



THE GOVERNANCE OF INFORMATION TECHNOLOGY IN SUPPLEMENTARY HEALTH PLAN OPERATORS IN THE STATE OF CEARÁ

Wellington Sousa Aguiar

wellington@tecsist.com

Estácio de Sá University, Rio de Janeiro, RJ, Brazil.

Antonio Augusto Gonçalves

augusto@inca.gov.br

Estácio de Sá University, Rio de Janeiro, RJ, Brazil.

Claudio Pitassi

claudio.pitassi@gmail.com

Estácio de Sá University, Rio de Janeiro, RJ, Brazil.

ABSTRACT

Modern organizations increasingly rely on information technology (IT) to support their transactional processes and business strategies. The objective of this article is to evaluate the impacts of the implantation of IT governance in the segment of health plan operators (OPS) based in the state of Ceará as support for compliance with the norms of the National Health Agency (ANS), through a qualitative case study for descriptive and applied purposes. The theoretical framework was based on a review of the literature on important IT governance frameworks applied in the supplementary health market in Brazil and the regulation imposed by ANS regarding IT. Semi-structured interviews were conducted with the IT managers and IT user areas of these companies. The results were obtained from the triangulation of the interviews, direct observations and documentary analysis, whose evidences were treated by content analysis. The conclusions indicated that IT governance has a strong impact on quality and planning in meeting ANS standards, but the operators surveyed still do not explore all the available potential, with several levels of maturity and many opportunities for evolution.

Keywords: IT Governance; Information Technology; Supplementary Health Plans; National Health Agency.



1. INTRODUCTION

In the early 1990s, faced with the reckless attitude of some executives, it became clear the need to ensure greater security for shareholders, particularly minority shareholders. To date, there were no established patterns of control over the management of organizations, which gave rise to fraud and systematic disobedience of the rules established by regulatory bodies. However, thanks to strong US economic growth and high corporate profitability, corporate governance has gained little focus on management models of organizations.

With the crises of Mexico, Asia, Russia, among others, investors changed their behavior, demanding that those responsible for management clear rules for mediation of interests that involve the allocation of resources in organizations. It was only after the year 2000, with a series of relevant facts around the world, such as the millennium bug, the internet bubble, fraud and crimes against the economy, that corporate governance plays a central role in the business management models. Among the new rules, the Sarbanes-Oxley Act stands out, the adequacy of which is now required for the trading of shares of the stock in the New York Stock Exchange (Mansur, 2007).

Information technology (IT), present in all contemporary organizations, regardless of size and nature, plays an increasingly important role in the execution of transactional and control processes and, consequently, in the support to adherence to the rules imposed by governmental and sectoral laws and regulations. Lunardi et al. (2014) found that companies that have adopted IT governance practices improved their performance by considering several dimensions, resulting in improved profitability. Public organizations have also benefited. Juiz et al. (2014) concluded that the use of an IT governance structure in a public entity helps in achieving the goals of transparency and accountability for IT assets.

Historically, the public health system in Brazil stands out due to the evidence of poor quality of care, scarce and precarious equipment, and unprepared or discouraged medical teams to offer a good health service to the population. The discussion of the causes that triggered this situation is not in the scope of this article, but the consequences of this situation have opened space for the consolidation of private health plans and insurance, which make up the supplementary health market, which have occupied an increasing space in the Brazilian health system (Pereira Filho, 1999). The increasing judicialization of health rights, both in the scope of the Unified Health System (SUS, acronym in Portuguese) and in the health plan operators (OSP, acronym in Portuguese), brings even greater pressures for the health system ba-

lance (Carlini, 2014).

The supplementary health sector, which began to gain relevance since the 1960s with the advance of formal work in private companies, is made up of health plan operators, doctors, dentists, nurses and other health professionals. It involves hospitals, laboratories and clinics in a health care network that serves consumers of private medical and dental health care plans (Machado et al., 2017).

In recent years Brazil's supplementary health sector, the world's second largest health care provider reached 72,000 users in June 2015. On this occasion, the National Health Agency (ANS) registered 1,390 active supplementary health care providers, of which 1,013 were health care plans and 377 were exclusively dental plans. Among the health plan operators, the seven largest, all with more than 1,000,000 users, held more than 31% of the beneficiaries at the time; among the operators that operate exclusively in the dental plans, the concentration is even greater, since nine of them, all with more than 300 thousand beneficiaries, hold more than 60% of the market (ANS, 2015).

Insofar as they operate in a heavily regulated sector and subject to a growing process of judicialization, compliance with ANS standards and the improvement of the quality of services become critical.

Given the context, the objective of this article is to evaluate the impacts of the implementation of IT governance in the OSP segment with headquarters in the state of Ceará as support for compliance with ANS standards. It is important to point out, in order to highlight the relevance of the study, that failure to comply with the ANS rules may result in fines, interventions, suspension of the sale of plans, and even cancellation of the operator.

2. THEORETICAL REFERENCE

2.1 Corporate governance

The implementation of corporate governance has become a must after the the bursting of scandals in early 2002, involving organizations such as Enron, Worldcom and Tyco, which have caused declines in stocks in the United States and major markets worldwide, thus strengthening stakeholder compliance practices (Griffith, 2016).

According to the Brazilian Institute of Corporate Governance, corporate governance can be defined as the system by which companies and other organizations are



directed, monitored and encouraged, involving relationships between partners, board of directors, board of executive officers, supervisory and control bodies and other stakeholders (IBCG, 2016).

According to Weill et Ross (2006), the areas portrayed in Figure 1 act in the processes covered by corporate governance.

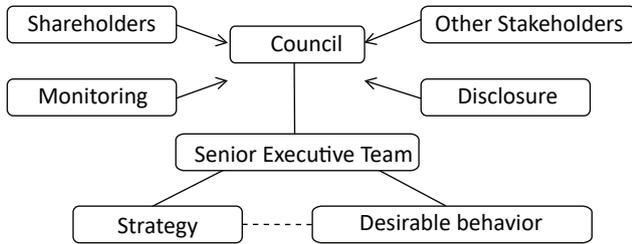


Figure 1. Corporate governance environment
 Source: Weill et Ross, 2006

The Sarbanes-Oxley Act, known as SOX, emerged in 2002 to change the global governance landscape, creating stricter auditing standards and new requirements in the stock market. SOX was designed to inhibit accounting fraud and to compel CEOs and CFOs to sign the financial statements, certifying and attesting to the effectiveness of their organization’s internal controls and procedures. SOX required a strong re-adaptation of the corporate governance mechanisms of organizations with agency problems (Gu et Zhang, 2017), which may influence the redesign of applied regulation in emerging economies (Goel *et al.*, 2017).

2.3 IT Governance

IT governance was heavily influenced by the discussions that took place within corporate governance, pro-

posing mechanisms to increase the security, tracking and transparency of IT processes in organizations (ITGI, 2003). According to Weill et Ross (2006), effective IT governance must address three issues: what decisions should be made to ensure effective management and use of IT? Who should make these decisions? How will these decisions be made and monitored?

Five key decisions are interrelated and require linkage for effective IT governance as outlined in Table 1.

For Kooper et al. (2009), there are two factors that limit the adoption of IT governance frameworks in organizations: the concept, since IT governance was developed by auditors and not by IT professionals; and how companies apply the concepts of IT governance, focused on control activities, ignoring the generation of value to the organization.

From its genesis, IT governance aims to ensure alignment between business interests and IT responsibilities by controlling and deploying IT strategy. Therefore, this strategy should be designed, planned and supported by top management, business management, and IT management to provide the necessary support to the organization’s business (Affeldt et Vanti, 2009; De Haes et Grembergen, 2004; Weill et Ross, 2006).

After nearly 30 years of matured formal and informal IT governance mechanisms in the organizational environment, where efforts were focused on the control and compliance mechanisms of regulatory bodies, evidence of the need to align it with IT governance and strategic planning are increasing, involving technical, methodological and behavioral aspects, especially those related to organizational culture (Wu *et al.*, 2015).

Corporate governance dictates corporate strategies that will guide IT governance activities. This, in turn, will

Table 1. Key IT Governance Decisions

Decisions about the principles of IT High-level statements about how IT is used in business		
Decisions about IT architecture Logical organization of data, applications and infrastructures, defined from a set of policies, relationships and technical options adopted to obtain the standardization and the desired technical and business integration.	Decisions on IT Infrastructure IT services coordinated centrally and shared to prove the company’s IT capacity.	Decisions about IT investments and prioritization Decisions about how much and where to invest in IT, including project approval and justification techniques.
	Business Application Needs Specification of the business need for IT applications acquired on the market or internally developed.	

Source: Weill et Ross, 2006



be guided by the IT committees, which will determine the actions and tools to be used in each area covered by IT, as described in Figure 2 (Schiavon *et al.*, 2010).

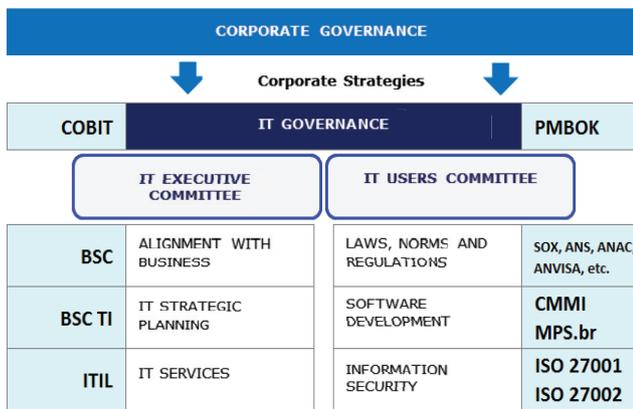


Figure 2. Governance Framework and its support tools by area
Source: Schiavon *et al.* (2010), adapted by the author.

As can be seen in the framework proposed by Schiavon *et al.* (2010), the complementarity of the tools applied in each area will be crucial to the success of IT. In this sense, it can be emphasized that the main objective of IT governance is to ensure that the services of the area support the strategic objectives of the company.

Nfuka *et al.* (2011) proposed a model presenting the critical success factors for IT governance effectiveness, among which: (i) the involvement and support of top management; (ii) the commitment of the stakeholders; and (iii) senior management's understanding of business objectives, the role that IT plays in achieving them, and in making that role perceived by managers.

Tallon *et al.* (2013) argue that IT governance consists of the management of physical IT artifacts, such as hardware and networks, and intangible assets such as software, and that information as an IT asset needs a diverse approach in order to be effectively governed.

The use of best project management practices to improve IT governance is highlighted in the scientific literature (Sirisomboonsuk *et al.*, 2018). Project Management Body of Knowledge (PMBOK) Guide, is an international standard of best practice in project management. A standard is a document that defines standards, methods, processes, and practices. This guide constantly evolves from the best practices reported by project management professionals (PMI, 2008).

The Project Management Institute (PMI, 2008) defines a project as a temporary effort to create a unique product, service or result that only ends when the ob-

jectives are achieved or when it is concluded that these objectives will not or cannot be achieved and, thus, the project ends; or when the project is no longer needed. The PMBOK presents several concepts about project management, but this guide is not a methodology, it is a set of knowledge and guidelines for managing projects, collaborating for their success. The PMBOK groups the best practices in groups of processes, areas of knowledge, with their inputs, outputs, techniques, and tools (Sirisomboonsuk *et al.*, 2018).

The Information Technology Infrastructure Library (ITIL) was created from the need to standardize IT processes for outsourcing. It is based on the experience of various professionals from public and private organizations worldwide, so it is adopted by large public and private organizations in its segments of activity. In Brazil, large organizations have also adopted this standard of IT management, such as Banco do Brasil Staff Assistance (CASSI, acronym in Portuguese), Companhia do Metropolitan de São Paulo (Metrô-SP), Federal Data Processing Service (Seprop), Sonopress, Banco Real/Santander, TIM, Carrefour, Odebrech, Roche, Alcoa, Santander Banespa, Philips, and Orbitall, according to news and success stories published in the specialized press (Magalhães *et al.*, 2007).

As highlighted by Fernandes *et al.* (2012), the main goal of ITIL is to provide a knowledge of the best practices of IT service management according to the service life cycle logic. Such practices, tested and validated by the market, can be used by both companies that wish to improve their IT operation, as well as those that are starting an IT operation. Adopting ITIL can help the company achieve a greater degree of maturity and quality in the use of IT assets, including information systems and IT infrastructure, aligned with the needs of customers and users.

The Control Objectives for Information and Related Technology (COBIT) was created by the IT Governance Institute (ITGI) in the 1990s as an educational resource for chief information officers (CIO), senior management, IT management and control professionals in order to guide these professionals in the management and control of IT (ITGI, 2007). To help organizations successfully address corporate challenges and regulatory requirements, ITGI published COBIT 4.1 in 2007 with a focus on control objectives and verification and reporting processes.

COBIT provides several models and resources for IT asset management. It stands out for being independent of the adopted platform and for not having any restriction as to the type of business of the organization. The COBIT best practice model defines 34 processes distributed



in four domains: Planning and Organization; Acquisition and Implementation; Distribution and Support; and Monitoring (Putri et al., 2017).

COBIT is designed to assist three distinct groups: managers who need to assess risk and control IT investments; IT users who need assurance that IT services will meet their internal and external demands and be well managed; and for auditors who rely on COBIT to assess the level of IT management and guide the organization's internal control areas (Putri et al., 2017).

3. METHODOLOGY

From a management perspective, the incorporation and use of IT involves cognitive and organizational aspects that require special care in management research (Pitassi et Moreno, 2009). In line with this understanding,

the research presented in this article used a qualitative approach, since it is the most adequate to investigate aspects related to the perception of the different subjects involved in the implementation of IT governance in health organizations.

The qualitative approach investigates in detail the phenomena of the studied environment and the researcher lives and knows the reality of this group or environment. In qualitative research, the researcher participates, understands and interprets (Michel, 2009). In this way, we tried to allow the emergence of inductively collected aspects of the interviewees' speeches (Creswell, 2010).

The research method used was a multiple case study of OPS based in the state of Ceará, enabling comparisons between them. Data were collected through ten interviews supported by semi-structured scripts, with five managers who hold executive positions in the IT areas

Table 2. Profile of respondents

IDENTIFICATION	PROFILE AND INFORMATION
IT_MANAGER_1	Has been the System Development Coordinator since 2009, leading a team with 16 systems analysts; has been in the company since 2005. Graduated in Accounting Sciences and specialist in Project Management.
USER_MANAGER_1	Has been the Actuarial Manager and Sales Administrator since 2008, leading a group of seven actuaries; has been in the company since 2005. Holds a degree in Actuarial Sciences, a post-graduate degree in Business Management and a master's degree in Finance and Insurance (UFC).
IT_MANAGER_2	Has been an IT Manager since 2006 and has been in the company since 2004 leading a team of 35 IT professionals; has a bachelor's degree in Computer Science (UNIFOR) and an MBA in IT Governance and Strategic Management.
USER_MANAGER_2	She has been the Director of Registration and Billing since 2008, when she joined the company, leading a team of 60 employees. She is graduated in Computer Science (UFC) and specialist in Computational Methods (UFC). She has extensive experience in IT, having worked more than 20 years with systems development.
IT_MANAGER_3	IT manager since 2005, has been in the company since 1995, and leads a team of 105 professionals. Graduated in Computer Science (UNIFOR), MBA in Business Management (FGV) and master's in applied informatics (UNIFOR).
USER_MANAGER_3	Manager of Strategic and Actuarial Information since 2006 when he joined the company to lead a team of ten employees. Graduated in Veterinary, Administration and Public Administration, has a degree in Finance, IT and Foreign Trade and a master's degree in Administration and Controllershship.
IT_MANAGER_4	IT Superintendent since joining the company in 2009, leading a team of 40 employees. Graduated in Computer Science (UNIFOR), specialist in Information Management and master's in applied informatics (UNIFOR).
USER_MANAGER_4	An actuarial Manager since 2010, he has been in the company since 2009. Leads a team of four people, holds a degree in Actuarial Science and an MBA in Financial Management.
IT_MANAGER_5	In the company since 1990, he holds the position of Technology Manager since 2009, leading a team of 16 IT professionals. He has a bachelor's degree in computer science (UNIFOR), post-graduate in Software Engineering (UNIFOR) and a master's degree in Applied Computing (UECE).
USER_MANAGER_5	He has been in the company for less than a year to deploy the Project Office, managing a team of four. He holds a degree in Computer Network Management, specialization in Telematics and an MBA in Project Management.

Source: Own production

UFC: Federal University of Ceará; UNIFOR: University of Fortaleza; FGV: Getúlio Vargas Foundation; UECE: State University of Ceará; MBA: Master of Business Administration. (Acronyms in Portuguese)



of the OPS and five managers of direct IT user areas with knowledge and experience in the supplementary health sector. Table 2 presents relevant information on the profile and experience of the respondents. In this work, a fictitious identification was used for each interviewee, aiming to preserve their identities and their companies.

According to Yin (2010, p.39), the case study is an “empirical investigation that investigates a contemporary phenomenon in depth and in its real-life context [...] specifying when the boundaries between phenomenon and context are not clearly evident”.

The qualitative case study requires the use of several techniques of data collection and evidence. In this research, the data were collected by triangulation of: i) **semi-structured interview**: used in the field research by means of a script structured by topics, in order to approach the whole context of the research; they were fully recorded by digital equipment; open questions were transcribed and interpreted to support the proposed research goal; ii) **documentary research**: records, documents, policies, ANS standards, company and ANS portals, and ANS information sheets were collected, etc.; iii) **direct observation**: during the field visits behavior, attitudes and visual information of the work places were detected.

The units of analysis of this multiple case study were the IT governance practices and tools used by the reviewed OPS, including dentistry, based in Fortaleza, capital of the state of Ceará, but operating in several states of the federation. They are representative companies in the health insurance market in Brazil. Table 3 presents a summary of the OPS without identifying them, keeping their names confidential, according to the commitment made in the invitation letter sent to each company participating in the research.

In the analysis of the results, the Supplementary Health Performance Index (IDSS, acronym in Portuguese) was used to compare the cases studied. The data collected from the interviews were treated through analysis of categorical content (Bardin, 1991). The categories of analysis were collected from the literature review on the tools and models of IT governance available to managers. The interviews were transcribed and analyzed in the same sequence as the script, which was used only as a guide. The wealth of the information collected in the field, the maturity of the companies, and the great experience of the interviewed facilitated the grouping and the analysis by theme.

4. PRESENTATION AND DISCUSSION OF RESULTS

4.1 National Health Agency (ANS, acronym in Portuguese)

The creation of ANS was a milestone in the regulation of the health sector in Brazil. It is linked to the Ministry of Health, but has administrative, financial and political autonomy and legal power to enforce its resolutions (Brasil, 2000). The purpose of the ANS is to promote the defense of the public interest in the supplementary health care, in a process of regulation marked by the economic perspective, which aims at the organization of the market and the stimulation of competition, as well as the assistance, aimed at guaranteeing the interests of consumers in this market (ANS, 2013).

Private insurance is supplementary because it sells health insurance plans and sells services already covered, in theory, by public systems, such as SUS in Brazil. In the country, 62% of hospital services and 92% of support

Table 3: Summary of reviewed OPS

DESCRIPTION	CASE I	CASE II	CASE III	CASE IV	CASE V
Occupation area	Exclusively dental	Medical hospital	Medical hospital	Medical hospital	Medical hospital
Modality	Group dentistry	Group medicine	Medical cooperative	Self-management	Medical cooperative
Number of users	More than 600,000	More than 2,500,000	More than 350,000	More than 150,000	More than 52,000
Main states	CE, PI, MA, PA, AM, RN, PB, PE, AL, BA, SE and GO	All over Brazil	CE, PI, MA, RN, PB, PE, AL, BA, SE, DF, PA, RJ and SP	CE, PI, MA, RN, PB, PE, BA, SE and MG	CE
Ranking in Brazil (number of users)	Among the 5 largest	Among the 3 largest	Among the 20 largest	Among the 80 largest	Among the 200 largest

Source: Own production



and diagnostic units are privately owned. Only outpatient units have a state majority (78%).

The ANS publishes standards that must be fulfilled by the OPS through so-called compromises and interactions. One of the main commitments relates to the sending of information for the control and participation in programs to stimulate the improvement of the quality of services provided to clients. Among the information required periodically by the ANS are the OPS registration data, the cadastral data of all users, the user registration movements and clinical, surgical and laboratory appointments, and the accounting data of revenues and expenses in accordance with the chart of accounts defined by the agency.

All information must be generated and transmitted digitally, taking into account technical criteria of layout, data transmission, and information security. For the generation of this information, the IT areas of the OPSs need to be prepared and organized to meet the requests within the deadline and with the level of quality required by the ANS offices. Much of this information is shared and cross-referenced with other Federal Government agencies as a way of confirming the truth of the data provided or complementing them.

The ANS has the power to require technological procedures and constantly demand, with previously stipulated deadlines, technological activities to the OPS, such as requests for changes in systems, sending of data, and exchange of information. For example, customer cadastral information should be forwarded monthly with customer data (personal identification, address, and contractual identification). The OPSs have until the 5th of the month following the client's adhesion to the plan to send the data. The ANS makes available, upon request by OPS, conference files containing the data of all the clients that appear in the database of the Beneficiary Information System (SIB/ANS, acronyms in Portuguese).

The Product Information System (SIP, acronyms in Portuguese) is the instrument used by ANS to send information and to monitor the assistance provided to the beneficiaries. Sending the SIP is mandatory for all OPSs. The information should be sent to ANS through an XML file. The Periodic Information Document of the Operators of Health Care Plans (DIOPS, acronyms in Portuguese) was created with the purpose of collecting registration and financial information for the follow-up of the OPSs with regard to economic-financial health and the maintenance of cadastral data.

ANS also requires that OSPs maintain the continuity of IT services so that customers can access information

from the plan at any time via the WEB or through call centers. In order to meet these demands, it is important to manage the portfolio of IT projects, with well-defined prioritization so that deadlines are met and fines or penalties are avoided. The PMBOK is the most used model for the management of these projects.

In 2007, ANS created the Supplementary Health Qualification Program to evaluate the quality of OPS, based on the IDSS. The objective of ANS, with the program, is to improve the quality of the services provided by the operators, to guarantee a balance in the market and to help the consumer when choosing a health plan. The IDSS classifies the operators by means of a score ranging from 0 to 1, divided into five bands: 0.00 to 0.19; 0.20 to 0.39; 0.40 to 0.59; 0.60 to 0.79; and 0.80 to 1.00.

According to Chart 1, the number of companies that achieved the highest IDSS scores increased from 2013 to 2014.

4.2 Health plan operators in Ceará

All respondents confirmed IT's participation in strategic business decisions, helping to decide and supporting with relevant information. A detailed examination of the speeches reveals different levels of competence, with different interpretations for what it means to participate in strategic decisions:

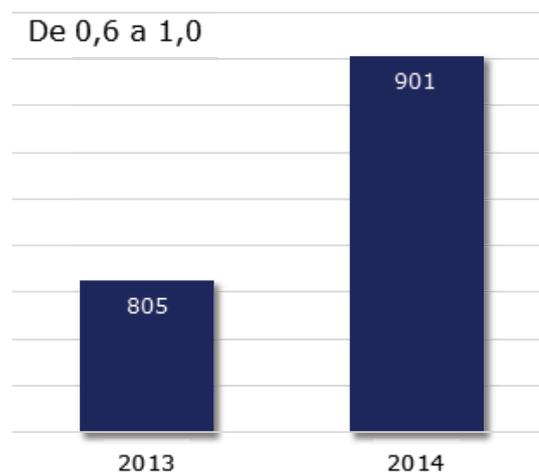


Chart 1. Set of operators with IDSS in the range of 0.6 to 1.0.

Source: ANS (2015).

“Yes, the IT area actively participates in the corporate governance process through monthly meetings, both for company performance appraisal and for monitoring and planning,



participating in strategic planning and annual budget planning. About three years ago, the IT area participated in this process". (IT_MANAGER_1)

"Yes, it participates in strategic planning meetings. There is always someone from IT participating in the prioritization of projects and definition of indicators, as well as other areas of the company." (USER_MANAGER_1)

The statements about the IT committees were those that presented the greatest weaknesses and divergences regarding the relation between IT and users, since IT managers confirmed the existence of IT committees, while the users' managers were unaware of the existence or disqualification of their activities and importance. This evidence, portrayed below, may indicate that the differences regarding the relevance of IT are still significant in the studied OPSs.

"There is, because IT is not only responsible for the activities of software development and service management. The whole communication part of the company, which is probably one of the most important budgets within the corporation, after the medical field, is under our care. Every investment that is made in IT goes through a financial planning process produced quarterly within a scope of corporate governance. This committee is formed by the Management Committee and by all the managers, at the time of forming the financial planning of the following quarter." (IT_MANAGER_2)

"No, as far as I know, there is no IT committee here in the company. If there is an IT committee I do not understand its actions." (USER_MANAGER_2)

The relational mechanisms between IT and other organizational units are, for IT governance, the determinants of good IT performance and are very positively correlated with good organizational performance (Tonelli *et al.*, 2015).

Through the responses of the interviewed managers, it was possible to see that most companies use IT governance mechanisms in some way, but none of them in their fullness or with great maturity. One company has demonstrated that it is already implementing some good practices, and that it has a well-defined medium and long-term planning for future deployments. Three companies have parts of IT governance deployed and want to

implement new strategies soon, even though they do not have a specific plan or project. The following testimonial shows how companies use parts of the methodologies, adapting them to their needs:

"With IT governance, we implement parts of ITIL, not completely, using the XMon tool, which is a suite that covers four ITIL disciplines. We have created the service portfolio and ITIL is well used in infrastructure and end user service. In the part of indicators we have used the methodology of project management based on the PMBOK, mainly in the area of BI (Business Intelligence) and in the area of strategic projects. In software development, on the other hand, we use project management, but using agile management methodology, SCRUM, adapted with some characteristics of the PMBOK, which is called SCRUMBUT, an adapted SCRUM. And it is always aligned with the business of the company." (IT_MANAGER_3)

It is easy to see the expression of concern of IT managers in the management of the project portfolio, because the volume of demands is high and the level of collection is very large. Most IT managers had, at the end of the language, the rules of prioritization that they should apply to the demanded projects. The following testimony reveals the high degree of maturity of IT areas regarding the use of project management tools:

"The company implemented the project development methodology about two years ago for all areas. IT already worked with project management. Deployment priorities are defined between the IT area and the various demanding areas and are always in line with the company's strategic planning, with system errors having higher priority, followed by legal and other demands." (USER_MANAGER_3)

Tables 2 and 3 present two worksheets that are used in one of the companies surveyed to assist in the prioritization of the IT projects that will be selected for execution in the following semester.

Table 1 presents an example worksheet, where each project is compared to the others on the importance, based on three strategic criteria (without authorization for disclosure). Projects with the highest number of victories are developed in the following semester.

Graph 2 presents another tool used to identify the most important projects. The GUT (Gravity, Urgency and



Graph 1. Matrix "X x Y"

PROJECTS	PRO- JECT 1	PRO- JECT 2	PRO- JECT 3	PRO- JECT 4	PRO- JECT 5	PRO- JECT 6	PRO- JECT 7	PRO- JECT 8	PRO- JECT 9	PRO- JECT 10	TOTAL
PROJECT 1		0	0	0	0	0	1	0	1	0	2
PROJECT 2	1		1	1	1	1	1	1	1	1	9
PROJECT 3	1	0		1	0	0	1	1	1	1	6
PROJECT 4	1	0	0		0	1	1	1	1	0	5
PROJECT 5	1	0	1	1		1	1	1	1	1	8
PROJECT 6	1	0	1	1	0		1	1	1	1	7
PROJECT 7	0	0	0	0	0	0		0	0	0	0
PROJECT 8	1	0	0	0	0	0	1		1	1	4
PROJECT 9	0	0	0	0	0	0	1	0		0	1
PROJECT 10	1	0	0	1	0	0	1	0	1		4

Source: Documents of the researched company

Graph 2: GUT Matrix (Gravity, Urgency, and Trend)

PROJECTS	EVALUATION	QUESTIONS (1-3-5)	G	U	T
PROJECT 1	25,667	Financial risk? (high/low/medium)	3	3	3
		Risk of legal penalties? (high/low/medium)	1	1	1
		How long have you been waiting in the execution queue?	3	3	3
PROJECT 2	34,333	Financial risk? (high/low/medium)	5	5	5
		Risk of legal penalties? (high/low/medium)	3	3	3
		How long have you been waiting in the execution queue?	1	3	3
PROJECT 3	29,444	Financial risk? (high/low/medium)	3	5	5
		Risk of legal penalties? (high/low/medium)	3	5	5
		How long have you been waiting in the execution queue?	1	3	1
PROJECT 4	18,333	Financial risk? (high/low/medium)	3	1	3
		Risk of legal penalties? (high/low/medium)	1	1	1
		How long have you been waiting in the execution queue?	1	3	1
PROJECT 5	11,222	Financial risk? (high/low/medium)	1	1	3
		Risk of legal penalties? (high/low/medium)	1	1	1
		How long have you been waiting in the execution queue?	1	1	1
PROJECT 6	29,444	Financial risk? (high/low/medium)	3	5	5
		Risk of legal penalties? (high/low/medium)	3	5	5
		How long have you been waiting in the execution queue?	1	3	1

Source: Documents of the researched company



Graph 3: Interpretative evaluation of authors.

AREAS OF APPLICATION Frameworks	CASE I	CASE II	CASE III	CASE IV	CASE V
	USES? EVIDENCE? ASSISTS?	USES? EVIDENCE? ASSISTS?	USES? EVIDENCE? ASSISTS?	USES? EVIDENCE? ASSISTS?	USES? EVIDENCE? ASSISTS?
CORPORATE GOVERNANCE	M B R	M B R	M B R	M R R	B R R
IT GOVERNANCE	B B B	R R B	B B R	R P P	N N N
PMBOK	B B B	B R R	B B B	B B R	P R R
COBIT	N P P	N P P	N P P	N P P	N N N
ITIL	B M B	B M B	M M B	B B B	P P R
INFORMATION SECURITY	R R R	P R R	R R R	P R R	P R R
Interpretive Assessment	11 GREEN and 04 YELLOW	07 GREEN and 07 YELLOW	10 GREEN and 05 YELLOW	06 GREEN and 06 YELLOW	01 GREEN and 07 YELLOW

USES? - It evaluates whether the company uses the framework totally, partially or not.

EVIDENCE? - It evaluates if evidence of the use of the framework was found, visualized or detected in the field research.

ASSISTS? - Evaluates whether the framework assists the company in meeting ANS standards.

Grade attributed by the author	1,0	2,0	3,0	4,0	5,0
		NO	LITTLE	CONFIRM	WELL/GOOD

N - No	P - Little	R - Regular	B - Good	M - Much
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Initials in Portuguese
 Source: Own elaboration

Trend) Matrix is a way of evaluating each project individually as to the gravity of the problem that the project will solve, the urgency of solving this problem for the company's business and the worsening of conditions if this problem is not resolved.

According to the IT manager, the Matrix GUT and Matrix "X x Y" tools are used as support for decision making to present a first version of project prioritization for the coming semester; however, projects are definitively prioritized at the IT Committee meeting, and adjustments can be made based on the sensitivity of the managers who form the IT committee.

In the informal conversations, meetings, interviews, and documents used to manage the projects that were

presented, it was easy to perceive and prove that the PMBOK is the framework most used by companies. It is important to note that, nevertheless, these effects and advantages are not perceived by the user areas; on the contrary, most of the user managers reported not knowing the methodology and the use by IT.

"I know they use a methodology, but I do not know what it is. It has certainly contributed to the demands of the ANS; the regulations that go to all the systems are altered upon these deliberations." (USER_MANAGER_2)

The COBIT framework is the least used by the IT governance of the companies surveyed. Of the 34 processes that make up COBIT, only three or four, usually focused



on the control function, are used. The processes with the most evidence during field research were: i) to monitor and evaluate IT performance; ii) to monitor and evaluate internal controls.

With the exception of one of the reviewed OPSs, all others use, on some scale, indicator panels, cash management or periodic reports to monitor IT performance. Although the use of COBIT does not summarize the presence of indicators, some statements report the contribution of the COBIT methodology to the adoption of more sophisticated control mechanisms, as can be seen below:

“All IT management personnel are formed and trained in COBIT and ITIL. The company funded all team training with more than one course. We have a structure of managerial and strategic indicators that are monitored monthly in the forum with the executive board and all superintendents; the technology has five indicators of performance and projects, and tactical indicators, with which management accompanies its teams. The tactical indicators were pointed by the COBIT methodology.” (IT_MANAGER_4)

Of the OPS surveyed, only one did not use ITIL. All the others have professionals certified in ITIL and have demonstrated knowledge, evidence and defended the advantages of its use. The internal documents evidenced the maturity of the use of this framework in meeting the demands of ANS:

“We have several ways to improve our internal ITIL processes: we have the internally developed call opening tool, which controls who opened them, and prioritizes and controls the level and time to execute them. This allows controlling quantities at the end of the month, - the number of calls that were opened and closed, and those whose deadline was expired. This generates some tactical indicators. In addition, we have market tools that control the full availability of assets: servers, links, desktops and all inventory of machines and software. In conclusion, we have several ITIL activities contemplated, but I cannot say that I have the ITIL process fully implemented. All these tools allow me to be within the deadlines and to meet these ANS demands.” (IT_MANAGER_4)

Given the critical nature of this issue for ANS, all companies demonstrated a high level of use of Information

Security, seeking constant improvements in this area, as can be seen in the following testimony:

“Today, as the operator is regulated by ANS and there is a standard that we have to follow, our websites are certified by Certisign. Following a standard required by ANS, our database is backed up on a daily basis, [...] besides the use of security standards for the composition of passwords, use of last generation operating system; everything so that customer data and data used by the service provider are always being kept securely.” (IT_MANAGER_1)

Information security is also perceived by IT user managers, who recognize the need and importance of this subject, as verified in the statements below:

“There is an entire system of access control, both to the functionalities via WEB and to the internal systems; the users have their profile determined in the system and they only access the functions and functionalities according to their profile; there is a password exchange control, which requires that the person revalidate the password and register again every month, all done automatically by the systems.” (USER_MANAGER_2)

Although reports and evidence show that some actions are taken to ensure information security, no company has implemented or plans to formally implement the best-known norms in the market, such as: NBR ISO/IEC 27001:2006 and 27002:2005. These standards have conceptually all the technical and legal requirements necessary to supply, with quality, the security of the information in any type of organization.

Based on the interviews, document analysis and participant observation during the visits, Graph 3 was elaborated from the consolidated evaluation regarding the use of each IT governance framework in the companies surveyed. It should be noted that the classification of the level “No” to “Much” was obtained qualitatively from the interpretative and collective effort of the authors of this article.

The classification ranged from one operator (Case V), who received only one green score (Good) and seven yellow scores (Regular), to the best operator (Case III), who received ten green scores (Good or Much) and five yellow scores (Regular). Table 6 represents an evaluation that is considered regular or good for the company that best applies IT governance and an evaluation considered insufficient for the company that least applies IT governance.



Graph 4. Dimensions assessed from IDSS.

IDSS	Supplementary Health Performance Index
STRUCTURE/OPERATION	Verifies the conditions of the offer of network of clinics, hospitals, outpatient clinics, laboratories, and diagnostic centers offered by health plan operators to care for their beneficiaries. In addition, it assesses the fulfillment of the technical and registration obligations of the operators with ANS.
DATA SUBMISSION	Corresponds to the degree of fulfillment of the periodic obligations of the operators regarding the due referrals of the data of the information systems: SIB, SIP, DIOPS, within the established deadlines.
CADASTRAL QUALITY	It is a measure of the quality of the registration data of beneficiaries of an operator, regarding the fields of identification of the beneficiary and identification of the plan to which it is linked.

Source: Own elaboration.

Table 4. Comparison of interpretive evaluation with IDSS 2014.

ASSESSED CASES	AVERAGE EVALUATION	AVERAGE IDSS: ANS Assessment in 2014	
		GENERAL IDSS	OPERATING STRUCTURE
THE BEST TWO	GOOD	0,75788	0,84508
THE WORST TWO	REGULAR	0,59422	0,694085

Source: Own elaboration.

In order to compare the results obtained, Graph 4 shows the ANS assessments reflected in the IDSS, which range from 0 (zero) to 1 (one). It should be emphasized that, in this research, only those indicators that directly involve IT were used.

Considering the operators that obtained the best concepts (Cases I and III) and the operators that obtained the worst concepts (Case IV and V), it can be seen in Table 4 that the qualitative evaluation constructed in this article from the evidence in the field is compatible with the IDSS calculated by ANS for these operators in 2014 (data for 2013).

5. CONCLUSIVE CONSIDERATIONS

The objective of this article was to evaluate the impacts of IT governance implantation in the OPS segment in Ceará state as support to meet ANS standards that involve IT. The analysis of the obtained results allows concluding that all the evaluated OPSs already implanted the IT governance, although they have different levels of maturity. As expected, given the penetration of IT use in contemporary organizations, it became clear that OPSs use IT to support processes that meet the demands of ANS.

The results show that, in fact, IT governance assists in meeting ANS standards, even for those operators that do not use the full potential of the tools analyzed in this

study. From the tools evaluated, the COBIT processes were those with the lowest level of utilization. It can be seen that the emphasis in the use of governance mechanisms, processes, and tools falls on the objectives related to information security and the control and monitoring of IT activities.

Although the focus of this article was to comply with ANS rules, which involve transactional processes and cadastral information, it was possible to perceive the less emphasis on the processes aimed at aligning IT projects with the needs of the business areas, considered a strategy objective of IT governance that is still flawed. This gap is even more relevant when one observes the difference of perception between IT managers and business managers when discussing this alignment and the management of projects critical to the business. As a suggestion to address this gap, the strengthening of IT committees and IT users is indicated.

In all the OPSs studied there is the opportunity to evolve in the implementation of processes or frameworks of IT governance. It should be noted that the interviewed managers indicated that they usually adapt the tools studied to the needs of their organizations, which may explain the choice of the most critical processes for the compliance objective to ANS rules.

According to the results obtained, it is possible to argue that the full use of IT governance can bring greater



control, transparency and security in meeting ANS standards. On the other hand, the low use or total absence of these frameworks can cause critical situations, such as: wrong prioritization of projects, projects without adequate management, poorly targeted IT infrastructure, and inadequate data and access security. However, full adoption of management systems, such as COBIT, may require efforts that many organizations are not prepared to implement, or even do not want to adopt, given the risks of tool bureaucratization.

Despite the representativeness of the cases studied, it is recommended, to further support the conclusions, to extend this research to operators of other states of the same or greater size, thus guaranteeing the confirmation of the data in other places. This new approach would allow the comparison of IT governance between states of the federation.

It would also be of great value to study the regulatory agency's perception of the IT governance of OPS. This type of research would bring valuable information to the operators, supporting the improvement of the services provided to their users. It would also be necessary to study IT governance in these organizations to evaluate the benefits of these frameworks in supporting the commercial and operational processes essential for this sector of the economy.

REFERENCES

- Affeldt, F. S.; Vanti, A. A. (2009), "Alinhamento estratégico de tecnologia da informação: análise e modelos de propostas para pesquisas futuras", *Revista de Gestão da Tecnologia e Sistemas de Informação*, Vol. 6, No. 2, pp. 203-226.
- Agência Nacional de Saúde Suplementar – ANS (2015), *Caderno de Informação da Saúde Suplementar: beneficiários, operadoras e planos*, jun., ANS, Rio de Janeiro, RJ.
- Bardin, L. (1991), *Análise de conteúdo*, Edições 70, Lisboa.
- Brasil (2000), Lei 9.961, de 28 de janeiro de 2000, cria a Agência Nacional de Saúde Suplementar – ANS e dá outras providências, *Diário Oficial da União*, 29 jan. 2000.
- Carlini, A. (2014), *Judicialização da saúde pública e privada*, Livraria do Advogado Porto Alegre, RS.
- Creswell, J. W. (2010), *Projeto de pesquisa: métodos qualitativo, quantitativo e misto*, 3 ed., Artmed, Porto Alegre.
- De Haes, S.; Grembergen, W. V. (2004), "It governance and its mechanisms", *Information Systems Control Journal*, Vol. 1.
- Fernandes, A. A.; Abreu, V. F. (2012), *Implantando a governança de TI: da estratégia à gestão dos processos e serviços*, 3 ed., Brasport, Rio de Janeiro, RJ.
- Goel, U.; Kumar, S.; Singh, K.; Manrai, R. (2017), "Corporate Governance: Indian perspective with relation to Sarbanes Oxley Act.", *Proceeding of the International conference on Economic and Development*, Vol. 1, pp. 60-72.
- Griffith, S. J. (2016), "Corporate Governance in an era of compliance", *William & Mary Law Review*, Vol. 57, No. 6, pp. 2075-2040.
- Gu, Y.; Zhang, L. (2017), "The impact of the Sarbanes-Oxley Act on corporate innovation", *Journal of Economics and Business*, Vol. 90, pp. 17-30.
- Information Technology Governance Institute – ITGI (2003), *Board Briefing on IT Governance*, 2 ed., ITGI, Illinois, disponível em: www.itgi.org. Acesso em: nov. 2012.
- Information Technology Governance Institute – ITGI (2007), *COBIT 4.1*, Rolling Meadows, IL.
- Instituto Brasileiro de Governança Corporativa – IBCG (2016), disponível em <http://www.ibgc.org.br/>. Acesso em: set. 2016.
- Juiz, C.; Guerrero, C.; Lera, I. (2014), "Implementing good governance principles for the public sector in information technology governance frameworks", *Open Journal of Accounting*, Vol. 3, No.1, pp. 9-27.
- Kooper, M.; Maes, R.; Lindgeen, E. R. (2009), *Information governance: in search of the forgotten grail*, PrimaVera Working Paper Series, University of Amsterdam.
- Lunardi, G.; Becker, J.; Maçada, C.; Dolci, P. (2014), "The impact of adopting IT governance on financial performance: an empirical analysis among Brazilian firms", *International Journal of Accounting of Information Systems*, Vol. 11, No. 2, pp. 397-414.
- Machado, C. V.; Lima, L. D.; Baptista, T. W. F. (2017), "Políticas de saúde no Brasil em tempos contraditórios: caminhos e tropeços na construção de um sistema universal", *Cadernos de Saúde Pública*, Vol. 33, Suppl. 2, pp. s143-s161.
- Magalhães, I. L.; Pinheiro, W. B. (2007), *Gerenciamento de serviços de TI na prática: uma abordagem com base na ITIL*, Novatec, São Paulo.
- Mansur, R. (2007), *Governança de TI: metodologia, frameworks e melhores práticas*, Brasport, Rio de Janeiro, RJ.
- Michel, M. H. (2009), *Metodologia e pesquisa científica em Ciências Sociais: um guia prático para acompanhamento da disciplina e elaboração de trabalhos monográficos*, 2 ed., Atlas, São Paulo.



- Nfuka, E. N.; Rusu, L. (2011), "The effect of critical success factors on IT governance", *Industrial Management & Data Systems*, Vol. 111, No. 9, pp. 1418-1448.
- Pereira Filho, L. T. (1999), "Iniciativa privada e saúde", *Estudos Avançados*, Vol. 13, No. 35, pp. 109-116.
- Pitassi, C.; Moreno, V. (2009), "O papel das disciplinas de sistemas de informação nos cursos de graduação em administração", *Revista de Administração Ensino e Pesquisa (RAEP)*, Vol. 10, No. 2, pp. 9-32.
- Project Management Institute - PMI (2008), *Guia PMBOK: um guia do conjunto de conhecimentos em gerenciamento de projetos*, 4 ed., PMI, Pensilvânia, USA.
- Putri, M. A.; Aknuranda, I.; Mahmudy, W. F. (2017), "Maturity evaluation of information technology governance in PT DEF using Cobit 5 Framework", *Journal of Information Technology and Computer Science*, Vol. 2, No. 1, pp. 19-27.
- Schiavon, M.; Lima, H. G. F.; Pires, S. R. (2010), "Construindo estruturas organizacionais de TI para a otimização da prática da governança de TI", In: 7^o CONTECSI: Congresso Internacional de Gestão da Tecnologia e Sistemas de Informação, FEA-USP.
- Sirisomboonsuk, P. et al. (2018), "Relationships between project governance and information technology governance and their impact on project performance", *International Journal of Project Management*, Vol. 36, pp. 287-300.
- Tallon, P. P.; Ramirez, R. V.; Short, J. E. (2013), "The information artifact in IT governance: toward a theory of information governance", *Journal of Management Information Systems*, Vol. 30, No. 3, pp. 141-177.
- Tonelli, A. O. et al. (2015), *It governance in the public sector: a conceptual model*, Elsevier, Springer.
- Weill, P.; Ross, J. W. (2006), *Governança de TI - Tecnologia da Informação*, Makron Books, São Paulo.
- Wu, S. P.; Straub, D. W.; Liang, T. (2015), "How information technology governance mechanisms and strategic alignment influence organizational performance: insights from a matched survey of business and it managers", *MIS Quarterly*, Vol. 39, No. 2, pp. 497-518.
- Yin, R. K. (2010), *Estudo de caso: planejamento e métodos*, 4 ed., Ed. Bookman, Porto Alegre.

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