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Integration of social security programmes and the role of ICTs: case studies

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1. Introduction

By integrating social security programmes, the effectiveness and efficiency of social policies can be improved and the scope of programmes covered can be expanded.

This approach has generally been implemented based on various scenarios, which may be categorized as follows:

- integrating social protection programmes and social services
- integrating health insurance systems;
- collecting the system's financial resources;
- improving the quality of information and services within social security institutions;
- and,
- implementing international social security agreements.

It is important to note that a single project may often include several of these objectives.

The purpose of this report is to analyse systems and projects in order to identify key characteristics associated with the integration of social security systems. The report is part of the "Information and Communications Technologies (ITC) as enabler of social security policy and programme integration" project of the International Social Security Association, developed by the Technical Commission on Information and Communication Technology over the 2011-2013 period.

2. Social protection and social services

Large social protection programmes seek to provide solidarity benefits to the most disadvantaged populations. They frequently involve creating networks among the social protection actors.

The Economic Commission for Latin America and the Caribbean (ECLAC) views these kinds of programmes as coordination and implementation mechanisms for social programmes,

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ensuring the coordination of traditional social programmes and the provision of social services and assistance programmes.

Although the specifics of the social protection programmes vary, they do share certain elements (1):

- They seek to provide social responses to the poorest and most vulnerable populations.
- They cover a wide range of initiatives, including economic transfers, food security and access to basic health care, education and housing.
- The interventions are increasingly structured within networks and integrated social programmes; thus, always a part of an overall set of social protection policies and strategies, rather than isolated or ad hoc actions.
- The social protection programmes define the conditions applicable to beneficiaries, who must make certain shared commitments, thus corresponding to the notion of conditional transfer programmes.
- Most of the initiatives encourage beneficiaries themselves to participate, including in the social control mechanisms.

The implementation of these programmes that create a network of multiple social protection organizations requires the integration of information and services, often involving several institutions (see references 1, 2, 4 and 26).

Several such efforts have been carried out in Argentina, Brazil, Chile, Colombia, Mexico and Uruguay.

Brazil's "Bolsa Família" is a conditional transfer program intended to provide economic support to the poorest families to promote access to health care, education and social assistance. It currently covers 26 percent of the population and is having a significant impact on poverty reduction (2). This program is based on the *Cadastro Único para Programas Sociais do Governo Federal* (CadÚnico) information system, which enables the implementation of technical registration processes and mechanisms and the updating of beneficiary information. To achieve these objectives, the project integrated the existing databases of various social programs and mechanisms enabling municipalities to update the necessary information (see references 1 and 3). CadÚnico thus supports the provision of benefits, avoids data redundancy and erroneous payments (for example, duplicate payments) and reduces the risk of fraud (5).

Chile's social protection system is based on two primary programmes: *Chile Solidario*, which provides social protection for poor and vulnerable families and *Chile Crece Contigo* ("Chile Grows with You"), which seeks to improve educational and developmental conditions for children (from conception to adolescence) (see references 4 and 1). These programmes are based on the Integrated Social Information System (SIIS) and the Register of Social Information (RIS), which store and process information on government benefits and beneficiaries. The sectoral benefits provided through the programme's 15 partner institutions are also stored in the RIS programme information (see references 4 and 1). The systems are implemented through an interoperable information exchange platform, via both Web services and batch processing. It functions as an online system in partnership with the municipalities and institutions, most of which provide access via Web services. With these services, the relevant SIIS information may be accessed by consulting the data sources directly whenever necessary (4). The system interacts with the Civil Registry and Identification Service (SRCI) to confirm the identification data that the families report. This principle of e-administration, or e-government, is based on the security and XML semantics standards used in Chile (5).

In Mexico, the "Oportunidades" program focuses on households in extreme poverty and includes three closely-linked components: education, health care and food assistance. An "Oportunidades" programme for youth also exists. "Oportunidades" was the first programme in Mexico to register all beneficiaries using an identification process and to select eligible households on the basis of their resources, via a proxy means test (PMT). It relies on an integrated information and beneficiary identification system (SIIIB), the "chances and opportunities" registry integrated into the operational information system (SIIOP). This integration is based on the development and application of information and communication technologies. It is central to the SIIOP system, which manages the certification registry (conditionality monitoring) and the provision of transfers (see references 1, 2 and (4)

Other social service programmes, widespread in developed nations, provide many kinds of benefits to the entire population without relying on the integration approach described in the examples above. The issue of the quality of data used arises frequently here in relation to the determination of benefit eligibility ("case management"). In particular, the situation outlined in C.H. Carter's report (27) reveals the tragic consequences of the lack of coordination among social programmes in the District of Columbia (United States). Social services agencies in the city of New York (8) and a group of California counties (9) have addressed these problems. The two projects created integrated information systems with data from different beneficiary databases to ensure that eligibility is determined properly.

Until recently, every medical and social service agency in New York City had its own traditional management system, which could not connect with the others. From child care to assistance to the elderly, nine New York health and social service agencies provided services and benefits contributing to the health and well-being of the city's eight million residents, particularly those least capable of caring for themselves. The impacts of the systems' inability to connect included redundancy of information entered into the various systems, lack of collaboration among the agencies and non-optimal services for the families. Mayor Bloomberg assigned priority to developing an integrated system to manage the various agencies' programmes and the HHS-Connect programme was implemented in 2008. It integrates relevant data, thus enabling the city to improve and speed decision-making and to improve results for its citizens.

Users connect to a Web portal, which offers a shared information base regarding "clients" drawn from data provided by five city agencies: the Human Resources Administration; the Administration for Children's Services; the Department of Homeless Service; the Department for the Aging; and, the New York City Housing Authority. The client portal, which was entirely redesigned by ACCESS NYC, provides access to 311 Internet sites, offering the best functionalities and services to citizens. The transactions are integrated directly with the related agencies, eliminating the need for employees to input the data. This electronic service reduces visits to beneficiaries' home, as well as telephone calls and letters.

California has developed an integrated automated system for services to individuals. It streamlines the management of multiple benefit programs for caseworkers, users and clients.

Social service agency employees have a difficult job. The programmes that they administer are diverse and complex and involve vast quantities of information. The rules change frequently, from one year to the next. Any mistake – from a misunderstanding about a requirement to a simple typing error – can create costs for the organization, increase processing time for agency employees and lead to delays in receiving benefits for beneficiaries.

The clients' task is difficult, too. To enrol in a programme, they must make multiple trips to and from social service agencies, answer numerous questions, complete forms and documents – and often redo the steps once or several times if the information goes astray. If they are

eligible for several programmes, they will probably have to start the entire process all over. Agencies may also have to duplicate their efforts in order to process applications to different programmes.

By using the new system, social protection agencies streamlined their professional practices, reducing the number of processes from 205 to 58 and creating common procedures for the four counties involved. Based on these improvements, an integrated, Web-based approach was developed to manage all the functions using a single database for all the social protection departments. "You collect the data one time, it's housed one time, it's maintained one time and it's used to determine eligibility for multiple programmes," says John Boule, the consortium's C-IV project director. Caseworkers are then able to manage the user data more easily and users find it simpler to obtain the aid they need. "The new system greatly reduced the time and effort required to process an application for benefits," says Donna Gonzales, acting eligibility worker supervisor with the Ontario Transitional Assistance Department in San Bernardino County. "As long as you have the information correctly input into the system, you can issue the benefits instantaneously." Because the system contains all the rules used to calculate benefits for different programs, caseworkers no longer need to search for information in hard copy documents or to make calculations by hand. Automation saves time and increases accuracy.

In France, a common social protection register (RNCPS) was created in 2008 and has been operational since 2010 (10). Its purpose is to strengthen anti-fraud efforts and to simplify administrative processes.

Its primary objectives are to:

- improve the quality of service for users by simplifying procedures;
- increase the productivity of agencies responsible for managing benefits and social assistance; and,
- increase the effectiveness of controls to ensure proper payment of benefits and optimize anti-fraud efforts.

This register contains data from the different French social security schemes (programmes), representing approximately 1,500 different institutions, including:

- beneficiary identification (personal data);
- affiliation (agency or department to which the individual is assigned); and
- nature of the risks covered, benefits provided by the various social service institutions (including old-age, disability, family allowance, social assistance, health insurance, maternity benefits and unemployment benefits) and addresses reported to which benefits are to be sent.

A single identifier for the individuals included in this register enables all member institutions to access the RNCPS. (The individual's social security number is used as the registration number, or NIR.) Nearly 75 million people are listed in the RNCPS, which is gradually integrating improved compatibility rules so that determinations may be made as to the conditions under which an individual is eligible or ineligible for multiple social benefits.

The register's content provides a comprehensive view of the insured person's circumstances vis-à-vis the entire French social protection system and, when consulted, makes it possible to identify potential fraud, abuse and anomalies. Fraud primarily involves benefits that may be received simultaneously from multiple organizations under various schemes or multiple benefits that are inconsistent (for example, as in the case of a person receiving both unemployment and full retirement benefits). It also involves cases in which an individual is

receiving benefits that may be paid only in France, but in which other agencies report addresses outside the country for that same beneficiary.

The register makes it easier to detect wrongful affiliations, for example, in the case of individuals who inappropriately receive family benefits under various schemes or minimum social benefits such as a minimum old-age pension. It will also be useful in investigating benefits subject to residency requirements in cases where an individual has declared French residency to the general authority but reports residency abroad to the tax authority. It may also be used to verify a beneficiary's statements regarding his social benefits when assistance is granted.

Caseworkers responsible for investigating benefit applications and changes in the applicant's circumstances are to consult the register, which will help to simplify administrative procedures and improve the quality of services to insured persons. This will help to detect benefits that were not received. Caseworkers at the social protection institutions access the register via a Web portal established by the French national old-age insurance fund (CNAV), which operates the system. Today, all the social security funds of the health, family and retirement divisions, the national employment service organizations, the paid leave funds and the organizations in the collections branch (which is responsible for the majority of funding for the French social security system) have access to the register. Regional and local authorities and municipal social welfare centres also have access to the portal in connection with determinations regarding grants of social assistance.

Caseworker access to the RNCPS is strictly regulated and controlled by the French National Commission for Information Technology and Freedoms (CNIL), which protects civil liberties. In that regard, on 30 April 2009, the CNIL reviewed and noted the decentralized organization of the data. The national-level register includes all beneficiaries and, for each person, the list of organizations providing benefits ("affiliations"). The databases of the partner organizations provide real-time detailed information on each benefit and the addresses of the insured persons. Thus, the system does not maintain all the data on the insured persons in a centralized file. This organization ensures greater protection of personal data, particularly addresses, which are particularly sensitive.

The social protection organizations and the municipalities monitor the use of the RNCPS system closely and insured persons are properly informed. This has been underway on a gradual since summer 2010, as organisations connect to the register.

In summary, the primary characteristics of this scenario are:

- the creation of information systems regarding individuals (current and prospective beneficiaries); and,
- the integration of data from different institutions and social programmes.

These systems are used to identify beneficiaries, assist in the determination of benefit eligibility and reduce the risk of fraud or wrongful payments by cross-referencing data held by the different institutions.

In the cases studied, IT integration (interoperability) was based on:

- implementation of shared information resources, specifically with regard to beneficiaries and the social programmes for which they may be eligible;
- access to data from external institutions (for example, via web services) to load data into the shared information system; and,

- access to the shared information systems via mechanisms included in the programmes (for example, web services).

3. Integrated health insurance systems

Health insurance systems, whether managed as a public service or by private service providers, are one of the most common models.

To improve system coverage, reliability, quality and the effectiveness of public services, many countries have implemented approaches that integrate, to varying degrees, the different insurance systems, the connections among them and the entities providing the medical services.

Integrated health insurance systems particularly require consolidated information on insured persons so that local health care providers can determine the eligibility of individuals seeking services. This involves integrating various data sources that have information useful in determining an individual's eligibility for health care services and the mechanism used to access this information from health care providers.

Solutions to these problems have been implemented in Chile, Colombia, Thailand and Uruguay, among other countries.

In Chile, the national health fund (FONASA) provides access to health services to all persons, regardless of their financial resources. In this situation, determining the eligibility of low-income people, who do not pay for health insurance, requires validating their socio-economic situation. FONASA's "T titularidad de Derechos" (rights holders) programme is intended to support that determination, particularly for the health services. An information system was thus created that integrates data from different institutions used to certify the status of persons without income. Simultaneously, FONASA implemented a system accessible to health care service providers seeking to validate the rights holder's eligibility for medical care at the time of the request for services.

The integration of the online data bases and the validation of accessibility have significantly improved the quality, effectiveness and efficiency of health insurance services (5).

In Thailand, the health care system incorporates both public and private providers, each with its own funding. However, the public health care services provide the majority of care. Thai citizens belong to one of the following health care systems:

- the Civil Servant's Medical Benefit Scheme (CSMBS); or,
- the Social Security Scheme (SSS), for private sector employees, and the Universal Coverage Scheme (UCS), which insures the rest of the population (76 percent).

Currently, although ICT use in the health field is fragmented in Thailand, all actors use a common registration and reporting system. The national register of health care beneficiaries, which uses a central database with data on beneficiaries' health status, benefits the entire population. Data from all three systems are integrated bi-monthly. By using the national health insurance beneficiary registration system, hospitals and other health care providers may be accessed via Web services to record information for individuals seeking services based on their personal data.

In addition, the specifications of these services are available to software publishers so that they can integrate this functionality in their applications. Service providers may thus submit

payment requests electronically to an individual's health insurance system and the benefits can be provided at no cost to that individual (see references 2 and 23).

In Uruguay, both public and private institutions manage health care services. The country established a unified insurance system, the integrated national health system (SNIS). This insurance is based on contributions from employees, employers and retired persons, allowing them to access the services of all health care providers for payers and their minor children. To facilitate benefits determination for a person seeking health services, health care providers access an online system that integrates data for all individuals registered in the SNIS. This system is linked to the contribution collection system and to data registered about individuals and their family relationships, which allows data to be updated on an ongoing basis (11).

In short, although differences exist among the countries' systems, they share certain characteristics:

- The systems rely on reference databases regarding individuals covered by health insurance and their eligibility and that can integrate different circumstances (including worker, child and partner).
- Integration involves different information systems allowing for determination of eligibility (for example, several health care or contribution collection systems).
- Integration relies on "transparent" systems of connection and allows data to be exchanged among institutions providing health care services and those responsible for control and oversight (for example, the Ministry of Health) (25).

4. Proper implementation of calculation and collection contribution methods

In connection with verifying compliance with the rules and the efficiency of funding collection efforts, one or more establishments responsible for contributions collection system has (or have) the information necessary to calculate the amounts to be paid.

To produce economies of scale, the institutions – whether public or private – interact directly with employers, who are responsible for paying contributions on behalf of their employees, and assemble the information necessary to determine benefit eligibility of the dependent persons.

In this context, the integration of all actors seeks to enhance the effectiveness and efficiency of the system overall, facilitate the admission of new contributors to the system and confirm compliance with the requirements. The most common forms of integration are based on the exchange of data:

- between the collective management institutions and payers, particularly employers who hold contributions for dependent employees and handle overall payments; and,
- the aggregation of information from several institutions, including tax authorities.

The first form of data exchange, which is critical to the system's effectiveness and efficiency, may be based on sending files with data about employers' contributions (or about the entire payroll) and, increasingly, via communication over the Internet. Simultaneously, the collection institution must validate the data received and perform the contribution calculations. Next, the employer must send a response with the amount to be paid or with notification of any errors in the calculations provided.

This mechanism is increasingly common in many countries (22), including Argentina, Barbados, Brazil, Canada, France, Germany, Italy, Japan, Malaysia, Mauritius, Mexico, Morocco, the Philippines, Saudi Arabia, Singapore (13), Spain, the United Kingdom and Uruguay.

The second kind of data exchange among the institutions responsible for collecting contributions is intended to conduct controls to prevent fraud and to communicate relevant information to the social security administration when an external institution handles the collection (for example, the tax administration). The primary countries that have implemented this kind of integration are (see references 15 and 22) Argentina, Austria, Azerbaijan, Barbados, Belgium, Cameroon, Canada, China, Estonia, France, Germany, Holland, Italy, Jordan, Kyrgyz Republic, Mexico, Morocco, Panama, Saudi Arabia, Uganda and the United Kingdom.

Note: Many countries combine both practices.

There is thus a growing trend towards the integration of services at banks and other financial institutions to facilitate the payment of contributions, implemented in (22) China, Mexico, Panama, the Philippines, Thailand and Uganda.

In addition, some countries have established integrated systems to collect contributions for the various institutions responsible for social protection, although this approach does not involve bringing the entire function together within a single institution. In France (29) and Republic of Korea (14), all social security institutions collect contributions in transparent fashion. In Uruguay, the collection of social security contributions and taxes on dependent workers is conducted transparently (see references 30 and 11).

- France and Republic of Korea: an integrated contributions collection system on behalf of several social security institutions.
- Uruguay: an integrated system for collecting social security contributions and taxes on dependent workers (employees).

The primary characteristics of this scenario are:

- the exchange of data between the collecting institution and employers;
- the exchange and use of data and the integration of shared functions with other social security institutions and the tax collection agencies; and,
- the exchange of data and access to services offered by banks and payment services.

The primary techniques used are shared information systems, data exchange and access to external services (Web services).

- interaction with employers, who receive payment and reporting forms and handle payments and checks;
- interaction with the other social security institutions concerned;
- interaction with the institutions responsible for taxes: data exchange and sharing and shared collection; and,
- interaction with private institutions: banks, payment services.

5. Improving the quality of information and services within social security institutions

The integration of information and services can significantly improve management and enhance the use of complementary services and functions provided by institutions and ministries. Institutions have carried out this kind of integration internally by implementing information systems based on unique registries and shared information repositories and by implementing service-oriented architecture (SOA) IT systems.

Information repositories that are shared among institutions (unique registries) help to prevent inconsistencies resulting from increasing amounts of data and reduce the cost of collecting that data. They also facilitate communication when data are updated (for example, changes in family, personal and professional circumstances).

A smaller number of solutions rely on service-oriented architecture. They include Norway's Directorate of Labour and Welfare (NAV), the UK's Department for Work and Pensions and the Vermont Agency of Human Services (US).

Norway's Directorate of Labour and Welfare conducted a large-scale project to convert its IT systems and replace the existing ones. To reduce discrepancies in operations related to service interruptions, some of the systems had to be re-used, while others were replaced.

Another challenge involved increasing the number of applications and their impact on the system's performance. This conversion was also intended to integrate the technology systems and the availability of around-the-clock services via the Internet by using the rules engine to perform the calculations and automate the management of applications via a process engine. The new system is based on a service-oriented architecture and uses an Enterprise Service Bus (ESB) enabling the integration of all the systems (16).

The challenge facing the UK's Department of Work and Pensions was the rapid implementation (in less than five years) of online services for its primary activities in order to improve the quality and effectiveness of public services. In response, a new system based on a service-oriented architecture and industry standards was developed, which reduced the complexity and cost of reusing existing systems and relevant data (19).

The state of Vermont's Agency of Human Services (US) manages a broad range of social programmes and works with the state's Agency of Transportation and Department of Taxes. To reduce the time required to implement the programmes integrating all information and services, the new systems were implemented using a service-oriented architecture. The Agency of Human Services (AHS) serves a diverse client base in a state with more than 625,000 residents. It is responsible for the agencies that provide support services for children and families, economic services, economic opportunity and aging and independent living, among others. AHS also works with other state departments, such as the tax and transportation departments. Because the state's prior information systems were approximately 30 years old, information could not be shared transparently among all departments. Without an integrated view of individual clients and families, it was difficult to determine which services and programmes families received and which they might need.

Vermont's AHS is an excellent example of how service-oriented architecture can speed the transition to integrated services, based on the objectives of ensuring the integrity of data and easy access for users (employees of the social services agencies and partners).

In addition, some countries have established interoperability frameworks and platforms specializing in social security that allow different institutions to interconnect. Take, for example, Belgium's Crossroads Bank for Social Security (24), which serves as an "integrator" for Belgian social security. This institution is at the centre of a system that exchanges data among all institutions, employers and foreign institutions and manages the receipt and routing of the data transmitted, which are coded in XML using standard schemas (XML schemas). The data exchanged involve all functions related to social security affiliation, return-to-work statements and changes in circumstances that affect beneficiaries.

The Crossroads Bank for Social Security manages a reference directory, which includes:

- for all citizens, the social security institutions in which they are registered, in what capacity and for which period(s);
- type of social security institution, based on the capacity in which they may be registered and based on the kind of data available about the insured persons; and,
- type of social security institution, the data that that institution holds and the data it is authorized to receive from other institutions in order to perform its tasks.

The Crossroads Bank for Social Security uses this reference directory:

- as a preventive measure, by allowing access to authorized data on individuals (beneficiaries) only to the institutions that process their benefits;
- to transmit data requests to the social security institution that can provide the information in question; and,
- to automatically transmit the data received to the social security institutions that may use the data in question to perform their tasks.

Every insured person is identified in the social security system by a single, common identification key and has an electronic social security card (an SIS card) containing the identification number and his or her health care status under the social insurance system.

France has developed an interoperability standard (INTEROPS) (17) for all French social protection organizations (OPS): the Central Agency of Social Security Institutions (ACOSS), which handles the collection of social security funds, the National Health Insurance Fund for Salaried Employees (CNAMTS), the National Family Allowance Fund (CNAF), the National Old-Age Insurance Fund for Salaried Employees (CNAVTS), the Central Fund of Social Agricultural Mutual Benefit Societies (CCMSA) and the Insurance Scheme for the Self-Employed (RSI).

The objectives of this standard are to:

- provide new services to insured persons as quickly as possible;
- grant accessibility to the organizations' information systems at reduced cost of management;
- ensure the long-term continuity of the exchange architecture among the organizations, based on a joint standard; and,
- ensure secure interchanges based on a standard of extended access and authorization rights.

As specified, the standard provides two modes of exchange:

- application-to-application, or exchange via Web services, which allows a client organization's application to request services from a supplier organization; and,

- portal-to-portal, in which the client organization's staff may consult a supplier organization's Web applications after identification/authentication in their local infrastructure.

INTEROPS is based on international technical standards:

- SAML, for the input of identification and authorization data into an identification vector;
- SSLV3, to secure the transport layer and ensure the integrity and confidentiality of the exchanges;
- SOAP and WS-Security for Web Service exchanges; and,
- XML, to describe interoperability agreements and the trace interchange format.

The standard as specified provides two methods of exchange:

- "by application," based on Web services, which allows a client organization's application to request services from a supplier organization;
- portal-to-portal mode, by which the client agency's staff may access the supplier organization's Web applications after identification/authentication in the local infrastructure.

While the specifications were being drawn up, a tooling project facilitating the adoption of the standard and speeding up its implementation was carried out, primarily to address the most complex technical aspects (SAML and XML signature). This produced an effective industrial software package, which many social protection bodies chose to implement the standard in their infrastructure.

In short, these initiatives have sought to improve the efficiency and effectiveness of the social security institutions' platforms via the systematic reuse of the services and information, also emphasizing the need to facilitate the implementation of new programmes and services for the public. With regard to interoperability techniques, the use of standard technologies such as XML, SOAP and Web services to integrate systems and the implementation of service-oriented architecture is relevant.

6. Implementation of international social security agreements

International social security agreements generally have a dual focus.

First, they seek to allow workers to total up their periods of activity in different countries when calculating their pension entitlement. Second, the agreements establish favourable conditions so that workers on temporary assignment in a country that has signed the agreement with the worker's country of origin may be covered by the host country's social security system without a waiting period. The agreements also provide for the payment of pensions independent of the beneficiary's country of residence and ease the formalities associated with obtaining and managing benefits. Currently, most of the agreements are bilateral, despite the trend towards multilateral agreements.

The implementation of these agreements is based on data exchange among the signatory institutions, which depend on the kind of management to be performed out (for example, a request for information on the periods worked in a country, pension application or a report

on a temporary assignment). These exchanges are generally provided for under internal social security agreements.

Example: the European multilateral agreement based on the EESSI system (Electronic Exchange of Social Security Information)

The right to social protection is one of the elements of the right to free movement of persons within the European Union. To facilitate this mobility, the European Union (EU) established an international legal framework that ensures the coordination of national social security systems for citizens of States who move to other countries.

The regulations apply to all branches of social security in the areas of health care benefits, maternity and paternity benefits, disability benefits, old-age benefits, survivors' benefits, industrial accident and occupational disease benefits, death benefits, unemployment benefits, pre-retirement benefits and family benefits. They also address special non-contributory cash benefits.

These texts allow the EU member States' institutions to exchange the information necessary to identify, evaluate, manage and control benefits, establish obligations and determine benefits for those persons covered by the regulations.

Currently, data exchanges are based on the use of paper forms that exist in all the official languages of the member States. With the new European regulation No. 883/2004 and its implementing regulation No. 987/2009, the European Union decided to:

- simplify the regulations; and,
- abolish paper exchanges among member States.

As a result of the latter, all EU member States must adapt their information systems so that they can send and receive electronic messages by 2014.

The European project implementing this system is the EESSI Project (Electronic Exchange of Social Security Information).

Its purpose is thus to strengthen enhance citizens' rights by computerizing the application of European legislation on social security coordination. Computerized exchanges will:

- facilitate and speed the decision-making process for calculating and paying social security benefits;
- increase the efficiency of data verification;
- provide a more flexible and user-friendly interface among the different systems; and,
- make it possible to collect accurate statistical data regarding European exchanges.

All information previously exchanged via the hundred-odd EU forms on paper (which total nearly 2,000 if the different language versions are added up) must be processed electronically by 2014.

The system includes:

- a common European architecture, developed and funded by the European Commission;
- a network of national access points (France has retained the single point-of-access principle, while other countries have several) that communicate via a central node supporting various services (including directories and routing);

- a national-level architecture and operation to be established and funded by each member State;
- a definition of the data to be exchanged in each of the social security sectors covered by the agreement;
- the notion of a data "transport" system among the partner institutions - structured electronic documents (SED)

All French institutions and organizations (approximately 1,500) involved in one or several of these aspects are thus directly involved.

The multilateral MERCOSUR agreement (Argentina, Brazil, Paraguay and Uruguay) is based on the International Agreements System in Social Security (SIACI) (18).

This system manages part of the pension application process, which is governed by a multilateral agreement. It enables individuals to handle the formalities in their country of residence and communicate (electronically) with the social security institutions in the countries where they worked to obtain the information required to process their application.

The system's functions are organized into five modules:

- management applications;
- data transmission among institutions;
- digital signature of the information and its validation;
- record of operations ("traceability"); and,
- reports of operations performed.

The SIACI architecture corresponds to a "federation" model for participating institutions, based on their information systems, and structures the exchange of essential data. The distributed-federative model makes it possible to comply with each institution's information privacy standards and to use existing systems.

Information is exchanged in XML packets and communications are based on Web services. Beneficiary identification is managed by each country's institutions and SIACI establishes the connections among them. Users digitally sign the information transmitted, using external systems with processing capability (tokens or smart cards).

In summary, the implementation of international agreements is based primarily on data-exchange mechanisms, which must be authenticated by signature. It also required maintaining an operations journal to ensure the transparency and traceability of transactions.

The interoperability technologies are implemented primarily based on data formatting standards (XML) and system interconnection (Web services) in the versions that allow the inclusion of electronic signatures and data encryption (WS-Security).

7. Conclusions

All these experiences address a wide range of concerns and, by their very diversity, make it possible to improve performance and the adequacy of social security organizations' responses to the challenges of the modern world.

Several elements stand out and cover complementary themes:

- **Organizational:** the proper "identification" of beneficiaries, which facilitates exchanges and sharing of information among many public and private institutions.
- **Technical:** system interoperability, which allows data to be transmitted among heterogeneous information systems.
- **Technological:** use of Soap/WS and other technologies in increasingly open systems, now possible thanks to the maturity of solutions offered by IT service providers.
- **Legal:** a explicit, clear contractual framework for exchanges and sharing among different institutions.
- **Civil liberties:** to address "Big Brother" concerns (as described by George Orwell in his futuristic novel, "1984"), the authorities responsible for the protection of basic liberties and privacy frequently ensure that the systems implemented comply with those protections.

In any event, all the solutions described in this report point have a common purpose and work in the interest of the citizens in those countries and the social policies implemented there:

- to strengthen "governance" by improving decision support for the development of public policy measures and the evaluation of their impacts;
- to enable the development of appropriate services for:
 - citizens: thoughtful approaches in connection with major life events (including births, changes in personal or professional circumstances and death);
 - economic actors (employers) and the social security systems' partners (doctors);
- to significantly improve overall risk management and strengthen anti-fraud efforts:
 - prevent duplicate payments and the growth of benefit fraud, which often cause serious harm to the populations' common interests.

8. References

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