

IT governance for public universities: Developing a model

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Abstract

Information technology (IT) has become essential in supporting the growth and sustainability of all types of organizations. Universities are one of those types that are more and more dependent on IT having a technological infrastructure made of heterogeneous technologies that turns IT Governance into a real challenge. The teaching-learning and research processes, nuclear for universities, require effective and efficient IT governance so universities remain competitive.

IT governance calls for the definition and implementation of formal practices at the highest level in the organization involving structures, processes and relational mechanisms for the creation of business value from IT investments. However, it is quite notorious the difficulty in defining and implementing those practices from frameworks such as COBIT, ITIL, ISO/IEC 38500, among others. The level of adoption of such frameworks at universities is quite low, superficial or limited in scope.

To address these issues, we propose, using design science research, the development of an IT governance model for public universities. The model will be designed having the appropriate mechanisms identified through survey research and case studies involving Portuguese and Brazilian public universities. We expect to contribute with a model having structures, processes and relational mechanisms suitable for the public sector universities with the guidelines for effective and efficient IT governance. Moreover, contributions to the body of knowledge, regarding the adoption of frameworks such as COBIT and ITIL, taking in consideration contextual and contingency factors, are also expected in what particularly relates to Portuguese and Brazilian public universities.

Keywords: IT governance; Public Universities; Design Science Research; Model.

Introduction

Information technology (IT) has become essential in supporting the growth and sustainability of all types of organizations (De Haes et al, 2011; De Haes & Van Grembergen, 2009; De Haes et al, 2013; Jairak et al, 2015; Williams & Karahanna, 2013; Wu et al, 2015).

Universities are complex organizations that require an adequate IT infrastructure and information systems to fulfil their mission. Their information technology infrastructure consists of a variety of applications, different platforms, academic systems, cloud applications, i.e., a heterogeneous set of technologies (Figure 1). The challenges are huge in managing that set of technologies in universities, even more when administrative burden put on budgets has to be reduced (Svensson & Hvolby, 2012).



Figure 1. Information Technology environment at Universities

Different types of system, structure, process and technology can be found at the universities contributing for considerable complexity in managing IT. The speed of change at which new technologies are implemented in this environment such as mobile devices, wireless computing, portal software, or digital libraries, adds to the challenge of getting value from IT investments. All this is to offer the right conditions for teaching, learning and research while supporting the management processes (Coen & Kelly, 2007). IT can act as a strong agent for change in teaching, research and knowledge generation and transfer to society, nuclear processes at universities (Sarkar, 2012).

The effective and efficient use of information technology at universities to support the research, teaching and administration requires appropriate IT governance (Bajgoric, 2014; Conger et al, 2008; Hicks et al, 2012; Jairak et al, 2015; Wu et al, 2015). The adoption of formal practices at the highest level of the organization for governing IT should bring benefits to the organization, had been studying by different authors Weill and Ross (2004) and Lunardi et al (2014a).

The study of Weill and Ross p.3 (2004) in 250 organization from twenty-three countries, shows that organizations with effective IT governance have 20% higher performance than other organizations with similar strategies. Several studies in Brazilian firms also reveal that organizations that have adopted formal mechanisms of IT governance, improved their organizational performance in terms of profitability, efficiency and cost savings (Lunardi et al, 2009; Lunardi et al, 2014a; Lunardi et al, 2014b). In other words, effective IT governance mechanisms and frameworks maximize the creation of business value in organizations.

However, the difficulty of organizations in implementing IT governance frameworks such as ITIL or COBIT is notorious since they seem complex (Bin-Abbas & Bakry, 2014; Pereira & Silva, 2010;

2011). For example, ITIL version 3 provides twenty-seven processes in five different books and, in the case of COBIT, there are too many control objects. Both seem confused and present quite a challenge for the organization on how to go about implementing them.

Organizations may prefer to develop their own frameworks to attend their particular needs for IT governance (Fernández & Llorens, 2009). Different organizations may require different solutions for IT governance. Universities are such type of organizations, rather complex, that may benefit substantially from high level IT governance mechanisms, as suggested by Weill and Ross (2004) and Lunardi et al., (2014a), for teaching, research and management activities. There is a lack of studies on IT Governance for universities, in particular, as for specific sectors, in general. The number of universities using frameworks for IT governance is limited (Jairak et al, 2015). We have only identified eight studies and yet, limited in scope, given the reduced number of universities involved in the studies.

Organizations such as universities have quite different goals from industry, specially, the public ones, in their mission in society (Zhen & Xin-yu, 2007). While universities create and disseminate knowledge in society, the industry is more focused in generating profit to the shareholder, reduce costs and create economic value.

Therefore, because there is considerable difficulty in implementing IT governance frameworks, different organizations may require different solutions for IT governance, universities are one particular kind of organizations and there is a lack of studies on IT governance for universities, we propose to develop a model for IT governance in universities.

IT governance

Information Technology governance is an instrument to control and manage the IT resources such as infra-structure technology and people in any kind of organizations, including universities (Bajgoric, 2014; De Haes & Van Grembergen, 2009; Hicks et al, 2012). Besides, IT governance helps the corporate governance of the organization assisting the strategy and achieving objectives, goals and mission. A framework of IT governance may be deployed with a set of the mechanisms such as *structures*, *processes*, and *relational mechanisms* (De Haes & Van Grembergen, 2004; 2005; 2009; Peterson, 2004a; Weill & Ross, 2004).

Structures are responsible for defining roles and responsibilities. Steering committees are an example of those structures composed of directors, managers and executives, in other words, people responsible for decision-making in the organization (De Haes & Van Grembergen, 2008c; Webb et al, 2006; Weill & Ross, 2004).

Processes refer to, planning and strategic decision making of IT based on practices from ITIL, COBIT or Balanced Scorecard to name some examples, including techniques and appropriate tools to align business and IT for a good performance (De Haes & Van Grembergen, 2008b; c; Webb et al, 2006; Weill & Ross, 2004).

Relational mechanisms include the participation and interaction between IT and the business. An appropriate communication and knowledge sharing with learning and coaching is important (De Haes & Van Grembergen, 2008c; Webb et al, 2006; Weill & Ross, 2004).

Main studies on how organizations implement IT governance have been focused on the industry so the effectiveness of the mechanisms under evaluation are quite dependent on that context. Therefore, it is necessary to identify in each specific organization which are the suitable frameworks and tools to obtain satisfactory findings (De Haes & Van Grembergen, 2005; Ko, 2010).

Finding out which mechanism is most suitable for a specific organization may depend on contingency factors such as type of organization, size of organization, and country (Marrone et al, 2014; Sambamurthy & Zmud, 1999). Marrone et al (2014) e Pereira & Silva (2012) not only agree

but also add the organization context, (public or private) type of organization and (external and internal) environment as contingency factors.

Different organizations need different solutions for IT governance (Jairak et al, 2015). A mechanism that may be appropriate for an organization in the financial industry may not be appropriate for an organization in other industry (Brown & Grant, 2005; De Haes & Van Grembergen, 2008a; Van Grembergen et al, 2004).

Thus, the challenge for a specific sector as public universities is first to understand their real situation regarding IT governance and then define the right way to implement structures, processes and relational mechanisms to realize the full potential of IT to leverage research, teaching and knowledge transfer to society (Hicks et al, 2012). The next section identifies frameworks that have been used for IT governance in universities.

IT governance in universities

Higher education institutions, in special universities from many countries, have increasingly recognized the importance of IT governance (Jairak et al, 2015). Complex and decentralized organizations, such as universities, should frequently review their IT governance mechanisms to deal with innovation and changes in their environment and adapt to new technologies (Hicks et al, 2012). It is not only necessary but also essential for this kind of organizations to reduce risk and resolve vulnerabilities to provide an efficient and high quality of service.

Few studies about IT governance can be found for universities. A limited number of institutions have been utilizing frameworks and standards for IT governance. Table 1 summarizes the findings.

Table 1 - Frameworks for IT governance in universities

Source	Purpose	Findings
(Bhattacharjya & Chang, 2006)	Exploratory study of IT governance implementation in two Australian institutions of higher education	Adoption of industry best practice frameworks such as COBIT, ITIL and ISO17799 have been utilized in the implementation; institutions of higher education may benefit from experiences gained in IT governance implementation in other industries.
(Coen & Kelly, 2007)	To present the Information Systems Management and Governance framework developed for UK Higher Education (JISC model)	Built around five perspectives: governance, management, resources, structures and services.
(Zhen & Xin-yu, 2007)	To develop an IT Service Model for Chinese universities	Based on ITIL and realities of Chinese universities, it is a framework composed of three models: organization model, process model and technology model.
(Wan & Chan, 2008)	To improve ITSM for managing campus-wide IT operations in Hong Kong	Based on ITIL, utilizes business continuity planning processes to identify the relationships between business services and IT resources.
(Fernández & Llorens, 2009)	To present ITG4U, a university-oriented IT Governance framework to be promoted by the Spanish Association of University Rectors	Applying six ISO38500 principles, it is an adaptation of the JISC model designed for UK universities.
(Ribeiro & Gomes, 2009)	Case study of the implementation and use of COBIT for IT Governance in a High Public Portuguese Educational Institution	Quality of services significantly improved, time for tasks reduced by about 25%, number of incidents reduced by 30%, number of reopened incidents reduced by 10%.
(Saleh & Almsafir, 2013)	Explanatory study of ITIL adoption in a Malaysian university	KPI improvement, intellectual capital and organization size (in terms of annual budget) are the drivers in the adoption of ITIL.
(Jairak et al, 2015)	To develop a formal set of IT governance practices to fit the context of Thai universities.	Based on sufficiency economy philosophy (SEP). IT governance practices are mapped to ISO/IEC 38500.

Some universities have used ITIL as the main practice to implement IT governance, others COBIT, ISO/IEC 38500, ISO 27001, or ISO 20000. Iden & Eikebrokk (2014), Ahlan et al (2014), De Haes & Van Grembergen (2008a) encourage research on IT governance, especially in the implementation of frameworks such as ITIL, COBIT, and ISO/IEC. Indeed, more research is required to identify appropriate process and control objects for the organizations.

The issue is not only which framework to consider but also how to choose and implement adequate mechanisms for a particular business context. The next section presents a proposal to develop a model for public universities.

Developing an IT governance model for universities

Building upon the findings from studies mentioned in table 1, while recognizing their specificities and limitations, we intend to develop a model for IT governance for public universities in Portugal and Brazil, both Portuguese speaking countries. We need to pay particular attention to appropriate mechanisms and tools in the context of universities (Arshad et al, 2014; De Haes & Grembergen, 2008; De Haes & Van Grembergen, 2008c; Iden & Eikebrokk, 2014).

Models are used to represent the real world synthesizing the knowledge about the reality (Dewalt, 1999; March & Smith, 1995). In this case, our model will address the reality of IT governance for universities in two different countries. As already pointed out (Bhattacharjya & Chang, 2006), universities may benefit from experiences gained in IT governance implementation in other industries that adopted ITIL, COBIT, ISO and others. We will also be looking at those frameworks as guidelines to consider in the development of our model.

For the development of the model, we will follow Design Science Research (DSR), extensively used in information systems research to solve complex problems (Hevner & March, 2003; Kuechler & Vaishnavi, 2008; March & Smith, 1995; March & Storey, 2008). DSR is not only appropriate to solve organizational problems in specific domains but also adequate to produce artefacts as it is the case of our model (Hevner et al, 2004; Kuechler & Vaishnavi, 2012)

We will look for the appropriate structures, processes and relationship mechanisms to design a model of IT governance for universities using the six steps of DSR (Figure 1) as proposed by Peffers et al. (2006).

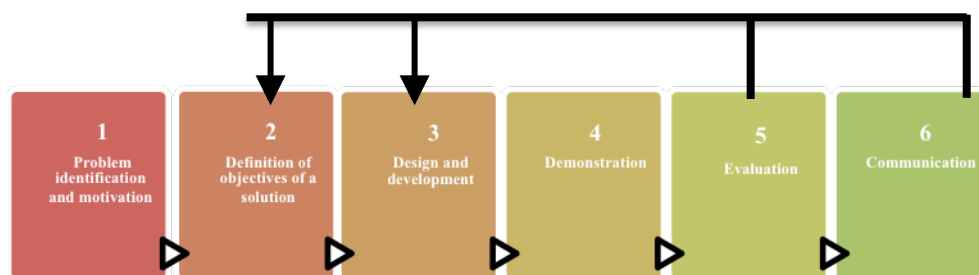


Figure 1. Steps of Design Science Research (Peffers et al, 2006).

Table 2 provides a description for each step of DSR in the development of our IT governance model for universities of Brazil and Portugal. Since both are Portuguese speaking countries, that will facilitate the research for comparative purposes as well as the development of the instruments for data collection. Brazil is the seventh largest world's economy with a large geographical area and population and is growing in international influence. There are 103 public universities with seventeen in the ranking of the best world universities in accordance with Times Higher Education (2015).

Table 2 - Steps of DSR to develop an IT governance framework for universities

Step	Description
1 Problem identification and motivation	Maturity of IT governance in universities is considered low; few studies exist on how IT governance for universities may be suitable implemented.
2 Definition of objectives of a solution	Proposal of an efficient and effective model for IT governance in public universities, including guidelines for its adoption in terms of structures, processes and relational mechanisms.
3 Design and development	Design of a model; identification of suitable mechanisms of IT governance. Survey research and case studies involving Portuguese and Brazilian public universities.
4 Demonstration	Demonstration of efficiency and effectiveness of the model with IT professional of universities through the simulation of scenarios.
5 Evaluation	Evaluation of the model through interviews, workshops and surveys with experts from industry and universities.
6 Communication	Communication and dissemination of the model to IT practitioners and managers as well as directors of high education. Publication of findings in journals and conferences, magazines, blogs and forums.

Discussion and conclusions

We found few studies about IT governance in universities, mainly focused on the implementation of standards such as ITIL and COBIT to reduce costs and time, and increase agility. These standards have been followed namely because they provide best practices for IT governance processes. However, processes are just one of the required IT governance mechanisms. As De Haes & Van Grembergen (2008a) suggest, a well balanced mix of structures, processes and relational mechanisms will enable better IT governance outcomes. We will follow their suggestion to develop our IT governance model for public universities.

While applying their framework, De Haes & Van Grembergen (2009) revealed a list of 33 IT governance practices for the Belgian financial services sector using a Delphi study with IT experts. We intend to do something similar for the public university sector having in mind that the mix of structures, processes and relational mechanisms to choose may be dependent upon multiple contingencies according to the organizational context of public universities.

Effective IT governance with high level mechanisms, such as structures, processes and relational mechanisms, has been shown to have a positive impact on financial performance (Lunardi et al, 2014a). That is relevant for any organization, particularly, the profit ones. However, other dimensions and strategies beyond the financial one have to be considered (Peterson, 2004b), namely, for other types of organizations such as non-profit ones, as it is the case of public universities. Their mission to the society requires a balance between financial and non-financial dimensions to achieve their goals in teaching, research and knowledge transfer to society.

This work intends to contribute for IT governance in universities developing a model that incorporates practices for structures, processes and relational mechanisms suitable to public universities. Brazilian and Portuguese public universities provide the research context, one that shares the same language and will facilitate data collection and cross-cultural comparisons. The proposed model should allow public universities to govern information technology with effective and efficient practices. A guide will be provided on how to take in account contingency factors relevant to choose suitable IT governance mechanisms for public universities to fulfill their mission.

Acknowledgements

This work was supported by CAPES Foundation, Ministry of Education of Brazil Process n.º10415/13-0 and by FCT – Foundation for Science and Technology, project UID/CEC/00319/2013.

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