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Management Information Systems in Social Safety Net Programs: A Look at Accountability and Control Mechanisms

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Abstract: This paper is intended to provide task managers and World Bank Group clients working on Social Safety Net (SSN) programs with practical and systematic ways to use information management practices to mitigate risks by strengthening control and accountability mechanisms. It lays out practices and options to consider in the design and implementation of the Management Information System (MIS), and how to evaluate and mitigate operational risks originating from running a MIS. The findings of the paper are based on the review of several Conditional Cash Transfer (CCT) programs in the Latin American Region and various World Bank publications on CCTs. The paper presents a framework for the implementation of MIS and cross-cutting information management systems that is based on industry standards and information management practices. This framework can be applied both to programs that make use of information and communications technology (ICT) and programs that are paper based. It includes examples of MIS practices that can strengthen control and accountability mechanisms of SSN programs, and presents a roadmap for the design and implementation of an MIS in these programs. The application of the framework is illustrated through case studies from three fictitious countries. The paper concludes with some considerations and recommendations for task managers and government officials in charge of implementing CCTs and other safety nets program, and with a checklist for the implementation and monitoring of MIS.

JEL: I38 - Government Policy; Provision and Effects of Welfare Programs
H55 - Social Security and Public Pensions
M15 - IT Management

Keywords: Safety nets, social protection, social assistance, transfers, conditional cash transfers, management information system, MIS, information and technology, control and accountability.

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Chapter 1: Purpose, Audience, and Methodology

Why a Management Information Systems (MIS) Paper?

1 In May 2006, a special review of the control and accountability systems for conditional cash transfers (CCTs), a type of social safety net (SSN) program, was carried out by the World Bank's Latin America and Caribbean Region.[1] The review concluded that a more consistent framework for the design, implementation, and control of the MIS was needed to evaluate progress of SSN programs and particularly to manage the various business risks.

2 The purpose of this paper is to provide this type of framework, which aims to: (i) maximize the use of the MIS to strengthen the control and accountability mechanisms of SSN programs (with a focus on CCTs) and (ii) evaluate and mitigate operational risks originating from running a MIS.

3 The paper focuses on the information management practices that can be applied both to programs that make use of information and communications technology (ICT) and programs that are paper based. In fact, none of the programs visited for this paper are fully automated, and automation is not always appropriate or cost efficient. Even the most advanced programs in countries with developed infrastructure are often a mix of ICT and paper-based solutions.

Who Is This Paper For?

4 The paper is intended to provide task managers and World Bank Group clients working on SSN projects with practical and systematic ways to use information management practices to mitigate accountability and control risks. The paper also discusses alternative practices and options to consider in the design of the MIS, and the risks and risk mitigation alternatives inherent in each option. Independent of their computer literacy, task and program managers can use good-practice guidelines and the examples of mature systems in the design, supervision, revamping, and maintenance of the MIS systems that support their programs.

5 This paper is not intended to make task managers and program administrators, experts in the implementation of IT projects; nor is it intended to be a step-by-step tool for the implementation of ICT projects or projects with an ICT component.[2] Instead, this paper provides task managers with enough information to ask the right questions and to make sure that an adequate risk management plan for the implementation of the MIS in CCTs is in place and is being properly implemented.

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[1] See World Bank 2007, "Control and Accountability Mechanisms in Conditional Cash Transfer Programs: A Review of Programs in Latin America and the Caribbean." *Operational Innovations in Latin America and the Caribbean*, Volume 1 Number 1. Social Protection Human Development Department in collaboration with the Operations Services Department, Latin America and the Caribbean Region, The World Bank.

[2] Bank staff can find a step-by-step guide to implementing ICT project components in the "ICT Toolkit for Task Managers" provided by the Global Information and Communication Technology and available on the intranet.

Methodology

6 The findings of the paper are based on the review of several CCT programs in the Latin American Region—through a two-day workshop held with specialists from the Bank and outside—and on a two-day, hands-on review of the MIS systems of Colombia, Chile, and Argentina's CCT programs. Experiences from the MIS implementation of Ecuador's CCT have also been incorporated. Most of the programs reviewed are from middle-income countries.

7 Several publications on CCTs have been reviewed (in particular the proceedings of the Third International Conditional Cash Transfer Conference) to identify the standard processes, goals, accountability and control risks, and mitigation strategies; and to determine the information management processes that can help achieve those goals and mitigate the risks.

8 In addition, the paper includes industry standards in the implementation of MIS (or projects with an ICT component) and cross-cutting information management practices applicable to all processes and programs that use ICT, including disaster recovery, records management, security, data warehousing, etc.

9 Although the paper is focused on CCTs, these programs include all the key business processes (such as the selection of beneficiaries and payment) common to several SSN programs. In addition, the process of monitoring the conditionalities results in additional challenges not always present in other SSN programs.

10 The task was a joint effort of the Social Protection Unit in the Latin America and Caribbean Region, the Social Development Network, and the Information Solutions Group.

Paper Structure

11 The paper is organized as follows. In Part I, a framework is introduced for the implementation of an MIS in CCTs that goes beyond having a unique identifier and cross-checks, and that can be used in both paperless and paper-based programs. The application of this framework can result in a more systematic approach to information management. Examples of MIS practices that can help in the control and accountability mechanisms of CCTs follows. Part II presents a roadmap for the design and implementation of an MIS in SSN programs. Part III synthesizes case studies from three fictitious countries used to illustrate the application of the framework. Part IV provides considerations and recommendations for task managers and government officials in charge of implementing CCTs. A checklist for the implementation and monitoring of MIS is included in the annex.

Part I: Management Information Systems and Social Safety Net Programs

Part I focuses on the role of the MIS in the monitoring and evaluation systems of SSN programs, in particular the business impact an MIS can have. Chapter 2 provides the details of a proposed framework, and Chapter 3 gives an example of the application of the framework to a conditional cash transfer program.

Chapter 2: Management Information Systems in CCTs: A Framework

12 SSN programs and in particular CCTs "belong to a growing generation of development programs that seek to provide poverty alleviation in the short-run while fostering human capital accumulation among the young. CCTs are intended to break the intergenerational cycle of poverty. As their name implies, conditional cash transfers provide money to poor families, conditional upon investments in human capital—such as sending children to school or bringing them to health centers on regular basis."[3]

13 The number of beneficiaries and the volume of individual payments from CCTs are very large. Around 1.1 million households receive transfers every month in Ecuador, and 11.1 million households (or 46 million people) in Brazil, which makes these programs the largest in Latin America in relative and absolute terms, respectively. The programs are typically high-visibility, flagship national initiatives, and thus can be subject to political pressures. Program managers can find themselves under pressure to increase payments or expedite coverage in the midst of crises (including the recent food price crisis), or because of political decisions, and they depend on their MIS to be able to do so with minimum risks.

14 If implemented correctly, an MIS is also one of the main enablers of the accountability and control processes of CCT programs. However, an MIS can be an additional source of risk for potential errors, political manipulation, service interruption, and fraud. The implementation of an effective MIS needs to address these risks.

15 It is important to address these risks and to maximize MIS use in a disciplined, consistent, and systematic way. This consistency allows comparisons across programs and facilitates the prioritization of investments and risk mitigation strategies. The following framework is intended to help provide this type of discipline.

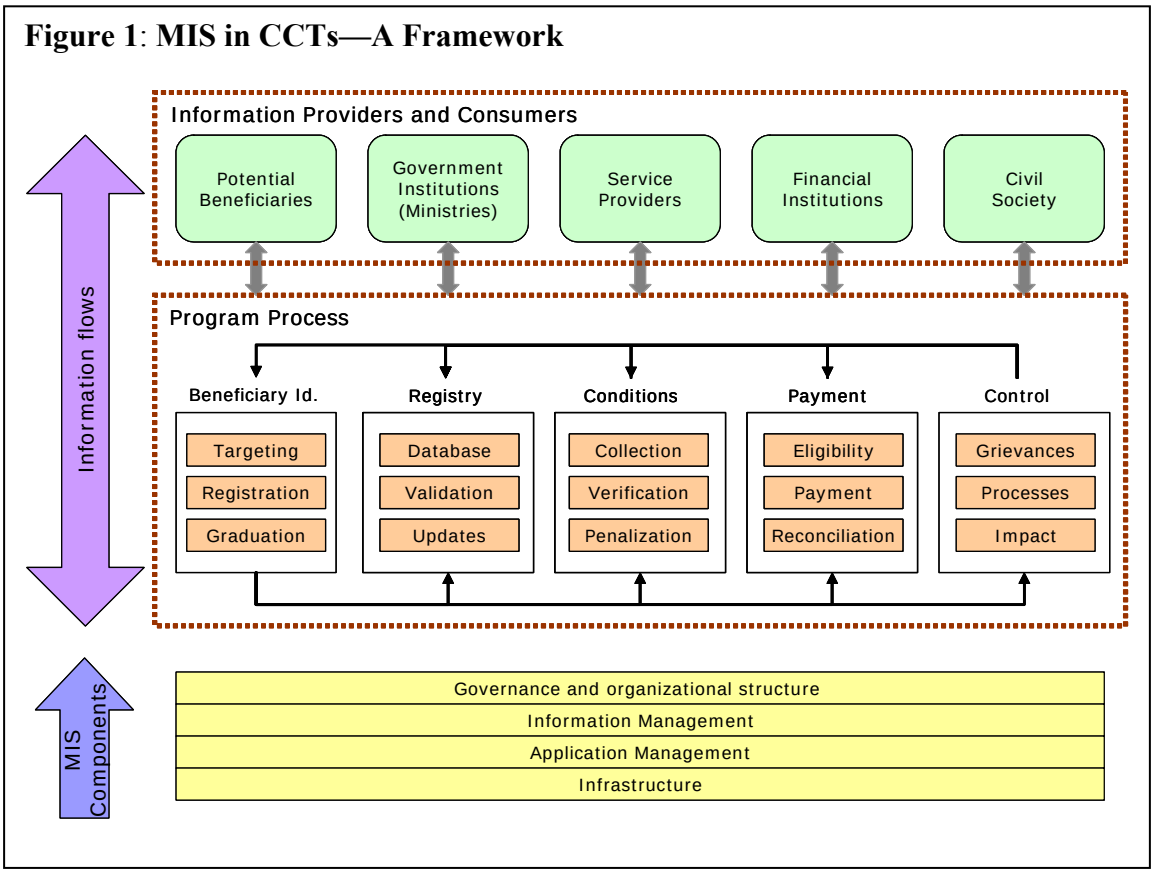
16 The framework builds on the proceedings of the Third International Conditional Cash Transfer Conference, which outlined three phases of CCT programs where the integrity of the program is at risk: "(i) determination of eligibility, targeting, and registration (grouped in this paper as beneficiary identification and including also recertification); (ii) monitoring conditions and co-responsibilities; and (iii) payment of benefits." This paper complements the list of risk and mitigation strategies in these areas. It also looks at four additional areas of risk:

[3] World Bank 2007, "Control and Accountability Mechanisms in Conditional Cash Transfer Programs: A Review of Programs in Latin America and the Caribbean." *Operational Innovations in Latin America and the Caribbean*, Volume 1 Number 1. Social Protection Human Development Department in collaboration with the Operations Services Department, Latin America and the Caribbean Region, The World Bank.

(i) institutional arrangements; (ii) management of beneficiary registry; (iii) complaint resolution and appeals; and (iv) monitoring, control, and evaluation processes.

17 The main building blocks of the framework include the information flows between information providers and consumers and each of the business processes and subprocesses of CCT programs (see Figure 1). The timeliness, accuracy, and relevancy of these flows are supported by four main components of the MIS: (i) IT expertise and organizational structure, (ii) information management, (iii) application quality management, and (iv) information and communication technology infrastructure.

Figure 1: **MIS in CCTs—A Framework**



18 A brief look at information flows from the information management perspective is shown in Figure 1. The details of information management practices and their supporting MIS components are included in subsequent sections.

Chapter 3: Accountability and Controls in SSN: An MIS Perspective

19 As mentioned before, the size, visibility, and risks of leakage of CCTs require a disciplined and systematic approach to risk management. MIS —the backbone of CCTs— is an effective risk management tool that can provide programs with the accountability and controls processes required to mitigate operational risks. At the same time, many of these risks can materialize by a fraudulent use of the MIS or by human and system errors in the MIS design, implementation, and management.

20 The materialization of the risks can jeopardize timely and accurate information flow between information providers and consumers—which is essential for the functioning of the programs—and thereby disrupt the program processes shown in Figure 1. Beneficiaries, government institutions, service providers, financial institutions, and civil society count on information flows to monitor and evaluate each business process to ensure that it is carried out as intended.

21 Although implementation of an MIS involves substantial risks (detailed in the following sections), it can also strengthen the control and accountabilities mechanisms of CCT programs. Table 1 provides examples of MIS practices that improve control and accountability mechanisms of CCTs.

22 In addition to the three phases of a CCT program's operation where the integrity of the program is at risk—as identified in the Third International Conditional Cash Transfer Conference—Table 1 includes four additional areas that carry their own control and accountability risks: (i) institutional arrangements; (ii) management of beneficiary registry (including the change management processes); (iii) complaints resolution and appeals; and (iv) monitoring, control, and evaluation processes. The table also complements the list of CCT program risks with risks inherent to the implementation of an MIS.

23 The last column of Table 1 gives examples of MIS tools for mitigating specific risks. Many of these tools (unique identifier, cross-checks) have been implemented in several of the programs visited. However, they were often implemented outside of a comprehensive strategy, resulting in ad hoc decisionmaking, rework, and increased costs.

24 These types of problems can be lessened by implementing several functions that look at the MIS decision-making process in a comprehensive and integrated manner (Table 1, column 4). These integrating functions were mostly absent in the programs visited, which used shortcuts and reactive, spur-of-the-moment practices to address problems and program needs (such as the development of managerial reports). A detailed discussion of the proposed framework is presented in Part II: MIS for SSN Programs: An Integrated Assessment Framework.

Table 1: MIS Risk Mitigation Strategies				
Processes	**Risks**	**Causes**	**MIS functions**	**Tools (examples)**
Beneficiary identification	Inclusion errors Exclusion errors	Ineffective eligibility criteria Imperfect targeting tool Incoherent registration processes Human errors Fraud	Data quality Data security Records management	Cross-checks Access control Separation of functions Audit trails Security classifications Archiving strategy
Monitoring of co-responsibilities	Unwarranted penalization Wrong payment amounts Unreliable data Misleading impact evaluations	Dishonesty Inconsistent collection/recording Human errors Complex data integration	Data governance Database management Data quality Data architecture	Separation of functions Spot checks Audits Error/inconsistencies alerts
Payment of benefits	Irregular payments Inaccurate payments Interruption of payments	Insufficient funds Human errors Systems availability Bribery/dishonesty Service disruption	Data quality Master data management Systems availability management	Error/inconsistencies alerts Service level agreements
Institutional arrangements	Lack of interministerial coordination Lack of enforcement Political manipulation Enforcement of decentralization arrangements Lack of funding	Confusing roles and responsibilities Political volatility Weak institutions Lack of political will	Data governance Organizational structure	Service level agreements Publication & transparency Information management Agreements publication on Website
Beneficiary registry	Service interruption Unauthorized access to information Unauthorized changes Creation of false information/transactions	Environmental events System breakdown Malicious acts Human errors	Disaster recovery Availability management Capacity planning Security management Data warehouse	Backups and redundant systems Downtime management Access control (logical and physical) Unique identifiers Cross-checks
Complaints resolution and appeals	Program abuse Bounce beneficiaries between offices Program credibility Misleading impact evaluations Missed opportunity for demand-driven improvements	Inexistent feedback systems Feedback black-box Broken processes Culture (resignation)	Records management Process monitoring	Case management system Service level monitoring Alerts for systemic appeals (category, geographic, etc.)
Monitoring & evaluation	Uninformed decision making Reputation risks Political risks	Lack of reporting Lack of transparency	Data quality/integrity Records management Data availability Data usability Data warehouse	Reporting tool History tracking Management reports Transparency Case management

Beneficiary Identification

25 The main risks identified for the beneficiary identification phase of CCTs are the errors of inclusion and exclusion. They can materialize through ineffective eligibility criteria, an imperfect targeting tool, and incoherent certification and recertification processes—all of which are largely the result of a defective process design and outside the scope of this paper.

26 In addition, inclusion and exclusion errors can be increased by poor management of the beneficiary registry and flawed information management processes. These can result in human errors (unchecked duplication/deletions) and fraud and political manipulation (creation of ghost beneficiaries or inclusion of ineligible beneficiaries). On the other hand, efficient and cost-effective information management processes that include systematic cross-checking can be a tremendous aid in detecting these errors and can flag them in the moment they are created.

27 The number of errors can be decreased through the use of good information management practices that focus on the following processes: (i) data quality (cross-checking with authoritative/official sources, automatic detection of duplications, etc.); (ii) data security (access control through separation of targeting and registration functions, separation of data collection and recording functions, and monitoring of security classifications and access profiles); and (iii) records management (archiving strategy—electronic and paper—and disaster recovery).

Monitoring of Co-Responsibilities

28 Methods of monitoring compliance vary across countries, and the risk mitigation strategies should be adjusted accordingly. Nevertheless, independent of design and implementation, the process of monitoring of conditions and co-responsibilities is vulnerable to the following risks: (i) unwarranted penalization, (ii) wrong payment amounts, (iii) misleading impact evaluations, and (iv) unreliable data. The causes of the materialization of these risks include dishonesty (bribery); inconsistent management of information (collection, recording); human errors; and complex data integration processes.

29 Ex ante risk mitigation strategies include data governance and data architecture. These strategies may include the separation of the data collection and recording functions, and introduction of financial incentives to improve data recording by localities and administrators (the latter is applicable for any process that involves data collection, such as registration). Ex post strategies include information management practices that can reduce the likelihood of misrepresentation and misreporting. These strategies include data quality and database management; cross-checking data (manually in paper-based programs and automatically in electronic programs); spot checks based on unusual results (for example, if hours attended exceed hours of school); implementation of automated checks for inconsistencies; and information management audits.

Payment of Benefits

30 CCT programs rely on a variety of payment providers, including banks, post offices, postal banks, private agencies, etc. Once again, the risk management strategy should be adapted to the specific risks carried by each option.

31 Risks in the payment of benefits originate from administrative inefficiencies and cash-flow risk (leakages). Administrative inefficiencies by the payment provider can result in irregular and inaccurate payments, which can be reduced through a standing and enforceable arrangement with the payment agency and by allocating a sufficient budget to the program. Administrative inefficiencies can also result from inadequate management of the beneficiary registry (for example, unavailable payment history or payment amount/eligibility, system downtime, and human errors) and from untimely flows of information between the program administrator and the payment provider.

32 Information management practices that can help in this area include process automation (real-time alerts of errors/inconsistencies), formalization of service level agreements (with payment provider and with system administrators), information, and system audits. These fall under the data governance, database management, data quality, and data architecture functions.

Institutional Arrangements

33 Different institutional arrangements are appropriate for different country conditions, but several accountability risks apply to all situations: (i) arbitrary and random interministerial coordination, (ii) absent or diffused accountability, (iii) political manipulation, (iv) lack of enforcement of decentralization agreements, and (v) unpredictable sustainability of funding. The alignment of incentives and financing is essential in the enforcement of interinstitutional arrangements.

34 The causes for the materialization of these risks include unclear roles and responsibilities, mismatched responsibilities and incentives, lack of institutional capacity, absent feedback mechanisms, weak institutions, conflicts of interest, and lack of enforcement mechanisms.

35 Key to a CCT program's control and accountability effort is the timely flow of information from provider to consumers. Program managers, governmental institutions (information and service providers), financial institutions, beneficiaries, and civil society all provide and consume information vital to the successful functioning of the program. Timely information flows also enable citizens, government institutions, and nongovernmental organizations (NGOs) to hold the program accountable and reduce opportunities for corruption and/or questionable program management.[4] A data governance function that includes formal agreements to ensure optimal information flows is essential but rarely exists. Transparency practices and publication of the agreements help build demand-side pressure for their enforcement.

36 The use of pilots in CCT programs can help identify these risks before the program is implemented nationwide and can test the appropriateness and effectiveness of information management practices.

[4] Transparency International: Access to information.
http://www.transparency.org/global_priorities/access_information

Management of the Beneficiary Registry

37 The beneficiary registry is the backbone of CCT programs and may be paper-based, electronic, or a blend of the two. The complexities of the registry process depend on its implementation. Real-time access to data in a decentralized program is more challenging than a centralized program and can be aided by ICT of appropriate sophistication for the country circumstances and infrastructure. The integrity and quality of data are highly dependent on the robustness of the beneficiary registry and the change management processes implemented, as well as the level of integration with the other processes and information systems that shape the program.

38 Several risks are endemic to management of the beneficiary registry, including service interruption, unauthorized access to information, unauthorized information changes, and creation of false information/transactions. They can be caused by malicious acts, human errors, and environmental events, and they apply to all CCT processes (targeting, payment, monitoring of co-responsibilities). Estimating the probability of occurrence and the risk tolerance level is helpful when carrying out a cost/benefit analysis for the adequate level of preventive and/or corrective actions for each program. A detailed description and analysis of these risks and mitigation strategies through the use of MIS functions is included in the next section.

Complaints Resolution and Appeals

39 The complaints resolution and appeals process supports the functions mentioned above and, if managed properly, can be used to flag program bottlenecks and failures. Once again, the risks are dependent on the way the process is implemented—whether housed by the program, outsourced to a third party, housed by the ministries, or a blend. The process can be centralized or decentralized. Regardless of the implementation, categorization and organization of cases allows for integration of information and aids process monitoring and decisionmaking. This can be helped by relatively inexpensive out-of-the-box solutions for case management. The risks associated with paper-based processes are obviously higher and more difficult to detect, and the magnitude of their materialization is almost impossible to determine.

Monitoring and Evaluation

40 Ad hoc evaluations or reactive evaluations based on the complaints system are not sufficient to ensure the good functioning of the program. Stakeholders that are likely to issue complaints are not exposed to the nuts and bolts of all business processes. In addition, different reasons (such as fear, culture, and resignation) prevent stakeholders from sending feedback on inadequate processes.

41 Systematic monitoring and evaluation of business processes is a sign of program maturity and sophistication. But monitoring and control efforts can be crippled by lack of transparency and by incomplete and untimely information. An MIS can help track indicators and integrate data, thereby providing a timely and realistic picture of malfunctioning or suboptimal processes.

42 Furthermore, the results of program impact evaluations can be widely affected by the quality and reliability of the data, from the demand and compliance, from the supply, and from the quality of the control group's data.

43 In conclusion, a zero-error policy is unrealistic, and program administrators should identify their risk tolerance level for each process depending on the country circumstances, the cost/benefit analysis, and the maturity of the program.

Part II: MIS for SSN Programs: An Integrated Assessment Framework

Part II presents a framework for assessing the MIS designs and implementation in a SSN program. Chapter 4 describes the building blocks that make a typical MIS and the approaches to assessing them. An evaluation of each of the four framework components follows in the subsequent chapters: governance and organizational structure (Chapter 5), information management (Chapter 6), application management and development (Chapter 7), and information technology infrastructure (Chapter 8).

Chapter 4: MIS for Social Safety Net Programs: An Integrated Framework

44 Anecdotal evidence suggests that most if not all SSN programs have implemented several of the MIS tools and mitigation strategies included in the previous section. However, there is no evidence that such solutions have been implemented within a strategic and systematic framework. If these solutions are implemented in isolation or in an ad hoc reactive manner, the future systems integration required for the effective management of a mature system might be costly and disruptive. The integrated framework proposed in this paper provides a systematic approach to understanding and assessing the MIS components that are essential for supporting a SSN program.

MIS Components

45 A typical MIS has four main components

- **Governance and organizational structure** provides the adequate business environment for an effective and efficient MIS, including (i) institutional arrangements and service agreements, (ii) good oversight, (iii) clearly defined roles and responsibilities, and (iv) an established process for business improvements.

- **Information management** ensures the quality (accuracy, correctness, currency, completeness, and relevance) and security of the program's beneficiary, co-responsibilities, and payment information.

- **Application management** prevents vulnerabilities in the day-to-day operations of the SSN program. MIS applications provide an interface between the user and the beneficiary database, and control and monitor user and system access to the information.

- **Infrastructure** is the physical equipment used to operate the MIS. More specifically, it includes the hardware and network used to operate the MIS application and beneficiary database, and connects the program's central office with the local and regional offices.

46 Each of these components complements and constrains one another. The integrated framework provides a picture of the implementation of the MIS and helps evaluate and identify areas in need of strengthening.

47 The framework does not prioritize its various MIS components and functions. Rather, prioritization is dependent on the maturity and design of each program, and varies considerably between paper-based and automated programs. A maturity model[5] could help map each program according to the successful implementation of the MIS components. However, this discussion is beyond the scope of this paper and requires a more exhaustive survey of SSN programs in low- and middle-income countries.

Assessment Approaches

48 There are two ways to evaluate an MIS system: top-down and bottom-up. The top-down approach evaluates the alignment of technology with the operations of the CCT program; bottom-up takes a technocratic approach, looking to fit the operations of the program to the technology available.

49 A top-down approach starts with ensuring that the business environment is conducive to the effective operation of an MIS. First, the assessment focuses on evaluating the governance and organizational structure of the program. Second, information management practices are evaluated in the context of the said organizational structure. Third, the application management is evaluated to determine the level of support it provides to the information management practices. Finally, the infrastructure is evaluated for adequate support to the application components. As implied by its sequence, a top-down approach follows the business objectives through the technological implementation and support.

50 Alternatively, the technocratic bottom-up approach assesses an MIS system by first looking at the available infrastructure. Second, the application is assessed to make sure it is able to leverage the available infrastructure. Third, information management practices are evaluated in the context of the application and business processes. Finally, the governance and organization structure is designed to ensure the business environment needed for the MIS to operate.

51 This paper recommends a top-down approach to assessing an MIS. Most MIS systems fail because of business reasons, including lack of sponsorship, poor governance, deficient organizational structure, undefined roles and responsibilities, etc. Technology gaps can be overcome with business processes, but it is not easy to make up for a poor business environment.

[5] A maturity model is a tool to help a program assess and determine the level of maturity of its processes, in this case MIS processes. The higher the maturity, the better the MIS will address accountability and control risks.

Roadmap to Assessing an MIS

52 Most CCT programs count on an existing MIS and information management practices. The assessment, realignment, and expansion of the existing systems are critical for the ongoing success of the CCT. To this end, three distinct steps can be followed:

(i) **Diagnostic:** This exercise focuses on understanding the current state of the MIS and information management practices including: g**overnance and organizational structure, information management, application management,** and i**nfrastructure**. Each of the components and a guide for their assessment are detailed in the following chapter.

(ii) **MIS Strategy:** The MIS strategy must be aligned to the program's objectives. Developing the strategy will force the CCT administrator to think about ways the MIS can help achieve the program goals, and particularly the role the MIS must play in the monitoring and evaluation framework set forth for the program. If this exercise is done after major technical decisions have already been implemented, the probability of rework is extremely high and its costs prohibitive. This is the most common reason for programs to implement and endure less than optimal solutions.

(iii) **Action Plan:** having assessed the current state and articulated the desired state, an action plan must be developed to bring the two together. This plan cannot be done in isolation by the technical team as it requires an in-depth understanding of specific program objectives and implementation plan. The action plan should identify immediate corrective actions as well as those that can be implemented in the short, medium, and long term. The action plan provides the yardstick against which progress can be measured.

Chapter 5: Governance and Organizational Structure

53 The governance and organizational structure provides the adequate business environment for an effective and efficient MIS. A business environment includes (i) formalized arrangements and agreements, (ii) a governance body and process, (iii) clearly defined roles and responsibilities, and (iv) established processes for business improvements. The ability of an MIS to provide effective monitoring, controls, and accountability is directly dependent on its business environment.

54 Institutional arrangements across different government agencies, formal agreements between the program and local governments, and service level agreements between the program and service providers are essential to achieving the objectives of the SSN program. Identifying all stakeholders and formalizing their roles and responsibilities is a prerequisite for organized and timely information management.

55 Governance processes become even more important when a stakeholder does not uphold its side of the agreement. The governance body should be able to enforce the penalties specified in the agreement or address any conflict that prevents the timely flow of information. To this

end, the governing body should have oversight both for the operation of the MIS and the flow of information.

56 The representation in the governance body should be inclusive and have the decision-making capacity to influence all stakeholders. When outsourcing implementation of the MIS, for example, the governance group should include senior management of both the SSN program and the outsourcing vendor. This inclusive representation should result in a more effective and efficient implementation of corrective actions.

57 The roles of the IT and operational teams also need to be clearly defined. It is important that these job descriptions maintain a separation of duties and checks and balances. This separation will help reduce internal fraud and maximize effectiveness of the MIS in its control and accountability functions.

58 Most SSN programs will evolve, grow, and improve over time, which requires that MIS functions evolve as well. For example, as pilot SSN programs come to be implemented country wide, the MIS must have the scaling capacity required for the new program contexts, which will also be affected by rigidities in the governance and organizational structures.

59 In summary, a good governance and organizational structure can help accomplish the following program objectives:

- gain timely access to the authoritative sources of information needed to maintain data integrity and accuracy (such as the civil registry and tax information)
- reduce diffuse accountability in the different levels of government for the collection, update, and dissemination of beneficiary and program information
- obtain required information in a timely fashion from service providers
- achieve clarity in the roles and responsibilities of its IT team
- enforce the institutional arrangements
- ensure a clear process for improvements and participation of the IT team in setting priorities and schedules that affect the MIS

Assessment

60 Assessment of the governance and organizational structure of existing programs includes interviews and reviews of supporting documentation. The interviews are used to verify that practices match the arrangements, agreements, and operational manual. A list of key elements to look for in each supporting document and a sample of interview questions are presented in Table 2.

Table 2: Key Assessment Elements for Governance and Organizational Structure

Issues	*Interview questions*	*Key elements*
Institutional arrangements		
1. Lack of timely access to authorities' source of information 2. Integration between sources, systems, and program's MIS	1. Does the program include all the sources of data and all the institutions involved (civil registry, immigration, municipalities, etc.)? 2. Does the program have formal arrangements with all institutions involved? 3. Is there a clear chart of the information flows between agencies? 4. Are the roles and responsibilities for each agency/unit formalized and clearly documented? How is this accomplished (executive decree, etc.)?	Operational manual: 1. Information flows with external parties Institutional arrangements with information providers: 1. Unique identifiers for each record 2. List of fields provided and their definition 3. Periodicity of data exchange 4. Technical contact 5. Escalation process
Local government agreements		
1. Lack of cooperation from local governments 2. Local governments do not fulfill their responsibilities in support of the program	1. Does the program depend on autonomous regional governments or agencies? 2. If so, are there formal agreements formalizing the collaboration? 3. How often are these agreements renewed? 4. Do agreements with the subnational governments or agencies carry any incentives, financial or otherwise? 5. Do agreements specify service levels and indicators from the subnational governments and agencies? 6. Are the service indicators monitored periodically?	Agreements with local governments 1. Terms of reference for the local representative 2. Level of authorization given to access, update, and delete beneficiary information 3. Method for collecting information from the local government 4. If incentives are provided, what is the service level to be attained to receive the incentives and what are the penalties if the service levels are not met? 5. Escalation process
Service provider agreements		
1. Timely access to information needed to process benefits 2. Timely access to information to reconcile payment information 3. Integration of data between service provider and program	1. Do the agreements with services providers specify service levels and indicators? 2. Are the service indicators monitored periodically? 3. How often are these agreements renewed? 4. In case of a dispute, are there clear escalation procedures?	Agreement with service providers: 1. Unique identifier for data reconciliation 2. List of fields provided and their definition 3. Periodicity of data exchange 4. Customer support contact 5. If incentives are provided, what are the service levels to be attained to receive the incentives and what are the penalties if the service levels are not met? 6. Escalation process
Roles and responsibilities		
1. Unclear or undefined roles and responsibilities for IT department personnel 2. Lack of proper	1. Are the roles and responsibilities for the IT personnel formalized and part of the Operations Manual? 2. Are there check and balances in the job functions? The person generating the	Operations Manual: 1. Terms of reference for the Information Technology team 2. Operational process with the actors responsible for each step in

Issues	*Interview questions*	*Key elements*
checks and balances, especially transactions affecting distribution of funds.	list of beneficiaries and benefits does not approve the disbursement.	the process
Governance of institutional agreements		
1. Lack of body to resolve issues between institutions	1. Does the program have an interinstitutional committee that monitors program progress and impact? 2. How often does this committee meet? 3. Are formal minutes kept of those meetings?	Review of terms of reference of governance group(s): 1. Responsibilities and scope 2. Membership, including who will chair the group and who will be the secretariat 3. Periodicity of group meetings
Process improvements		
1. Lack of involvement from the IT department in the improvement, automation, and optimization of business processes 2. Lack of ownership from the IT department	1. Are the business processes documented in the operational manual? 2. Is the information flow (paper or electronic) documented? 3. Does the IT team participate in program design?	Operations Manual: 1. Terms of reference for the IT team 2. Operational processes with the actors responsible for each step in the process
External expertise		
1. Lengthy MIS development cycle 2. Attrition leading to loss of important expertise	1. Has the level of effort to be undertaken by IT been identified? 2. Will additional efforts be contracted to a third party? 3. Are there strategic skills to be retained by the program? 4. How is the program ensuring that the skills are retained in the program?	Operations Manual 1. Levels of effort to be undertaken by the program's internal IT 2. Identification of essential IT skills to be retained in the program

Chapter 6: Information Management

61 A key role of the MIS is the management of the beneficiary, co-responsibilities, and payment information. The characteristics of high-quality information include accuracy, correctness, currency, completeness, and relevance to the business processes it supports.

62 There is a distinction between data accuracy and correctness. Accuracy refers to data correspondence to field observations, whereas information is correct if it has passed business rules validation. For example, a surveyor could have recorded in a survey sheet that a 13-year-old boy was the head of a household with resident adults. The information would be accurate if the MIS records reflect the surveyor's notes; however, the record will not pass the business rule that assigns the oldest female as head of the household. Therefore, the information would not be correct. For information to be of high quality, it must be both accurate and correct.

63 In addition to business rules, cross-checks with external sources are a good way to ensure that information collection is both accurate and correct. For example, whenever possible,

programs should cross-check their beneficiary database with the civil registry, thereby validating the information collected in the field.

64 Just as important is information timeliness. Most SSN programs recognize the need to capture current information about the beneficiaries, conduct periodic recertification/registration, and perform off-cycle beneficiary updates (although the latter are restricted to specific family events). These processes are put in place to reduce the risk of inclusion or exclusion. Timely access to information on monitoring of co-responsibility is essential to implement timely corrective actions in payments.

65 To monitor, control, and assess the accountability of SSN programs, the MIS must ensure that the information collected, managed, and maintained is complete and relevant. To this end, the operational and management indicators need to be defined early in the design of the program in order to capture the complete and relevant dataset.

66 Achieving high-quality information is important. Information security controls and information access monitoring help prevent erroneous or malicious modifications and thereby ensure data integrity.

67 Good information management practices allow the SSN program to achieve the following objectives:

- accurate, current, and uncompromised beneficiary information
- supporting evidence for beneficiary information in the database
- accurate program monitoring indicators
- transparent information for oversight and accountability

Assessment

68 An assessment of information management practices includes interviews of IT staff, operational staff, and program representatives at local offices. The interviews are used to verify that information management practices are followed at all levels of the SSN program. The risk of having disparate information management practices—and therefore the risk of corruption and fraud—increases with decentralization.

69 In addition to interviews, the assessment includes testing the retrieval time for beneficiary and program information from the MIS, both for the central and decentralized program administration.

70 A list of information, indicators, and questions to ask during an assessment is presented in Table 3.

Table 3: Key Assessment Elements for Information Management

Issues	*Questions*	*Key elements*
Data cross-checks		
Unable to cross-check beneficiary database with external sources	1. Does the program have a unique identifier for each beneficiary? 2. Is this unique identifier interoperable with official sources? 3. Does the program cross reference beneficiary information with external sources (e.g., the civil registry, immigration data, tax records, social security benefit records)?	Data model or database design 1. Unique identifier per individual in the database 2. Common identifier between program database and external provider of information Data validation 1. Frequency of cross checks 2. Procedure for handling errors/exceptions
Information traceability		
Unable to validate information in the beneficiary database	1. Does the program have record management and archival policies and procedures at the governmental level? 2. Are the record management policies followed by the department? 3. Are the record management policies followed at the subnational level? 4. Are the record management practices audited? 5. Can changes in the information systems be traced back to their supporting documents? 6. Does the program keep a history of paper and electronic changes? 7. Can changes in the information systems be traced back to the editor?	Records management, for a randomly selected entry 1. Trace information back to its source (even on the field)? 2. List the users who have entered or updated the record?
Data collection at local government level		
Unable to collect and incorporate information from local governments into central database Data collected from local governments might not be validated	1. Is any beneficiary information uploaded and/or changed by local governments? 2. If yes, can the information/data be aggregated at the program level? 3. Can local governments change beneficiary information that impacts payment? 4. If yes, can the information/data be aggregated at the program level? 5. Are procedures in place to make sure the information is captured correctly? 6. Does the data go through business rules for validation?	Data model 1. Common unique identifier 2. Fields mapped to central beneficiary database Data validation 1. Validation at the local government
Benefit payment and reconciliation		
Separation between generation of beneficiary registry (including benefits) and benefit payment approval Reconciliation of payments with beneficiary registry	1. Is the generation of the beneficiary registry automated? 2. Is the beneficiary registry reviewed and signed off before payment? 3. Is the process of uploading payment information from banks automated? 4. Is there a process to deal with differences between the beneficiary registry and payment information?	1. The entity that generates the beneficiary registry should not be the same one that approves payments. 2. There should be a response team that is able to review information and resolve the differences between the registry and payments.

Issues	*Questions*	*Key elements*
Process for uploading payment information	5. Is the payment provider's information reconciled with the beneficiary registry? 6. Is payment information uploaded to the MIS manually or automatically? 7. If done manually, are procedures to upload information documented?	Uploading payment information process 1. Automated 2. Manual and documented
Information security		
Unauthorized access to beneficiary database for entering and updating information Audit of transactions, including who did what to the beneficiary database	1. Does the program have a documented information security policy (such as access control, etc.)? 2. Is the addition, updating, and deletion of beneficiaries logged? 3. If yes, are the logs reviewed for unauthorized accesses? 4. Are access logs kept for later verification? 5. Are information practices audited periodically?	Information security 1. All users should have enough access control to be productive, but not full access. 2. Process for requesting and approving user accounts and access 3. Logs of database access and information changes
Operation oversight		
Produce beneficiary and payment reports with ease Review performance indicators and deviations	1. Do operational reports contain progress indicators and service levels of each process? 2. Does the program have access to operational reports containing progress indicators without the intervention of the IT department? 3. Are operational reports generated periodically? 4. Are operational reports reviewed periodically? 5. Are the reports used to identify operational issues and bottlenecks?	Information access 1. Ease of generating reports 2. Key performance indicators 3. Frequency of reports 4. Frequency of reviews 5. Action items taken derived from bad performance on key performance indicators
Information access		
Access to beneficiary database for authorized users Public access to beneficiaries for transparency	1. Is the list of beneficiaries publicly available? 2. Are monitoring indicators publicly available? 3. What means are used to share information (Web, bulletin boards in regional offices, other)?	Information shared with 1. Public 2. Local governments 3. Government institutions 4. NGOs and civil society

Chapter 7: Application Management

71 The application most commonly referred to as an MIS is the one used to access the beneficiary database. An MIS application can be divided into (i) user interface, (ii) programmed logic, and (iii) a database. Application management makes beneficiary information operational, the governance and organizational structure provides the necessary environment for the MIS to be successful, and information management practices ensure and protect the accuracy and integrity of the beneficiary information.

72 MIS applications can be custom built or commercial off-the-shelf (COTS) products that can be configured for the specific needs of the SSN program. The market for COTS solutions in support of SSN programs is not well developed and therefore most programs are forced to use a custom solution.

73 The application management component of this framework assesses the practices used for the development, maintenance, and security of the MIS application. The MIS application automates business processes. Like all software applications, the MIS needs to be protected from viruses or malicious code that could delete, edit, or add inaccurate beneficiary information. More generally, the SSN program should use good application practices to prevent all kinds of service interruption.

74 Assessment of the application management component judges the quality of practices in place to manage the MIS application. Quality management includes disciplined design, development, and release of application versions, thereby minimizing the risk of system failures, data corruption, fabrication of records, and leakage. In this framework, we look at the processes that directly impact the design, development, implementation, and maintenance of the application.

75 Practices to ensure the quality of the MIS application should be in place regardless of whether the program is developed internally or outsourced to a third party.

Assessment

76 Similar to information management, assessment of the application management component aims to validate that processes are being followed as documented (or documented when the documentation is absent). For the most part, the assessment is done through interviews of the project management and development teams and through site visits.

77 Questions and key elements of the assessment are presented in Table 4.

Table 4: Key Assessment Elements for Application Management

Issues	***Questions***	***Key elements***
Development process		
Undefined development processes including gathering requirements, design, and coding	1. Does the MIS development team follow a software development process? 2. How are business requirements for the MIS collected?	1. Document processes 2. IT staff know and follow processes

Issues	*Questions*	*Key elements*
Incomplete knowledge of data requirements and process definitions before coding	3. Are the signed business requirements signed off on? 4. How are business requirements translated into system design? 5. Are system designs peer reviewed? 6. If the program is decentralized to local governments, how does the program ensure the system design matches the nature of the program? 7. Is the development done in a separate environment from testing and the live MIS?	
Quality assurance processes		
Insufficient unit, integration, and functional testing Lack of engagement from the operational units on sign offs	1. Do new development and changes undergo unit testing by the developer? 2. Do new development and changes undergo integration tests by other parties than the developer? 3. Do new development and changes undergo functional tests by the user of the MIS? 4. Are users from the operational units of the program engaged in the functional testing and sign off of the MIS?	Evidence of 1. Unit, integration, and functional testing 2. User sign off
Change management		
Unmanaged and disruptive changes to live MIS	1. Is there a process to capture change requests from the business users? 2. Is there a process for prioritizing change requests? 3. Once prioritized, are changes bundled in releases? 4. Is there a deployment schedule for each release?	Evidence of 1. Change requests 2. Deployment schedules
Configuration and release management		
No separation between testing and live software No separation of duties between developer and release manager	1. Is there separation between development, test, and live environments of the MIS system, including the beneficiary database? 2. Do the different environments share the same database and data? 3. Who is in charge of releasing changes to the live MIS? 4. What is the frequency of releases to live MIS? 5. Is there a process for unscheduled emergency fix releases? 6. Who authorizes the emergency fix release?	Release management 1. The requester of a release should not execute the release. Configuration management 2. Different environments for development, test, and production
Version management		
Inability to roll back or recover in case of software malfunction	1. Are developers using version control? 2. Are database scripts for creating tables, indexes, etc., version controlled? 3. Are all the assets, code, and scripts for every major version released?	1. Evidence of version control

Issues	*Questions*	*Key elements*
	4. Is there a version that includes all live assets that could be used to configure a new live MIS in case of a disaster?	
Documentation management		
Lack of system, database, and server configuration documentation preventing good maintenance and administration of MIS	1. Are the business requirements and system designs documented and archived? 2. Are there notes for each release? 3. Is there a user guide to the MIS?	System documentation 1. Administration guide 2. Developers guide User documentation 3. Users guide

Chapter 8: Information Technology Infrastructure

78 The fourth component in the framework assesses the IT infrastructure supporting the SSN program. More specifically, the assessment looks at the hardware and network used to operate the MIS application and beneficiary database, and to connect to the local/regional offices.

79 The IT infrastructure is vulnerable to service interruption and intrusion. The risk of service interruption increases with the age and stress on the hardware. If hardware is operated past its intended life, the risk of malfunction increases. In addition to aging, overworked or underpowered hardware can stop responding to user input. Malfunctions due to aging and lack of capacity are common sources for service interruptions.

80 Preventing IT infrastructure service interruptions requires renewing hardware periodically, planning capacity needs, and eliminating single points of failure. Moreover, beyond regular maintenance, the IT team must articulate a disaster recovery plan with procedures to follow in case of a service disruption.

81 Part of the assessment focuses on verifying that recovery plans exist and cover the important elements of the infrastructure. Disaster recovery plans must also protect the information assets from permanent loss and corruption, particularly the beneficiary database.

82 Beyond planning for aging, capacity, and recovery, the IT infrastructure should be secured. Physical access to the hardware and network should be controlled and restricted. Servers, network devices, cables, power supply, and other physical infrastructure should be in a controlled environment, protected from heat, cold, sun, rain, sand, etc.

83 In addition to physical access, virtual access to servers, the database, and network should be controlled and restricted. In most cases, the operating system and database software provides logical security such as password protection. Networks can also be protected from intruders using firewalls, virtual private networks, and other security protocols.

84 The assessment framework looks for the following factors in the IT component of the CCT program:

- deploying adequate resources (CPU, memory, bandwidth, etc.) to collect beneficiary information, process the beneficiary registry, and reconcile payments in a timely fashion
- securing the software against intrusion (such as hacks and viruses) by applying the latest security patches to servers and network devices
- securing the server, network devices, and other hardware against unauthorized access, environmental elements, and failures

Assessment

85 The assessment of IT infrastructure is carried out primarily through interviews and site visits by IT experts. The site visits help assess the physical security of the infrastructure.

86 Questions and key elements to look for are presented in Table 5.

Table 5: Key Assessment Elements for IT Infrastructure

Issues	***Questions***	***Key elements***
Hardware capacity and planning		
Slow system Service interruptions because of: - insufficient resources - aging systems	1. Are the hardware resources (CPU, memory, and bandwidth) of the servers and network devices reviewed periodically? 2. Is the review used to plan future upgrades? 3. Has the review led to upgrades in the capacity of the system? 4. Are the servers and network devices renewed after their useful life?	Depending on the age of the program 1. evidence of hardware renewal, or 2. upgrade schedule Resource utilization reports 3. Threshold for resource (CPU, memory, and bandwidth) utilization
Software updates and maintenance		
Systems vulnerable to unauthorized access (hackers) due to security holes Systems interruption due to software malfunction	1. Are the operating systems, database, COTS, and network devices updated with the latest service packs? 2. Is there a periodic review of server and network devices to verify that they are current? 3. Are there scheduled service interruptions for systems maintenance? 4. Is the service interruption communicated to the operational users?	• Service shutdowns for maintenance • Versions and latest patches for operating systems, database, and other software components (including embedded software in network devices)
Secure hardware and software security		
Unauthorized access to servers and network devices Exposure to environmental elements	1. Is access to the servers and network devices restricted? 2. Is access to the servers and network devices controlled and monitored? 3. Are the servers and network devices protected from environmental elements such as rain, sun, wind, and sand? 4. Are the servers and network devices in a climate-controlled environment?	Physical security 1. Server room 2. Environmental conditions around servers, network devices (network cables, routers, hubs) 3. Security used to control access
Disaster and recovery planning		

Issues	*Questions*	*Key elements*
Service interruptions due to server or network device malfunction Service interruption due to lack of electricity Loss of data and software	1. Have single points of failures been identified? 2. Are the systems connected to redundant power supplies? 3. In cases where electricity is scarce, are servers connected to an uninterrupted power supply or generator? 4. In the case of disaster, data loss, or service interruption, are there standard operating procedures to restore the service? 5. What is the backup strategy for system data and application? 6. In case of a disaster, are there standard operational procedures for disaster recovery? 7. Have the standard procedures been tested?	Disaster recovery 1. Backup schedule 2. Evidence of testing 3. Documented policies and procedures

Part III: Applying the Framework

Part III applies the framework developed in the previous sections to three fictitious SSN programs. These programs have been developed integrating examples from various country visits. To provide context to each of the programs, three fictitious countries have been developed using mythological places: Nibiru, Agartha, and Cockaigne.

Chapter 9: Nibiru

Introduction

87 Nibiru is a tropical middle-income country with approximately 1.5 million families living in extreme poverty in rural and urban areas. To provide a social safety net to households at risk, Nibiru's welfare ministry established a cash conditional transfer program to provide income support to extremely poor households, which was conditional upon school-aged children attending school and on younger children and their mothers visiting health centers.

88 The program was introduced in rural areas first through a pilot. The pilot was followed by a rollout to the most accessible rural communities. The first phase covered close to one-half of the extremely poor population. The rest of the extremely poor households reside in urban and inaccessible rural areas.

89 Politically, Nibiru's subnational governments count with great autonomy. Without their support, Nibiru's CCT program cannot succeed. Thus far, Nibiru's subnational governments have supported the program and found it to be politically beneficial. At the same time, the program puts additional strain on the scarce resources at the municipalities.

90 Nibiru's government is under pressure to expand the program to the remaining extremely poor families. Buckling under pressure, the Nibiru's welfare ministry committed to scale up the resources in 9 to 12 months doubling the number of beneficiary households.

Governance and Organizational Structure

91 **Institutional arrangements**: The program has established institutional arrangements with Nibiru's national census agencies, civil registry, and education and health ministries. These arrangements ensure that the program has access to the information required to validate beneficiaries' information at the registration and monitoring of co-responsibilities phases, and before the payment to beneficiaries.

92 **Agreements with the local governments:** For every participating municipality, the program has established a formal legal agreement that defines roles, responsibilities, and performance indicators. If the indicators are not met, the program has the right to withdraw benefits from the participating community. The indicators cover the local operations of the program and the local supply of services. These indicators are reviewed periodically with the municipalities. Renewal is offered to municipalities in compliance.

93 **Agreements with service provider:** The program counts on two types of service providers: banks and a third party that monitors co-responsibilities. The agreement with each service provider establishes the schedule and protocol used to exchange information.

94 **Roles and responsibilities:** The program uses the IT department from the ministry of welfare. The roles and responsibilities are well defined. The IT department from the ministry develops the databases and MIS applications, while program staff members manage the information (e.g., the beneficiary database, payments, co-responsibilities).

95 **Governance and institutional arrangements:** Although there is no formal governance body and process, the program does monitor all of its agreements at the operational level. In the case of the municipalities, the program monitors the performance and reserves the right to renew or cancel the program in a municipality depending on its compliance with the service levels stated in the agreement.

96 **Process improvement:** The IT department does not seem to actively participate in process improvements of the program. The program does not have a process to invite participation or collect process improvements from the IT department that can help the program be more efficient.

97 **External expertise:** The program contracts out the printing, distribution, and collection of co-responsibility information. Although the program administrators recognize the importance of the information, they are also aware that they do not have the capacity to take on these tasks. The program outsources the development and maintenance of the MIS to the ministry's central IT department.

Information Management

98 **Data cross-checks**: The program does not use timely, authoritative sources for cross-checking beneficiary information. Although the program does use an external targeting tool, (the civil registry, service centers, etc.), the cross-checks do not use up-to-date information. New information from local sources is updated directly in the MIS, but the updates are not cross-checked against authoritative sources (such as the civil registry.) Using alternative avenues to update information results in duplication of efforts, increased errors, and opportunities for political manipulation. It also weakens the capacity of the authoritative sources (such as ministries of education and health).

99 **Information traceability:** The program is pursuing ISO certification including records management, a welcome practice. The implementation will require a capacity-building effort targeted to municipalities. An audit of current practices, if not already underway, is recommended. The traceability of co-responsibilities is very good. The service provider provides on-line access to the co-responsibility records for beneficiaries, giving the program real-time access to scanned copies of the original records. The service is heavily used in grievance hearings to answer beneficiaries' complaints.

100 **Data collection by the local governments:** The program does allow the local governments to update some beneficiary information. However, if the information affects benefit payments, the update is escalated to the regional or central offices.

101 **Benefit payment and reconciliation:** Banks submit payment records to the program to reconcile payment with beneficiary registries. However, the process to upload the information is manual, and procedures to upload the information are not formally documented.

102 **Information security:** Access to the beneficiary information is controlled through MIS application.

103 **Operational oversight:** Using the MIS application, the beneficiary database produces operational and monitoring reports. At this point, the reports are used to monitor the local governments and reconcile payments. There was no evidence that the system reports were used to shorten the 60-day payment cycle.

104 **Information access:** One of the responsibilities of the local government is to post the list of the beneficiaries in the public office.

Application Management

105 **Development process:** The management information system used to administer the program is a client-server application that might face operational difficulties in a decentralized implementation. Currently, the application does not match the design of the program. A Web-based application would be better suited to provide regional and subnational office real-time access to the beneficiary database for consultation.

For the other elements of the evaluation for application management (quality assurance, change management, configuration and release management, version management, and documentation management), the IT department does have processes in place, which is evident from the department's ability to develop and deploy working systems.

The Ministry's IT department has a systems engineering process, but the process is not formally documented. Documenting the processes and educating the program team could help establish collaboration between the IT department and program team and provide continuity in the event of staff turnover. If the IT department were to develop a Web-based MIS, the documented processes would facilitate communication and ensure that expectations are met.

IT Infrastructure

106 **Hardware capacity and planning:** While the infrastructure is robust, its capacity to scale up has not been tested. The program might experience difficulties scaling up using the current manual processes. Different strategies can help the program grow (for example, data warehousing).

107 **Software updates and maintenance:** The servers and network devices supporting the program are part of the ministry's infrastructure. The server and network device software are updated as part of regularly scheduled updates and maintenance of the ministry's infrastructure.

108 **Hardware and software security:** The servers and network devices are located in a server room with restricted access and protection from the elements.

109 **Disaster and recovery planning:** The application and database are part of the backup and disaster recovery plans for the ministry.

110 The ability to leverage an existing infrastructure (the ministry landscape) affords the program economies of scale and increased efficiency in planning, maintaining, and securing the IT infrastructure.

Chapter 10: Agartha

Introduction

111 Agartha is a small middle-income country with 225,000 families living in extreme poverty. As part of the social protection plan, Agartha introduced a comprehensive set of programs to address the needs of families in extreme poverty. As part of the plan, a cash conditional transfer was set up to provide financial incentives for families to participate in the social protection plan, which includes educational and health services.

112 The program provides two main payment methods—debit cards for urban areas and mailed checks for rural areas. The transfers of funds to payment agencies for direct deposit are done automatically. The checks are written and mailed by a services provider. All return checks are sent back to the main offices of the program. The beneficiary population is equally divided between rural and urban areas.

113 The following evaluation of the MIS looks only at the MIS in support of the CCT program; it does not evaluate the MIS supporting the comprehensive social protection plan.

Governance and Organizational Structure

114 **Institutional arrangements:** Argatha has strong institutional capacity within the country's ministries. The program has established institutional arrangements that allow for a formalized and timely exchange of information. In some cases, the exchange of information is real time.

115 **Agreements with local government:** The program has formalized its agreements with local governments to provide social services to eligible families. The local governments are held accountable for defined service levels, which are periodically monitored by the program.

116 **Agreements with service providers:** The program has established formal agreements with payment providers, in which the providers are responsible for making payment information available to the program for reconciliation.

117 **Roles and responsibilities:** Roles and responsibilities are well defined and separated. The program has a production team (separated from the operational and IT team) that manipulates the beneficiary database to produce the beneficiary registries, verify inconsistencies, etc.

118 **Governance of institutional and subnational agreements:** The governance function is the responsibility of the ministry. There is also a governance body made up of representatives from various national and subnational institutions that governs the regional offices and ensures local governance compliance.

119 **Process improvement:** The IT department is very familiar with the program's operational processes. The IT department has established a strong alliance with the operational teams to provide feedback and suggestions for timely innovation to enhance the MIS in order to effectively support the program.

120 **External expertise:** Most of the IT personnel are external contractors. They are key players in the development, maintenance, or operation of the program. The program uses established third-party service providers for printing and mailing checks. This has helped reduce the program's operational burden.

Information Management

121 **Data cross-checks:** The program uses strong data validation and cross-checking techniques. The program validates and uploads data from authoritative sources in real time. For example, given a unique identifier, the MIS validates its authenticity against the civil registry as the user enters the information. Once the identifier is validated, the MIS downloads the beneficiary information found in the national registry. This is made possible because of the high technical and human resources capacity available throughout the government in Agartha.

122 **Information traceability:** The program follows the country's records management policy. It was not clear whether information could be traced back to the source documents.

123 **Data collection from local governments:** The program collects information from local governments and regional offices. Both use a Web-based application to enter information, which is validated in real time with authoritative sources. The application to capture and access information is centralized, eliminating the need to integrate multiple data sources.

124 **Benefit payment and reconciliation:** Before payments are authorized, the program searches for benefits the family could be receiving from other government programs in the plan. Payment amounts are adjusted accordingly. Once the program authorizes the payment, the program executes payments by directly depositing the benefit amounts into the families' bank account or by authorizing the printing and mailing of the check for the adjusted amount. Information about the deposits and cashed checks flows back to the program for reconciliation with authorized payments. The returned checks are posted back onto the system to reflect no payment to the beneficiary. The reconciliation of returned checks is done manually.

125 **Information security:** The program is very mindful of the privacy of information. The MIS protects information using access control lists at the application level.

126 **Operational oversight:** The program uses information in the beneficiary database to produce timely progress reports.

127 **Information access:** Limited information is made available to the public.

Application Management

128 **Development process:** The program has developed a Web application that accommodates the decentralized nature of the program. The IT teams seem to be very familiar with the operational details of the program. This is evidence of a fairly good development process. Technically, the program does need to establish a mature development process.

> The IT department has robust processes in place for application management (quality assurance, change management, configuration and release management, version management, and documentation management). This has resulted in a strong capacity to quickly develop and deploy changes to the systems. However, the process and procedures are not formally documented.

IT Infrastructure

129 **Hardware capacity and planning:** The infrastructure is robust and renewed on a periodic basis. The hardware is part of the IT infrastructure supporting the social protection program, and makes use of an already established process to build hardware capacity.

130 **Software updates and maintenance:** The servers and network devices are part of the social protection program infrastructure. Software updates and maintenance of the servers and network devices are part of the support provided by the social protection program.

131 **Hardware and software security:** The servers and network devices are kept in a server room with restricted access and protection from the elements. Access to the server room is not monitored or reviewed for unauthorized access.

132 **Disaster and recovery planning:** The program has backup and recovery plans, but there is no disaster recovery strategy or plans to implement one.

133 The consolidation of IT infrastructure for the social protection program allows each program to reduce its overall IT costs and take advantage of economies of scale.

Chapter 11: Cockaigne

Introduction

134 The Cockaigne government is planning to implement a conditional cash transfer program. The government plans include the establishment of a new office under the supervision of the Ministry of Social Development. The program will allow local governments to participate.

Participation in the program is contingent upon the local governments' providing the health and education necessary for families to comply with the conditions of the program.

135 The evaluation reflects their plans for the implementation of the program vis-à-vis the MIS system to support operations.

Governance and Organizational Structure

136 **Institutional arrangements:** The program has established a working group of participating governmental institutions including civil registry, Ministry of Finance, Ministry of Statistics, Ministry of Education, and Ministry of Health and other governmental stakeholders. The working group's goal is to lead the implementation of the program while strengthening the capacity of the participants and preventing the creation of parallel information sources.

137 **Local government agreements:** The program has established a working group of local government representatives to manage and monitor feedback. The feedback will be used to put in place and adjust the agreements between the program and the local governments.

138 **Service provider agreements:** The program is surveying the market for service providers, particularly payment providers and data collection services.

139 **Roles and responsibilities:** To structure the program as efficiently as possible, the program is analyzing programs in other countries to learn from the others' experiences and find the optimal structure, roles, and responsibilities to run the program within the country context.

140 **Governance of institutional and subnational agreements:** As part of the design of the program, the government established a steering committee with the participation of senior officials from across the government. This committee will define the formal agreements across governmental institutions at all levels of government. Operationally, the program will establish key performance indicators to be included in the agreements.

141 **Process improvement:** The program is looking at the best way to involve IT and operational personnel in process improvements. Hopefully, the experiences of similar programs will provide insightful lessons on the best process.

142 **External expertise:** The program recognized the current trend of outsourcing IT projects. The program management is currently evaluating the expertise they should retain versus the expertise they could outsource.

Information Management

143 **Data cross-checks:** The program has assigned the design of data cross-checks and validation processes to the intergovernmental working group.

144 **Information traceability:** The program is evaluating the country's public records management policy.

145 **Data collection from local governments:** The program has assigned the data collection responsibilities at the local level to the local government working group. The process needs to take into consideration the capacity of the local governments to comply with the requirements of the program. In the event that local governments will not be able to comply, the processes will be adjusted to acknowledge the limitations of the local contexts.

146 **Benefit payment and reconciliation:** The program is working with the Ministry of Finance to define the flow of funds and payment receipts. As part of the payment providers' assessment, the program is putting a lot of emphasis in the automated flow of information for payment reconciliation. It is also important for the program to decide the best payment method to minimize leakage and reduce reconciliation errors.

Application Management

147 The program currently does not have an implementation approach. The MIS could be developed in house or could be outsourced. It is premature to discuss application management processes.

IT Infrastructure

148 The program plans to leverage the Ministry's IT infrastructure and processes. The hope is to leverage the economies of scales currently available in the Ministry and not to devote resources to building capacity in-house.

Chapter 12: Lessons from the Programs Assessment

149 This chapter provides a summary of the noteworthy good practices and opportunities observed during the assessment of the fictitious programs. At the end of the chapter, a summary table is presented with an overview of each of the fictitious countries and how they measure against the four components in the framework.

Good Practices

150 **The involvement and active monitoring of the local government.** The formalization of the arrangement between the programs and the local governments (and in some cases incentives) affords the program the ability to enforce minimal service standards. A good example is Nibiru. The program and the municipalities enter into a legal contract outlining the roles and responsibilities of the program and the municipalities. In this agreement, the program gains oversight over the operation of the program in the municipalities. The operational indicators of each municipality are reviewed periodically. In return, the municipality is provided with financial incentives and often gains political capital from its constituency.

151 **Roles and responsibilities are well known.** In all three programs, the roles and responsibilities are well defined and understood. In some cases, the roles are well divided and great care is taken to maintain the division of labor. This is the case in Agartha, where they count with a production team to assist the program with the information management processes. The

program and IT staff members are barred from directly having access to modify information in the beneficiary database.

152 **Operational oversight and access to information.** The first two programs have sophisticated MIS that allow management and program staff access to various levels of program and beneficiary information. Some even have the information available for NGOs and civil society, therefore providing them with the means to hold the program accountable. Agartha provides a well integrated MIS, which incorporates all of their social program systems in one dashboard providing a good overall view to the countries' programs and progress in their social safety net agenda. The same system provides the ability to look at information for one program, one municipality, etc. At the same time, the public is provided limited access through an Internet Website.

153 **Leveraging economies of scale.** All three programs have been able to leverage economies of scales in the infrastructure components. The first two leverage their government agencies' infrastructure and communication network reducing their costs of implementation and maintenance. On the other hand, Cockaigne's program is following in their footsteps hoping to leverage the Ministry's IT infrastructure.

Opportunities

154 **Payment reconciliation.** In the first two programs, the reconciliation of the benefit payment is done manually. Banks and other institutions provide payment information to the program electronically. The information is then loaded manually into the database in what can be considered an error-prone process. Cockaigne's program has learned from the shortfalls in the first two programs. Cockaigne is looking for ways to make payment reconciliations automatic.

Table 6: Summary of Country Experience

Practices	Nibiru	Agartha	Cockaigne
Governance and organizational structure			
Institution arrangements	S	HS	S
Agreements with local government	HS	HS	S
Agreements with service providers	S	S	HS
Roles and responsibilities	S	S	HS
Governance of institutional and subnational agreements	S	S	S
Process improvements	U	S	HS
External expertise	S	S	S
Information management			
Data cross-checks	U	HS	S
Information traceability	S	ND	S
Data collection at local government level	S	S	S
Benefit payment and reconciliation	U	U	S
Information security	S	S	HS
Operation oversight	S	S	S
Information access	S	S	S
Application management			
Development process	ND	ND	ND
Quality assurance processes	ND	ND	ND
Change management	ND	ND	ND
Configuration and release management	ND	ND	ND
Version management	ND	ND	ND
Documentation management	ND	ND	ND
Infrastructure			
Hardware capacity and planning	S	S	S
Software updates and maintenance	S	S	S
Secure hardware and software security	S	S	S
Disaster and recovery planning	S	S	S

Table Key: HS: Highly Satisfactory, S: Satisfactory, U: Unsatisfactory, HU: Highly Unsatisfactory, ND: No Data

Note: The missions did not have the time to evaluate all aspects of the MIS, especially the Application Management. ND has been used for cases with insufficient information to make an assessment.

Chapter 13: Conclusion and Final Considerations

155 The paper has presented an integrated framework for a systematic approach to understanding and assessing the MIS components that are essential for supporting a SSN program. To this end, the paper used CCTs, as proxies of other SSN programs. First, the paper looked at the impact that good information management practices can have in the improvement of control and accountability processes. Second, the paper examined the four components that make up a successful MIS implementation (**governance and organizational structure, information management, application management,** and **infrastructure)**. Third, the paper provided methodologies and roadmaps to assess both existing and new MIS. Fourth, the paper applied the framework in the assessment of three fictitious CCTs in middle-income countries—Nibiru, Agartha, and Cockaigne.

156 The proposed framework has been applied to existing MIS. Nevertheless, the same framework can be used to develop a new MIS from scratch.

Additional Considerations

157 Although the paper provides a disciplined approach to assessing and developing MIS, the paper also recognizes that the following external factors need to be considered:

Country Context

158 Assessing the capabilities of an MIS for control and accountability cannot be done in a vacuum. Culture, infrastructure, and the structure of central and local governments all affect MIS effectiveness. These considerations affect the way the SSN programs can implement the guidelines presented in the paper.

159 Culture tends to impact the way of doing business. For example, although paper-based processes can be inefficient, in some cultures paper is required because it gives processes legitimacy. Similarly, a country's existing infrastructure or lack thereof can limit the options for the MIS implementation.

160 The availability of aggregated information is one of many challenges that can arise from differences in the political makeup of a country. When programs are decentralized, the availability of information is dependent on the capacity of each local government.

Program Maturity and Feedback

161 SSN programs are always changing. As programs mature, their processes are optimized through incorporation of feedback and experience. The MIS must keep pace with the processes it supports. At the same time, the MIS must evolve to incorporate the feedback from the operation teams to reduce program inefficiencies.

Paper versus Electronic Recordkeeping

162 Most guidelines included in paper recordkeeping apply to both paper-based processes and electronic recordkeeping. The decision to move to a paperless environment must consider the country context and the cost/benefit analysis of an automated MIS. Automation should take place only when the benefits outweigh the costs.

Complementary Systems

163 The MIS is only one of a series of systems that support the SSN. The MIS needs to interoperate with the case management, payment, and financial management systems to better monitor and evaluate the operations and impact of the program. The principles presented in the paper can be applied to each of these systems separately.

Procurement

164 Procurement is one area where corruption or fraud is more likely to occur. Detailed guidelines for effective procurement processes are included in the Bank's procurement guidelines and are outside the scope of this paper.

Economies of Scale

165 The MIS should leverage IT expertise and infrastructure where possible. Leveraging the economies of scale from government agencies or other programs will reduce the cost and time of implementation and maintenance.

Knowledge Sharing

166 The IT teams supporting the SSN programs in different countries all face similar challenges. A nascent program can learn from the experience of a mature program. Providing a forum for the programs to share their experiences with the MIS system would help prevent repeating mistakes and leverage the knowledge and experiences of all programs across countries.

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Annex I: Additional Resources for Assessing an MIS

Overall MIS

❖ *Main risks:*

(i) Service interruption; (ii) unauthorized access to information/data/records; (iii) unauthorized changes; (iv) creation of false information/transactions.

❖ *Causes:*

(i) Malicious acts, (ii) human error, (iii) environmental events.

Institutional Arrangements

Main risks: (i) No accountability—absence of formal agreements; (ii) no enforcement—unclear roles and responsibilities, no means for issue escalation; (iii) no control—no documentation and follow-up on agreements.

1. Does the program have formal arrangements with all institutions involved?
2. Are the roles and responsibilities for each agency/unit formalized and clearly documented? How (for example, by executive decree)?
3. Does the program have an interinstitutional committee that monitors program progress and impact?
4. How often does this committee meet?
5. Does the program have formal minutes of those meetings?
6. Does the program have follow-up sessions for the implementation of the agreements?
7. Does the program have a clear chart of the information flows between agencies?
8. Does the program depend on autonomous regional governments or agencies?
9. If so, are there formal agreements formalizing the collaboration?
10. How often are these agreements renewed?
11. Do the agreements with the subnational governments or agencies carry any incentives, financial or otherwise?
12. Do the agreements specify service levels and indicators from the subnational governments and agencies?
13. Are the service indicators monitored periodically?
14. Is administration of the targeting instrument carried out by a different agency from the program administration?
15. Does the program have an interinstitutional IT team that looks at systems integration?
16. If yes, does the team monitor IT risks?

Information Management Practices

Main risks: (i) false information/transactions; (ii) no repeatability; (iii) difficult control processes caused by human errors, no traceability, and information misuse/abuse.

1. Are the business processes documented in the operational manual?
2. Is the information flow (paper or electronic) documented along with the business processes?
3. Does the program have record management and archival policies and procedures at the governmental level?
4. Are the record management policies followed by the department?
5. Are the record management policies followed at the subnational level?

6. Are the record management practices audited?
7. Does the program have access to operational reports containing progress indicators and service levels of processes without the intervention of the IT department?
8. Are operational reports generated periodically?
9. Are operational reports reviewed periodically?
10. Does the program have access to managerial reports that contain strategic indicators without the intervention of the IT department?
11. Are managerial reports reviewed periodically?
12. Are the reports used to optimize the operations of the program and identify systemic issues?
13. Is generation of the beneficiary registry automated?
14. Is the beneficiary registry reviewed and signed off before payment?
15. Is the process of uploading the payment information from banks automated?
16. For grievances, are the cases managed systematically?
17. Is the case management process automated?
18. Are the cases followed to completion?
19. Are the cases managed by the local governments?
20. If yes, can the cases' information be aggregated at the program level?
21. If the program is decentralized, do regional offices have the ability to register complaints, check the progress of a complaint, or close a complaint?
22. Is any beneficiary information uploaded and/or changed by the local governments?
23. If yes, can the information/data be aggregated at the program level?
24. Can local governments change beneficiary information that impacts payment?
25. If yes, can the information/data be aggregated at the program level?
26. Is the list of beneficiaries publicly available?
27. Are monitoring indicators publicly available?
28. What means are used to share information (Web, bulletin boards in regional offices, other)?
29. Does the program have a documented information security policy (such as access control)?
30. Does the program keep a history of paper and electronic changes?
31. Can changes in the information systems be traced back to their supporting documents?
32. Can changes in the information systems be traced back to the editor?
33. Are information practices audited periodically?

IT Team

Main risks: (i) No HR capacity; (ii) unrealized economies of scale; (iii) no institutional memory.

1. Does the IT team report to the program administrator?
2. Does the program have an information management expert?
3. Does the program have an infrastructure expert?
4. Does the program have an applications expert?
5. Does the IT team participate in program design?
6. Does the program have a list of essential functions?
7. Does the program have backups for the essential functions?
8. Does the program have a quality control function?
9. Does the program have a quality assurance and testing function outside the IT team?

10. Does the program have systems documentation to establish the historical basis for future decisions and continuity in the event of staff turnover?

Application Development Management

Main risks: (i) Flawed design; (ii) business continuity.

1. Does the program have standard software development processes?
2. Are these processes documented?
3. Are these processes audited periodically?
4. Does the process include requirements gathering?
5. Does the process include high-level and low-level designs?
6. Does the process include the business process owner's approval?
7. Does the process include quality assurance functions?
8. Does the process include configuration management, deployment, versioning, upgrades, etc.?
9. Does the process include training?
10. Does the process include peer reviews?
11. Does the process include documentation?
12. Does the process include risk management?
13. Does the process include project management?
14. Does the process include project phase and project milestone reviews?
15. Is there separation of functions between development, quality assurance, and deployment?
16. Do applications keep action logs, specifically changes in data?
17. Do the logs indicate who accessed the application, and what action they performed on the application?
18. For decentralized programs, does the program consult local governments in the process of requirements gathering?

Data Management

Main risks: (i) Reliability; (ii) accuracy/consistency; (iii) integrity; (iv) security.

1. Does the program maintain a list of institutions involved (civil registry, immigration, municipalities, etc.)?
2. Are the information systems used to administer the program interoperable?
3. Does the program own the data created as part of registration, payments, and other processes?
4. Is the beneficiary database validated against official sources?
5. How often are data validated against authoritative sources?
6. Are the data captured by the program validated for integrity and consistency (for example, to flag registration of a minor as the head of household)?
7. Does the program have a unique identifier for each beneficiary?
8. Is this unique identifier interoperable with official sources?
9. Does the program keep historical data for each beneficiary?
10. Does the program have access to a report on historical information?
11. Is there access to real-time information?
12. Does the program have a data warehousing strategy?
13. Does the program separate transactional data from reporting data?

14. Are changes to the data logged?
15. Are the logs reviewed periodically?
16. Is access and changes to data restricted?
17. Is the application development team part of the program operations office?
18. Is the system developed outsourced to a different institution?
19. Is the database backed up periodically?
20. Are the tapes kept in a different location?
21. Has the program identified the authoritative sources and custodians for each critical variable?
22. Does the program use the authoritative sources in all cases, or does the program do the data collection itself?

Infrastructure Management

Main risks: (i) Availability; (ii) scalability; (iii) sustainability.

1. Is the capacity of the system reviewed periodically?
2. Are depreciated systems renewed on a periodic basis?
3. Do information systems have single points of failure?
4. Does the power supply have single points of failures?
5. Is the system connected to redundant power supplies?
6. Is the review used to plan future upgrades?
7. Has the review led to upgrades in the capacity of the system?
8. Is the system protected from environmental elements?
9. Is the system kept in a climate-controlled location?
10. Is physical access to the system restricted?
11. Is logical access to the system restricted?
12. Is the system audited by a third party on a regular basis?
13. Is there an information security strategy to prevent denial of service attacks?
14. Does the system have a documented process for security policy patches?
15. In the case of disaster, data loss, or service interruption, are there policies and standards in place to bring the system back up?
16. Does the system have a disaster recovery plan?
17. Have the disaster, data loss, or service interruption plans been tested?
18. Does the system have redundant systems in a different location?
19. Is the system audited periodically?

Telecommunications

Main risks: (i) Availability; (ii) coverage.

1. Are the field offices connected with headquarters?
2. Are regional offices connected through a private network?
3. Is the network topology taken into consideration in the design of the system?
4. Do local networks have a single point of failure?

Monitoring and Evaluation

Main risks: (i) No baseline; (ii) no timely access to progress indicators; (iii) absence of process monitoring.

1. Does the program have a baseline for the information systems at project identification?
2. Does the program have a set of indicators of program status at project identification?
3. Does the program have the requirements for management reporting at project identification?
4. Does the program have the requirements for systems reporting at project identification? Does the program have a baseline?
5. Has the program established the periodicity for progress supervision?
6. Does the program have real-time access to the indicators required for project supervision and program progress?
7. Does the program have the information required for impact evaluation?
8. Does the program have real-time access for the indicators required for the impact evaluation?

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This paper is intended to provide task managers and World Bank Group clients working on Social Safety Net (SSN) programs with practical and systematic ways to use information management practices to mitigate risks by strengthening control and accountability mechanisms. It lays out practices and options to consider in the design and implementation of the Management Information System (MIS), and how to evaluate and mitigate operational risks originating from running a MIS. The findings of the paper are based on the review of several Conditional Cash Transfer (CCT) programs in the Latin American Region and various World Bank publications on CCTs. The paper presents a framework for the implementation of MIS and cross-cutting information management systems that is based on industry standards and information management practices. This framework can be applied both to programs that make use of information and communications technology (ICT) and programs that are paper based. It includes examples of MIS practices that can strengthen control and accountability mechanisms of SSN programs, and presents a roadmap for the design and implementation of an MIS in these programs. The application of the framework is illustrated through case studies from three fictitious countries. The paper concludes with some considerations and recommendations for task managers and government officials in charge of implementing CCTs and other safety nets program, and with a checklist for the implementation and monitoring of MIS.

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