



BRAZILIAN ORGANIZATIONAL CULTURE ON INFORMATION SECURITY: A LITERATURE REVIEW

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ABSTRACT

An extensive literature review on the organizational culture in Brazil is presented and compared to the information security culture, in the past decade. This article is provided scholars with a new perspective and taxonomy on the case study analysis, and implications of these findings are discussed, as part of the master's thesis from one of the authors (Vieira, 2008). Recommendations for future investigation and discussion compile the present work.

KEYWORDS

Information security, organizational culture, Brazil

INTRODUCTION

This article addressed the organizational culture in Brazil, applied to the information security culture, as the unit of analysis of this comprehensive literature review. In the last part, on change management, the actors of change and the role of resistance to change are presented. Also in this part, the models of change management are addressed. The chapter concludes with a more detailed explanation of the model used in this research. The topic has attracted scholarly attention over the years (Silva. G.B., Dias, M., Felicio Jr, R., 2022; Aquino, L. Dias, M., 2022; Alvesson, M., 1993; Dhillon, G., 2001; Freitas, A.B., 1997).

Regarding organizational culture, Freitas (1991) argues that, due to the great difficulty of reaching a consensus in the definition of culture, many different methodologies are developed, since research is directly related to what is considered culture. Also according to the author, a way of easy identification of culture is to investigate the different elements that compose it, that is values; beliefs and assumptions, rites, rituals, and ceremonies; stories and myths; taboos; heroes; standards; communication process.

The term organizational culture was introduced in the 1970s in the academic literature of the United States, by Pettigrew (1979), after the publication of his article in the journal Administrative Science Quarterly. According to Pettigrew (1979): "Organizational culture is a system of meanings accepted publicly and collectively by a given group at a given time. This system of terms, shapes, categories, and images interpret their situations for people." (p. 574)

Culture, according to Alvesson (1993), is a way of thinking about the social reality that has no direct correspondence with any given empirical object. It consists of the experiences, meanings and values learned and shared in contact with the environment and expressed and communicated, although partially, symbolically.

According to Schein (1997), the term culture should be used to designate the basic beliefs and assumptions shared by the members of an organization, who operate unconsciously and define the organization's view of its environment and its own.

Schein (1997) states that culture manifests itself at three different levels: a) visible artifacts; b) values; c) basic assumptions. The visible aspects of the organization – such as technology, way of dressing, language – represent the artifacts. At this level, the cultural elements are easy to observe, but the logic used is not always explained, making it difficult to understand. At the second level are the values, which are the justifications of the organization to explain and predict the acts of the members of the organization. In the third level are unquestionable beliefs, perceptions, and feelings. According to the author, this is the most complex level of being explained, even though it is the essence of culture because it is associated with elements less debatable and confrontational than visible values and artifacts.

Corroborating Schein, Pettigrew (*apud* Fleury and Fisher, 1996), Rousseau (1990), Hofstede and collaborators (1990), and Kotter and Heskett (1994) also point out that culture in organizations is expressed in levels.

Rousseau (1990) argues that organizational culture is expressed through five levels: artifacts, behavior patterns, behavioral norms, fundamental values, and assumptions. In this model, in addition to Schein's cultural elements, the author adds behavior patterns and behavioral norms. The first refers to the decision-making, coordination, and communication mechanisms used in problem-solving, and the second is what the organization expects from its members in the way of behaving and interacting with others, regarding the relations of cooperation or competition in the group.

Hofstede et al. (1990) used the onion metaphor to elaborate a model based on the existence of two levels: organizational practices and values. Organizational practices represent the outermost and most visible layer of culture and are divided into three levels. The first are symbols that include words, gestures, and objects meaningful to the organization. In the second level are heroes, who associate themselves with the living or dead characters, real or imaginary, who serve as a model of behavior for the members in which the culture manifests itself. Next come the rituals, which are the superfluous but socially indispensable collective activities, through organizational practices. In the most subjective and internal layer, configuring the core of culture, are the values – feelings unconscious and collectively accepted, which can be observed through behavioral manifestations within the organization. Organizational practices can be the object of planned change, unlike values, which only change according to their logic.

For Kotter and Heskett (1994), culture can be divided into two levels that have reciprocal influence over each other: a deeper and less visible one, which are the values shared by the people in the group; they remain over time, even if the group members change. At the least deep and more visible level are the organization's behavior or style patterns, which the group automatically encourages new members to adopt. This level is easier to change.

According to Pettigrew (*apud* Fleury and Fisher, 1996), culture is composed of a set of values, beliefs, and assumptions by which it defines the way organizations will conduct their business. Also according to the author, the external presentation of assumptions and beliefs is carried out by structures, systems, symbols, myths, and reward patterns in the organization.

According to Alvesson (1993), Schein is one of the most influential authors of corporate culture, fitting into the functionalist approach. Schein describes the relevant role of the actions of the founders of the companies at the beginning of the process of creating the culture. Pettigrew is also well known for his research in the area of corporate culture and, in common with Schein, highlights the importance of founders in the creation of organizational culture.

For Smircich (1983), it is possible to differentiate the concepts of organizational culture, as to the philosophical assumptions that support them. The author presents two possible views: (i) Objectivist and positivist (functionalist) vision – culture is an independent variable, whether internal or external; (ii) Subjectivist and interpretive (phenomenological) vision – culture is the organization itself, being the form of expression of the manifestation of human consciousness, ideas, and symbolic aspects.

According to Hilal (1996), one can group the literature on organizational culture into two basic lines: (i) The one that considers the culture manageable, to a greater or lesser extent; (ii) the one who considers that culture is not manageable.

In the next sections, a comprehensive theoretical background on the subject is revealed, followed by the methodology, findings, & analysis sections. Finally, the discussion section and recommendations comprise this research.

METHODOLOGY

In this study, we addressed the organizational culture in Brazil, applied it to the information security culture, as the unit of analysis of this comprehensive literature review. We investigated mainly on four databases: (i)Springer, (ii) EBSCO, (iii) Elsevier, and (iv) Proquest, for identifying relevant research in the field, on articles published between 2022and 1994 in a comprehensive literature review on the subject, to be discussed in the following sections.

BRAZILIAN CULTURE

Freitas (*apud* Motta and Caldas, 2007) points out that the influence of national culture on organizational culture has its importance highlighted when using imported management models. These models bring with them divergent and to some extent conflicting cultural assumptions and values. The authors also comment that many models can fail precisely because of the lack of support of some basic traits of Brazilian culture. Also, according to Freitas (*apud* Motta and Caldas, 2007), Brazilian traits are the general characteristics common to most Brazilians. Thus, they represent the basic assumptions that each individual uses to see himself as Brazilian. As mentioned by Schein (1997), it is the basic assumptions that create the values of our daily lives, are pre-conscious and taken for sure. Oliveira and Machado-da-Silva (2001) consolidate the view of several authors of the specialized literature on the main characteristics of Brazilian culture, as illustrated in the following Table 1:

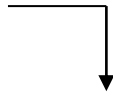


Table1 Main characteristics of Brazilian culture

Brazilian cultural characteristics	Indicators
Personalism	Favoritism
	Paternalism
	Emphasis on personal relationships
	Public ownership by the private
	Moral and non-legal equality
Protectionism	Spectator posture
	Guidance by an external authority
	Government as a unifying principle
	Transfer of responsibility
Aversion to uncertainty	Need for rules
	Avoid conflict
	Affection for peace and order
	Rules without grounds in customs
Formalism	Difference between law and concrete conduct
	Exaggerated attachment to laws
	Legalism
	Circumvention of a pre-established standard
	Turn a blind eye
Way	Get a godfather
	Flexibility
	Rapidity
	Improvisation
	Receptivity to other breeds
Receptivity to foreigners	Hospitality
	I like what comes from the outside
	Imports of techniques
	Higher appreciation than comes from outside
Short-term guidance	Emphasis on short-term planning

Source: *Oliveira e Machado-da-Silva, 2001, p. 4*

Corroborating the authors, Motta and Caldas (2007) also points out that the critical points of Brazilian culture are formalism, flexibility, loyalty to people, and paternalism. Motta and Caldas (2007) also state that Brazilian culture "is always plural, complex and multifaceted." (p. 81)

Freitas (*apud* Motta and Caldas, 2007) points out that it is not necessary to discuss the level of influence of the national culture on each organization. It should be noted, however, that each organization delimits a unique organizational culture supported by various elements and forms. The author also reveals that the national culture influences the formation of organizational culture and may vary from organization to organization.

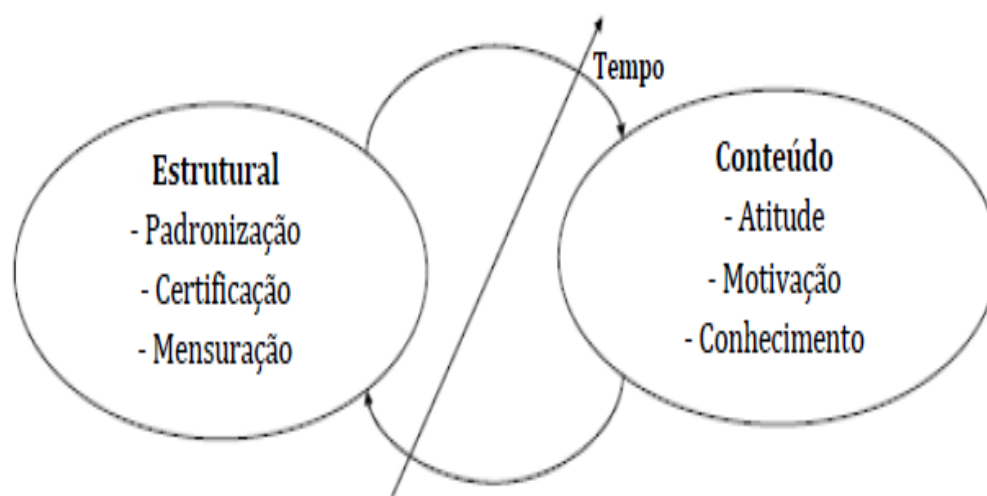
According to Torres and Pérez-Florianio (*apud* Lima *et al*, 2003), the effects of national culture on the processes of organizational change have received a lot of attention. The authors point out that culture is certainly not the only factor to be considered in the processes of change, but it is probably the most stable to influence processes of continuous improvement, *empowerment*, decision-making, and organizational change.

INFORMATION SECURITY CULTURE

According to Martins and Eloff (2002), the information security culture is a set of information security characteristics, such as integrity and availability of information, which characterize acceptable behavior. Corroborating Martins and Eloff (2002), Dhillon (2001) defines what safety habits are the behaviors of people that contribute to the protection of data, information, and knowledge.

Helokunnas and Kuusisto (2003) emphasize that information security awareness is a state in which users realize their mission in maintaining security. The authors also identify two key components for the information security culture, structure components, and content components. Helokunnas and Kuusisto(2003) emphasize that not only structural components should be focused, because usually what invalidates an information security culture is content components. The following figure illustrates the fundamental components of each composition.

Figure 1 Key components of the information security culture



Source: Helokunnas and Kuusisto, 2003, p. 192

Von Solms (2000) describes information security in "three waves". The first refers to the technical wave that treats information from the perspective of information and communication technologies. In this, one can observe the use of encryptions, authentication devices, and access control services. The second is known as the managerial wave. This takes strength when first-line managers become involved with the information security process. It began with the use of the Internet and browsers, facilitating commercial activities, such as e-commerce. Von Solms (2000) also stresses that in this wave one can observe the creation of policies, standards, procedures, and methods of information security, as well as the creation of a team, focused on information security.

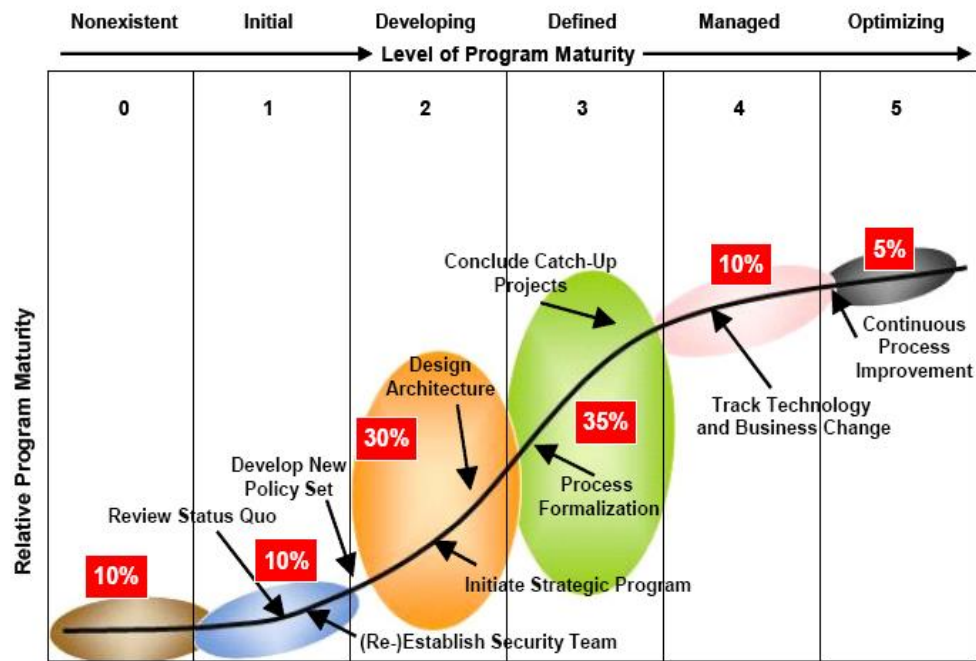
The third wave, according to Von Solms (2000), is the wave of institutionalization. The fundamental objective of this wave is to build a culture of information security, making it, of course, and part of the daily routine of everyone in the organization. In this wave, there are both structural components such as standardization, certification, and measurement, as well as the components of attitude, motivation, and knowledge. The author stresses the great importance of content components, as until then they had not been treated in previous waves and, without these; there is no success in forming a culture of information security.

Thus, von Solms (2000) and Helokunnas and Kuusisto (2003) emphasize the importance of content components nowadays, in ensuring success in the formation and maintenance of an information security culture.

Specifically, regarding the implementation of information security, Gartner (2009) points out the maturity levels of the program, divided into six phases: (1) Level 0 - Non-existence - Security controls are implemented *ad hoc*. Tasks are performed informally and in a disorderly manner; processes are undefined and personnel changes cause failures; (2) Level 1 - Initial - Security processes are carried out *ad hoc*, disconnected and disorganized. Few advocate the existence of the program, but it is not formalized. Actions for awareness are developed and increase the level of acceptance of the formalization of a corporate program, although in a limited way; (3) Level 2 - In development - the vision of change is drawn and is managed through a formalized program. Requirements are evaluated, responsibilities are designated, and implementation of the plan is initiated. *Gaps* are identified. Communication and education programs are conducted throughout the organization; (4) Level 3 - Defined - Goals, practices, and performance indicators are fully defined. Processes are standardized, integrated, documented, and implemented. Governance and compliance model is implemented; (5) Level 4 - Managed - The program is part of the culture and is an integral and inseparable part of day-to-day operations and decision-making. The performance of the program is highly predictable, and finally, (6) Level 5 - Optimization - Processes are mature. All investments and all decisions are interconnected. *Feedback* from stakeholders is used to adjust and continuously improve processes, as well as people's behavior, and changes and opportunities arise related to technological and business requirements.

Figure 2 represents the situation of the world's 2,000 largest companies in terms of the maturity of the deployment of information security, as follows:

Figure 2 Maturity levels in the information security program

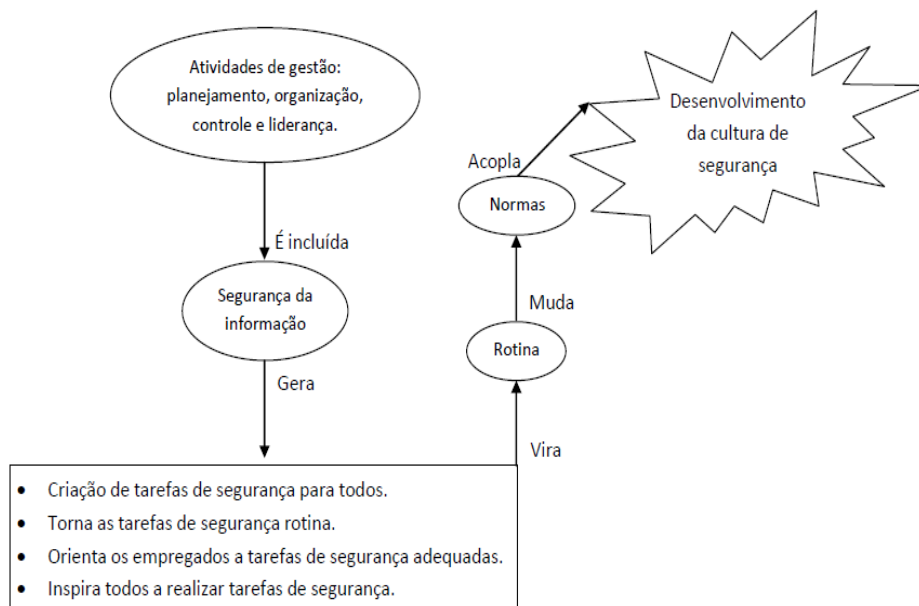


Note: Population distributions represent typical, large Global 2000-type organizations.
Source: Gartner (January 2009)

Source: Gartner, 2009, p. 3

Zakaria et al. (2007) propose a model for restructuring the development of the information security culture, which covers management activities, through planning, organization, control, and leadership. The authors emphasize that, by including all management activities, appropriate safety practices can be developed among employees, because the human factor was considered in the phases of implementation and maintenance of safety in organizations. The model proposed by Zakaria *et al* (2007) is presented in Figure 3, as follows:

Figure 3 Model for restructuring the development of the information security culture



Cast iron: Zakaria et al, 2007, p. 640

As presented in this chapter, developing a culture of information security requires many steps and commitment. It is a large process of organizational changes that, to facilitate understanding, will be further explored in the following topic.

DISCUSSION AND IMPLICATIONS

The research has implications in several fields of study, such as (i) Brazilian public institutions (Silva. G.B., Dias, M., Felicio Jr, R., 2022; Craveiro and Dias, M., 2019; Vieira, 2008); (ii) Brazilian cooperative societies and organizational culture (Dias, M., 2019; Dias, M.; Silva, Cleber A.; Lund, Myrian, 2019; Dias, M.; Teles, A., 2019); (iii) public services and agents (Dias, M., 2018; Dias, M.; Teles, A.; Pilatti, K. (2018)); (iv) Family business(Dias, M.; Davila Jr., E., 2018)

On the other hand, hearing about information security is already prosaic, but understanding how to manage a process of change to ensure the establishment of a culture of information security is a somewhat more complex task.

Using a model of how to drive organizational change by focusing on a culture of information security became a challenge that aimed at both academic and practical gains. In this sense, the problem question of the study in question is "to what extent was Kotter's (1997) proposed criteria met for the implementation of an information security culture at Petrobras?" (Vieira, 2008)

The bibliographic investigation resulted in the fulfillment of the research objective. The bibliographic material provided clear and objective definitions on the themes of organizational culture, and information security culture.

Concerning the culture of information security, it can be seen that its development was tied to the activities of planning, organization, control, and leadership, corroborating the model of Zakaria *et al* (2007). The structural components are somewhat well defined and the greater commitment is focused on the content components: attitude, motivation, and knowledge. Petrobras is in the 3rd wave proposed by Von Solms (2000), the construction of a culture of information security.

The organizational change studied can be classified as intentional, programmed, macro, episodic, radical, rupture, predominantly human/social, and adductive in nature according to Silva's classification (2001). Already according to the classification proposed by Lima and Bressan (2003), it is transformational, of 2nd order, episodic, discontinuous, and radical. It is verified that the necessary change was created intentionally following also the Lewin model (1951): thawing, defrosting, and frosting.

This is a planned and unstructured change in which the momentum of the change was initially due to the company's senior management. Based on the analysis of Torquato (1997), it was observed the need for better sociopsychological preparation of the internal community and the agents of change for a process of cultural change.

FUTURE RESEARCH

A research job doesn't run out in itself. In addition to trying to answer a question, it makes room for other studies. Future research is encouraged on case studies comparing the Brazilian organizational culture to other cultures in Latin America or Europe and Asia, for instance. Moreover, in the study in question, it was noticed that there was no proactive work in identifying groups resistant to change and why resistance. In this sense, it is suggested that further research be done in this area. Power relations, both external and internal, can influence the conduct of a successful change process. A more detailed study of these relationships is recommended not only in the company studied but also in others.

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