting Unit and processes it using a proxy means test targeting index. This categorises households into four levels and combines it with program-level criteria to target programs. For example, Raskin validates lists within communities[67], while PKH only targets extremely poor households with elementary school age children or pregnant mothers.

Data transfer

UDB data is stored using a Microsoft SQL server but it is not linked to other servers or web services for remote access. Transfer of data between TNP2K with other government institutions continues to be done manually. Ministries or local governments send written requests detailing the type of data needed. UPSPK retrieves it and sends it in excel format by email or on disk. Updated data at program level is usually transferred manually to TNP2K, but—importantly—not incorporated into the central database because of inconsistencies and the partial nature of data. The UDB cannot be updated online because of inadequate infrastructures, such as reliable Internet connection.

Since January 2012, the TNP2K has provided open web access to data on national, provincial and district distributions, on 16 indicators.

Figure 8: Sample of Unified Data Base online data



How information from the Unified Data Base is used

Data and information available in the UDB is mostly used to determine the beneficiaries of social protection programs, at national and local levels. A few initiatives are being implemented to use the UDB as the basis for M&E and grievance mechanisms. Since 2013, for example, the TNP2K has collaborated with the Presidential Work Unit for Monitoring and Control to use an online complaint handling website called LAPOR. Similarly, TNP2K's National Targeting Unit's research division evaluates the UDB's performance and conducts

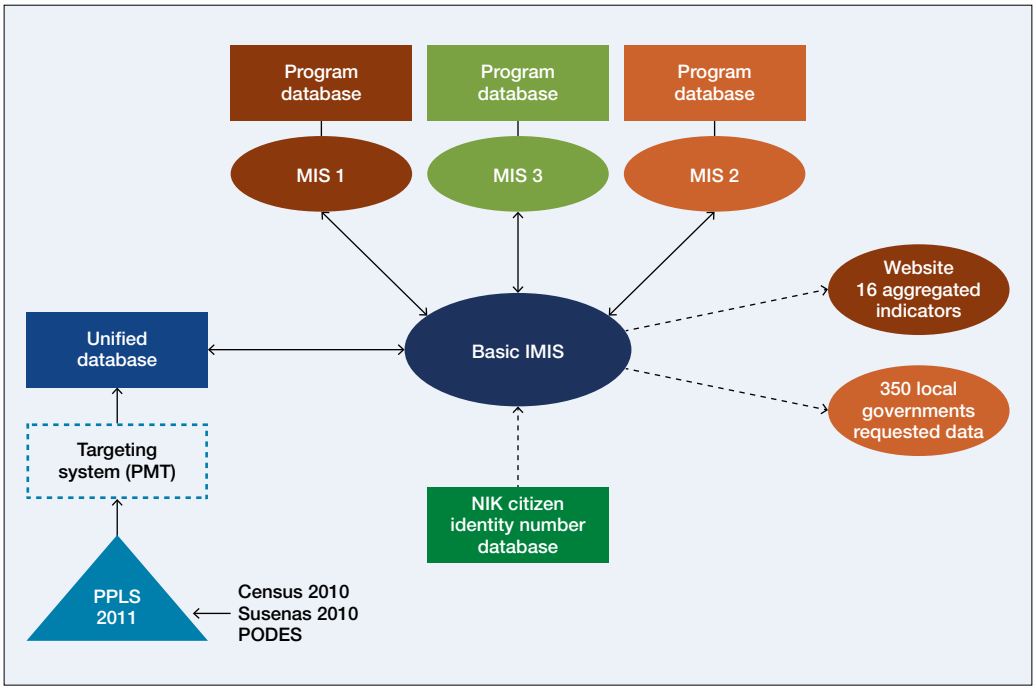
67 This process often results in distribution of less rice to a much higher number of households. For example, around 55 per cent of all Indonesians report receiving Raskin rice, even though it is targeted at the poorest 25 per cent (see World Bank 2012c).

other analyses related to poverty, social protection policies and targeting methodologies. Independent evaluations of UDB effectiveness by other research institutions are encouraged.

The main challenge within the UPSPK relates to quantity of staff. With limited staff, the TNP2K cannot undertake outreach and dissemination, providing assistance to local governments on how to use data and monitor its use.

Figure 9 summarises the key inputs and outputs of the UDB.

Figure 9: Overall Unified Data Base structure



Source: Developed by authors.

Main challenges and lessons learned

Efforts to improve the data and information management systems for poverty reduction programs in Indonesia have enjoyed some success, although there are still challenges.

Improvements were made with 2011 data collection, most significantly increasing the number of households surveyed (43 per cent of the population). This was possible because Census data was triangulated with community validations and other data sources used to select households for interview. Fifty-seven per cent of households were not surveyed for cost reasons.

Another challenge is whether Statistics Indonesia should remain in charge of data collection or whether capacity should be built elsewhere, in line with international standards. Capacity is the main constraint and there is little evidence that much will happen any time soon.

Data updating was the biggest challenge, especially for programs targeting categories with 'volatile' status, such as PKH which focuses on school-aged children and pregnant women. Even when implementing agencies at program level update their beneficiary data, these changes are not fed back into the UDB.

With data use it is hard to predict the future. Lack of formal institutional arrangements and MoUs with individual program implementers and other government bodies mean data exchange is managed adhoc. Moreover, program managers and local governments have displayed complacency and resistance to change (Nazara 2012). Still, 350 requests for data from local governments is a good indicator there is strong demand, even if the UDB is just as a starting point for tailored targeting approaches.

With key lessons learned, interviews with staff involved in creating the database revealed four key lessons learned:

> Developing such a system requires an enormous work and extensive capacity (technical, administrative and financial), which is not always available. This means donor support could be essential during development.

> Instilling a culture of learning—flexible and open to ongoing adaptation—is important. Pilots take time and money but are essential to creating a shared and commonly accepted approach that is effective and sustainable.

> Embracing complaints and criticism, instead of fearing it, is key.

> Getting staffing right, including by attracting and retaining competent staff with competitive salaries, is essential.

> Dedicating energy to communication during implementation increases ownership and transparency.