Impacts of Internet use on Public Administration: A Case Study of the Brazilian Tax Administration [i]

Maria Virginia de Vasconcellos[1,2] and Maria das Graças Rua[2]
[1]Federal Data Processing Service SERPRO, Ministry of Finance, Brazil
[2]Sustainable Development Center - CDS, Federal University of Brasília
virginia.vasconcellos@serpro.gov.br
http://www.serpro.gov.br
mgracasrua@uol.com.br
http://www.unbcds.pro.br/

Abstract: This paper seeks to identify the effects of Internet used as a vehicle for sending federal tax returns through the RECEITANET program. The benefits that came out from security and costs reduction in the process of delivering tax returns are identified, as well as the impacts on Tax Administration (TA)[ii] and on the Treasury-Taxpayer relationship.

Keywords: E-Government, G2C-Government to Citizen service, E-public service, IT application in Tax Administration, Transmitting Tax returns via Internet, Treasury-Taxpayer relationship, IT Evaluation.

1. Technology, the State and the Citizen: the role played by Tax Administration

The world dissemination of microcomputers and their interconnection through the Internet at the end of the 1980s led to the adoption of what is called Information and Communication Technologies (ICT), symbolizing the integration of information systems with data communication.

One of the gains resulting from this trend was the possibility of providing information and services at a distance to the citizens through the good practices of Electronic-Gov. The evolution of ICT led to new forms of relationship between citizens, companies and the public sector - including compliance with citizen and governmental obligations required in a democratic system.

Among the various relationships between citizens and public institutions, the interaction of TA with the taxpayer has a specific nature: it is characterized by a natural aversion of the citizen to his duty to pay taxes. Furthermore, those taxpayers who pay their taxes properly do not receive immediate reward in exchange as many believe they should, but rather a *promise* of a service that is sometimes not provided adequately or simply not at all. Moreover, even when the services are provided, they are not divisible or appropriated in the sense that the taxpayer does not acquire the good for exclusive use. (RAINS et al., 1997, p.1-6).

On the other hand, tax-evaders enjoy the same public services, drive on the same roads and highways and have the same possibilities of access to state universities as those who fulfill their tax obligations. In the end, the use of taxpayers' contributions to society is something beyond their control. Even when the taxpayers recognize that tax payment is the price of living in a democratic state there is low willingness to comply voluntarily with tax obligations, associated to other difficulties faced by them: the cost of processing and filing tax returns and making the required payment.

In spite of not being responsible for provision of the public services to the society, TA plays the role of revenue collection to obtain part of the necessary resources needed for financing the welfare state and ensure these services, providing social security, health care, education. Tax collection and audits are functional obligations of TA. Nevertheless, given the taxpayer's natural aversion, information and assistance to taxpayers in fulfilling their duty to declare taxes should also be a function of the TA. (RAINS et al., 1997, p.1)

The concept of TA's mission has undergone significant change in the 1990s. It moved away from the idea of being an organization dedicated only to collecting taxes - centered almost

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exclusively on ensuring the execution of tax obligations and repressing tax fraud - to that of giving crucial importance to information, assistance and services for citizens. (PITA, 2003, p.1). Increasingly perceived as "clients" of the government - in the style of total-quality programs- citizens and companies have started becoming the focus for TAs in many nations. The taxpayer is no longer considered only as someone who has an obligation to pay taxes but a citizen who has the equal right to receive quality services from the State.

An effective application of IT in TA can provide the conditions to improve the quality of services rendered to citizens, enhancing the taxpayer's relationship with the treasury and building a feeling of trust in the organization that imposes the tax system. These factors tend to positively influence voluntary compliance with tax obligations.

As stated by SECO FERREIRA (2000), IT is now an indispensable tool for public management and TA has been the engine stimulating its application:

> *"The history of IT in government proves that TAs have always been at the forefront of its application... TAs were the driving force behind the creation of governmental IT companies and computer centers inside the Ministries of Finance, in Latin-American countries".* (SECO FERREIRA, 2000, p.1, Free translation)

2. RECEITANET - Background

In Brazil, the *Secretaria da Receita Federal*-SRF (Federal Revenue Service) has been using IT as a tool for optimizing the effectiveness and efficiency of its internal processes since the 1960s, with the technological support of the Federal Data Processing Service-SERPRO, a public company from the Ministry of Finance.

However, the original model of assistance to taxpayers was fragmented into specialized systems based on technical areas, impeding the conception of assistance as an activity in itself.

In the 1990s, citizens and companies have started becoming the focus for Tax Administrations in many nations around the world, increasingly perceived as “clients” of the government – in the style of total-quality programs. The taxpayer is no longer considered only as someone who has an obligation to pay taxes but a citizen who has the equal right to receive quality services from the State.

With the emergence of this movement to modernize taxpayer services, beginning in 1993 when a seminar to employees on "Assistance to the SRF's public" was given, the concept of conclusive and immediate assistance with a comprehensive vision has been introduced to the culture of the organization. The old technological model, physically centralized but logically fragmented, and which did not allow for a complete picture of a taxpayer's history, has been gradually modified and a number of activities were accomplished in this respect - including remote assistance programs - through intensive use of IT.

One of the important early developments in this process was the creation of the Declaration Generating Program (PGD), in 1991, which allowed for electronic filing of tax returns: personal computers could be used to process income tax calculations and generate a diskette later delivered as a document to the SRF.

With the aim of making the taxpayer's life easier and stimulating voluntary tax compliance, in 1996, in conjunction with the SERPRO, the SRF installed the RECEITANET as a pilot project.

> The RECEITANET program validates and transmits tax returns and federal fee declarations via the Internet. It consists of an interface between the taxpayer's computer connected with the Internet and the SRF's reception base for tax declarations.

Officially launched in May 1997, the service has been increasingly accepted by the SRF and taxpayers alike, exceeding all initial expectations: In the first year, 704,835 declarations were transmitted by RECEITANET; (LEAL, 1999, p.31); and, for 2003, 37,941,736 declarations, as the figure below demonstrates.

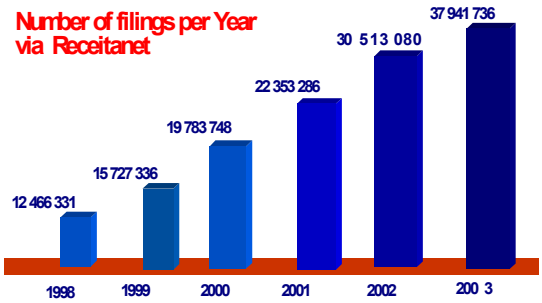

Figure 1: RECEITANET - Source: "SERPRO International", Institutional presentation, 2004

(These figures do not include declarations related to previous fiscal years, transmitted with delay)

Soon after its launching in 1998, of the 10.8 million Personal Income Tax returns received by the SRF for 1997, about 2.7 million were received through the Internet - 25% of the total - plus another 1.1 million Corporate declarations, 32% of the total in that case (LEAL, 1999, p.17).

> In 2003, 96% of the 16.5 million Personal Income Tax returns were transmitted on time through the Internet, confirming the success of RECEITANET in conquering taxpayers´trust and credibility (MEDEIROS and COSTA, 2003, slides 13-14)

The RECEITANET program is optimized every year. In 2004, the program handles more than 60 different types of personal (IRPF) and corporate (IRPJ) tax returns.

> Up to August 19, 2004, taking into account all kinds of forms as well as the delayed returns related to previous fiscal years, **34.275.243** were transmitted via the RECEITANET program, indicating an increase with respect to 2003.

Its success is explained by the fact that its immediate benefits overcame the initial threat of security risks. Discussed in tax congresses during 1996/97, the program has been recognized by tax authorities from international organisms as a pioneering effort and one of the outstanding examples of good practices in Electronic Government.

> "Brazil is the first country to enable large-scale tax filings over the Internet. In the U.S. and Australia, electronic filings are done over proprietary dial up lines, and the Australian filings are done only through tax agents. Brazil lets individuals and companies file directly..."
>
> in http://www.microsoft.com/billgates/speedofthought/additional/brazil.as, February, 2004

This innovation was disseminated and has since been adopted by a number of countries: Chile (1998), Portugal (1998), Mexico (March/2003), among others. With the advent of digital certification it is believed that more countries will come to adopt this process, since the additional security should overcome any impediments in tax legislation.

3. Results and Impacts on Tax Administration and on treasury-taxpayer relationship

To conduct an *ex post* analysis of results and impacts[*], a diachronic evaluation methodology will be used, considering the previous situation (entry indicators) in comparison with the condition after the implementation of the RECEITANET (exit indicators). The following indicators will be taken into account: speediness of procedures; response time; quality, security and cost.

According to BURDGE (1998, p.15):

> *"One way to captures the dynamic quality of social impacts is to metaphorically take a series of snapshots over time as development progresses and try to fill in what happened in between. This, in essence, is what a diachronic model represents; the study of the same*

[*] In this article the evaluation of a project results is based on an analysis of the final product or resulting service in relation to what was planned, taking into account the resources allocated for such a project, the completion terms and the quality of the new product or service. The expected result is the very product or service itself. On the other hand, an impact evaluation concerns the consequences caused by the result. Impacts can be intermediate, unexpected, indirect, diffuse etc. They have a wider scope than the result.

> *phenomenon at two different points in time. In this case the time periods are usually before and after development occurs."*

This model allows a re-study of the affected organization and surrounded environment, as well as a dynamic interpretation of events; likewise, it permits to see if predicted impacts occur and what unanticipated outcomes have taken place.

3.1 The black and white photograph

3.1.1 Before the implantation of RECEITANET

(a) The reception and processing procedures for returns were complex, accomplished in several phases, and required a large number of employees from diverse areas in countless shifts, especially during the peak filing periods. There was physical manipulation of documents and files as much at banks, post-offices, at the SRF itself or at SERPRO, with risks of failures in security and confidentiality, not to mention actual loss. The physical security of the archives, especially those on paper, was precarious. The microfilms with declaration copies required physical space, organization and meticulous care. Even with diskettes (using the PGD), the safekeeping of documents was not of a quality standard.

(b) Before the use of diskette, the taxes had to be calculated manually, form completion was complex, and the time spent waiting in line unpredictable; declarations on paper were organized into lots and sent to SERPRO for data entry, demanding a lot of overtime and expenses on transporting the lots. There were distinct programs for receiving of each type of declaration, which made the task excessively complicated and slow. Even after the use of diskette, there was no standard, and each type of declaration had its own form, hampering the work of employees during reception. This complex process provoked a high frequency of mistakes and extra work in correcting them. Disappearance was a common occurrence, both in paper delivery and diskette (LEAL, 1999, annex 5, p.30).

(c) For the taxpayer, the liberation of personal income tax refunds occurred long after delivering the declaration; For auditors, the generation of audit files with tax returns to be checked and reviewed was time consuming and hindered the checking of information.

(d) Tons of paper were used as much for the forms as for instruction manuals on how to have them filled out, with a negative repercussion on the environment. Also the postage costs for all this material cannot be ignored.

3.2 The digital photograph

3.2.1 After the implantation of RECEITANET

(a) The process of defining, generating and receiving a declaration became simple, standardized and consequently much quicker and less onerous, because it eliminated the need for data transcription, besides reducing paper, personnel, bureaucracy and procedures.

In 2003, the time spent on receiving a declaration was 50% less than in 2002; the process is being continually improved. Today, a declaration is received in an average of 2.4 seconds [†].

(b) Processing takes place in real time with total transparency and visibility, guaranteeing security, integrity and confidentiality. The chance of a declaration miscarriage is eliminated.

(c) The simplification and standardization of procedures encouraged the generation of statistics - from 2003 onwards, updated daily and - on the last day of delivery, every hour. These reports contain data useful to SRF managers (number of declarations received per hour, day, month, year, place, type, etc.), besides technical information (on-line status of the receptive circuits, history of CPU, memory and disk use in the receptive servers and databases, etc.). Quantitative indicators are updated every 10 seconds, without impacting on or competing with the process. The reports also contain comparative charts with previous years in a

[†] Source: GABBP/COEMP/SERPRO Business Communication Data, Bulletin No. 60, April 29, 2003

numeric and graphic form (MEDEIROS and COSTA, 2003).

(d) The quality of data collected is much better, with a significant reduction in errors, and access to information is much faster.

(e) Reduction in the average time spent on liberating refunds helps to comply with the legal deadline for reimbursing taxes.

(f) Bureaucratic procedures were simplified and consequently the number of employees required for receiving declarations was reduced.

(g) For the taxpayer, who had already reduced the average time spent on filling out forms electronically, calculating taxes and making simulations with the diskette program (PGD), the Internet made delivering a return even easier. It was convenient, eliminated the need for physical displacement (from the house, office, self-service terminals at the SRF or authorized banks and other entities), saved time both in travel and shortened lines at the SRF and banks.

(h) For the SRF, the shorter lines, especially in the peak periods, allowed for the reallocation of former reception employees to more complex functions.

Two items deserve a more detailed examination: Security and Costs-Savings on Resources.

3.3 Security

This item has been considered the "Achilles' heel" of the process, especially in the opinion of Tax Administrators from developed countries.

3.3.1 In the digital photograph security is priority

(a) Communications security: The RECEITANET is a client/server application where the connection is initiated by the client application and control of the message flow is done by the server. All messages are encrypted using routines from the latest products in the security area. In addition, the client application is only connected to the server application after certification of both: the client and server modules verify their identities between themselves.

(b) Security levels: The client/server application works with three levels of security - for the client, the server and the transmission. For transmission security, data compression and asymmetrical cryptography with 1024-bit keys are used, thus economizing communications resources and eliminating language redundancy. The compressed file is only uncompressed at the SERPRO center in São Paulo (Brazil).

(c) Guarantee of integrity: A validation process guarantees the integrity of the client's declaration before beginning transmission; there is also a validation process in the server to guarantee the integrity of the declaration's content after transmission and storage in the reception base; and there is even a validation process in the mainframe database to guarantee the integrity of the declaration's content after uploading the files to other server systems.

(d) Data security: All resources of the RECEITANET project such as hardware, software, communication circuits and electric power, have redundancy mechanisms. A no-break system and dedicated power generators protect the Data Processing Center- PDC. There are also safety copies of all files created.

(e) Network security: There are alternative routes and package filtering mechanisms.

(f) Specialized human resources: A specially trained team monitors attacks against infrastructure and protocols, and specialized consultants in permanent risk and vulnerability analysis suggest improvements permanently. (MEDEIROS and COSTA, 2003, 25-35).

In spite of all these displays, the growth in the use of RECEITANET has made the SRF site one of the principle targets of attempted attacks from hackers in Brazil, which have risen in the same proportion as Web use for sending declarations. In 2003, attacks increased 370% - almost four times more than the year before. The good news is that, 100% of these attacks were blocked by SERPRO. "The company prefers not to divulge the number of

attempted attacks so as not to reveal our capacity to block them,"[‡]

With the advent and dissemination of digital certification, soon electronic signatures could become used on an ordinary basis by taxpayers, thereby closing the cycle of basic security requirements.

3.4 Costs and savings on resources

The *cost of compliance* with tax obligations can be seen from the perspective of the TA and that of the taxpayer. From the point of view of the TA, they are the *administrative costs* which the government incurs in collecting taxes:

1. Costs of filing returns and payment process: printing forms, systems development, contracts with banks;
2. Costs for resolving legal appeals and objections;
3. Costs of diligence and tax audits (RAINS et al., 1997, 2-4).

The expected results from RECEITANET lie especially in type "1" costs mentioned. According to Leal (1999, Annex 5, p.31), there has been a significant reduction in the cost of transmitting returns through the Internet.

> It has been estimated that a hand-written return costs US$ 1.10 (one dollar and ten cents) to process. The cost for using a diskette drops to US$ 0.40 (forty cents), while returns sent by Internet require an outlay of only US$ 0.13 (thirteen cents) per declaration. (LEAL, 1999)

These values should be multiplied by the growing number of taxpayers who use RECEITANET and compared with the US$ 300.000,00 originally invested to develop this tool.

In addition, going deeper into the examination of costs, it is necessary to consult the SIARE Information System at SERPRO, that registers, since 1999, the invoices payed monthly by SRF to cover the RECEITANET service expenses, mainly related to maintenance of the technological infra-structure. (Service: Id number 34161, Contract numbers 26166, 31540, 32679, 34147, 35291). [§]

If we consider just the invoice values (and not any possible existing internal costs of SRF), based on these figures, the costs of returns sent by the program are getting even lower than estimated. In fact, making a simple calculation - dividing the amount invoiced annually by the number of declarations transmitted by RECEITANET in the period - one declaration requires an outlay varying from US$ 0.069 to US$ 0.086, less than one cent.[**]

Although impressive, these data are not sufficient to conclude an analysis of the resources saved for the TA from using RECEITANET. Chain-reaction and co-produced impacts can only be detected over the medium and long term - and even then, diffusely.

In any model of TA, the fundamental element for encouraging taxpayer compliance with legal obligations is the fiscal presence. This presence can make itself felt in two ways:

1. by coercive action on the part of the TA towards the taxpayer, or
2. by building consent between the fiscal system and taxpayer.

The second case is less demanding for TA: the taxpayer fulfills his/her fiscal obligation in a timely and voluntary manner (LEAL, 1999, p.1). Aiming at raising voluntary compliance with tax obligations, many authors stress factors like cultivating a positive image of the institution, tax education for the population, efficient taxpayer assistance, simple and lasting tax legislation, effective communication, transparency, and without a doubt, lower costs in tax return and payment process for citizens.

From the point of view of the taxpayer, *voluntary compliance costs* are defined as those incurred by the taxpayer in fulfilling

[‡] Source: SERPRO Electronic Newspaper SERPAUTA – Daily Bulletin for June 17, 2003. That information was also transcribed by *Valor Online*, *Mundo Virtual*, June 12,2003

[§] Up to 2004 , because it is a public company, the SERPRO´s employees salaries were covered by the government and included in the Federal budget.

[**] Calculation made by the author: considering US$ 1.00 (one dollar) equivalent to R$ 2,89 (two *reais* and eight nine *centavos),* exchange rate of September 30, 2004. The result presented here certainly invites further refinement in costs evaluation due to rates variations – considering for instances the average exchange rate in each year. Nevertheless, this refinement will not invalidate the trend. These figures provide evidence that costs are lower than expected.

the law or disputing contentious processes with the TA, and do not include the value of taxes paid as such. Some costs are considered inevitable, such as the cost of completing forms and professional advice from accountants; and other are considered optional, such as interfacing with the TA, usually measured in terms of time spent waiting on line or in rooms, besides physical transportation.

According to RAINS (1997, p.3-4) "…high voluntary compliance levels that maximize tax revenue is almost always the result of institutionalized procedures undertaken by TAs minimizing the cost incurred by taxpayers in complying with their obligations". (Free translation).

In order to stimulate voluntary compliance, some nations have developed preventive measures as their main (though not exclusive) strategy, providing convenient facilities and services for taxpayers. One of the basic preventive measures is to offer a flexible, easy and speedy process for filing returns and payment, which also tends to reduce the administration operating costs: the convenience in declaring taxes with electronic or magnetic media. (RAINS; 1997, p.7)

With respect to willingness to meet their obligations, the taxpayers can be divided into four general groups:

1. those who fulfill their obligations voluntarily, independent of the TA performance;
2. those whose compliance is conditioned on efficient and correct behavior on the part of the TA (It depends on the costs incurred);
3. those who only pay taxes when forced to, fearing sanctions by the TA; and
4. those who do not fulfill their obligation in any situation, independently of the TA performance.
5. (DGIA, 1997, p.7).

A program like RECEITANET will particularly affect type (2) and (3) taxpayers mentioned above. It will affect the type (2) group because these taxpayers expect a minimum of inconveniences and effective tools for fulfilling their obligations; if the TA offers better quality of services and assistance to them, they will tend to respond positively. The program also affects the type (3) group because these taxpayers are inclined to believe that more effective TA has more capability to auditing and accessing data; and consequently they fear to be caught and sanctioned.

Although it is not the only factor, this technological support implies, in many cases, significant advantages for the TA as it entails timely and precise compliance with obligations and the acquisition of fiscal information from the returns.

Thus, RECEITANET can minimize *costs*, add value to the treasury-taxpayer relationship and therefore contribute to higher voluntary compliance - which, in turn, provides even greater savings for the TA over the medium and long term. This chain reaction impact, with indirect and diffused effects, although difficult to measure and identify must be considered.

4. Challenges

It is worthwhile to briefly recall the main challenges of the RECEITANET implementation. At the early stage of the project planning, the primary goal was the program acceptance by the taxpayers. Therefore, the objectives of the project were related to program facilities, like simplicity, availability *any place-any time*, friendly features, as well as security, integrity and reliability, to assure prevention of taxpayer information from violation. In other words, the program ought to be simple, fast and safe.

Combine with these basic requirements, others objectives were set out in the SRF and SERPRO strategy: target audience, tax returns process simplification, time and cost reduction in TA, convenience and assistance to the taxpayers, as well as reasonable implementation cost, taking advantages of large-scale utilization.

To meet these objectives, the role played by the SRF and SERPRO investment in the training and development of its employees was significant, as well as intense external program dissemination and communication to the public. The results lived up to initial expectations. The RECEITANET has received a number of national and international awards in recognition of its quality.

Recently, the Brazilian government has adopted new IT policies. The current recommendation to use open-source software whenever suitable has raised new demands and challenges. The reasons that lead to this strategy are: to save money with licenses, improve the national expertise in software development and facilitate digital inclusion. (MUSAFIR, 2003)

As a result of the aforementioned open-source software policy, the RECEITANET program provided a new version integrated with the Java PGD, in 2004, in order to allow taxpayers to use software other than Windows. However, regarding open-source, there is a lot to be done with respect to transmission security, data compression and cryptography: the challenge is to replace these proprietary solutions. Likewise, much has to be accomplished with digital certification dissemination.

In addition to these technological challenges, in a broad view, the biggest challenge of the Brazilian government today is to reduce the social divide and, on the same way, to reduce the digital divide of the Brazilian population with their inclusion in the Information Society. To achieve the citizen inclusion on the E-Gov program and increase the Internet access in Brazil, it is necessary to face and address two major problems:

a) the concentration of income on a few people, situation that causes huge social and cultural differences, specially on the level of education; and
b) provision of telecommunication infrastructures mainly for the rural areas. (MUSAFIR, 2003). For the Brazilian government, digital reduction is top priority.

5. Conclusions

The Shakespearian parody "*IT or not IT=That's the question*" has little meaning today. This debate is no longer at the center of strategic decision-making in major organizations, and even less so in public administration. Instead, the current debate is over which technology to use, what will be the value of the investment and the expected return for the organization and society. The emphasis is placed on the results and the impact of public investments, and what criteria should be used to decide on allocating public resources in order to ensure the attainment of economic and social objectives.

The role of IT projects evaluation begins to increase, not just in terms of analyzing the return on specific products or services, but also to create an *evaluation culture* that may be useful in fostering transparency in public investment. Tracing the impact of a project and its aggregated effects could provide information for other decision-making processes, besides rendering accounts to society, and stimulating and fostering provision of new services using the same tools.

In the context of the E-Government, the RECEITANET program will indeed be affected by the current government policy. It also reflects the features of the Brazilian socioeconomic environment where the majority of the population is not yet included in the Information Society. A fundamental lesson learned in the development of E-Government is not about informatizing existing operations. It is about reinventing government and therefore the political commitment is paramount. The government should make use of existing best practices whenever feasible. Under these circumstances, continual and cumulative IT impact assessment acquires strategic relevance in order to verify if results are still positive.

In closing, it is worthy to mention BANNISTER´s words (2001, p.12) regarding IT in public administration:

> *"IT value in public administration is measured by its contribution to the good of the citizen. … the primary aim of IT in public administration is to serve the citizen and the society in which (s)he lives."*

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[ii] Tax Administration is a general term to designate the organizations that impose the tax system. In Brazil, Tax Administration on the federal level is the *Secretaria da Receita Federal-SRF* (Federal Revenue Service).

