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* Original Article

Information Technology at the Oswaldo Cruz Foundation

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Abstract

This research object is the Information Technology (IT) and it aims to perform a diagnostic analysis of such field at Oswaldo Cruz Foundation (Fiocruz). In order to obtain guidance, a cross-sectional study of an exploratory and descriptive nature was carried out. Such study covered 23 Units of Fiocruz Foundation. A questionnaire about their IT structure was answered, as well as questions about processes, exchanging data and suggestions so that the IT can be aligned to the institutional mission. The recovery of the IT history at Fiocruz was also performed, having (with the sources of) institutional documents as source. It was noted that the IT appears in progress over time. However, such discussions do not put IT on focus, but in a position of support to projects, responding to emergencies. The need of creating a continued training plan for the IT professionals was verified. It was also noticed that the sub-area of Corporate Systems is far short the ideal. The low utilization of free softwares and the use of unsupported operating systems at workstations was verified. There are few professionals involved with the Security of Information. For IT area, the implantation of a new decentralized model is suggested, under the coordination of a central level.

Key-words: Information Technology; IT; Management

Introduction

This study has as its subject the Information Technology (IT) in the Oswaldo Cruz Foundation (Fiocruz) as a set of resources related to the management and use of information (Rezende; Abreu, 2000). The purpose of this study was to perform a diagnostic analysis of IT in this institution. Thus, it was necessary to investigate the structural and historical question in this area in Fiocruz achieving the goals to rescue historical attempts of the organization of the management of this area, explore the existence of policies and procedures documented in the IT area and to identify the current structure in the various Fiocruz Units.

Given the relevance of structuring this area in the public sector, various ordinances, instructions and regulations were published in order to organize the Information Technology in that sector. In August 2008 judgment 1603/2008 was published in the Official Gazette (DOU) where the Audits Court (TCU) presented the situation encountered in the management and use of IT in the Federal Public Administration (FPA), reporting that IT lacks institutional strategic planning, has deficiencies in staff structure and treats the information inappropriately, hurting their confidentiality, integrity and availability. (BRASIL, 2008a).

Not only legal issues direct to a greater knowledge about the structure of IT at Fiocruz, but also the fact that Fiocruz produces a large volume of critical information that cross the Economic Industrial Health Complex (CEIS), since the position of the institution within the CEIS permeates almost all areas that make it up and can be framed in industrial sectors and service provider sectors.

In order to meet their own needs, that is, the demands of the public system, because this is the major consumer of services, supplies and equipment in health, it is necessary for Fiocruz to be prepared to do so. It is noticed that although Fiocruz seeks today to meet the demands of the system itself, there is still a long way to go. There is then the obligation to invest in Information Technology, providing the foundation for the management to become more efficient.

To do so, knowing how Information Technology is structured and charting possible paths for the integration of the various Units of the institution is vital to enable it to achieve its mission, strengthening and consolidating the Unified Health System and contributing to improving the population's health and quality of life, in addition to being a public and strategic health institution. At the Internal Fiocruz Congress in 2010 these issues were again highlighted (CONGRESSO..., 2010).

It is noteworthy that, according to the Department of Logistics and Information Technology (SLTI) in its Ordinance 11/2008, "the first phase of PDTI development is diagnosis, during which will be identified the current situation of the organ and the IT Needs to be met.". Moreover, this Ordinance indicates that the diagnostic phase includes the evaluation of the services rendered and the quantification and verification of staff training. In addition, such reference also indicates some techniques to carry out the diagnosis phase, for example, "the sending of forms by formal instrument." (Brasil, 2008b)

This paper presents a diagnosis of IT areas within Fiocruz, constituting both a historical setting of this area of the institution as well as a descriptive analysis of the current situation.

METODOLOGY

This is a cross-sectional study of an exploratory (HULLEY et al, 2003) and descriptive (TOBAR; YALOUR, 2003) nature, aimed to consolidate a diagnosis of IT at Fiocruz having as its analytical axis the systematization of information and the understanding of this organization's characteristics.

This research, as to the means, used field and documentary research strategies. To rescue the organization history of IT management at Fiocruz were analyzed the contents of some documents such as reports of the Fiocruz Internal Congresses, Activity Reports generated by the Planning Directorate (Diplan) and the Fiocruz Information and Communication Integrated Program ('Green Book').

To achieve the goals of identifying the structure of the Information Technology areas at Fiocruz Units and exploring the existence of policies and processes in IT at Fiocruz Units a collection instrument was assembled in the form of a structured questions questionnaire. This questionnaire is divided into five parts, and explores different dimensions related to IT at Fiocruz: The Unit; the structure of the IT area; on policies, processes and procedures; on the exchange of information between IT professionals and the impressions of the respondent about IT at Fiocruz.

The first two parts of the questionnaire, used to achieve the first objective of identifying the structure of the IT areas at Fiocruz Units, dealt with questions about the organizational structure of the Unit, sharing activities from other areas of knowledge and questions about the Unit's physical structure, involving items such as human resources, equipment, systems and services. Physical structure is understood as the set of resources required to build an IT area.

The three subsequent parts serve the objective of exploring the existence of IT policies and processes at Fiocruz Units of and try to present whether the Unit's IT area has documented processes and policies, and check what means of exchange of information between professionals the IT Unit considers most relevant, in addition to gathering suggestions from respondents so the IT area would be able to align more with the mission of the Unit and the institution.

For the pre-test a Unit was chosen that would probably attend to more than 90% of the questions without having to resort to search for information, because it was imagined that they already had it documented.

This test aimed to check the time taken to answer the questionnaire as well as itsclarity and its appropriateness for the data requested.

The questionnaire and the consent form were sent by email to the representative of the remaining 22 Units. These questionnaires were returned on average after 32 days, exceeding the response time of the pretest. Only four Units did not have inconsistencies in their answers. The questionnaire was re-sent to all the others (19) so the inconsistencies could be resolved. The average response time for this was 13 days. Although the final average was 45 days, one of the Units responded in five days without inconsistency and another in 99 days.

The option of returning the questionnaires to remedy the inconsistencies was due to the fact that in addition to this also being a study in the context of a professional master's degree, there is a commitment to the consolidation of contributions to the institution. Moreover, not having the information was not in our interest.

Also the response time and the comings and goings of the questionnaires is, already and in itself an expression of the inefficiency and instability of the area at the Institution.

Analysis

The data collected with the first part of the first survey brought subsidies to identify the structure of the Information Technology areas at the Units, seeking to identify the role played by IT in the organizational structure of the Unit.

The second part of the questionnaire was analyzed on three aspects: staff, equipment and systems/services. For these three aspects, interrelationships between them were observed, in addition to confronting them among the Units, maintaining the confidentiality of their identity.

A spreadsheet was created from the data collected through the questionnaires in standard MS Excel© to assist in its tabulation.

Importantly, for part V of the questionnaire responses were rated semantically using the five sub-areas, namely: Corporate Systems, Computer Security, Training and Qualification, Technology/Infrastructure and Services on information technology than other five categories detached of the technique: Management, Integration, Governance, Politics and Vision. These categories, although not regarded as sub-areas of IT, are closely related to its existence.

RESULTS

The results of this research will be presented in three sections, namely:

- IT History at Fiocruz;
- IT Profile at Fiocruz;

IT History at Fiocruz

Fiocruz is a public institution that has as its core mission and vision, respectively

> *Produce, disseminate and share knowledge and technologies aimed at the strengthening and consolidation of the Unified Health System and contribute to improving health and quality of life of the Brazilian population, to reduce social inequalities and for the national dynamics of innovation, having as central values the defense of the right to health and ample citizenship.*
>
> *be a public and strategic health institution recognized by the Brazilian society and in other countries, for its ability to effectively put science, technology, innovation, education and technological production of services and strategic inputs to the improvement of population health, the reduction of social inequalities, the consolidation and strengthening of the UHS, the development and improvement of public health policies.* (CONGRESSO..., 2010, 21,23).

The first Internal Fiocruz Congress, held in July 1988, was titled **Science and Health: The Future of Fiocruz.** At that time the term “innovation” was not yet used, however was presented the idea that “a true institution for research generates knowledge, generates new things” and “to create something new we must know the old, otherwise we will (re)invent the wheel or (re)discover gunpowder.” (CONGRESSO..., 1988, 3)

However, it is clear that some of the propositions from that time are still being discussed and nothing concrete was done, as the proposal to develop a

> *Computerized database which will allow an adequate monitoring of the professional profile of FIOCRUZ staff, and its level of expertise/development, used as a tool for human resource management* (CONGRESSO..., 1988, 21).

This proposal is still a demand in 2011 of the Vice President of Education, Information and Communication together with Direh, under the name of "Who-is-Who" (CONGRESSO..., 2011).

Problems were perceived as the absence of an Institutional Project that would guide, delineate and define priorities for both Research and for what was called the middle areas. Also identified was the “absence of a policy that ensures thorough training and qualification of professionals and technicians related to these areas” (CONGRESSO..., 1988, 23). On these aspects can be said that the institution continues without a clear training policy for professionals in this area.

It was proposed that immediately after the closing of the Congress a forum was to be constituted composed of all sectors working with the information objective “in order to draw guidelines for the definition of an Information Policy for FIOCRUZ.” (CONGRESSO..., 1988, 19). This policy was reflected in what is now called the ‘Green Book’ within the institution. The aforementioned book does not present any policy for the area of Information Technology. In addition, the committee

that drafted it had only one professional in this area.

This congress also proposed the definition of a FIOCRUZ IT Policy in Science and Technology created from a Planning Council in conjunction with the Office of Planning (SUPLAN) and the Presidency (CONGRESSO..., 1988). This fact shows that Fiocruz was already concerned with the area and thought it in line with management.

From the Second Internal Congress, held in 1994 and had as its theme **Autonomy Flexibility and Quality**, the term Fiocruz Institutional Complex arises in an allusion to the Health Industrial Economic Complex and presents different proposals that "converged to the joint activities of research, Education, Manufacturing, Health Care, Quality Control, Information and Administrative Management" (CONGRESSO..., 1994, 4). It is noticed that information is part of the areas considered important to strengthen the institution.

That year the creation of the Administration and Information, Computing and Communication Technical Councils was approved "with advisor character to CD/Fiocruz in the formulation of institutional policies in the areas of competence." (CONGRESSO..., 1994,5).However, the area of Information Technology, as already mentioned, still lacks an Institutional Policy.

Administrative decentralization was proposed in the management area, based on the premise that this "is an essential tool that enables increased efficiency and effectiveness of the Units." (CONGRESSO..., 1994, 17). It adds that the

> *decentralization should be a gradual process that takes into account the priorities of the Unit, the existence of a planning and evaluation process, the availability and access to an information system* (CONGRESSO..., 1994, 17).

It is understood that such a management system should be unique, able to offer subsidies for the leaders. However, nowadays there are very little integrated information systems within the Unit, and almost 50% of Units with little or no integration between internal systems, and with no integration to corporative systems (± 40%).

The propositions made for the area of Scientific and Technological Information and Social Communication in Health contemplated:

> *Completion of the physical design and implementation of the Fiocruz Network logical project, linking all Fiocruz Units, departments and laboratories.*
>
> *Identification and priority in the implementation of institutional Databases. Preparation of Information Master Plan, the guidelines of which should govern the Master Plans of the Units.*
>
> *Preparation of Information Master Plan, the guidelines of which should govern the Master Plans of the Units.* (CONGRESSO..., 1994,15).

It is seen that this Internal Congress was concerned not only with the network infrastructure, but also with issues related to information, management and policies.

Four years later, in November 1998, the third Internal Congress was held with the theme: **Fiocruz as a Public and Strategic institution.** It can be seen through the report that Information Technology has its importance being increasingly presented and discussed, but with no conclusive actions.

The report of this Internal Congress has raised the need to accelerate scientific and technological production, "investing in the training of professionals in research and in production and management" (CONGRESSO..., 1998, 3) and adapt the new times. It is clear at this point that Information Technology is a key part in meeting these needs.

The fourth Internal Congress was held in November 2002 and the theme was **Science, Technology and Innovation for Quality of Life Betterment**. This Internal Congress relied, among others, on the principle that "information and communication are structuring factors for institutional development and FIOCRUZ relations with society." (CONGRESSO..., 2002, 5)

The final report from this Internal Congress brings a specific topic on Information, Communication and IT, and for the latter it presents four issues on national Health information systems, namely:

> *1)indicators' quality and data reliability; 2) standardization and interoperability of national systems; 3) low use of systematic analysis of information in the evaluation process and decision making in the three spheres of government; and 4) absence of treatment and dissemination of data and information for purposes of social control.* (CONGRESSO..., 2002, 32)

It is felt that the concern is with the Information Systems, but the necessary infrastructure to support them as a problem is not presented.

That having been said, it appears that Fiocruz pointed at this time as one of the problems of national information systems the lack of standardization and low (or no) interoperability between systems and it is repeated in this survey within Fiocruz.

Three years later, in October 2005 was held the fifth Internal Congress in order to build up the Four Year Plan from 2005 to 2008 which showed the main policies, strategies and goals that would guide the actions of the institution during that period. These actions were organized according to the various Fiocruz actuation areas and in line with the Multi-Year Plan of the Federal Government and the National Health Plan.

IT (information technology as was mentioned in the document) was presented within the large area of Education, Information and Communication in Health and C&T. However, the Four Year Plan states that

> *despite the advances, some challenges remain, mainly related to the need for greater integration between the activities of information, computers and communication at Fiocruz, as well as in relation to greater coordination between these actions and other purposive areas as, for example, education, and to overcome the fragility of information for decision making*.(CONGRESSO..., 2005, 60)

Let it be noted that Fiocruz thinks IT – as well as information and communication – as fundamental to Management, promoting better decision making.

The document also points to "a lack of uniformity policy in the implementation and distribution of human and financial resources in the area of Information Technology" (Fiocruz, 2005: 61). At that time, it was proposed the development and implementation of a "strategic plan for the continuous updating of computer resources (...) encouraging the development and implementation of free software applications." (CONGRESSO. .., 2005, 62) No plan that referred to this proposal was found.

In October 2010 was held the sixth Fiocruz Internal Congress and the theme was **Fiocruz as a public and strategic State institution for health**. This theme is reflected directly in the mission and mainly vision set in this Internal Congress.

The Congress presented as one of the challenges to health the fact that

> *the systems will need to be interconnected and provide the most diverse network interactions, and to this end, specific programs for the development of information technologies applied to health should be encouraged* (CONGRESSO..., 2010, 14)

However it presents no action to be taken to achieve this integration. It also added that in the

> *field of science, technology and innovation (STI), the trend is that government and private spending continue to grow and the S&T infrastructure to expand, strengthening coordination of the National System of Innovation and increasingly demanding the consolidation of information and communication policies.* (CONGRESSO..., 2010, 14).

With this it is understood that investment will be made in IT, but such investments should be made in advance to the needs seeking to fulfill at least the capacity planning for equipment.

Some of the macroprojects described in the report indicate the use or even the great importance that IT has. The macroproject *Information, communication and dissemination on health and science and technology for the UHS and society* expects as a result a "better technological communication quality through integration with the area of information and information technology at Fiocruz" (CONGRESSO..., 2010, 52).

In the general context of Fiocruz it is perceived that IT is now viewed with greater importance in the discussion of Internal Congresses. However, in the latter, less than 1% of participants were from the IT area. Although the area carries the future in public management innovation that will "achieve a high level of development" (CONGRESSO..., 2010, 73) and there is a macro project aimed to implement an "Integrated Information Management System", the IT area has most often been seen as an area that responds to immediate needs.

It should be noted that there were not found many actions registered for the IT field and from this vision of the whole, it is not possible to see that the records belong to a larger strategic plan for that area, because they do not even have an incremental consistency between the actions. While reading the documents, the fragmentation of actions by the Units became clear.

IT Profile at Fiocruz

We highlight that the IT profile at Fiocruz, presented below, represents all the Units, since there was a 100% return of questionnaires. It is noteworthy that the survey was based only on the data collection instrument without auditing the answers.

It can be seen from the data collected in Part I of the questionnaire that there isn't a hierarchy pattern for the IT area, i.e., the aforementioned area is directly linked to managers from different areas.

It is known that the units have different missions and it is clear from the data in Table 1, that the IT areas ascendancy orbits between the Administrative, Management, Information and Education areas, and although about 70% has as ascendancy the area of management, diversity implies possible different guidelines that the IT area should follow according to their direct ascendancy, because the interests of these Units are closely related to their missions.

However the search for the IT area organization by the federal government adopted an organizational conformation that fits the area as "ancillary activity" or "service" alongside other administrative functions, so it is seen that a little more than a third (34.8%) of the IT areas are characterized as a service.

Moreover, although the General IT Strategy (EGTI) for the biennium 2011-2012 has not pointed to anascending organizational structure to the IT area, has as one of its goals, specifically target five of objective three of the Internal Processes perspective, to propos an organizational structure for IT.

Thus, we can say that almost 80% of the Units of the institution, framed the area of IT with ascendancy aligned to EGTI because they are linked to the Management or Administrative areas.

Table 1: Characterization of the IT organizational integration in Fiocruz, Brazil, 2010

	Feature	*QTY*	*%*
1	Formalized chart		
	Yes	19	82,6
	No	4	17,4
2	IT area is present in this chart		
	Yes	18	78,3
	No	5	21,7
3	Presentation of IT in the organization chart		
	Service	8	34,8
	Sector	2	8,7
	Department	2	8,7
	Other	7	30,4
	Does not exist	4	17,4
4	Subordination of IT area		
	Administration	2	8,7
	Management	16	69,6
	Education, Information, Communication	4	17,4
	Undeclared / Multiple subordinations	1	4,3
5	IT area shares other activities		
	Yes	10	43,5
	No	13	56,5
5a	Areas that IT shares		
	Information	1	10
	Information and Communication	1	10
	Information and Planning	2	20
	Communication and Planning	1	10
	Information, Communication and Planning	4	40
	Other	1	10

Source: Elaborated from survey the questionnaire (2010).

The organizational structure, as well as the aligning with the Unit's mission, has a direct influence on its structure. It can be seen in Table 2 a frame of 314 IT professionals distributed among the Units, of which only 24.5% are civil servants which would represent little more than three per unit.

It is also evident in the survey that almost 50% of these workers have no specific degree in the area and also no master's or doctoral degree; 36.9% have only high school. This situation is also perceived by a large proportion of respondents, and from the total of 83 suggestions, 14.5% of them are aimed at training professionals.

Totalling 88 professionals working in customer service (microcomputer service) and a total of 11617 workstations, we have a ratio of approximately 132 stations for each professional.

A team of 108 development professionals is distributed in 23 Units. It is understood that it would be more productive if it was centered in conformity with the understanding of the whole (3.6%) of the suggestions to the Corporative Systems subarea.

Given the number of Information Security professionals (10) we understand that the ideal would be for each Unit to have at least one professional for this subarea. This is verified by means of Article 5 of Normative Instruction 04 from November 12, 2010, which requires the Information Security management to be performed by a public servant, and there are 18 (78.3%) units with no professional for this subarea; it is concluded that Fiocruz is far from the minimum required.

For the Training and Capacity Building subarea there are 16 professionals located in eight of the 23 Units. Thus, 15 Units do not have professionals in this subarea. It is necessary to increase the professional staff involved with the Training and Capacity Building, which is a concern of the respondents that through their suggestions positioned this subarea as the 3 rd most important.

Table 2: Characterization and distribution of IT staff in Fiocruz, Brazil, 2010

	Feature	*QTY*	*%*
1	Number of IT professionals		
	Total	314	100
1ª	Number of IT professionals by bond		
	Servant	77	24,5
	Outsourced	199	63,4
	Trainee	25	8,0
	Scholarship holder	7	2,2
	Other	6	1,9
1b	Number of IT professionals by discipline		
	Corporative Systems	108	34,4
	Computer Security (Information Security)	10	3,2
	Microcomputer Services	88	28,0
	Training and Qualification	16	5,1
	Technology / Infrastructure	83	26,4
	Other	9	2,9
1c	Number of IT professionals by training		
	Doctoral	4	1,3
	Masters	11	3,5
	Specialization	51	16,2
	Degree in IT	97	30,9
	Graduation	32	10,2
	High school	116	36,9
	Elementary School	3	1,0

Source: Elaborated from survey the questionnaire (2010).

On the question of the microcomputer structure, Fiocruz is outdated as compared to existing technology. According to data from Table 3, about 77% of workstations use the Windows XP operating system, however Microsoft®, holder of the copyright, reported that the mainstream support for this operating system ended in April 14, 2009. (MICROSOFT CORPORATION, 2011)

With only about 1% of stations running on Linux (Table 3), one can say that Fiocruz is distant from the adoption of free software. In contrast to this, we verify that nearly 60% of the equipment that provides services have Linux for this feature. Thus, we conclude that the subarea Infrastructure is more prepared to adopt free software than subarea Microcomputer Services.

However, it is noteworthy that only nine Units have almost 80% of the Linux servers in the institution. Furthermore, when calculating the percentage of outsourced workers by the total number of IT professionals we find that eight of those nine Units areat the top of the list. Therefore, it is possible to infer that the outsourced workers are better prepared in this

technology than public servants.

The process of virtualization of servers, which is to use equipment with a large processing capacity, memory and storage, is being used at Fiocruz. Virtualization is a technology that is in line with the concept of Green IT (BRASIL, 2010a). A total of 26.4% of servers are virtualized, however the management software of this technology is well diversified.

There is also a total of 132 web servers at Fiocruz, where two Units are responsible for about 60% of this total. Considering technical issues, it appears that this number is exaggerated when compared to the number of Units and therefore, it is suggested to unify the services providing internet pages. The concentration of these services does not imply only the unification of the equipment, it brings benefits with the expertise of the team that will keep them.

The same applies to the 87 database servers. However, four Units are necessary to achieve the same percentage as described above. Using the same proposed concentration of the services would be even more effective if also the database management software was unified. Four different ones are used, namely: Oracle®, MS SQL®, PostgreSQL®, MySQL®.

Table 3: Characterization of the IT equipment available at Fiocruz, Brazil, 2010

	Feature	QTY	%
2	Number of stations supported by IT area		
	Total	11617	100
2ª	Stations supported by the IT area per operating system		
	Windows 2007	876	7,5
	Windows Vista	1020	8,8
	Windows XP	8970	77,2
	Windows 2000 Pro	444	3,8
	Windows 98/95	89	0,8
	Linux	108	0,9
	Other	110	0,9
2b	Stations supported by the IT area per type of hardware		
	Desktop Intel	10442	89,9
	Desktop Mac	29	0,2
	Notebook Intel	818	7,0
	Netbook	237	2,0
	Macbook	11	0,1
	Thin client	80	0,7
3	Number of servers at the Unit		
	Total	458	100
3ª	Number of servers by operating system		
	Windows 2008	56	12,2
	Windows 2003	95	20,7
	Windows 2000	19	4,1
	Linux	272	59,4
	Other	16	3,5
3b	Number of servers by type		
	Real	337	73,6
	Virtual[1]	121	26,4
3c	Number of servers by service		
	File Server	37	10,5
	Print Server	13	3,7
	FTP Server	60	16,9
	WEB Server	132	37,3
	Mail Server	25	7,1
	Data Base Server	87	24,6
4	Total area of data storage in TB (Tera Bytes)		
	Occupied	59,14	27,6
	Free	155,10	72,4

Source: Elaborated from survey the questionnaire (2010).

It is also verified that Fiocruz is no different from the described in the National Health Information and Informatics (BRASIL, 2004), which recounts the great need to advance the integration of

information systems. At Fiocruz, 82.61% believe that their information systems have some or no integration with corporative systems. However, 43.48% of respondents state that the information systems of the Unit are partially integrated, i.e., some systems pass information to other Unit systems. In addition, 8.70% said that the systems are fully integrated.

Importantly, 22 out of 23 respondents reported that they have their systems installed in their own Units. And it is concluded that probably human and technological resources are wasted due to this fragmentation.

The lack of standardization is a problem faced by IT. A majority of respondents suggested that an effort would be made to standardize several components. It is suggested that a strategy is to be outlined to standardize the programming language of information systems, for 19 (82.61%) Units used the PHP® in developing their information systems. JAVA® is the second most widely used language: 11 (47.83%) Units.

Table 4: Characterization of the IT systems available at Fiocruz, Brazil, 2010

	Feature	QTY	%
5	Degree of integration of the Unit systems		
	Fully Integrated	2	8,7
	Partially Integrated	10	43,5
	Some Integration	9	39,1
	No Integration	2	8,7
6	Degree of integration of the Unit systems with those of other Fiocruz Units		
	Fully Integrated	0	0
	Partially Integrated	4	17,4
	Some Integration	10	43,5
	No Integration	9	39,1
7	Language used in existing systems		
	. NET	5	21,7
	ASP	8	34,8
	C, C#, C++	2	8,7
	Clipper	2	8,7
	Cold Fusion	2	8,7
	Delphi	5	21,7
	Java	11	47,8
	Java Script	10	43,5
	PHP	19	82,6
	Visual Basic	3	13,0
	Power Builder	3	13,0
	Other	10	43,5
8	Where the major systems/services are hosted		
	In the Unit	22	95,7
	In another Unit	12	52,2
	Datacenter	1	4,3

Source: Elaborated from survey the questionnaire (2010).

From the survey we can say that the Units are not organized with regard to documentation. Only one Unit has stated that it has full documentation of information systems and two claim to have full documentation of the data network.

It was found by means of the data presented in Table 5 that 60.9% of the Units have said they have an Information Security Policy (ISP), but half of them do not have this policy documented. Since, according to IN 01 GSI/PR, such a policy has to be a “document approved by the authority responsible for the agency or entity of the Federal Public Administration, direct and indirect, with the goal of providing guidelines, criteria and support” (BRASIL, 2008d), it is possible to consider that about 70% have no such ISP.

For the case that a user needs a problem to be solved by the IT staff, it is important that there is a call opening procedure and that it remains registered in order to create a knowledge base. (OGC, 2007, 91). It is noticed that in this aspect, only one Unit does not have a calls system (helpdesk); however, slightly more than half (52.2%) of the Units have not documented the procedure for opening and tracking of calls.

It is also evident that the systems development subarea is very behind with respect to

organization, for in addition to there being almost no documentation of systems, only two Units use a systems development methodology, namely: Based on UML (Unified Modeling Language) and ASD (Agile Software Development).

Table 5: With respect to IT policies, processes and procedures in Fiocruz, Brazil, 2010

	Feature	QTY	%
1	Data network documentation		
	Total	2	8,7
	Partial	14	60,9
	Non Existant	7	30,4
2	Systems documentation		
	Total	1	4,3
	Partial	13	56,5
	Non Existant	9	39,1
3	Information Security Policy		
	Yes	14	60,9
	No	9	39,1
3a	Documentation of the Information Security Policy		
	YES	7	30,4
	No	7	30,4
	Not applicable	9	39,1
4	Backup and Restore Policy		
	Yes	16	69,6
	No	7	30,4
4a	Backup and restore policy documentation		
	YES	5	21,7
	No	12	52,2
	Not applicable	6	26,1
5	Technical calls system		
	Yes	22	95,7
	No	1	4,3
5a	Documentation of the calls opening		
	YES	10	43,5
	No	12	52,2
	Not applicable	1	4,3
6	Software development methodology		
	Yes	2	8,7
	No	21	91,3
6a	Which		
	Based on UML (Unified Modeling Language)		
	ASD (Agile Software Development)		

Source: Elaborated from survey the questionnaire (2010).

Based on the responses received and consolidated in Table 6 it was found that the Technical IT Subchambera and Technical IT Forum reached first place, having both achieved the same degree of importance, 23% each. Almost tied, the TI-L List of e-mails (17%) and Virtual Community (16.3%) came behind the first two. Informal contact, with 12.6% and other formats (8.1%) were in the end.

It is possible – and surprising – to highlight that IT professionals give more importance to the exchange of presence information, leaving electronic forms in the background.

One sees also, from the collection of suggestions for the IT department to develop more, fulfilling the mission of the Unit and Fiocruz that **integration** (19.3%) is a gap that must be bridged (see Table 7). On the other hand change in **management** (25.3%) is the issue that deserves most attention. Some respondents (6.02%) suggested that the management of IT should be centralized (Table 7). Thus, IT would function with a centralized management, but with actions implemented locally by Units. In addition to this, some technical centering actions (7.23%) would bring about resources saving, both human and financial from the equipment consolidation.

It is also important to **train / qualify** (14.5%) the IT staff. However it must be ensured that, in accordance with Article 12 of Instruction No. 2, from April 30, 2008, that works under Instruction

No. 4, from November 12, 2010,

> *The contracting agency or entity, (...) should establish the obligation of the contractor to promote the contract transition (...) and may require, including, the training of the contractor technicians or from the new company that will continue to perform the services.* (BRASIL, 2008c).

In addition, item F of the Labor Inputs worksheet enables the service provider to present the cost for Training/Qualification/Recycling.

We conclude that it is extremely important to qualify/train public servants who work in IT – 77 in total – both technically and managerially.

For some of the suggestions of the subareas of Technology/Infrastructure (8.4%) and Corporate Systems (3.6%) we could notice that 60% of the suggestions for these two subareas were directed to the unification of resources. It was found that the creation of a Datacenter for Fiocruz as well as a single team of systems development are issues that deserve attention in the Information Technology Master Plan.

The Governance category is also noteworthy. According to the IT Governance Institute (ITGI) IT governance is defined as "the responsibility of executives and senior management, consisting of aspects of leadership, organizational structure and processes to ensure that the organization's IT area will support and enhance the organization's goals and strategies." (ITGI, 2007, 5). However, it was found that 13.3% of the suggestions in this category were related to the use of the COBIT 4.1 process model.

Computer Security with only 2.4% of the suggestions, as well as microcomputer service with 1.2% merit special attention. As described, the Computer Security subarea has only 3.2% of professionals and this may be a reason for it not having had many suggestions for this area. However, it is important for this area to receive special attention because EGTI 2011-2012 has recommended in its goal number 6, that it is necessary to "Promote the Safety of Information Technology and Communications in the organs of the SISP members." (BRASIL, 2011). However it is not possible to use the same reasoning for the amount of suggestions that the microcomputer Service received, since it has 28% of IT professionals, thus being second in number of professionals.

Customer focus is a principle for quality programs; technical standards such as the ISO 9000:2000 family have customer satisfaction as its main feature. Therefore, it is possible to infer some possibilities for this meager number of suggestions: The subarea does not know the expectations of users or this subarea needs no improvement. Even without a detailed study it is possible to affirm that the expectations of users towards the use of information technology and communication are not known.

Table 7: Suggestions for the IT department at Fiocruz, Brazil, 2010

Category	QTY		%	
Management	21		25,3	
Management Centralization		5		6,0
Management		16		19,3
Integration	16		19,3	
Training	12		14,5	
Governance	11		13,3	
Infrastructure	7		8,4	
Technical Centralization		3		3,6
Infrastructure		4		4,8
Policies	7		8,4	
Vision	3		3,6	
Corporative Systems	3		3,6	
Technical Centralization		3		3,6
Information Security	2		2,4	
Micro computer service	1		1,2	
Grand Total	83		100,0	

Source: Elaborated from survey the questionnaire (2010).

FINAL THOUGHTS

This research provides support for the maintenance of the IT Master Plan.

However, it is perceived that Ordinance No. 11 refers to the Master Plan as a document that provides **rules** and **guidelines** and for such needs gradual and slow updating. It is thus perceived that this also subsidizes the construction of an Information Technology Strategic Plan (PETI), which would present strategies and actions for the area.

After achieving the goals set, it was realized that Fiocruz still has a few gaps with respect to the subareas that make up the IT as well as in its management.

It appears from the survey, that IT at Fiocruz lacks a clear plan for continuing education for its staff aimed not only at technique, but also to skill workers in management, for according to Instruction No. 4 (12/11/2010) the whole team responsible for hiring – planning, selection and management – is composed of civil servants. (BRASIL, 2010b)

Although the goals have been reached it is important to emphasize that the study of certain issues should be deepened. As described above, it is necessary to establish a continuing education plan, however there is a need for further analysis, as this survey found the formation of human resources without worrying about who had which training, that is, it could not be determined, for example, if the four experts who have Ph.D.s are civil servants or not.

It was also found that over time, the discussions at the Internal Congresses have increasingly involved the IT area. However, IT has been discussed in the wake of other issues. Even being seen as the middle area, it is important to remark that this area could/should be ahead of the demands.

Among the subareas described in this study, it was realized that the area of Corporative Systems is the one that requires the most effort to organize. Probably such evidence is perceived because it is very strategic to enable the institution to achieve its mission.

From this research it appears that the IT department should have a structure that would allow it to work as described in the IV Internal Congress on the Management and Planning System:

> *Under the current administration, a significant effort is underway to build a mindset for planning and implementing a Decentralized Planning System, coordinated by the central level.* (CONGRESSO..., 2002, 39).

Thus, it is proposed that Fiocruz should have a central IT department for some of its attributions, like the case of the Corporative Systems sub-area, as well as Infrastructure/Technology. That is, for the IT field to work in an integrated manner and to meet the institution's mission, it is important that it has a central area that determines the policy with the Units, covering rules of technology use, system characteristics, infrastructure characteristics, information security, while the units would be responsible for information technology services.

From this research and analysis, we conclude that the Information Technology strategic alignment has the power to enhance the performance of Fiocruz in the Unified Health System Moreover, this is an important challenge to be faced in an institution that has as its mission to guide strategic actions in health and needs to work with information and become competitive within the CEIS.

Conflict of Interests

Authors have declared they have no conflict of interests.

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Notes

1. The most common inconsistencies appeared in Part II of the questionnaire: The total amount of machines or workers reported wasn't the same as the sum of the parts. Ex.: Total supported equipment: 100. The sum per operating system: 110.

2. MS Excel© is a trademark owned by the Microsoft company.

3. Part V of the questionnaire contains the question: In general, what suggestions would you give for the IT department to develop more, and fulfill the mission of its Unit and Fiocruz?

4. Capacity planning is the process of determining the technological capacity needed to meet new demands for their services.

5. Mainstream Suport includes: opening of incidents, security update, and general updates.

6. To learn more about Database Manager Software, please visit the following links:
Oracle (http://www.oracle.com/);
MS SQL (http://www.microsoft.com/sqlserver);
PostgreSQL (http://www.postgresql.org);
MySQL (http://www.mysql.com)

7. Virtualization Management Software used: VMWare, XEN, Hyper-V and Virtual Box

8. To learn more, visit http://php.net

9. To learn more, visit http://www.java.com/

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