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THE IMPACT OF THE INFORMATION ECONOMY IN THE PUBLIC SECTOR

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The Impact of the Information Economy in the Public Sector

ABSTRACT

This paper seeks to give a comprehensive understanding of the public services delivery process over the Internet, verifying how efficient this new interaction channel between governments and citizens is. To achieve this purpose, a bibliographic review is made about Information Economy, Electronic Government and Internet. This paper also seeks to contribute to the transparency process of government programs through the use of the Internet as a public and governmental interest information deployer. The analysis is based on secondary sources available at governments' web sites. As a result of the assembled information, it might be concluded that the use of the Internet as a public services delivery system is in real evolution in Brazil and other countries' governments. On the other hand, it also warns of the amount of work still needed to be done in order to provide high quality public services over the Internet to the citizens.

The Impact of the Information Economy in the Public Sector

Table of Contents

1	Introduction.....	4
2	The Information Economy and the Internet.....	5
	2.1 From the Atoms to the Bits.....	6
	2.2 Convergence of Technologies.....	7
	2.3 The Information Economy.....	9
	2.4 The Internet.....	10
	2.5 Understanding the Information Economy	13
	2.5.1 The General Theory of Connectivity	13
	2.5.2 The Tendency to Free of Charge	14
	2.5.3 Valuing Time and Content	17
	2.5.4 Consumer with Power.....	20
	2.5.5 The E-Commerce in the Center of the New Wave of Prosperity	21
	2.5.5.1 Defining New Models of Business	22
	2.6 Considerations	23
3	Electronic Government	24
	3.1 Defining the Electronic Government	25
	3.2 The use of Information Technology in the Public Sector	26
	3.3 Changes that are Happening	27
	3.4 Considerations	32
4	Lessons Learned	33
5	Conclusions	39
	Bibliographic References	43
	Addresses of Sites for Researched Governments	47

The Impact of the Information Economy in the Public Sector

1. Introduction

The world economy has been going through a great transformation in the last years. The combination of computer and telecommunication technologies and its planetary dissemination are the principal causes of this phenomenon. The changes that occurred in the present economic situation due to the impact of these factors is denominated The Information Economy.

The Information Economy is changing the environment where companies, governments and communities interact. It is changing, basically, the way these people receive, treat and store information. In this new environment, speed, flexibility and innovation are words of command.

The companies are the first ones affected by these changes, when the sudden entrance in their market of a new and aggressive competitor surprises them attending better and faster their clientele, using an environment of virtual business. As a consequence of this digital way of work, the citizens start pressuring the governments for public services similar in quality to the ones they find in the private market.

This paper focuses on the transformation that public services are going through all over the world with the arrival of the Information Economy. In particular, it analyses the new public services that are available to the citizen and the changes the governments are promoting to incorporate the technology of information into the new digital services.

With the confirmation that this new economic configuration is here to stay, the focus question of this paper is: how can governments take advantage of the global network of dissemination of information to offer public services of better quality?

The Impact of the Information Economy in the Public Sector

In answer to this question there is a hypothesis of an increasing availability, at all levels of government, of the services and important information for the citizens through the Internet.

As a result, the public administration is also going through a series of transformations that bring the adequate support to provide these services. A new question arises: what main changes are happening in the governments provoked by this new environment?

Thus, this research aims to answer the two questions mentioned above. The data collection necessary to achieve the objective of the paper used the following methodology: literature review – about topics such as the economy in the public sector, the reform of the state, the electronic government and the network society; collection of primary data – documents which, searching on the Internet, would describe the strategy of the governments in this new scenario; visit to the main *sites* and consulting specialized literature.

2. The Information Economy and the Internet

The present chapter discusses the determining factors of the Information Economy, with the objective to give support to the study of digital public services. To do so, it presents a bibliographic review of the determining factors of this new economic environment and of its best-known product: the Internet.

The Internet is rapidly changing the way we live, work and buy, in all sectors of the economy. It makes it possible for anyone, a student, a researcher or another citizen to have access to information that was only available for those who would go personally to libraries or government agencies.

The Impact of the Information Economy in the Public Sector

People, all over the world, can obtain a huge variety of products and services any time, day or night, from home, the office or even a kiosk in a shopping center. Companies of any size can relate directly to their suppliers, employees and clients to offer better products and services at a lower cost. All this generates a flux of financial resources that changes hands at the speed of light through satellite channels and optical fibers, and it feeds the so-called Information Economy.

2.1 From the Atoms to the Bits

Since Nicholas Negroponte wrote, in 1995, the book *The Digital Life*, people began to perceive that something very important was going to happen and would strongly influence our lives. Negroponte was one of the first to recognize that the traditional economy, based on the manufacturing and the transportation of material goods (atoms), was about to confront an aggressive competitor: the production and transportation of untouchable goods (bits).

According to him:

“The world commerce traditionally consisted of exchange of atoms. When we go through customs, we declare our atoms, and not our bits. Even the music recorded by the digital process is distributed in plastic CDs, adding huge costs in packing, shipping and storing. This is all changing rapidly. The regular movement, in the shape of pieces of plastic, recorded music, as well as the slow human handling of most part of the information, in the shape of books, magazines, newspapers and video tapes, is about to be transformed in instant and cheap transfer of electronic data moving at the speed of light. In this shape the information can be available to everyone. Thomas Jefferson left us the concept of public libraries and the right to consult a book free of charge. However, this great ancestor had never considered the possibility

The Impact of the Information Economy in the Public Sector

of 20 million people having electronic access to a digital library, being able to take the needed material without any cost. The change of atoms to bits is unavoidable and it is impossible to stop it.”

Eight years after this analysis, we came to the conclusion that Negromonte was partially correct. It is true that the tangible products are suffering the competition of this new virtual market, specifically the sectors of knowledge that are more easily available electronically, such as the written information and music; nevertheless, we are aware that this new way of exchanging information and services has pushed and increased enormously the market of the same tangible products. A small furniture manufacturer in the interior of Brazil, for example, can, using the Internet, increase his market beyond his area of traditional influence – some near cities, reach the whole country and even abroad, if he has a site of electronic commerce translated in two or three idioms.

2.2 Convergence of Technologies

But how did all this start? What was the foundation for this true revolution?

Integration is the key word to answer these questions. The technological development of telecommunication, from analogical to digital, and of computing, with the increase in the processing power, miniaturization and price reduction, made it possible to integrate computers among themselves through networks connected by means of communication and, of these networks among themselves, or in other words, the Internet.

Figure 1 shows the convergence of computing, of communication and digital information centered in the Internet. This model of convergence in three points derives from the massive

The Impact of the Information Economy in the Public Sector

information digitalization starting with the appearance of personal computers and from of the means of communication digitalization. Built in the PCs popularization, the Internet combines the advantages of e-mail with the web in one platform of services.

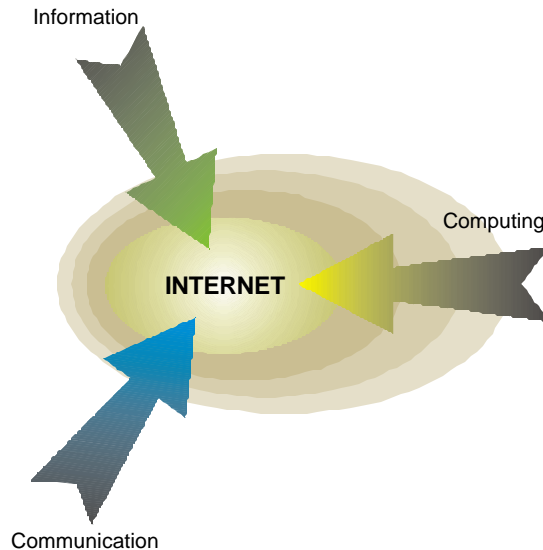


Figure 1 – Modeling the Information Economy.

Source: www.commerce.gov

According to Tapscott (1997, p.8), the economy in the network intelligence era is the Information Economy. In the industrial economy, the flux of information was material: money, checks, invoices, knowledge of cargo, reports, face to face meetings, analogical telephone calls, maps, photography and advertising by direct mail.

In the Information Economy, this information, in all its aspects, tends to become digital – reduced to bits stored in computers and traveling in networks at light speed. Using this binary code of computers, the information and the communication are transformed in digital zeros and ones. The new world of possibilities created is so significant that its impact on humanity is being compared to the great inventions like the wheel or the writing system.

The Impact of the Information Economy in the Public Sector

2.3 The Information Economy

Castells (1999, p.87) claims that a new economy emerged on a global scale in the last two decades. He calls it informational and global, to identify its fundamental and differentiated characteristics, and to emphasize its interrelatedness. Informational, because the productivity and competition of its units and agents in this economy depend basically on its capacity to generate, process and apply in an efficient way the information based in knowledge. Global, because the main productive activities, the consumption and the circulation, as well as its components (funds, work, raw material, administration, information, technology and markets) are organized on a global scale, directly or by means of a network of connections among economical agents. Informational and global because, under new historical conditions, the productivity is generated and the competition is done in a global network of interactions. This emerged in the last quarter of the XX century because the Information Technology revolution provided the essential basis for this new economy. For him, it is the historic connection, between the basis of information/economy knowledge, its global range and the Revolution of Information Technology, which creates a new and distinct economic system.

Castells (1999) believes that the Information Economy is also an economy of knowledge. Information and knowledge have always been crucial elements in the growth of economy, and the evolution of technology facilitated greatly the productive capacity of society and the standards of life, as well as the social patterns of economic organization. The emergency of a new technological paradigm, organized around new and more flexible and powerful information technologies, makes it possible for the information itself to become the product of the productive process. For him, the products of the new information technology industries are mechanisms for the information processing or the processing of information itself. By transforming the ways of this processing, these new technologies act upon all domains of human activity and allow the

The Impact of the Information Economy in the Public Sector

establishment of innumerable connections among these different domains, and among the elements and agents of such activities. An economy in a strongly and interdependent network emerges and becomes each time more able to apply its progress in technology, knowledge and administration to its own technology, knowledge and administration. It is a virtuous circle, which leads to more productivity and efficiency, taking into consideration that organizational and institutional transformations may occur.

2.4 The Internet

The Internet can be classified (Cronin apud Soares, 1998), as a whole, as a collection of network of computers connected ones to the others at a worldwide level. The Internet connects any kind of computer, from mainframes to portable devices, through common telephone lines, private communication lines, underwater cables, satellite channels and several other means of communication. The information contained in texts, sounds and images travels in high speed between computers connected to this network.

For Castells (1999, p.369), the Internet is the spine of the global communication mediated by computers (CMC) of the 90s, since it connects gradually most of the networks.

According to Ruthfield (1999), the Internet was created in 1969, developed by the Defense Department of the United States, under the name of *Arpanet*, with the aim to provide the country with communication among the military units even in case of a nuclear war. The network was designed to work even if there was an interruption of some communication channels, searching for alternative ways to send the information. In addition, the network offers an internal mechanism of load balancing which allows deviating, to channels less loaded, the transit of the more requested channels, guaranteeing the delivery of data.

The Impact of the Information Economy in the Public Sector

In the beginning, the Internet offered four basic services; remote access (Telnet), transfer of files (FTP), email and news board. To develop the technology, the Department of Defense hired the Universities of California in Los Angeles (UCLA) and in Santa Barbara (UCSB), the University of Stanford and the University of Utah, which set up the first network connections.

Since it was created in the university environment to promote research and educational activities, the access to the network was free of charge. This concept of a free public network pushed forward the culture created around it. The students and professors used the network to exchange information, share softwares and to debate and discuss projects.

During the 70s, other academic organizations, in the whole world, started to create networks similar to *Arpanet*, using the same *software* available in the United States.

The military noticed that they needed to create a safer network than the experimental *Arpanet*. They wanted to have their own telecommunication security system and maintain the connections with the public network. To do so, a project of interconnection of networks – in English, internetting – was initiated to connect these networks. Then the word Internet emerged.

A protocol – the standard language of data communication – to interconnect the networks (internet protocol – IP) was developed to work with the original transmission control protocol (TCP) of *Arpanet*. This combination of transmission control and interconnection protocols, whose abbreviation is TCP/IP, became the world standard protocol among computers. The main benefit of the standard TCP/IP is that it can be used by any kind of computer running any operating system. If the intention is to spread information inside or outside the organization, this pattern can be used with free choice of equipments and softwares suppliers.

The Impact of the Information Economy in the Public Sector

Although since 1987 the Internet has been available to commercial use, its explosion came only in 1991, with the introduction of the World Wide Web (WWW or Web) which allows the combination of words, sounds and images (multimedia) and the information linkage through hypertext.

In Brazil, the first connections with the Internet were made in 1988 through FAPESP – Foundation of Support to Research of the state of São Paulo and LNCC – National Laboratory of Scientific Computer Science, Rio de Janeiro. In 1992, the RNP – National Research Network - was established, connecting universities and research centers all over the country. In August 1995, the commercial access started being offered by some internet service providers - ISP. The explosion of the Internet access in Brazil started in 1996.

For Leer (2000, p.27), one of the main explanation to the Internet worldwide quick expansion was the means of communication billing system adopted. At the price of local phone calls, the Internet allows people to have access to information and communication with other people in the whole world. This inventive way to share and even to subsidize the high costs of international communication made the quantity of network users to increase a lot. Other key factors to this growth were:

- a) the possibility to connect networks of different technologies;
- b) the creation of a world pattern of email;
- c) the use of standard protocols of public dominium;
- d) the growing acceptance by the commercial sector and society;
- e) the two-way communication, where the participants are, at the same time, consumers and generators of information;
- f) the possibility of using the existing computerized systems.

The Impact of the Information Economy in the Public Sector

The Internet provides different manners to access information. Among the most utilized are the e-mail and the *World Wide Web (WWW)*.

2.5 Understanding the Information Economy

After knowing this new reality, we should investigate the reasons for these changes.

Why did people start to use computers to communicate, if the telephone existed, the fax and even the mail? What was the reason to use the computer to obtain goods and services, in spite of today's huge and attractive shopping centers?

2.5.1 The General Theory of Connectivity

The first explanation is given by the General Theory of Connectivity (Kelly, 1999,p.36), based on the principle that the value of a network grows exponentially with its expansion. Let's take as an example a fax machine. If it is the only one in the world, and there is not another one similar for communication, it will not be of any value. However, if the first one is connected to the second, both will have more value. Adding millions of fax machines to the network, like we have today, this network becomes something valuable. This is the law of increasing return of investment with the expansion of use.

The Impact of the Information Economy in the Public Sector

2.5.2 The Tendency to Free of Charge

Kelly (1999, p.68) shares the same opinion and goes further in the analysis, approaching the tendency of goods, which can be copied and become free of charge. Almost from the beginning, in 1971, the microprocessors suffered a process of evidently contrary prices. The more powerful, the cheaper the chip becomes. The dive of chip prices is called Moore's Law, in honor to Gordon Moore, engineer of Intel, who was the first to notice the outstanding and systematic increase in computers processing capacity per dollar. The Moore's Law stands that the prices of the computer chips drop to half or that its capacity doubles every 18 months (Figure 2). Now, the area of telecommunication is suffering a dive similar to the micro processed chips – although in a more drastic way. The curve in the network is called Gilder's Law, in honor to George Gilder, a radical techno theoretician who estimates for the foreseeable future (in the next 10 years) that the total communication systems bandwidth will triple every 12 months.

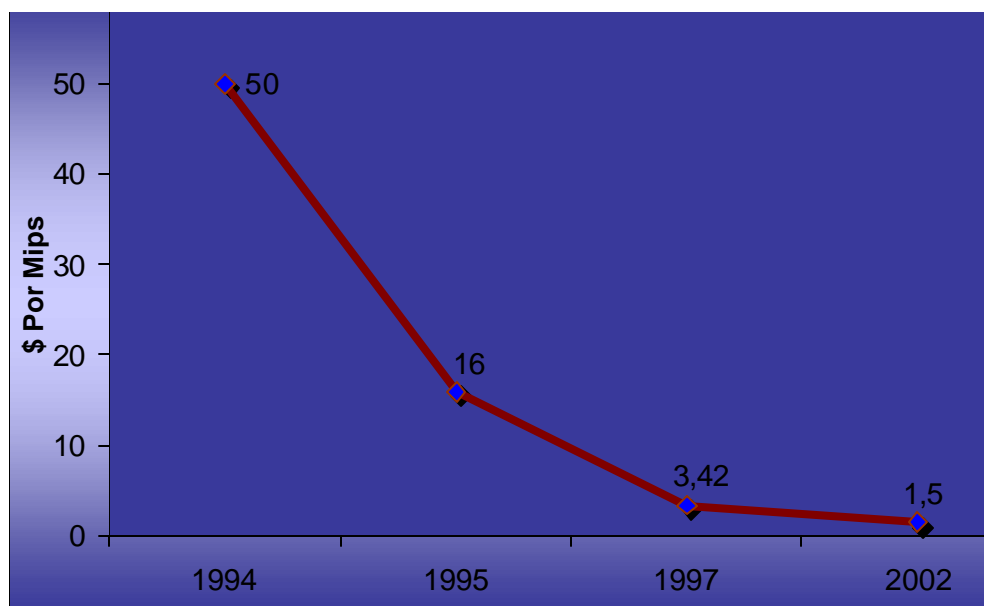


Figure 2 – Microprocessors Prices Fall Down

Source: Intel – www.intel.com

The Impact of the Information Economy in the Public Sector

The association of the growing communication capacity, with the continuous reduction of prices, makes Gilder talk about the imminence of bandwidth gratuity. What he wants to say is that the price for bit transmitted is falling down to become free of charge (Figure 3). What he does not want to say is that the telecommunication bills will fall down to zero. The payments for telecommunication should stay stable in dollars/month as we consume more bits and accordingly when their cost falls down.

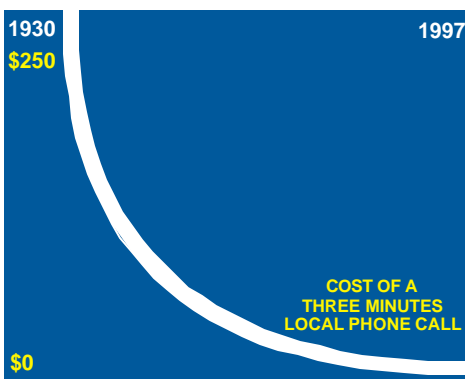


Figure 3 – Tendency to free of charge in local phone calls

Source: Kelly (1999, p.71)

The bit transmission cost falls so much, however, that its unitary value for the consumer is close to zero. This cost follows the so-called asymptotic curve. In an asymptotic curve, the line approaches the X axis although it never reaches it.

For Kelly (1999,p70), in the Information Economy, chips and bandwidth are not the only things relevant to the asymptotic gratis. The processing is also. The cost of computing – according to the millions of calculi by second in dollar – also tends to be free of charge. The cost of transaction also plunge in the direction of being free of charge. The information itself follows in the same direction. Quotations of stocks in real time, for example, one day were information reserved and sold at very high prices.

The Impact of the Information Economy in the Public Sector

It would be possible to argue that this frightening dynamics works only in the area of software, since the marginal cost of an additional copy is already close to zero (now that the software can be distributed on-line). But “follow the free of charge” is a universal law. The hardware, also, when integrated in network, follows this law. Cellular phones are offered for free to enable the selling of telephone services. For the same reasons, we can expect the free distribution of satellite dishes antennas. This principle applies to any object whose decreasing cost of the replica is surpassed by the advantages of being plugged.

Certainly, all items, tangibles or intangibles that can be copied, obey the law of the inversion of prices, as supported by Moore & Guilder (apud Kelly, 1999), and they become cheaper as they are improved.

The frontiers of the telephony continue in expansion. When the telephone was invented, there was uproar in relation to the new invention and how it would be beneficial in commercial terms. Some thought the telephone would be used to transmit music to homes. However, even the most ambitious of the exhibitionists would not think of having five telephone lines at home, like many people have nowadays. One for voice, one for fax, two for the Internet and another one for the security system. Moreover, there are the integrated services of messages, internal extension lines, call identifier, call blocker and personal numbers. The old telephone service, plain and simple, soon will be practically free. But once the clients use this service practically free of charge, they soon add optional and sophisticated services. The desire to have a telephone in the car and a call identifier was created, indirectly, by the technology itself.

Technology creates an opportunity for demand, and afterwards provides it.

The Impact of the Information Economy in the Public Sector

This argumentation makes us understand the reason we have free access providers in Brazil and even microcomputers distributed free in the United States, as long as the user uses exclusively the services of the company that makes the offer. It is clear that the intention is to create demand, generate flux so that with the entrance of more and more participants, the marginal return of the investment starts to appear.

2.5.3 Valuing Time and Content

To complement the answers to questions raised in the beginning of section 2.4, we see that the actual resources are not efficient enough to satisfy people's desire in two aspects: 1) the value of time; 2) the value of content.

As Aldrich (2000, p.27) explains, the companies should consider – and reconsider – exactly what the clients value in their products and services. Besides, they should follow closely how technology is transforming their industry, in particular.

It is true that quality and price are still important. The brand names continue to attract consumers' faithfulness and give status, however, two concepts of value – which we will call value of time and value of content – emerged as guidance each time more important in the consumers' purchasing decisions as the digital era progresses.

The first guide is time. Time has been considered the most valuable commodity that one can sell. Increasing workloads and the growing stress level experienced by many people nowadays brings more value to free time. That notion is expressed by people as a desire to do things the fastest way possible, and upon intolerance to what is considered waste of time. Add to

The Impact of the Information Economy in the Public Sector

this the tendency of technology to do things faster, and we will understand why consumers expect speed and more time saving as they buy products and services.

For Aldrich (2000, p39), the second greatest proposal in the digital era is the content. This is the second guide of this new era. In the industrial economy, in which the manufacturing activities predominated, the competitive advantage stayed with the enterprises which could manufacture products of better quality for the lowest cost possible. These products were generally designed and manufactured by methods of mass production. The manufacturers were understandingly concentrated in making a product acceptable and at low cost to the largest number of clients possible. We almost never thought of making a product which satisfied the individual needs of each consumer.

The services industry was created initially to provide basic support and maintenance services to mass manufactured products. For example, the auto repair shops started to open everywhere to serve the growing number of cars that appeared (and broke down) on the recently built roads. As time went by, it started a gradual transfer of the focus of those people who provided these services. They stopped concentrating on the needs of the products (like selling them or fixing them when they broke down) to attend the consumer's needs. As the value of time became more important for consumers, things such as, services of financial consulting, laundromats and fast-food became more popular – natural and direct consequence of the consumers' capacity to spend discretionally, of their desire of more leisure time, and of their appreciation for convenience.

In the Information Economy is fundamental to understand how these two economical elements, before considered separately as “products” and “services”, were gathered to create a kind of offer totally new. We noticed then that almost everything we can buy contains a tangible

The Impact of the Information Economy in the Public Sector

element, the wrapping (usually a material product), and an intangible element, the content (usually the information, the knowledge or the service, which accompanies and adds additional value to the package).

For example, a personal device like a PDA can be integrated in a cellular phone and have access to the Internet. Clearly, this is additional content, what makes the wrapping more valuable for the consumers. With the advent of new and sophisticated digital tools, the content of any package can now be personalized to serve the individual needs and requirements of each consumer. This simply was not feasible. Before the digital era, the generic offers were produced in quantity and towards large markets; the specialized offers were designed to smaller segments that could pay for customized products. Technology is changing this, allowing us to do what it was unimaginable before – customized products in mass.

The same way the industrial economy gradually derived from the agricultural economy, the industrial economy is opening space for the Information Economy. We can see this progress in relation to time in Figure 4, further. Let's observe the two intermediate economic stages. In the economy of services, the wealth created by people who do services, for the first time, exceeded the wealth created by manufacturing products. In the global economy, the economic, geographic and political limits became irrelevant in the exchange of goods and services.

The Impact of the Information Economy in the Public Sector

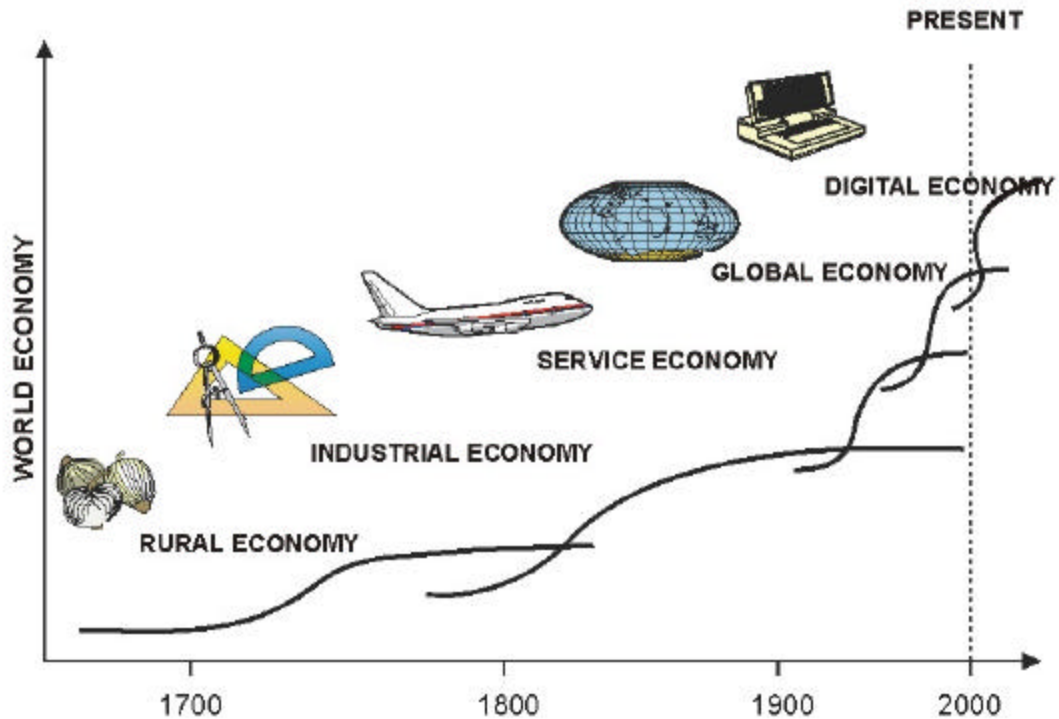


Figure 4 – Evolution of the World Economy

Source: Aldrich (2000, p.5)

As we can see, the traditional economy really allowed new ways of attending to emerge in the Information Economy, supplying the consumer with his needs not valued before: less time and less content.

2.5.4 Consumer with Power

Besides this, the Information Economy gives the consumer the power to decide better, since he now has enough information. Let's take as an example the sale of books and CDs over the Internet. When informed, on a specific web site, the product price he is looking for, the consumer can immediately search the main virtual bookstores and receive information in tables with price, delivery date and payment options of the same product. This way, he can decide where to buy, aware that he is making the best choice possible.

The Impact of the Information Economy in the Public Sector

For Kelly (1998, p.77), "The only factor that is becoming scarce in the world of abundance is human attention." According to Herbert Simon, who received the Nobel Prize of Economics, (apud Kelly, 1999, p.77): "What the information consumes is very obvious; it consumes the attention of those who receive it. This way, the wealth of information creates poverty of attention". All human beings have an absolute limit of 24 hours per day to pay attention to millions of inventions and opportunities dumped by the economy. Everything that is given for free keeps human attention, leading to the participation in the market. Exemplifying, the Internet provider, who offers free email, takes more visitors to its web site, increasing the number of people who read advertisement, which generates capital to maintain the structure to provide the Internet services.

2.5.5 The E-Commerce in the Center of the New Wave of Prosperity

However, what made the Information Economy to explode was the e-commerce. This new way to negotiate goods and services is defined as: business processes done over the Internet or through a system based on the Web. In the traditional economy, the way to negotiate goods and services is, in the majority, done in the presence of the consumer, face-to-face, or yet through electronic means like such as the telephone and the fax. With the arrival of the electronic commerce via Internet, the search for products from different suppliers is facilitated, in a shorter period of time, and the marketing area of the companies is largely increased, which becomes global. The options of payment vary besides the traditional bank deposit and credit card to transactions online between seller and buyer, increasing the safety of the transactions.

The Impact of the Information Economy in the Public Sector

Forrester Research (www.forrester.com) foresees that, in 2003, business generated by business-to-business will reach US\$ 1.3 trillion, and the business-to-consumer should represent the total of US\$ 80 billion.

2.5.5.1 Defining New Models of Business

The impact of e-commerce in the economy reaches further than the revenue obtained in this new sector. The companies are using the e-commerce to develop competitive advantages by supplying useful information, increasing the possibility of choice, developing new services, facilitating the process of buying and reducing costs.

Some companies redesigned completely their business to take advantage of the profits resulting from e-commerce productivity. A remarkable example is Cisco Systems, a technology company that not only manufactures products for the Internet, like routers, but also uses the network in all its operations. The company receives 78% of the clients' orders through its site - which is the largest in e-commerce, representing sales of US\$ 32 million per day – and attends 80% of the clients' orders via Internet.

The Internet imposes a price discipline as consumers have access to prices and products information from several different sources. This bigger market transparency demands the company to be more efficient to compete, since any mistake in prices composition will be punished with the market segment loss, not only because of the aggressiveness of the competition that now knows the parameters of each player, but also because of the consumers' choice. For those, therefore, the transparency is a powerful weapon to choose products with better cost/benefit relation.

The Impact of the Information Economy in the Public Sector

The e-commerce is doing more than simply provide alternative buying sites to real stores; it allows, above all, the expansion of existing markets, and even the creation of new markets.

Among the companies, the e-commerce allows the increase of the services offered to their business partners through the homogenous dissemination of information about their products that, previously, was done only to big clients.

Therefore, we understand that the e-commerce must continue to be the big driver of the Information Economy as more and more companies perceive the great advantages of using it to increase their sales and keep competitive in the market.

2.6 Considerations

As we saw, the Information Economy is a reality that is transforming life in the whole planet. The technology of Internet is the principal agent of change in the commerce, in the structure and in the operations of the organizations. We are watching the expansion of the frontiers of the organizations and even the appearance of more open kinds of organizations, virtual, like the new environment. All these changes have long term economic and social implications, for people and for the companies, in the shape of digital segregation; however, at the same time, it might signify a spectacular opportunity of development and generate jobs. In conclusion, we can affirm that the phenomenon of the technological convergence in the Internet will continue to be the principal factor of growth in this new scenario.

The public sector in the whole world is feeling the impact of the transformations that are occurring and is moving to answer the citizens' demands for better and faster services.

The Impact of the Information Economy in the Public Sector

3 Electronic Government

The aim of this chapter is to present the transformations the governments are going through, at all levels, with the adoption of the resources of the information technology and the Internet. The public sector will be one of the main agents of the Information Economy when using its immense buying power to obtain goods and services more efficiently, through the world network, and provide digital services, from the payment of pensions and retirement salaries to collecting taxes and electronic vote. But, for this the governments are reviewing their role, their size, their work process, the costs and, principally, the results they bring to society.

According to Drucker (1994, p.28), “the mega state this century has built has failed, morally and financially. It was not successful. However, its successor can not be a “small government” (like the so-called conservatives want). There are too many risks, in domestic as well as international terms. We need an efficient government – this is the clamor of voters in all countries.”

Tapscott (1997, p171) believes that it does not work to repair the system anymore. It is necessary a complete reinvention of the government. For him, “the governments are organizations of the industrial era, based on the same model of command and control of the company which was created for the industrial economy. The bureaucracy and the industrial economy ascended holding hands. The economy needed roads, sewers, electricity, highways and a sophisticated military apparatus. As the government grew and, with it, tax collection, there became necessary procedures, structures and more elaborated controls than those considered appropriate for an agricultural economy.”

The Impact of the Information Economy in the Public Sector

Osborne & Gaebler (1992, p.32) believe that only a total reinvention of the governments will make them reach a level of satisfaction desired by society in this new era of development.

Pereira & Spink (1999, p.32) claim “ the citizens are becoming each time more aware of what the bureaucratic public administration does not correspond to in terms of the demands that the civil society presents to the governments in the contemporary capitalism.”

An evidence emerges from the analysis of the main State reform processes implemented in the world; parallel to this new State, processes are redesigned and efficient information systems, based on computers, networks, softwares and databases, give support to the new internal processes and attend the citizens' demands for information. This is what has been called Electronic Government.

3.1 Defining the Electronic Government

According to Dorris (2000, p.3), the electronic government uses information and telecommunication technologies, integrated in networks, to provide services and information to the whole society, any time and in any place, and to receive retro feeding, in a two-way channel, strengthening democracy.

For Tapscott (1997, p.176), the notion of e-government is spreading rapidly all over the public sector, in developed countries as well as in emerging countries. E-government is a government interlinked in network. It links the new technology to old internal systems and these, in turn, link the government information infrastructure to everything that is digital and to everybody – taxpayers, suppliers, commercial clients, voters – and all the other society

The Impact of the Information Economy in the Public Sector

institutions – schools, laboratories, mass communication, hospitals, other levels of government and other nations in the whole world.

Connected in network the government can overcome barriers of time and distance, using electronic systems to offer the public better quality products, efficient in terms of cost, faster and more convenient. For this paper, we concentrated on digital public services provided over the Internet: e-services.

3.2 The Use of Information Technology in the Public Sector

Since the 70's, the public sector uses information technology to manage its internal processes. However, the application of technology was directed to the achievement and improvement of internal processes, as it also happened in the private sector; there was very little interaction with its principal clientele: the community.

These controls were developed with the use of information technology, which was able to automatize tasks, speed them and create a huge base of information, which feeds the so-called corporative systems of government. With these systems, the government can attend the internal demands of the public administration, controlling expenses with personnel and payment to suppliers, planning and budgeting expenses, enrolling students, collecting health data and taking care of issuing identification cards and driver licences.

The development of the Web created a mechanism, independent of the computerized environment used, to transfer documents, to research in large databases, to enter data and to execute programs. The government has always had difficulty in coordinating and managing information in a large variety of distinct computerized environments, such as large, medium and

The Impact of the Information Economy in the Public Sector

small size computers and different operational systems. The technology of the Internet brings only one computerized environment, where data is entered and it goes out.

3.3 Changes that are Happening

Governments all over the world, at all levels, federal, state and municipal, are in different scales of progress in the sense of the transformation for e-government. What pushes these transformations is the belief that the providing of services online will result in better services and less costs. This belief is based on statistics that show that the access to company or public institution web sites is the forth-biggest reason for people to access the Internet.

The efforts to transform the public administration, using the information technology, started in the United States, in 1993, when President Clinton launched a program called Using the Information Technology to Reinvent the Government, acting internally in the organization of the administration. In 1997, the American government created a new program called Access America, with the aim to become more efficient, open, quick and easy to access. In this program, according to Leer (2000, p.139), the American government started to put into practice the concept of virtual government and described how the information and telecommunication networks can be used to create virtual organizations that improve the information processing and the knowledge distribution, necessary to provide high quality public services. The government virtual networks provide only one point of access for the citizens to search the services of the government itself.

In 1997, the Canadian government published the final report of the Consultant Council of the Superhighway of Information, with the name Preparing Canada for a Digital World, where it

The Impact of the Information Economy in the Public Sector

specified the actions and targets to begin providing public services over the Internet. (Canada, 1997).

In parallel, The United Kingdom developed a similar program and declared the desire to become the leading nation of the Information Economy in Europe. The plan, published in 1998, outlines how the digital technologies will cause impact in the communication between the governments and the citizens.

This way, the governments from different countries are establishing goals to the availability of services and access to electronic information. The goals vary from the presence online of Canada by December 2000, from the provision of all Australian public services on the Internet by 2001 and the availability of the United Kingdom's own services by 2008. In the United States, all government agencies should offer electronic services by 2003.

According to the Organization for the Economic Cooperation and Development - OECD (1999), the United States, Canada and the United Kingdom are leading in numbers of users who access the government services, while Italy, France and Germany are starting their efforts in the same direction.

The most common way of presenting the government information has been through portals. The Netherlands, for example, has created a central point of access with a search mechanism to find government information. Other nations developed portals for interest communities, such as, the elderly, students and war veterans.

The Impact of the Information Economy in the Public Sector

The actions of the American government to create only one point of access to the public services on the Internet are described in the document Electronic Government (www.whitehouse.gov), where it is highlighted:

- a) the information should be organized by type of services or type of information, and not by government agency;
- b) the forms used in the 500 more requested public services by the public should be online by December 2000;
- c) according to the Act to eliminate papers in the government, by October 2003, all transactions with the federal government should be processed online;
- d) the use of the electronic commerce should be stimulated to make the federal government purchases faster and less expensive;
- e) the practice of protection of people's privacy should continue to be implemented through the publication of privacy policies on the web sites;
- f) citizen access to government officials should be facilitated through e-mail communication.
- g) one year study will be conducted to verify the viability of electronic voting online;
- h) the health departments, human rights, education, agriculture and social security, besides other agencies that provide assistance to the citizens, should make a selection of the main benefits and services that can be offered over the Internet with guaranteed security;
- i) the government agencies should develop privacy mechanisms and information safety, and provide the effective electronic communication among agencies and citizens;
- j) the government agencies should develop actions to enlarge their capacity to use the Internet to act in a more open, quicker and more efficient way; at least, these actions should involve:
 - the increase of the capacity of federal officials at all levels;

The Impact of the Information Economy in the Public Sector

- identification and adoption of better practices implemented by leading organizations, public and private;
- acknowledgement of the workers who suggest new or innovative uses of the Internet;
- partnership with research institutions for tests of advanced applications;
- create mechanisms to collect suggestions from the citizens about a better use of the Internet.

The managers of the American government program Digital Government, and according to the report *Some Assembly Required: Building a Digital Government for the 21st Century* (United States, 1999), have chosen eight areas of action, inherent to the internal organization of the government, which should receive special attention.

- a) integrated computerized systems, trustable and safe – the software development methodologies, currently in use, are not able to deal with the amplitude and the immense diversity of users of the government corporative systems; it is necessary to make more research to understand the potential and the limits of systems integration;
- b) methods of citizens' participation in the democratic process – the technologies of the Internet can help involving citizens in the institutions and government processes; the easy access to information, electronic voting online, instant opinion researches and other possibilities bring important questions such as, citizenship, the role of the political leadership and the limits of changes in democratic institutions.
- c) models of providing digital services to the public – with the Internet widespread among government agencies and citizens, it is possible to offer new integrated services and self-service in places, hours and ways unthinkable before; new methods of verifying the identity, security of systems and auditing will be necessary, as well as new methods of measuring costs and benefits;

The Impact of the Information Economy in the Public Sector

- d) new models of partnership with the private sector and other forms of network organizations – because of the diversity of the people involved in providing public services, the development of information systems generally requires new forms of relationships between partners at all levels of government, and between the government, the private sector and the third sector;
- e) intuitive decision support tools to government officials – technologies and patterns that allow the search, selection, analysis and sharing of information can strongly influence in the effectiveness of decision making;
- f) electronic document management – each time more information is stored in electronic means, allowing, on the one hand, quicker path and smaller physical spaces, but demanding, on the other hand, more safety in the control of versions, access and care in the preservation of public registers.
- g) better methods of information technology management – agencies CIOs must adopt the new methods of software development and maintenance, making them more integrated, flexible, efficient and less expensive; the applied research should be stimulated in the areas of process redesigning, project and contract management, models of leadership and strategies to deal with smaller IT staff;
- h) adjust the research resources to government needs – applied research, in general, it is not recognized by the academic system of values; as a consequence, the researchers, generally, do theoretical researches instead of field work; agencies do not wait for long academic researches to make decisions; research in the era of the digital Government should overcome these obstacles and make knowledge available for immediate use.

The Impact of the Information Economy in the Public Sector

These practices, which are similar in all government programs researched (United States, Canada, United Kingdom and France), are shaping the initial steps that the public sector has been taking on the way to an electronic government.

3.4 Considerations

Reforming the State and transform it in a faster and productive environment is the most important task the majority of the governments all over the world have been looking for. The new information technologies have performed a fundamental role for the governments where the transformation of the State has been successful.

Nowadays, the use of the Internet as means of communication is a reality. It can be through self-service kiosks, placed in areas of great circulation of people, or through personal computers used at work or at home, the world network reaches a considerable part of the population, especially in the developed countries. The tendency is that, in less than a decade, the Internet will become a mass communication tool in the whole planet, so or more popular than television in the XX century, helped by the miniature and mobility each time greater of the communication equipment.

As private companies exceed in providing products and services over the network, the pressure increases for the offer of digital public services as efficient as the private services available on the Internet. Therefore, the governments reinvention is being catalyzed by society demands that, through technologies available, cry for efficiency and good services, any time day or night.

The Impact of the Information Economy in the Public Sector

4. Lessons Learned

By comparing the foreign experiences, we see that the Brazilian state governments, and even the federal government, need to develop effective actions to offer better services on the Internet. We will present next some Lessons Learned during the elaboration of this paper that serve as a guide for the governments that want to make progress in this new scenario.

Organization of the Information – The Internet brings new concepts of organization, presentation and delivery of government information to public use. The need to organize this information in a simple and coherent way, for the lay people, many times goes against the culture of information control existing in public institutions. It is necessary to have a global view of the information to be available, independently of which organism is responsible for generating or updating it. We believe this is the first lesson we can learn from the way the best government sites analyzed treat the information and the services they offer over the Internet.

Let's see, for example, the organization of the services "Events of Life", presented by the governments of UK and Singapore. It is a simple and inventive way to relate the services provided according to what citizens might need in the most important moments of his life or of his family. Thus, when selecting the options Becoming adult, Starting business, Buying property, Marrying, Becoming parents, Buying a car, Moving, Paying taxes and revenue or Retiring, citizens get all information and services online related to these topics. Notice that it does not matter which public agency provides such service, but that the searched service is available, in a simple and direct language that simple people understand.

Attractiveness – Another lesson that we learned from visiting governments web sites that are more advanced in the use of the Internet, is the purpose to be attractive, that is, to call the

The Impact of the Information Economy in the Public Sector

users' attention to the large number of information available on the Internet, so that it stays on people's minds as a place where one can find public services online. The government of Florida, for example, tries to make the site dynamic with a home page updated constantly with the most important news for the citizen. Therefore, it is not enough to make the services available on the Internet, but also to give a professional appearance to the services and information, which involves the work of communication and marketing professionals designing web sites and updating data.

Interactivity – The interaction should be one of the concerns for the success of a digital information system. As an example, we can cite the state of Indiana government, in the United States, that sends e-mails when topics of interest are being discussed in the state congress. This service can be extended to several processes in which the citizen needs to obtain information from the public sector.

Personalization and customization – In general refers to the ability of an Internet web site or service to be shaped or reshaped to meet the individual needs or wants of a user. Taking a more nuanced view, personalization would refer to a customer, client or citizen making choices about what they will be exposed to, while customization would refer to the efforts on the part of a service provider to select information or prioritize information for a citizen/customer.

Profitability – The Indiana web site also demonstrates the importance of taking from its own services the resources for the maintenance of the site. Thus, there are some services that are charged which support others that are not.

The Impact of the Information Economy in the Public Sector

Rationality – We believe that the development of government web sites that follows these concepts, will present the real competences and responsibilities of each agency, eliminating redundancy and duplication of efforts in the public administration.

Strategy of Government – Thus, we foresee that the digital services delivery on the Internet will change the flux of information within governments and between governments and citizens. Changing the flux of information, governments became more open and transparent. Therefore, the development of good government web sites should be a political as well as a technical process. Much more political than technical, since the software development tools for the Internet are widely known by the IT staff. We understand that this political process is responsible for the leadership in order to allow the information to be deployed in a defined format and standard, guaranteeing the necessary transparency for governments performance evaluation.

But how to measure the success of e-government programs? As described by Steyaert (in Rust, 2002, p.310), it is possible to help e-managers keep track of performance metrics by answering some questions:

1. Financial Metrics

? Effectiveness

- i. Does the agency have a strategic plan that links e-Services to corporate goals, vision and mission?
- ii. Is the e-Service initiative consistent with the agency's legislative mandate and responsibilities?

The Impact of the Information Economy in the Public Sector

- iii. Is there a capital asset plan and does it include e-Service projects? Is there an alternatives analysis on different e-Service options? How much funding is required and for how long?

? Sales and Revenues, Cost Effectiveness, and Cost Avoidance

- i. Was the Return of Investment (ROI) been calculated? What are the potential savings? Are there congressional or budgetary restrictions in terms of procurement?
- ii. How will changes in funding impact the project?
- iii. What additional funding is required before and after the eService deployment?
- iv. Can the private sector or nonprofits be partners? How would this impact funding? What risks do they face?
- v. Are the operating and maintenance costs been tracked as financial performance targets for new and existing (legacy) systems? Identify applications that can be brought online first and short-term and long-term cost savings.

2. Process Metrics

? Efficiency

- i. Can a business plan be made with metrics or benchmarks for process improvements in terms of efficiency, effectiveness, productivity, or service?
- ii. What is the current technology platform? Is there enterprise architecture? What is required for improvements in efficiency? Identify hardware-software applications that need to be integrated to provide an integrated supply chain and customer service chain for e-Services.

? Productivity

The Impact of the Information Economy in the Public Sector

- i. Is it possible to standardize applications or consolidate data centers to improve productivity?
- ii. How does paper flow through the organization? What processes can be immediately put online to increase productivity?
- iii. How accessible are the services for employees and the public? Is it possible to benchmark public access time for paper vs. e-Services and cost?

3. Customer Satisfaction

? Value

- i. Are the customer satisfaction targets already set in terms of customer access to services?
- ii. What techniques are been used to estimate relevancy and timeliness of e-Services products?
- iii. Have privacy and security issues associated with electronic provision of data been addressed?
- iv. Is it possible to calculate improvements in customer satisfaction in terms of faster services, more complete and accurate information, and so on? Are web statistics been incorporated as a lead indicator of satisfaction?
- v. Is there a customer relationship strategy? Is there a customer base survey in terms of customer expectations?

? Web traffic and customer loyalty

- i. What web metrics are going to be used to evaluate customer satisfaction, for example, quality, usability, and effectiveness?
- ii. How user feedback will be incorporated into business processes?

? Web traffic and market share

The Impact of the Information Economy in the Public Sector

- i. Are there value-added companies or agencies that have similar product offerings? What is the position of valued-added companies in the marketplace? Are the products and services tailored around a niche market or national market?
- ii. How many customers the agency currently has? Is the customer base national or regional, citizens, businesses, or employees?

? Multichannel delivery

- i. What are the sources of business intelligence about your customers?
- ii. What are the channels that will be needed to access or provide services delivery, for example, government to business, government to government, government to the public?

4. Learning and Growth

? Staff retention

- i. Is there support for the initiative at the CEO level?
- ii. Does the agency culture support new ways of doing business? Can the agency quickly adapt to change?
- iii. Are there financial incentives for performance? What benefits are provided to employees and contractors that meet performance targets in terms of savings, productivity, efficiency, and reduced costs?
- iv. Is there a CRM training strategy within the agency, and a plan to “train the trainer” or use contractors?
- v. Are there incentives for collaboration in delivering of e-Services with executives?
- vi. Is there a knowledge management environment to increase business intelligence and to anticipate customer demand?

The Impact of the Information Economy in the Public Sector

- vii. What are the current incentives for employee retention? Are there learning and growth strategies for the employees?

In technical terms, an integrated vision in the development of government web sites requires the establishment of a cooperative process that encourages the exploration of information technologies and the development of a standard project of information systems, using common methodologies, modeling and integrated administration of data. While it is not possible to convert the existing systems to these new standards, we should demand that any new system to be developed be adherent to the new requirements.

The establishment of government web sites adequately built represents an initial step to reduce or even eliminate bureaucracy. The consolidation of democracy and citizenship passes through the existence of channels that allow the citizen to express desires and opinion. The access to information managed by the public sector is, without doubt, vital to enlarge the transparency level of governments actions. Where there is a democratic environment, the Internet can be used to publish details about each one of the government program in progress, providing citizens access to services and information, at low cost. Where such democratic environment does not exist, the Internet will be seen more as a threat than as an opportunity.

5. Conclusions

In the beginning of this paper we formulated the hypothesis that there is a growing availability, on the part of the governments, at all levels, of services and important public information to the citizens over the Internet. As we can verify this hypothesis is totally confirmed. The tendency of the governments to use the world network is confirmed, however, we noticed the level of information and relevant services offer is still very low.

The Impact of the Information Economy in the Public Sector

To answer the first question we formulated – how could the government take advantage of the world network to deliver public services of better quality? – we concluded that we should look for:

- a) the redesign of the agencies internal processes, aiming to organize the flux of information, under wide focus of the government;
- b) qualify a group of public service technicians in modeling and administering data that will flow internally in the government, to redesign the organizational processes, providing online information and services;
- c) provide advanced telecommunication infrastructure, computers and Internet access to civil servants;
- d) organize a group of specialists, under the leadership of the state Chief Information Officer – CIO, to project, develop and maintain information systems and government homepages, guaranteeing the necessary technological modernization to deliver advanced services;
- e) train and qualify civil servants in the use of information technologies and in feeding information to maintain the internal and external flux;
- f) update the public sector legislation to use electronic documents, digital signatures, electronic purchases and payments, and a specific law to give the right to electronic information to all citizens;
- g) use the most modern ways of organizing information to deliver services via Internet, such as the ones presented in the previous chapter, to facilitate the use and make the citizen an effective user of the digital services;
- h) make available the digital services in the largest number of places possible, mainly where there is a great concentration of people, through totems of self-service;

The Impact of the Information Economy in the Public Sector

- i) use these new technologies to increase the level of schooling and literacy of the population, through distance learning, seeking to reduce digital segregation.

To answer the second question we asked – what major changes are happening in the governments provoked by this new environment? – we came to the conclusion that the governments, each time more, are becoming aware that it is necessary to reinvent themselves, seek new forms of organization, which cost less and satisfy taxpayers. The major changes are the intense use of the information technologies, the communication networks, the processes redesign and the discussion of the role performed by each agency in building this new government.

All those efforts are important, but special attention has to be given to bring a critical mass of citizens to get accustomed to e-government services in a daily basis and at a reasonable cost. As more and more people get used on e-services, it will be possible to put more services on-line, and progressively reduce the gap between those who have and those who don't have digital access. As we improve that, we can't let the e-services provision be directed only to those that access IT devices. For some services, people like to have direct contact with the civil servant in duty, in order to clarify a service special aspect. So we must consider the many different citizen needs and be aware of the natural pace of e-services learning by the people, as we advance working on closing the digital gap.

The Information Economy is molding, in this century, new ways of relationships between companies, between companies and their clients and suppliers, between governments, and between those and society, giving power to the common citizen to express ideas, obtain the best product or service and demand information. The governors have the opportunity to use the Internet technologies to bring transparency to the public administration, revigorate it and, even,

The Impact of the Information Economy in the Public Sector

reinvent the manner to govern in partnership with the citizen. If we know how to overcome the huge challenges, like the digital segregation, and prepare government and citizens to make better uses of the resources available, certainly the new technologies will be a strong ally to help decrease the social differences, consolidating citizenship and democracy in a significant number of countries.

We finish this paper with a thought that reflects our time:

“The world is so fast that there are days when someone who says that something can not be done is interrupted by the person who is doing it.”

(Anonymous)

The Impact of the Information Economy in the Public Sector

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The Impact of the Information Economy in the Public Sector

ADDRESSES OF SITES FOR RESEARCHED GOVERNMENTS

GOVERNMENT	WEB SITE
Bahia	www.bahia.ba.gov.br
Brazil	www.brasil.gov.br
Buenos Aires	www.buenosaires.gov.ar
Canada	www.canada.gc.ca
United States of America	www.whitehouse.gov
Florida	www.state.fl.us
Indiana	www.state.in.us
Maryland	www.state.md.us
Massachusetts	www.state.ma.us
New York	www.ci.nyc.us
Nuevo Leon	www.nl.gob.mx
Portugal	www.infocid.pt
United Kingdom	www.open.gov.uk
Singapore	www.gov.sg
Utah	www.state.ut.us
Victoria	www.vic.gov.au