



THE GOVERNANCE OF INFORMATION TECHNOLOGY AND ITS FORMAL AND INFORMAL MECHANISMS: PROPOSING A FRAMEWORK FOR THE CONTEXT OF SMALL AND MEDIUM ENTERPRISES

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Objective: To understand the phenomenon of IT governance in context of SMEs the agency theory.

Method: Qualitative, descriptive research with data collection. Are used as complementary visions to the agency's vision: the relational contract theory, dealing with contracts between principal and agent, and contingency theory, dealing with the contingent factors that influence the choices of IT governance mechanisms.

Originality/Relevance: Small and medium-sized enterprises (SMEs) are essential for economic development and represent an important part of job creation. However, there are several difficulties in governing this type of organization, among them investments in Information Technology (IT). IT governance, as part of corporate governance, aims to direct investments in this area, enabling its effective return. But the frameworks available in the literature were developed for the context of large companies, generating a theoretical vacuum when it comes to SMEs.

Results: From the framework proposed by Peterson (2004), this theoretical essay proposed a framework that would be more appropriate to the reality of the SME.

Theoretical/methodological contributions: The proposed framework seeks to enlarge the understanding of the IT governance phenomenon in the context of SMEs, opening the way for further theoretical and empirical analysis of the phenomenon.

Keywords: IT Governance; Small and Medium-Sized Enterprises; Theory of the Agency; Relationship Relational Theory; Contingency Theory.

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1 INTRODUCTION

The fundamental work of corporate governance was presented by Berle and Means (1932), from the observation that the separation between ownership and control produces a condition in which the interests of the parties, owners and managers, generally diverge. From this relationship between owner and manager, the agency problem arises, which is based on the asymmetry of the information inherent in the relationship between the principal and the agent. The agent, who performs the tasks, is a specialist and is familiar with the day-to-day reality of the task, has more information than the principal, who receives the result of the agent's work (Toigo, 2016).

From this ascertainment of possible divergence of interests, the parties, the principal and the agent, enter into a contract so that the agent performs a task on behalf of the principal, this relationship being defined as an agency relationship (Jensen & Mingling 1976). However, in the course of this relationship, there may be contingency situations and cases in which both parties decide to maximize their personal profits. Therefore, it is possible that, at certain times, the agent does not take actions that are of the principal's interest (Silveira, 2004).

In order to have a balance in this relationship, corporate governance is defined as a set of legal, institutional and convention mechanisms that are used by the principal so that it is possible to monitor the actions described in an agency contract, aiming to maximize the interests of shareholders or owners (Toigo, 2016).

Therefore, the application of governance mechanisms aims to address both the agency problems existing in an organization and the incomplete contracts between principal and agent (Hart, 1995). However, what mechanisms to use is an important and contingent decision to a number of factors.

For Sambamurthy and Zmud (1999), the IT governance mechanisms used in an organization are subject to a multiple set of contingencies that act in a collaborative, conflicting or dominant way, one over the other. In addition,



Bergeron et al. (2017) affirm that the size of the organization is one of the contingent factors that can interfere in the type of governance mechanism used, besides the manager's profile and its technological inclination, the company's relationship with suppliers and their power in organizational decisions, among others. These are contingent points that can lead to different governance arrangements.

The presence of structural, procedural and relational mechanisms in the definitions of IT governance is a constant in the literature (Sambamurthy & Zmud, 1999; Lunardi, Becker, & Maçada, 2014; Bergeron et al., 2017) and the combination of these formal mechanisms, related to the structure and processes, and informal or relational mechanisms, has been proposed by several authors as necessary to achieve effective IT governance (Peterson, 2004; Van Grembergen & De Haes, 2012; Lunardi et al., 2014a). Therefore, the contract between the principal and the agent to manage the organization's IT area is fulfilled through the application of formal and informal mechanisms (De Haes & Van Grembergen, 2008a).

Despite the constant assertion that effective IT governance can only be achieved through the use of formal and informal mechanisms, the intangible characteristic and the lack of literature and expertise on the subject, lead organizations to use, in a more formal mechanisms of IT governance (De Haes; Van Grembergen, 2008a). However, the need to use informal mechanisms intensifies when the context is small and medium-sized enterprises (SMEs), because these are characterized by relational transactions associated with relational norms with emphasis on integration, preservation of the relationship, reciprocal expectations of future, harmonization of conflicts and supra contractual standards (Mouzas & Blois, 2008).



In fact, the assertion here is not that, in the context of SMEs, formal IT governance mechanisms do not apply. It is possible to use the so-called formal tools. However, these mechanisms, although present in the IT governance literature in the context of large companies, may not be sufficient for effective IT governance in SMEs (Wilkin, 2012; Bergeron et al., 2017). Thus, in the context of SMEs, the use of relational IT governance mechanisms could provide higher levels of IT governance.

From the above and the fact that the proposed IT governance frameworks were developed for the context of large companies (Wilkin, 2012; Bergeron et al., 2017), the present theoretical essay aims to discuss the use of formal and informal mechanisms of IT governance in SMEs, and to propose a framework of IT governance appropriate to the context.

To this end, the text presents five sections. The first one, of introduction, gave a brief presentation to the researched subject. Then in the second part, follows the presentation of the research scenario, in which are discussed details present in the world of SMEs. The third section points to the theoretical discussion associated with work, the essay itself. The fourth section presents the fundamental concepts for the research design. Finally, the final considerations will be presented.

2 RESEARCH SCENARIO

Ayat et al. (2011) state that more than 90% of companies in all countries can be classified as SMEs. Therefore, SMEs have played an important role in the economy, including in the more developed ones. In more developed economies, including microenterprises, the total number of jobs generated is as high as 60%



of the workforce. In less developed economies, just over 30% of formal jobs are generated by companies classified as micro, small and medium (Sarfati, 2013).

Two characteristics of SMEs generally cited in the literature are the more informal and organic management structure and the limitation of access to resources, be they financial or specialized personnel. An advantage of the more informal structure is the ability to be more flexible and adapt to different situations. However, a counterpoint in the use of informal structures is the lack of strategic planning. (Curry, Marshall, & Kawalek, 2017).

The low capacity of management in small and medium-sized enterprises is also a characteristic cited by Silva and Araújo (2016a). Additionally, Silva and Araújo (2016b) argue that micro and small enterprises have scarce financial resources, simplified organizational structure, centralized decisions, decisions based on intuition and flexibility for rapid adaptation to the environment.

In addition to the characteristics presented by Silva and Araújo (2016a; 2016b), Huygh and De Haes (2016) summarize some of the characteristics / specificities they identified in a survey on IT governance and SMEs:

- SMEs tend to adopt more operational visions than strategic ones, being, of course, more reactive;
- SMEs tend to have simpler organizational processes;
- SMBs operate, in general, without an in-house group of IT specialists;
- SMEs tend to use more horizontal organizational structures, or even operate without a defined structure;
- SMEs tend to have greater resource constraints;
- The use of outsourced IT resources is more common in SMBs;
- SMEs suffer more influence from the external environment than large companies.

It is essential to be aware that SMEs, despite the characteristics presented, do not represent a homogeneous group. The heterogeneity in the group of small and medium enterprises is a phenomenon present in research and



practice, and should be reflected in the IT governance mechanisms adopted (Bergeron et al., 2017).

Thus, in the group of SMEs it is possible to perceive this heterogeneity already from the own entrepreneurs and owners, who have different origins, cultural aspects and academic formation (Curran & Burrows, 1993). In addition, organizations come from different sectors, such as a neighborhood retailer and a company that develops state-of-the-art technology for the industry, and from different constituencies, such as a family business or an organization with partners and directors, that it becomes necessary to evaluate each group in order to identify possible discrepancies of a specific type of SME (Torrès & Julien, 2005).

On the contrary, not all SMEs have specific characteristics and are isolated from the rest of the group, which would make the SME group completely different (Bergeron et al., 2017). There are specificities and commonalities and it is up to the studies to identify these points and present viable alternatives to management. In this context, Torrès and Julien (2005) propose the contingency approach in the search to identify to what extent an SME organization can be considered specific or isolated.

Therefore, the theoretical discussions about IT governance are presented on the look of agency theory and the type of contract, formal or informal, established between the parties. Thus, not only formal mechanisms, such as procedural and structural, are present in the relationship, but also informal, or relational mechanisms. In addition, the type of contract, formal or informal, established between the parties is also subject to contingency variations that may influence the type of governance mechanism to be adopted.

The next section will bring the discussions of agency theory, relational contract theory, and contingency theory.



3 THEORETICAL DISCUSSION

Defining theory and how it applies in research in information systems is an important, though elusive, task. For many, the concept of what is and is not theory is present, but the formal definition of what becomes theory is still a point to be improved (Gorelick, 2011).

Traditionally, the theoretical framework used to analyze the phenomenon of corporate governance, and consequently IT governance, is agency theory (Lunardi, 2008). The theory of agency focuses on the analysis of agency problems when managers make decisions aiming at maximizing personal utility rather than maximizing the principal's wealth (Jensen & Meckling, 1976). Thus, the agency contract is used by the principal so that it is possible to monitor the actions of the agent in order to maximize the interests of shareholders or owners (Toigo, 2016).

The theoretical lens chosen to understand the phenomenon of IT governance is agency theory. This is discussed in the sequence. Next, relational contract theory is presented because it is considered, in the present work, a complementary theory that deals with the contracts signed between principal and agent, specifically important in the context of SMEs in the study. In addition, the contingency theory will also be presented, since many of the aspects that deal with the choice of the IT governance mechanisms used are contingent in the context, such as the profile of the manager, the dependence of the business in relation to IT, the environment in which the company is inserted, among others.

3.1 Agency theory

The firsts work on agency theory took place between the 1960s and 1970s, and sought to understand the problem of shared risk when two parties, in cooperation, have different goals and different attitudes to risk. It is possible, in



this relation, that the agent has objectives different from those of the real owners, so the costs to align managers' interests with the agent's interests are called agency costs (Jensen & Meckling, 1976).

Thus, with this view, agency theory deals with the problem that can occur in the relationship between principal and agents, the so-called agency problem, which occurs when the objectives of the principal, the contractor, and the contracted agent come into conflict and it is difficult or expensive for the principal to ascertain whether the agent behaved properly (Eisenhardt, 1989).

The unit of analysis of agency theory is the contract that governs the relationship between principal and agent. Thus, the focus of the theory is the determination of the most efficient way of managing this contract given some premises about people (personal interests, limited rationality, risk aversion, etc.), organizations (conflict of interests of its constituent members) and information (which is a commodity that can be acquired through information systems that can be formal, reports and budgets, and informal, supervisions and meetings) (Eisenhardt, 1989).

Mahaney and Lederer (2003; 2010; 2011) studied agency conflicts in the context of project management and indicate that it is possible to measure the outcome of the work at the time the project is completed. In this case, and according to Eisenhardt (1989), the use of results-based contracts would have a negative impact on the conflict of objectives between principal and agent. However, in the context of IT services, since not every outcome can be measured objectively, it is to be expected that there are contracts that are more inclined towards the behavioral aspect of the agent.

In formal and informal contracts, information on what is being done and monitoring are fundamental for reducing opportunistic behavior and for reducing information asymmetry (Eisenhardt, 1989).



In addition, the adequacy of the type of monitoring to the type of contract signed leads to the reduction of opportunistic behavior and information asymmetry. These have an inverse relationship with the interests of the principal, that is, the reduction of opportunistic behavior and the asymmetry of information lead to better results in relation to the interests of the principal (Mahaney & Lederer, 2010; 2011).

Figure 1 shows the constructs of agency theory from the models of Mahaney and Lederer (2003; 2010; 2011) and Eisenhardt's (1989) propositions that are present in this study.

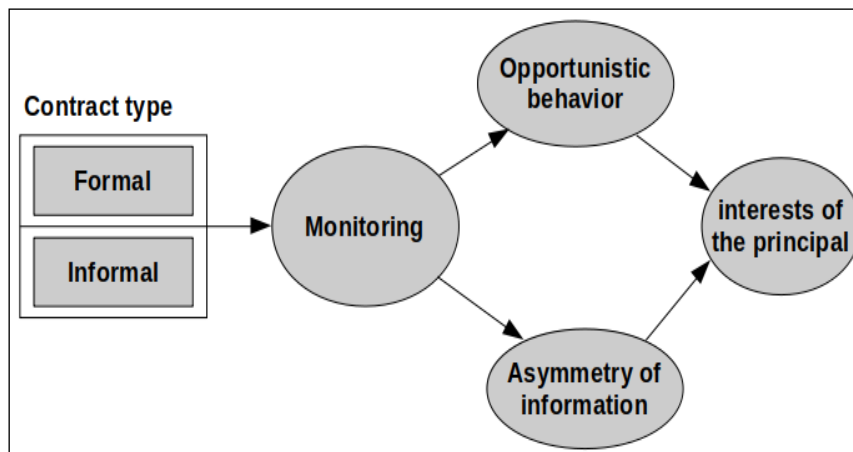


Figure 1: constructs of agency theory present in the study.
Source: based on Eisenhardt (1989) and Mahaney and Lederer (2003; 2010; 2011).

Since the central analysis unit of agency theory is the contract (Eisenhardt, 1989), and these are incomplete, it is impossible to create one that contains all the possible contingencies in a relation (Mouzas; Blois, 2008).

From the notion of incomplete contracts, Baker, Gibbons and Murphy (2002) present a framework in which are related forms of governance and the ownership or not of the means necessary for the production of the good or service. The same authors follow stating that a company can choose to use spot or relational governance mechanisms. One point raised is that, when using



punctual mechanisms, the organization does not count on eventual gains from extra performance performed by the employee or provider.

Concurrently with that proposed by Mouzas and Blois (2008) and Baker, Gibbons and Murphy (2002), Calabrò and Mussolino (2013) argue that agency theory and relational contract theory are complementary in the understanding of contracts signed in formal and informal governance. Thus, the following will be presented the relational contract theory, its relationship with agency theory and with IT governance in SMEs.

3.2 Relational contract theory

The discussions on governance are dominated by the theoretical focus of agency theory (Calabrò & Mussolino, 2013; Raelin & Bondy, 2013; Cuomo, Mallin, & Zattoni, 2015). In this theory, "the firm is seen as a set of contracts between factors of production, with each factor motivated by its own interests" (Fama, 1980, p.286).

Thereby, organizations are full of informal contractual relationships, from unwritten codes of conduct to understandings between bosses and employees about tasks, promotions, etc. Even contracts with a strong formal basis, such as compensation, audits or budget reviews, cannot be understood without considering the informal agreements associated with them (Baker, Gibbons, & Murphy, 2002).

Thus, a contract that describes a simple exchange, needs only to supply the parties with the necessary obligations to carry out that transaction, that is, a contract for a discrete transaction (Macneil, 1980). However, the IT sector of an organization, large or small, presents itself as an internal service provider and provides a long-term relationship between customer and service provider (Silva, Araújo, 2016b).



In fact, a company's technology sector presents itself as a service provider for internal customers, employees, directors, but also experiences the role of customer of a number of other services such as the Internet and email. This situation, dual and perhaps antagonistic, to be a customer and service provider, must be managed in such a way that the best service is delivered to its internal customers, enabling the increase of the IT business value (Silva & Araújo, 2016b).

Therefore, transactions and contracts are not present only at the discrete level, but also at the relational level. For Mouzas and Blois (2008), it is almost impossible to write a contract that includes all the necessary elements, so that the possible contingencies are supported by it. Thus, there would be a spectrum of relationships that would encompass both types of contract (Macneil, 1980; 2003).

Mouzas and Blois (2008), when studying familiar SMEs, affirm that this context is characterized by relational transactions associated with relational norms with emphasis on integration, preservation of the relationship, reciprocal expectations of the future, harmonization of conflicts and supra contractual norms. In this same line of thought, Bergeron et al. (2017) argue that SMEs have specificities, which include organic structure developed around key employees, ownership and management focused on a single person and simplicity in their information systems.

Thus, it is possible that these specificities, closer relationships, organizational structures and key employees, lead SMEs to use contracts with a greater relational tendency than discrete ones. However, according to Poppo and Zenger (2002), the two contractual forms complement each other, more than cancel each other out. So, it is to be expected that in organizations the two models will come together. Even in the context of large enterprises, where the availability of resources allows the creation of formal IT governance mechanisms, it is



possible to identify the use of relational mechanisms as IT leadership in the organization (DE HAES; VAN GREMBERGER, 2008a).

Thus, considering MacNeil's propositions (1980, 2003), that all exchanges, or relations between internal or external parts of the organization, are always, to some degree, relational, and of Poppo and Zenger (2002), that the models of contract, discrete and relational, must coexist together in the organizations, Figure 2 shows the relationship between the types of contracts signed in a spectrum of transactions ranging from relational to discrete.

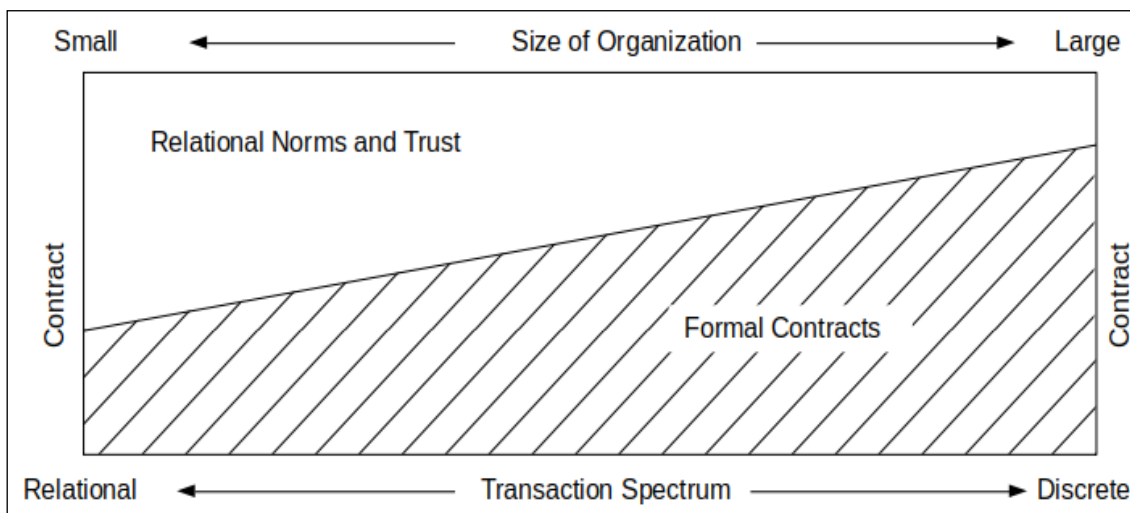


Figure 2: Spectrum of relational and discrete transactions.
Source: adapted from Macneil (1980; 2003) and Poppo and Zenger (2002).

It is important to remember that in both cases, relational or discrete, small or large company, the contract, to be fulfilled, must have relational and formal aspects (Macneil, 1980). Therefore, it is to be expected that formal and informal mechanisms must exist to ensure compliance with the contract. In terms of IT governance, Peterson (2004) proposes that the mechanisms necessary for its effective occurrence are procedural, structural and relational.

In this way, once the relationship model presented in Figure 1 is resumed, it is possible to separate the types of contracts (formal and informal) and the types



of monitoring needed to reach higher levels of IT governance, such as the use of mechanisms for monitoring the formal part and informing the contracts.

Together with the transaction spectrum presented in figure 2, the set of agency theory constructs present in the study that are related to the context of SMEs is available in figure 3.

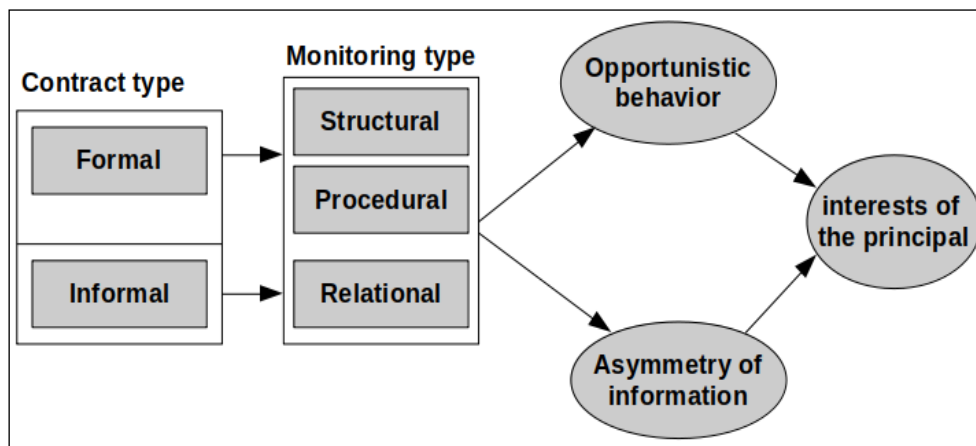


Figure 3: Formal and informal contracts and IT governance mechanisms
Source: adapted from Mahaney and Lederer (2003, 2011) and Eisenhardt (1989).

In addition to the contingent factor of size of the organization, other factors can be presented in the context as manager's personal inclination towards IT, power of IT suppliers in organizational decisions, among others (Bergeron et al., 2017). Thus, contingency theory can bring important contributions to the understanding of IT governance mechanisms in the context of SMEs. Concepts related to contingency theory will be presented in the following topic.

3.3 Contingency theory

According to the contingency theory, there is no single structure applicable to all companies (Assunção et al., 2014). For theory, the most effective organizational structure is one in which the structure is adapted to the various contingency factors (Donaldson, 2006).



For Donaldson (2006), several are the possible adjustments so that a company can adjust the most diverse contingency situations. Thus, an organization can move from one adjustment to another in the event of some environmental change, allowing a continuous adjustment of the organizational structure.

In contingency theory, the effects of interdependence between organizational structure and contingency factors are observed. The contingency model has basically three elements: first, it is assumed that there is a relation between the control of the organization and the contingencies; second, contingencies would determine the structure of an enterprise; Third, the adjustment between organizational structure and contingencies would result in superior performance (Ghof, 2015).

Additionally, Ghof (2015) states that the contingency approach must show a relationship and interdependence between structure or control and contingency factors. It could also be argued that a certain level of adjustment between organizational structure variables and contingency variables would lead to better performance.

Then, common contingent variables in the literature such as environment, strategy and structure (Melo Júnior, 2012) could influence the type of IT governance mechanism that will be used in a context. Bergeron et al. (2017) add that the manager's profile, the power of external IT vendors, and key employee characteristics are contingent factors in the context of SMBs.

Sambamurthy and Zmud (1999) argue that IT governance is influenced by multiple contingencies, which interact in three contingent scenarios of reinforcement, conflict, and domination. Scenarios with conflict contingencies tend to use a corporate governance model. Contingency scenarios that strengthen or dominate contingencies may present centralized or decentralized governance models.



One of the common contingency factors in organizational studies is the size of the company (Assunção et al., 2014), however, the context being evaluated in this essay is that of SMEs, so this factor may not have a strong influence. On the other hand, other factors are important, like the factors already mentioned by Bergeron et al. (2017). In addition, it is possible that other factors not present in the literature significantly influence the choice of the IT governance mechanism.

In the next topic, the essential concepts related to the present theoretical essay will be presented.

4 ESSENTIAL CONCEPTS

Additionally, to the theories presented so far, it is necessary to present essential concepts to the final theoretical formulation. This will present the key organizational elements, information technology in SMEs and IT governance, also in the context of SMEs.

4.1 Fundamental organizational elements

Organizations, in conceptual terms, are collections of individuals that organize around common goals (Mullins, 2010). The achievement of these objectives is the result of the meeting between the environment in which the organization operates, the strategy used and the internal structures and systems (Langfield-Smith, 1997).

In order to understand the phenomenon of IT governance in the context of SMEs, it is necessary to understand central organizational elements, such as organizational structure, control and strategy.

The organizational structure can be defined as the distribution of authority, the activities carried out in the organization and the communication system used



for people to carry out their activities and exercise the authority granted to them (Vasconcelos & Hemsley, 1989).

Thus, from the authority granted, managers exercise control over the activities performed by the members of the organization. This control can take place from coercive mechanisms, involving threat or use of physical control over others, normative, involving norms, formalized or not, that must be followed by members of the group, or remuneration, that reward members because behaviors considered desirable (Hatch & Cunliffe, 2013).

Therefore, these two elements, organizational structure and form of control, have a reflexive relation between them, that is, the existing control systems in organizations are created and reinforced by the organizational structure, which also suffers influence of the systems of authority used (Rezende & Abreu, 2000).

Additionally, for Rezende and Abreu (2000), control is fundamental to ensure that organizational activities are carried out, as well as the improvement of the competitive position and execution of the organizational strategy.

In this line, strategy can be defined as the long-term direction of an organization (Johnson, Scholes, & Whittington, 2007). Additionally, Porter and Roach (1996) argue that the strategy has the capacity to forge an organizational scope that would allow the organization to obtain advantages in an ever-changing environment.

Thus, IT governance uses the three organizational elements presented, creating an organizational structure that allows the monitoring and control of activities related to IT, within a strategy aligned with current and future organizational needs and objectives.

4.2 Information technology in SMEs



In the context of SMEs, the adoption of IT is influenced by several factors. Ghobakhloo et al. (2012) present a framework of factors that influence the adoption of IT in the context of small and medium enterprises, shown in figure 4, which shows the existence of internal and external factors in the adoption of IT. Among the internal factors are the characteristics of managers, organizational characteristics, availability of resources and IT users. External factors include the IT products available on the market, external competitive pressure, vendors and external IT consultants, and government regulations.

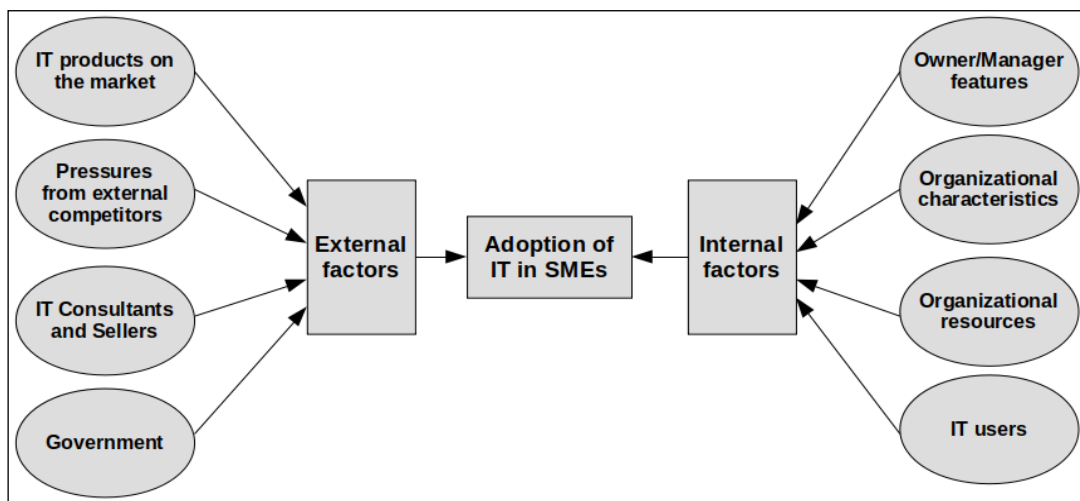


Figure 4: Framework of influence factors in the adoption of IT in the context of SMEs.
Source: adapted from Ghobakhloo et al. (2012).

From the reference proposed by Ghobakhloo et al. (2012) it is possible to verify that IT adoption in the context of SMEs can be initiated from a legal requirement from a governmental regulation, which obliges companies to have a minimum information system to control the entry and exit of products or for the issuance of invoices, or even for the external pressures of competitors that make their products or services available in applications that are easily accessible to customers, or even the simple use of e-mail services aimed at greater efficiency in communication with customers and suppliers. Thus, using IT resources is no longer an optional issue for the manager and becomes a functional obligation of the organization.



In this context, external factors force the use of IT in SMEs and the internal factors indicate what level and type of technology will be used (GHOBAKHLOO et al., 2012). This idea is corroborated by Prates and Ospina (2004, p.12) who affirm that "a given technology is not automatically good or bad for small businesses. Its outcome will depend on how this technology will be applied".

Siqueira, De Souza and Viana (2013) also argue that SMEs do not rely on strategic IT and business alignment, focusing on production-oriented activities, having a reduced budget, making incremental or contingency investments, and often do not consider IT in your development plan. Nevertheless, even at initial levels of IT use, its use is not optional, even in the context of SMBs.

It is important to remember that SMEs have serious budget constraints, and since IT is a mandatory issue, given the minimum governmental requirements, the investments made bring the need to evaluate what the real benefits are obtained from the correct application of the resources (Siqueira, De Souza, & Viana, 2013). Thus, in a context of low investment capacity, such as the context of SMEs, the correct implementation, proper use of IT resources and the alignment of these resources to organizational needs are fundamental aspects for the success of the investments made. It is in this scenario that IT governance is fundamental.

4.3 IT Governance

Bergeron et al. (2017) define IT governance as the responsibility of senior management and part of corporate governance, encompassing decision-making and accountability, so that desirable behaviors are encouraged by the IT sector. Weill and Ross (2004) define IT governance as the specification of decision-making rights and the framework of responsibilities to stimulate desirable behaviors in the use of IT. IT governance aims to make sure that investments made in technology assist firms in organizational goals, thus adding greater value to the organization's business (Lunardi et al., 2014a).



For Silva, Araújo and Dornelas (2018), corporate governance plays a decisive role in the development of IT governance, with IT governance being a subordinate of corporate governance. Thus, IT governance is the responsibility of the company's management, and cannot be left solely to the IT staff.

Several studies indicate a relationship between IT governance and higher organizational performance (Weill & Ross, 2004; Bradley et al., 2012; Lunardi et al., 2014a). In this way, efficiently governing IT resources is critical for organizations, including small organizations (Guldentops, 2014).

For Peterson (2004), effective IT governance could be achieved through the use of structural, procedural and relationship governance mechanisms. Each of these mechanisms used formally or informally assists the organization in obtaining better results in the use of IT resources. However, to the extent that the organization becomes aware of the use of one of these mechanisms, its use becomes more frequent, the greater the maturity level of IT governance, making the organization more IT (Lunardi, Becker, & Maçada, 2010).

Based on the characteristics of IT use in the context of SMEs, initially focused on operational and administrative aspects and not on strategic and decision-making activities (Prates & Ospina, 2004), the organic structure developed around key employees and simplicity in their information systems (Bergeron et al., 2017) and following the fact that the context of SMEs is characterized by relational transactions associated with relational norms with emphasis on integration, preservation of the relationship, reciprocal expectations of the future, harmonization of conflicts and standards supra (Mouzas & Blois, 2008), it is to be expected that structural, procedural and relational elements are unique to this context.



The following will discuss aspects of structural, procedural and relational IT governance proposed by Peterson (2004) and how they present themselves in the specificities of the context of SMEs.

4.3.1 IT Governance structures in SMEs

Structural governance mechanisms of IT involve how the organization is structured as to the authority of IT decision-making. Commonly, the definition of roles and responsibilities, the use of boards and the use of project offices, are the mechanisms proposed in the literature (Lunardi et al., 2014).

However, in SME environments with few resources, physical, human and financial, the creation of committees and administrative councils seems to be beyond the reality of everyday life. The creation of these mechanisms of structural governance can take place from the moment the organization starts to support them, both financially and structurally.

However, the use of the clear definition of the roles and responsibilities of those involved with IT can be considered as one of the prerequisites for establishing effective IT governance (Lunardi, 2008). Even in the context of SMEs, establishing the role of the IT manager, recognized in the organization as responsible for this sector and committed to its good operation, brings a clear message of commitment and accountability regarding deadlines, costs and results.

Concurrently, using a framework that addresses the execution and delivery of IT projects within the pre-set time and cost can lead to higher levels of IT governance. However, a project office can be a very costly structure to be implemented in the context (Lunardi, 2008). However, the structural dimension of IT governance emphasizes control and coordination (Bergeron et al., 2017), and the use of a structure of choice and prioritization of IT projects could bring numerous benefits.



Thus, the first dimension of a governance framework would be formed by IT governance structures, which is composed of the structures responsible for IT decisions.

4.3.2 IT governance processes in SMEs

The procedural dimension of IT governance emphasizes monitoring and control and refers to tools, techniques, frameworks or standards, which aim to ensure that IT is aligned with the business and to monitor the performance of the resources available to users to perform their tasks (Bergeron et al., 2017).

Among the process-related IT governance mechanisms literature cites strategic planning of information systems, IT indicators, service level agreements, project management, use of recognized frameworks such as COBIT or ITIL, among others (De Haes & Van Grembergen, 2008b).

In an SME context, using internationally recognized frameworks, such as COBIT or ITIL, can be a viable alternative, since these frameworks are already tested and applied in a wide variety of environments, with extensive and available documentation and proven effectiveness. However, it is a fact that its implementation is not simple, which leads to the abandonment of its use (Silva, Araújo, & Dornelas, 2018).

At the same time, small and medium-sized companies have a greater focus on operational aspects (Prates & Ospina, 2004), thus, using monitoring and control mechanisms that have a greater focus on operations, make them more likely to success and greater visibility into the value that IT brings to the business.

Then, once core IT management and monitoring processes are in place, additional procedural mechanisms can be deployed to achieve higher levels of IT



governance. IT project management and information security management are two possible examples to be used, too, in the SME environment.

From the above, it is possible to identify two basic components for the process dimension of IT governance in SMEs. The first component is process monitoring and IT management, and the second is the use of performance metrics.

4.3.3 Relational mechanisms of IT governance in SMEs

The relational mechanisms of IT governance include the participation of the IT area in the business (Bradley et al., 2012; Wilkin, 2012; Wu, Straub, & Liang, 2015). Some of the relational mechanisms of IT governance proposed in the literature are already present in the context of small and medium-sized enterprises, such as active collaboration between key members and close and shared work of IT and business people. Thus, their formal implementation would not be necessary (Wilkin, 2012; Bergeron et al., 2017).

At the same time, communication is intended to share information about IT and how IT management and organizational management can share knowledge and understand how the organization operates mutually (Wu, Straub, Liang,, 2015). This aspect becomes even more present in the context of SMEs, since, according to Silva and Araújo (2016a), small companies tend to change strategy more quickly and more frequently, and to follow these changes can be difficult process for the IT staff.

In addition, more formal knowledge transfer approaches are needed and shared learning may be one of the mechanisms used for business to understand IT and IT to understand the business (Lunardi et al., 2010; Peterson, 2004). The goal is for the organization to understand more details of everyday IT life, such as information security, technologies used and trends, and IT to understand how



all this technology is being used to improve organizational processes and what is not working.

In this way, three are the basic components of the relational dimension of IT governance in SMEs, IT manager leadership, shared learning and communication between the organization and IT. In addition, informal communication and training build trust between the parties, enabling the sharing of visions and the creation of common goals between the organization and IT.

5 Theoretical Construct

Up to the present moment, a theoretical convergence has been sought for the understanding of how the IT governance phenomenon occurs in the context of SMEs, through their specificities, resources and limitations.

As presented in the literature, effective IT governance is obtained from a mix of structural, procedural and relational mechanisms (Peterson, 2004). This mix is contingent upon company size, among other factors (Bergeron et al., 2017). In the context of PME relational mechanisms are already present, making its implementation simpler and more consistent (Wilkin, 2012). In addition, it is necessary to mention the natural difficulties that SMEs face in trying to implement structural and procedural governance mechanisms present in the context of large companies.

However, it is not possible to state that structural and procedural IT governance mechanisms are not present in the context of SMEs (Lunardi et al., 2014). In fact, the first mechanism proposed in the literature, defining roles and responsibilities, is present in the context and is the starting point for the framework proposed here. So, it is necessary to have a professional in charge of the IT sector so that the company can direct the efforts made to the technology.



The other proposed structural IT governance mechanisms are group decision-making mechanisms, that is to say committees and decision-making groups for IT investments and monitoring, and IT position in the organizational structure, which is related to IT participation in the strategic decisions of the organization.

In relation to procedural mechanisms, these can also be present in the context of small and medium-sized enterprises. The use of framework parts such as COBIT or ITIL would be an important and feasible step towards achieving effective IT governance in the context presented, as well as other procedural tools that could be used in the evolution of the framework (Silva, Araújo, & Dornelas, 2018).

It is important to remember that the mentioned frameworks are complex and their complete use seems to have no adherence to the context. However, it is possible to use parts of these frameworks to improve management and control over IT sector activities. Thus, the proposed procedural IT governance mechanisms are process monitoring and IT management and IT performance metrics.

On your turn, in the context of SMEs, relational IT governance mechanisms must be present, because the context is composed of close relationships, sharing of mutual goals and the confidence that the actions taken from both parties are always aimed at improving the organization (Mouzas & Blois, 2008).

Additionally, the link between structural and procedural mechanisms of IT governance is based on relational mechanisms (Lunardi, 2008) and, for De Haes and Van Grembergen (2008a, 2009), the implementation of relational governance mechanisms is, in general, a simple process. Thus, communication, shared learning, and other relational IT governance mechanisms should be used without parsimony.



Thereby, structural, procedural and relational elements present in the context under analysis promote, through the use of IT governance mechanisms, possible levels of governance maturity, where level 0 would represent the absence of any mechanism and level 4 would represent the use of all types of mechanisms of governance of the three elements mentioned (structural, procedural and relational).

Levels of maturity can be measured from the presence of an IT professional, so level 1. At maturity level 2, the enterprise uses combined elements of structure with other elements of a relational or procedural dimension. Whereas the level 3 of maturity, represents the combined use of elements of IT governance of the three dimensions, structural, procedural and relational. Finally, the level 4 represents the usage of all IT governance mechanisms.

In a complementary way, Davern and Wilkin (2010) stated that the performance impacts caused by IT are contingent on the ways in which it is used more or less effectively. Thus, common contingent variables in the literature such as environment, strategy and structure (Melo Júnior, 2012) could influence the type of IT governance mechanism to be used in a context, especially in the context of SMEs. Bergeron et al. (2017) add that the manager's profile, the power of external IT vendors, and key employee characteristics are contingent factors present in the context of SMEs.

Figure 5 presents the composition of the framework proposed for IT governance in the context of small and medium-sized enterprises, based on the dimensions proposed by Peterson (2004), structural, procedural and relational, and the possible contingency characteristics that presented in context.



**The Governance Of Information Technology And Its Formal And Informal Mechanisms:
Proposing A Framework For The Context Of Small And Medium Enterprises**

Mechanism \ Maturity Level	Structural	Procedural	Relacional	Contingency factors
0	Absence of any IT governance mechanism			
1	<ul style="list-style-type: none"> • Responsible for IT decisions 			
2 (At least 2 of the 3 elements)	<ul style="list-style-type: none"> • Group IT decisions 	<ul style="list-style-type: none"> • Process monitoring and IT management 	<ul style="list-style-type: none"> • IT Leadership 	
3 (A mechanism in each of the 3 elements)	<ul style="list-style-type: none"> • IT position in the organizational hierarchy 	<ul style="list-style-type: none"> • IT performance metrics 	<ul style="list-style-type: none"> • Shared Learning • IT / organization communication 	
4 (All mechanisms from the 3 elements)				

Figure 5: Proposed framework.

Thus, the evolution in the use of structural, procedural or relational IT governance mechanisms would allow the organization to also move towards more effective governance of IT resources.

6 FINAL CONSIDERATIONS

Small and medium-sized enterprises play an important role in the economy, accounting for 30% to 60% of formal jobs (Sarfati, 2013). The difficulties of managing and limiting resources make IT governance even more important in the context (Bergeron et al., 2017).

Despite the importance of SMEs in the economy, the mechanisms of governance present in the literature are generally developed for the context of large companies and present difficulties when used in SMEs (Wilkin, 2012). Thus, proposing an appropriate framework for the reality of small businesses could lead to better IT governance indices.

From the framework proposed by Peterson (2004), the present theoretical essay proposed a framework that would be more appropriate to the reality of PME taking as theoretical lens the theory of agency and complementary theories as relational contract theory and contingency theory.



The proposed theoretical lens converges to a better understanding of the phenomenon, since the relationship between principal and agent, treated by agency theory (Eisenhardt, 1989), is governed by the contract signed between the parties, with this contract having formal and informal aspects to be managed by relationship is possible (Macneil, 1980). In addition, governance mechanisms should be used so that the contract can be monitored, and contingency factors influence the choice of mechanism (Assunção et al., 2014).

Thus, the proposed framework intends to broaden the understanding of the IT governance phenomenon in the context of SMEs, opening the way to greater theoretical and empirical analysis of the phenomenon.

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