

E.4.5. Sustainability of Initiatives

A retrospective of project experiences shows that continuity and sustainability of information systems projects continue to be a major problem in the Region. A common observation is that externally funded projects frequently collapse upon funding termination, and this fact demonstrates that all projects need justification in terms of cost-benefit and long-term financial sustainability besides organizational capacity to develop and implement information systems. This further indicates that spreading the financial risk across several stakeholders may be appropriate, as cost-sharing increases overall awareness, utilization, and long-term potential for success.

E.4.5.1. Technological Infrastructure

Investment in information systems and technology must be linked to the right strategy to achieve long-term benefits. Greater value and longer life cycles of application products can be achieved in information systems projects when effort is directed to technology-independent development of common information functions, data standards, and data manipulation methods established across all applications.

E.4.5.2. Systems Specification Issues

A major problem in systems specification refers to persistent ambiguity in objectives and functions wanted — health sector applications may reflect the chronic problems of the sector: lack of agreement on priorities, lack of a coordinated approach to problem solving, poor definition of contents of care, and lack of definition of minimum data sets to support decision-making. Failing to resolve ambiguity in application development represents a serious risk and may surface as organizational conflicts, low usability, and inappropriateness.

A shared mission statement, robust requirements process, peer reviews of critical specifications, and user involvement in the design process will go a long way to prevent future problems. Given today's rapid and often unpredictable changes in the economics of health, in the organization and strategies of health services, the growing competitiveness among healthcare providers, and the changing of information requirements, health organizations must realistically expect that their information systems will be changing accordingly.

An appropriate systems specification process addresses the logical requirements of systems and avoids the temptation of technology-driven or imposed development solutions. The objective is to detach issues related to the physical implementation of an informatics solution, with its questions of software and hardware platform options, functional access, and actual application development, from the more permanent logical "knowledge" assets, represented by information structures standardized at a higher level of the systems architecture.

The aim of the model is to separate long-term knowledge assets from the implementation environment-associated short-term technological assets, particular procedures, hardware, and code-related issues. This will leave room for autonomy regarding physical systems development, implementation, and adaptation to user needs. The idea, therefore, is to be able to carry the knowledge-sharing assets of systems specification across different generations of systems without suffering from losses due to technology-induced innovations, for instance, the introduction of a new database management platform or operating system, and to avoid being caught in a short-term reactive behavior dictated by the "*du jour*" technological option.

E.4.5.3. Promoting the Use of Common Specification Standards

When designing health applications the aim should be to promote the utilization of an agreed common set of functional and data content specifications standards defined for the whole health sector at a national or even international level, as has been the case in the European Union. It involves the definition of the characteristics of systems application modules, functionalities desired, and the selection of core data elements in the context of an integrated, scalable, and platform-independent logical solution.

Appropriateness of the technology, cultural and language issues, models of healthcare institutional organization and delivery, acceptance, and systems cost-benefit are major concerns of developers and users. They all play a fundamental part in the selection, form of implementation, and operation of informatics applications.

Use of common specification standards will enable health application developers to draw on a pool of common knowledge and avoid redundant or repetitive developments. Such specifications will help the exchange of data across different providers, financing agents, and governmental agencies. They will further assist systems professionals to focus on any particular area of application using a general framework that will ensure consistency across different applications — this is especially valuable for the drive toward corporate approaches to management and integration of information systems and longer application life cycles.

By providing consistent specifications for all application areas, common systems standards also will leave developers and users free to concentrate on the issues that are particular to each implementation environment, such as local priorities and organizational structures.

E.4.5.4. Access to Technology

A significant issue in Latin America and the Caribbean continues to be access to technology and the availability, level, quality, and cost of telecommunication services. The technology infrastructure is generally poor compared to other regions. The human and organizational resources and capabilities and the level of technological development of providers and consumers vary widely among different countries. In most places only few computers or old generation equipment are available to direct patient care users, and generally most health professionals lack basic computer knowledge.

Frequently, there is an obsolete telecommunications infrastructure with low coverage as well as poor quality of communication lines. Although monopolies are gradually disappearing, or being significantly reduced, many countries still have a monopolistic telecommunications market with regulations and tariff structures that inhibit the utilization of the type of services that are required by health and healthcare telecommunications applications.

Only in a small number of countries and, even in those, in only limited geographical areas is the telecommunications infrastructure capable of supporting cost-effective broad-band applications. In most healthcare sites only few computers or old generation equipment is available to direct patient care professionals and, throughout the health sector, there is poor knowledge of the potentialities of computers. Most health information implementations found in the health sector in Latin America and the Caribbean correspond to applications directed towards the automation of the “back-office” and a limited number of “front-office” functions.

The information infrastructure of Latin America and the Caribbean is poorly developed and ranks just above that of Africa and some Eastern European countries but, although information technology expenditures in Latin America and the Caribbean represent only about 5% of the world total (Figure 5), the growth of information technology in the region has been consistently the world's highest since 1985 (Figure 6).

Figure 7 shows the ranking of five regions (North America, Latin America and the Caribbean, Western Europe, Eastern Europe/Middle East/Africa, and Asia/Pacific) regarding the Information Society Index (ISI), which considers the information infrastructure as developed by World Times, Inc. and the International Data Corporation, and the Expenditures in Information Technology as percentage of the Gross Domestic Product (IT\$/GDP).

Major problems to be dealt with relate to the disparity among Latin America and Caribbean countries regarding technological infrastructure, investment capability, and consistency of political support to ensure continuity of projects and adequate flow of resources to purchase and maintain relatively expensive capital equipment, products, and services. The design and deployment of information systems is complicated by the complexity and variety of objectives, functions, and technical contents of the health systems as they necessarily must be aligned to the institutional goals.

Figure 5. Information Technology Expenditures, Gross Domestic Product and Population as Percentage for Five World Regions (source: International Data Corporation, 1996)

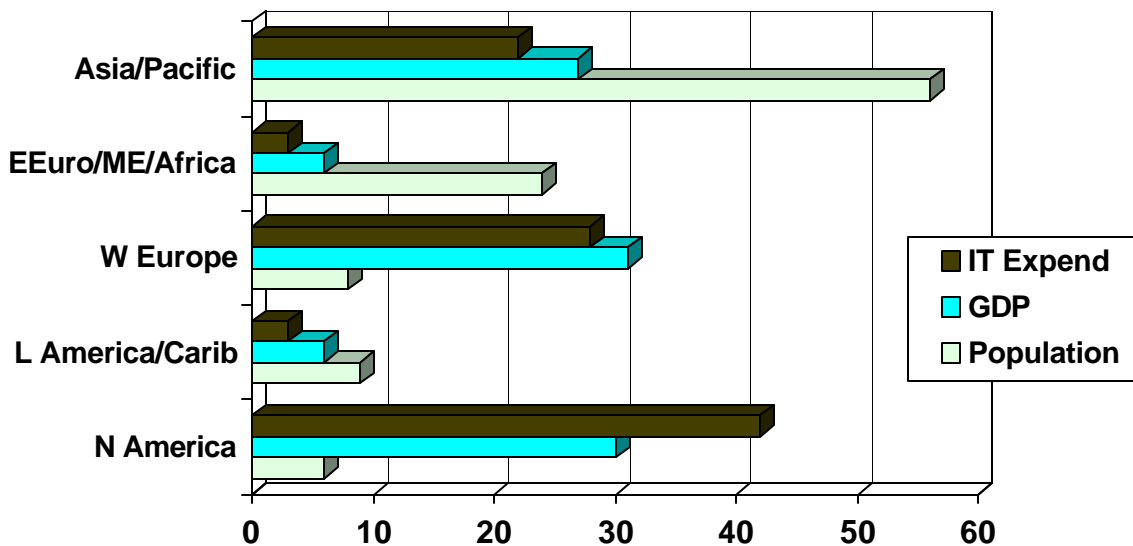


Figure 6. Information Technology Growth 1985-1995 and 1995-2000 (source: International Data Corporation, 1996)

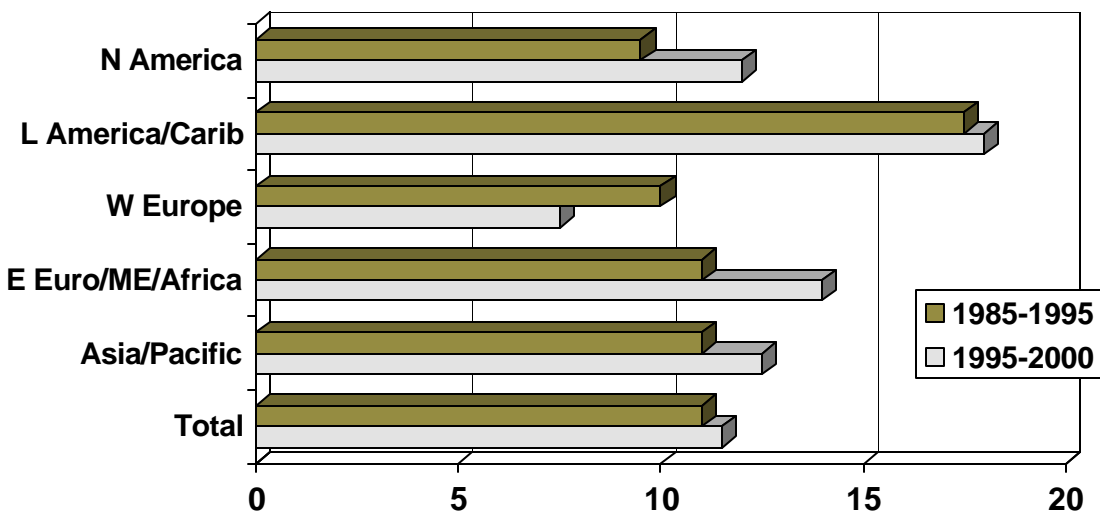
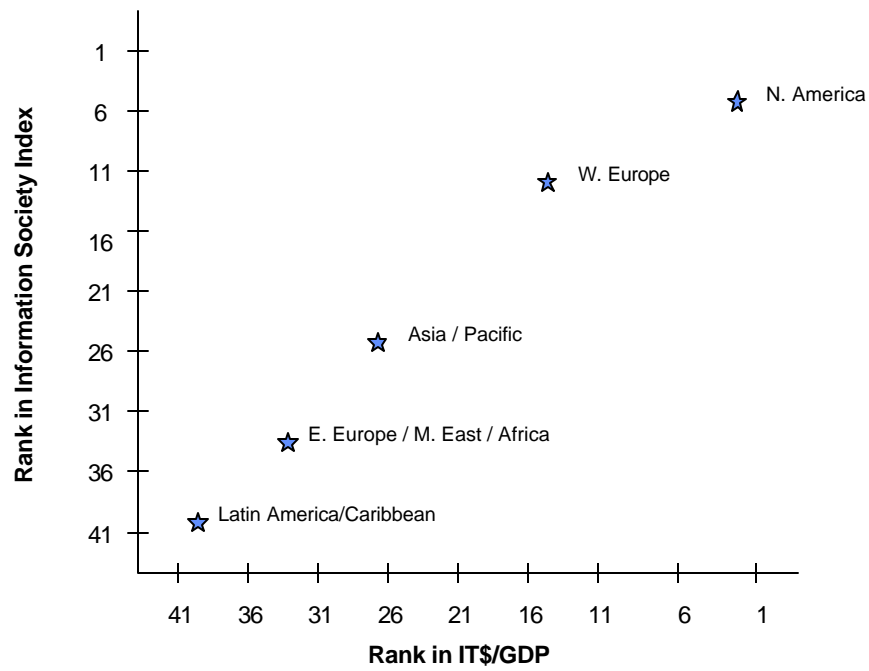
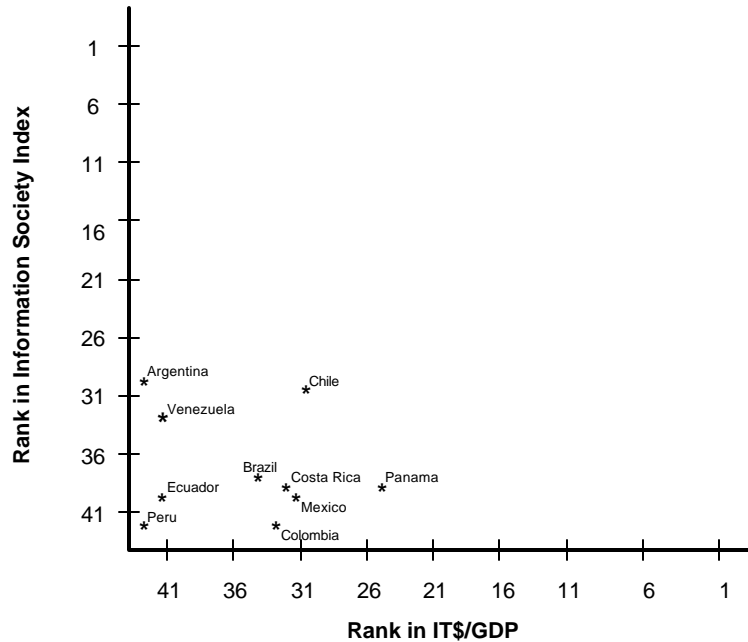


Figure 7. Information Society Index and IT Expenditure/GDP Ranking for World Regions and for Selected Latin American Countries



SOURCE: International Data Corporation, 1996



SOURCE: International Data Corporation, 1996

Many Ministries have embarked on the computerization of their services, aiming at providing better information for management and service delivery. Most of the initiatives have been centralized in health information units, but there is a growing tendency towards decentralization. However, systems rarely have been implemented at the level of primary or community care centers. These systems have positively impacted on the timeliness and accuracy in retrieving data and information about service utilization, patient flow, resource utilization, disease surveillance, morbidity and mortality patterns, and in the operation of healthcare and ancillary services. In the Eastern Caribbean a major project funded by the Inter American Development Bank was initiated in 1995 with the objective of deploying community health services information systems, but its impact is still to be evaluated.

Countries with on-going information systems projects of significance which consider a broader scope of information utilization include: Argentina, Chile, Uruguay, Brazil, Bolivia, Venezuela, Colombia, Barbados, Belize, Grenada, St. Vincent and the Grenadines, St. Lucia, Dominica, Jamaica, Cuba, Panama, Guatemala, Costa Rica, and Mexico. In Costa Rica, Chile, Brazil, and Mexico important telecommunications-based projects have been recently initiated.

In the past three years there has been a brisk growth of the Internet connectivity in the Latin America and the Caribbean, as measured by the number of hosts (164,051 by January 1997) registered under the corresponding geographic domain. Although the numbers do not reflect the real total number of hosts in each country, because organizational domain hosts were not included in the above figure, they demonstrate the growing number of hosts in every country.

An analysis of the distribution of Internet hosts exhibits wide variation, which becomes more evident when one considers the corresponding country population — the number of inhabitants per host being a good indicator of the penetration of Internet-related technologies in Latin American and Caribbean Region (Table 9). The number of telephone lines per 100 inhabitants is still low (average 11.69 lines per 100 persons) when, for example, compared to the U.S. (57.4 per 100 persons) or Canada (59.2 per 100 persons). The same is valid for television and radio receivers for 1,000 inhabitants. Increased connectivity and access to the Internet will require major expansion of the telecommunications infrastructure in nearly all countries.

Table 9. Geographic Internet Domain Hosts, Telephone Lines, and Television and Radio Receivers in Selected Latin American and Caribbean Countries Ranked by Population/Host Index

COUNTRIES	POPULATION x 1,000	REGISTERED HOSTS	% TOTAL	POPULATION PER HOST	TELEPHONES PER 100 PERS	TV RECEIVERS PER 1,000 PERS	RADIO RECEIVERS PER 1,000 PERS
ANTIGUA	66	169	0.103	47	28.9	356	417
CHILE	14,641	15,885	9.683	922	11.0	210	344
COSTA RICA	3,575	3,491	2.128	1,024	11.1	141	258
DOMINICA	71	55	0.034	1,291	19.1	72	587
BAHAMAS	284	195	0.119	1,456	30.3	225	592
URUGUAY	3,221	1,823	1.111	1,767	16.8	166	232
BRAZIL	167,046	77,148	47.027	2,165	7.5	208	386
ARGENTINA	35,405	12,688	7.734	2,790	12.3	221	683
MEXICO	97,245	29,840	18.189	3,259	8.8	149	255
DOMINICAN REPUBLIC	8,098	2,301	1.403	3,519	7.4	87	171
PANAMA	2,722	751	0.458	3,625	10.2	167	224
COLOMBIA	36,200	9,054	5.519	3,998	11.3	117	177
PERU	24,691	5,192	3.165	4,756	2.9	98	254
ST LUCIA	146	21	0.013	6,952	15.4	190	759
NICARAGUA	4,731	531	0.324	8,910	1.7	66	262
VENEZUELA	22,777	2,417	1.473	9,424	9.9	163	448
TRINIDAD & TOBAGO	1,335	141	0.086	9,468	15.0	316	494
JAMAICA	2,483	249	0.152	9,972	10.6	134	421
BARBADOS	264	21	0.013	12,571	31.8	280	876
HONDURAS	5,981	408	0.249	14,659	2.1	73	387
GUYANA	854	52	0.032	16,423	5.1	40	493
BOLIVIA	7,774	430	0.262	18,079	3.0	103	613
ECUADOR	11,937	590	0.360	20,232	5.3	85	318
ST KITTS & NEVIS	41	2	0.001	20,500	29.6	206	648
PARAGUAY	5,220	187	0.114	27,914	3.1	52	66
GUATEMALA	11,241	274	0.167	41,026	2.3	82	171
EL SALVADOR	6,027	132	0.080	45,659	3.2	93	413
SURINAME	432	4	0.002	108,000	11.6	132	639
	474,508	164,051	100	2,892 (a)	11.69 (a)	151.14 (a)	413.86 (a)

- Internet Hosts represents the number of hosts registered under geographic domains and does not include hosts registered in organizational domains (.com, .org, .net, etc.). Data for January 1997.
 - Data for telephone lines are for 1993
 - Data for television and radio receivers are for 1992
- (a) Average values

Sources: Organization of American States RedHUCyT Project United Nations 1995 Statistical Yearbook (40th Edition)