

5-2015

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Recommended Citation

Wiedenhöft, Guilherme Costa; Luciano, Edimara Mezzomo; and Testa, Mauricio Gregianin, "Definition of a Model for Measuring the Effectiveness of Information Technology Governance: a Study of the Moderator Effect of Organizational Culture Variables" (2015).

CONF-IRM 2015 Proceedings. 2.

<http://aisel.aisnet.org/confirm2015/2>

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R67. Definition of a Model for Measuring the Effectiveness of Information Technology Governance: a Study of the Moderator Effect of Organizational Culture Variables

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Abstract

This study began in 2013 through investigation of previous Information Technology Governance (ITG) relationships, in which theoretical evidence was identified to support the perception that the effectiveness of ITG is a result of the alignment between the principles, objectives and mechanisms of ITG. From its partial results, it is possible to highlight the definition of a conceptual model proposed by a Focus Group, in which this Group identified the perspective of IT Governance effectiveness as the one used. The aim of this research is to confirm the relationships between these constructs and to identify the existence of moderation of these relationships through the dimensions of organizational culture. The study is a descriptive exploratory research by nature involving different methodological strategies, working mainly with structural equation modelling.

Keywords

IT Governance, Organizational Culture, IT Governance Effectiveness

1. Introduction

The main issues related to information technology (IT) have gradually ceased to be about the types of technology to be adopted, becoming instead about the definitions and policies regarding how these technologies and resources should be used to generate a competitive advantage for organizations (Nfuka and Rusu, 2011; Bartenschlager and Goeken, 2010; Mahoney, 2012). IT Governance (ITG) acts in this context, since according to Weill and Ross (2004), it can be understood as the specification of the decision rights and accountability framework that encourage desirable behaviour in IT use. According to Sambamurthy and Zmud (1999), ITG involves specifying decision-making structures, processes and relational mechanisms for the direction and control of IT operations. It is further characterized as a set

of mechanisms associated with the structure, processes and relationships; these mechanisms must be related to one or more objectives of the organization (Van Grembergen, De Haes and Guldentops, 2004).

This change in the operational focus of IT often results in organizations turning to market models composed of quite extensive and complex items that contain a great diversity of suggested metrics and indicators, such as ITIL, COBIT or ISO/IEC standards (Nfuka and Rusu, 2011; Bartenschlager and Goeken, 2010). However, the adoption of market frameworks by an organization may occur through such phenomena as mimicry. This can lead to the acceptance of ITG practices that may not conform to the objectives of the organization or that may be inappropriate for its culture (Avgerou, 2001); this may also apply to the organizational culture.

The adoption of ITG mechanisms that occur primarily through the mimicry phenomenon between organisations can be characterised as a problem, since it denies important characteristics of the *modus operandi* expressed in the organizational culture. The adoption process performed in this way can generate a perception of uncertainty in relation to the IT area, contributing to stakeholder doubts regarding the contribution of IT to organizations. This scenario demands that organizations adopt systems and models of measurement that express in quantifiable values the effectiveness of relationships of ITG mechanisms (Westerman, Mitra and Sambamurthy, 2010; Patas, Bartenschlager and Goeken, 2011), and that they understand how the organizational culture variables moderate the relationships between ITG principles, objectives and mechanisms. In this sense, it is possible to identify the research question to which this study seeks to respond: What form should a model take that enables measurement of the main criteria of ITG effectiveness, taking into consideration the moderation of the organizational culture variables? In this study, measurement of effectiveness is based on the perception of the stakeholders and shareholders involved in the ITG as an organizational phenomenon. By solving the above issue, this study seeks to define a model of measurement of IT governance effectiveness based on relationships between the principles, objectives and mechanisms of ITG, exploring the moderator effects of organizational cultural variables.

The development of this study is timely in that organizations are motivated to adopt principles such as transparency, equity and accountability (Westerman, Mitra and Sambamurthy, 2010; Van Grembergen and De Haes, 2009; Bartenschlager and Goeken 2010) and for this, the IT sectors of organisations need to analyse their IT information systems, infrastructure, processes and procedures, aiming to adopt mechanisms that contribute or allow these principles to be met (Peterson, 2004). However, there can be differences in the way these principles are understood between nations due to elements of organizational culture, which can create a poor understanding of the expectations and possibilities, different conditions of service, or even aspects that are more important to some organizations with a specific culture.

1.1 Measurement IT Governance Effectiveness

In relation to the definition of ITG effectiveness, there are two main perspectives that can be used. The first refers to the functional aspect of IT and its role as an operational area, taking into account the characteristics of configuration items, such as hardware, software, the infrastructure to ensure continuity, availability of IT services, its resources, people, and economic and financial assets (Sambamurthy and Zmud, 1999). The second is a business

perspective, targeting the links between the IT results and the organizational success, and seeks to understand the organizational context and its effectiveness in a vision encompassing the external environment, the sectorial characteristics of each organization, the internal functional structure, and the meeting of the needs of the stakeholders (Van Grembergen and De Haes, 2009).

For this study, ITG is considered as part of the scope of corporate governance (Weill and Ross, 2004; Peterson, 2004), being related to organizational effectiveness, to compliance with laws and regulations, to meeting the interests of the stakeholders and to the demand for a return on the IT investment. It is further believed that the effectiveness of the ITG mechanisms is considered as the relationship between these mechanisms and its objectives and principles, as well as how well these mechanisms address and support the objectives and principles of ITG (Wiedenhöft, Luciano and Testa, 2013). For the authors, ITG effectiveness is achieved when the principles of ITG are respected by the objectives of ITG and these are, in turn, attended and addressed by their mechanisms or facilitators. The ITG mechanisms are contained in the arrangements necessary for the implementation and management of ITG. The effectiveness of these mechanisms is related to critical factors for the organization and how the IT contributes to the success of these. These factors should be monitored through indicators that reflect their condition within the organization, allowing the evaluation of the IT effectiveness before the organization itself (Macdonald, 2005).

1.2 Organizations Culture Dimensions

Culture is an important variable to be considered when it comes to the acceptance and use of technology and its design (Straub, Keil and Brenner 1997; Choe, 2004). For Marcoulides and Heck (1993), there is no consensus regarding what constitutes the dimensions of organizational or national culture, making it difficult to define as a construct. For the authors, it is necessary to choose an approach that allows the researcher to identify the dimensions and variables of empirical measurements and hypotheses tests, adjusting for a cultural analysis. This choice reflects the epistemological position of the researcher. However, it is important to begin with an acceptance of the conceptual limitations and discrepancies in relation to the different perspectives of analysis of the national culture (Marcoulides and Heck, 1993).

For Tsui, Nifadkar and Ou (2007), one of the best studies to be cited that better represents the elements of organizational culture is the research conducted by Hofstede (2001), in which the author presents the dimensions of the organizations culture and their relationships in the collective definition of a culture. For Hofstede (2001), in the core of a culture are the values that are “broad tendencies to prefer certain states of affairs over others”. The cultures of different companies can be distinguished from each other through their practices, just as national cultures can be differentiated by their values. In this sense, ITG can be understood as an organizational phenomenon susceptible to the moderation of the organizational culture (Avgerou, 2001).

Hofstede (2001) proposes that organizational culture can be distinguished by different dimensions, which are:

- a) Results orientation, defined as the degree to which an organization motivates, recognizes and rewards its members for their efforts, quality, development, achievement of objectives, excellence and performance;

b) Individualism vs. collectivism orientation, defined as the degree to which an organization emphasizes, reinforces or rewards actions based on the individuality of the people or the groups to which they belong, with the individual interest being predominant, with respect for all, regardless of who they are. It is based on the recognition of the person as a unique being, with their own virtues and defects;

c) Long-term vs. short-term orientation, related to how the beliefs and practices of the organization value the behaviours of individuals involved with long-term planning, personal preparation for the future, the focus on the future, and continuous updating;

d) orientation according to gender, expressed by the level that an organization motivates and rewards behaviours characterised by masculine or feminine adjectives, and the division of gender roles;

e) Uncertainty avoidance orientation, which indicates the respect of rules, beliefs and practices of the organization in order to avoid the occurrence of unknown, new or uncomfortable situations that can threaten the normal functioning of the organization;

f) Power distance orientation, which is measured by the extent to which less powerful members of an organization accept and expect an unequal distribution of power within the company. This dimension can be measured based on a values system of those that have less power, and is directly related to the ways used by different organizations to deal with the fundamental issue of managing inequalities between individuals.

2 Research method

This research is characterized as an exploratory, descriptive, cross-sectional research, having a qualitative and quantitative approach, given that it intends to use data collection techniques and analysis of two types, considering especially the definitions by Flick (2004). This study was divided into two distinct phases to facilitate its management. Each phase of the research resulted in a milestone used to start the following phase. Therefore, the combination of the results obtained in each phase of the research will contribute to its final outcome. It is important to note that this research began in 2013 and the first phase has been fully completed. This, however, is not the focus of this paper and thus, the results of that phase will not be discussed in this section. Figure 1 presents the design of this research.

3 Proposed Conceptual Model

Different studies have investigated the role of organizational culture in absorption capacity and the success of IT (Harrington and Guimarães, 2005), in the IT adoption and diffusion (Dasgupta, Gupta and Sharay, 2011), or to implement an IT artifact (Harper and Utley, 2001). Other studies have examined the impact of organizational culture on specific technologies, such as knowledge management (Gold, Malhotra and Segars, 2001) and implementation of data warehouses (Doherty and Doig, 2003). Leidner and Kayworth (2006) published one of the latest revisions on the influence of the culture on IT.

It is understood that the dimensions of organizational culture presented by Hofstede (2001) have strong potential to moderate IT Governance effectiveness relationships, as shown in studies related to other areas with similar complexity (Evanschitzky et al., 2012; Schultz, Salomo e Talke, 2013). This section shows the construction of the proposed relationships and development of the study hypotheses, seeking the structure of the relationships between the different concepts presented so far.

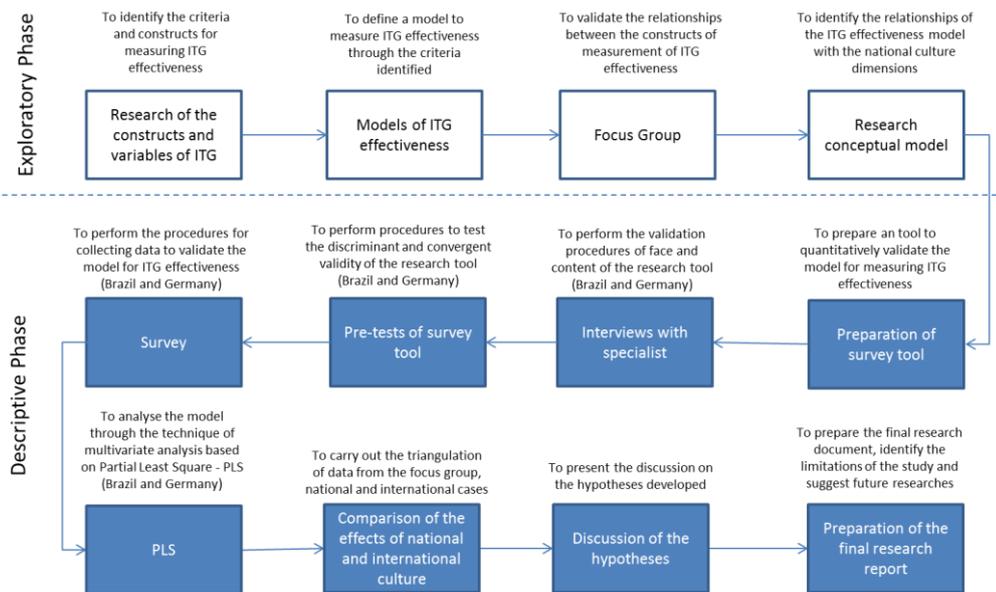


Figure 1: Research design

According to Schein (2004), organizational culture is able to support internal and external relationships and, therefore, it can effectively be the producer of roles, actors and identity recognition that form existing interactions within the organisation. In this way, an organization has a social system capable of allowing its members to recognize their specific identity and develop their potential for creativity and social adjustment (Sainsaulieu; Kirschner, 2006, p. 241). Ritter (2008, p. 56-58) argues that organizational culture has four basic functions in the organizational context: 1) Identification: brings to its members knowledge/recognition of the organizational identity; 2) Integration: provides a link between its members in order to know/recognise what unites them; 3) Coordination: enables greater freedom of action and decision-making through the application of standards; 4) Motivation: influences and legitimizes the behaviour of its members in order to seek the common good for achieving the objectives and goals planned by the organization. Therefore, culture is an influencer of the organizational environment on several levels. Robbins (2007, p. 378) states that culture performs various functions, highlighting those that: define boundaries; provide a sense of identity; facilitate the commitment of its members; stimulate stability in relation to organizational dynamics; and influence the attitudes of its members. In this sense, it is understood that IT Governance, as an organizational model, needs to reinforce the cultural behaviour of its members in order to support cultural values that enhance the relationship between the organisation of IT and its stakeholders. Thus, it is necessary to develop involvement strategies, from the dissemination of principles, values, beliefs, rituals, myths and standards to formalization of environments and processes that fit this form of management. Evidences pointing to the adoption of ITG mechanisms through mimetic influences between organizations (Wiedenhöft, Luciano & Testa, 2013) suggest that cultural aspects can influence the intensity of the relationships proposed by the model presented in Figure 2.

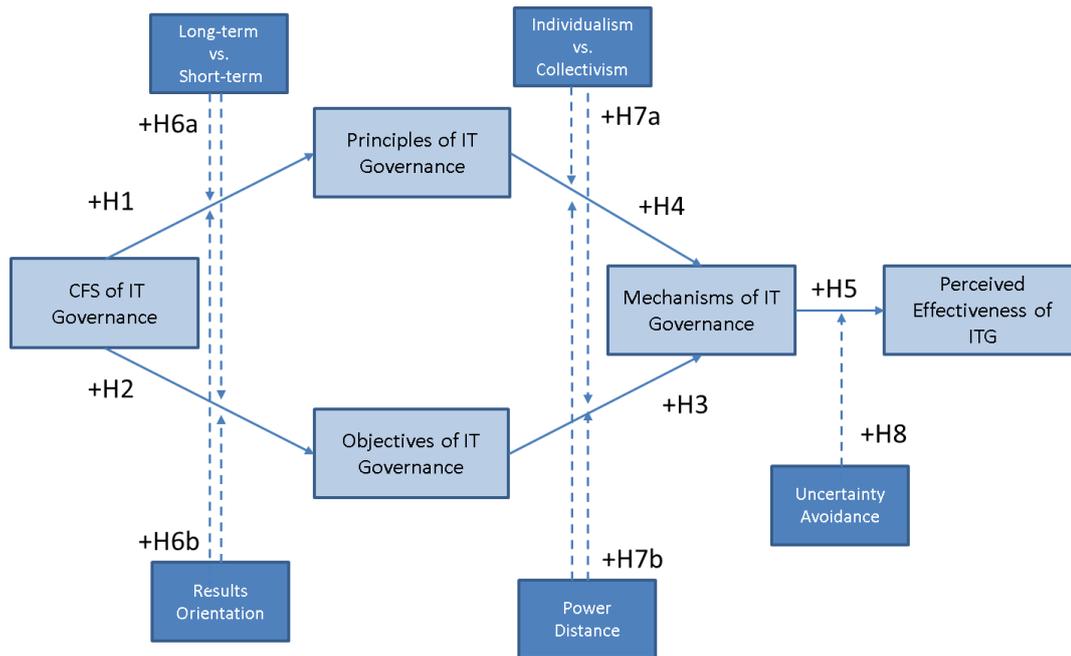


Figure 2: Conceptual Model

Many studies in the area of strategy and innovation argue that the critical factors of strategic direction within an organization address the organizational mechanisms to meet with the best results (Vincent, Bharadwaj & Challagalla, 2004; Ernst, 2002; Pattikawa, Verwaal & Commandeur, 2006). It is considered that the strategic direction of the organization is responsible for representing the expectations of different stakeholders (Muller, 2013) and, consequently, defines the principles of corporate governance (Westerman, Mitra & Sambamurthy, 2010). It is further believed that the principles of ITG are inherited from corporate governance (WEILL & ROSS, 2004). It is therefore necessary to define the objectives of IT Governance through the deployment of organizational strategies and resulting specifically from institutional strategic direction, in this sense shaping the hypotheses H1 and H2:

H1: The critical success factors of IT Governance exert a positive relationship with the importance of the ITG principles of organizations.

H2: The critical success factors of IT Governance exert a positive relationship with the definition of the ITG objectives of organizations.

Whereas, conceptually, the principles and objectives of ITG are responsible for determining the ITG mechanisms to be adopted by an organization (Weill & Ross, 2004; Muller, 2013; Van Grembergen & De Haes, 2009), it is believed that there is a relationship between the principles and objectives of IT Governance and the definition of their mechanisms. According to Freitas (2007) and Schein (2004), the organizational culture values influence the organizational formal structure. It also influences the way that members performed practices, and the way in which the commitment and understanding among its members occurs. The assumptions are main elements of the culture, because of its influence in decision-making processes. Also according to Freitas (2007), beliefs allow a group within an organization to

solve their collective problems. As a result, the process becomes part of the organizational knowledge. Thus, the following hypotheses are created:

H3: The objectives of ITG have a positive relationship with the mechanisms of ITG defined by the organizations.

H4: The importance of the ITG principles has a positive relationship with definition of ITG mechanisms of the organization.

In turn, the mechanisms of IT Governance are responsible for expressing the aspirations of corporate governance in relation to IT (Weill & Ross, 2004; Muller, 2013; Van Grembergen & De Haes, 2009). It is considered that the effectiveness of ITG is related to the adoption of mechanisms most suited to the cultural context of the organization, resulting from their insertion in a particular country. Therefore, based on the concept of effectiveness proposed by Wiedenhöft, Luciano and Testa (2014), hypothesis 5 of this study is then defined:

H5: The perception of ITG effectiveness is greater according to the mechanisms of ITG defined by the organizations.

The relationships presented in hypotheses H1 to H5 constitute the ITG relationship proposed by this study. However, it is believed that organizational culture exercises a moderating effect on IT Governance relationships and, to this effect, hypotheses H6 to H8 were formulated.

According to Schein (2004), results orientation involves incentives, recognition and rewards for members, directing the behaviour of the individuals in relation to the expected results. Weill and Ross (2004) argue that ITG promotes IT infrastructure to better understand and support the strategies and goals of the organization. In this sense, it can be seen that there is a latent possibility of moderation of gender and results orientation in the ITG relationships, thus supporting hypotheses 6a and 6b:

H6a: Companies whose orientation characteristics for results are higher tend to have a stronger relationship between critical success factors and the importance of principles and objectives of IT Governance.

Long-term orientation is related to the beliefs and practices of the organization that values behaviours of individuals involving long-term planning (Hofstede, 2001). Long-term planning necessitates a focus on the future, continuous updating and personal preparation for tomorrow. With this definition in mind, it is believed that two factors may be influenced by this cultural orientation. The first is the perceived effectiveness of ITG that has different perspectives in relation to time (short-term and long-term objectives). The second relates to the definition of ITG mechanisms and objectives that will be exposed to different expectations in organizations, depending on the short-term or long-term cultural orientation. Thus, long-term orientation is considered a moderator of ITG relationships, supporting the hypothesis H6b:

H6b: Companies whose orientation characteristics for the long-term are higher tend to have a stronger relationship between Critical Success Factors and the principles and objectives of IT Governance.

According to Hofstede (2001), the orientation towards individualism consists of some levels of emphasis or support of actions involving the individuality of persons or groups, with individual interests being predominant and also recognizing the person as a unique being with their own virtues and defects. These relationships can guarantee the decision-making

structures and define that ITG processes are, in practical terms, orientated towards individualism, supporting the following hypothesis H7a:

H7a: Companies whose power distance characteristics are higher tend to have relationships between the principles and objectives of IT Governance and the definition of structural mechanisms of IT Governance.

According to Hofstede (2001), orientation towards individualism consists of some levels of emphasis or support of actions involving the individuality of people or groups, with individual interests being predominant and recognition of the person as a unique being with their own virtues and defects. These relationships can ensure the decision-making structures and define the ITG processes as being, in practical terms, directed towards individualism, supporting the following hypothesis H7a:

H7b: Organizations whose orientation characteristics for individualism are higher tend to strengthen relationships between the principles and objectives of IT Governance and the definition of structural mechanisms of IT Governance.

Finally, the aspect of uncertainty avoidance refers to the rules, beliefs and practices of the organization that aim to prevent the occurrence of strange, new or unknown situations (Marcoulides & Heck, 1993; Hofstede, 2001). This is in alignment with the direction of the organizational mechanisms and strategies, involving the definition of procedures and policies that seek to reduce IT-related risks, impacting on the perception of IT Governance effectiveness. Based on this reasoning the hypothesis H8 is presented:

H8: Organizations whose orientation characteristics for uncertainty avoidance are higher tend to have a perception of greater effectiveness when the defined ITG mechanisms are the type of process.

The hypotheses H1 to H5 are specific relationships of ITG and all are supported by previous theoretical studies (Weill & Ross, 2004; Peterson, 2004; Muller, 2013; Van Grembergen & De Haes, 2009). However, it has been shown in studies by Weill (2004), Van Grembergen, De Haes and Guldentops (2004), and Janssen, Luciano and Testa (2010), that the effectiveness of ITG is not fully explained by the relationships between its constructs (principles, objectives and mechanisms).

According to Hofstede (2001), another important factor in the evaluation of organizational culture is the characteristic of gender, wherein a masculine organizational culture is more conducive to dominance, assertiveness, objectivity and material success, while a female organizational culture is more conducive to people, feelings and quality of life. Furthermore, according to Dasgupta, Gupta and Sharay (2011), orientation according to gender can be a mediator of other factors, since the organizational cultures in which masculinity prevails are more focused on results, concentrated on the individual and a greater degree of standardization, besides the preference for a long-term view (Hofstede, 2001). Therefore, hypotheses for gender moderation were not created as it is believed this moderation occurs indirectly through the other dimensions of organizational culture.

3.1 Next phase of research (Descriptive Phase)

This research phase will involve conducting a survey of professionals working with ITG in order to make the collection of data necessary for validation of a model for the measurement of ITG effectiveness, based on the relationships developed in the exploratory phase, between

the principles, objectives and mechanisms of ITG. Based on the concepts of Pinsonneault and Kraemer (1993), the survey can be described as the gathering of data or information about the characteristics, actions or opinions of a specific group of people, indicated as representative of the target population by means of a research tool, usually a questionnaire. As the main characteristic of the survey method, it can be cited: a) The interest in producing quantitative descriptions of a population; b) The use of a predefined instrument. For this study an electronic questionnaire will be developed, composed of three parts: b1) the first will evaluate the relationships identified in the exploratory phase of this study; b2) the second will feature a series of questions used to confirm the relationships identified between organizational culture and the conceptual model proposed; b3) the last part of the questionnaire will be related to the sociodemographic questions that will be used to assess the control variables, differentiating the sample between respondents in Brazil.

Questions belonging to the first two parts of the questionnaire will be closed and will use a 7-point Likert agreement scale (Hair et al., 2013). The application of the questionnaire will be carried out through a web address that will be sent to Brazilian professionals to be defined, which work with ITG. The respondents will be selected based on the following criteria: a) qualification and expertise in the research area; b) leadership position in an organization with an established ITG model.

To enhance the data collection tool, there will be validation procedures of the content through interviews with researchers with publications in ITG in both countries. For the interface validation, pretests with a group of professional that meet the same criteria proposed by the respondents of the survey will be performed. According to Hair et al. (2013), pretests should be conducted in a group of respondents of the previous validations when a measurement tool adapted from other researches is used. For the validation of reliability of the research tool, Cronbach's alpha is used. For Hair et al. (2013), Cronbach's alpha is one of the most used tests to verify the internal consistency of a set of variables, determining the reliability of the measurement. Due to the specificity of the respondent profile, a technique of systematic probability sampling will be used (Hair et al, 2013), since the size of the sample will take into considerations the number of relationships and variables observed. At the moment, it is not possible to determine the optimal sample size, because the survey instrument was not completed. However, according to the same author, 200 valid questionnaires are sufficient for the data analysis in social research. Thus, the sample could not be lower than 200 valid respondents.

For this phase of the research, the Partial Least Squares (PLS) method will be used as a technique of data analysis due to the objective of this study, which aims to define a model of measurement for ITG effectiveness based on the relationships between the principles, objectives and mechanisms of IT. According to Hair et al. (2013), the PLS method was developed to maximize the predicative accuracy of the models, offering flexibility for exploratory modelling. The PLS technique was initially presented as soft modelling (Hui, 1978) due to not having assumptions about the distribution of variables. There was also no need for the transformation of indicators, at least to diminish its asymmetry, and the size of the sample needed was smaller than in the model of structured equations based on covariance. This is the main reason for choosing this technique, since the criteria for participant selection limits the number of possible respondents. The analysis will be also performed using the SmartPLS. To verify the existence of any failure to get information from some members of

the population who were not selected for the sample, it will be checked if they are significantly different from those who responded, especially following the recommendations Churchill Jr. (1999). The T test considering these two groups will be conducted.

4 Conclusion

The adoption of a technology, as well as changes in processes and structure, occurs differently in each organization, but also differently within the same organization when it operates in different countries. The performance of this research is relevant as it provides immersion into the theme of ITG, contributing to a greater understanding by organizations of the effects of cultural dimensions on ITG efficacy. It is further believed that this research can contribute to improving understanding of the benefits achieved by organizations with an IT management strategy and adoption of ITG (Lunardi, Becker and Maçada, 2010). This will allow reflection on the best methods for monitoring the effectiveness of ITG mechanisms, contributing to future research and leading to the expansion of this content in the academic and organizational environment. As a potential contribution for the organization, is the need for a way of measuring the effectiveness of the ITG mechanisms, which in turn will support the development of the organizations and will disseminate the knowledge regarding this topic to the market.

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