Technological Bureaucratization of the Organization through the Use of Information Systems.

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Abstract. The text addresses the relationship between information technology and bureaucracy, aiming to understand the relationship between implementing information systems (IS) and bureaucratic thinking in times of flexibility. It reviews the literature by analyzing two aspects: the one that argues that, in times of flexibility, the use of information technology promotes the "death" of bureaucracy and the one that claims that technology updates the bureaucratic way of administering. The text presents the methodology used: qualitative, with collection through in-depth interviews, carried out in four companies with ten subjects, and use of thematic analysis to categorize the results. Four themes express the cycle of changes promoted by ISs: i) drivers of IS implementation, ii) IS implementation process, iii) results and consequences of using ISs, and iv) continuous improvement needs. The results allowed the identification of a cyclical process of technological bureaucratization

Keywords. bureaucracy, information technologies, information systems, ERPs, and technological bureaucratization.

1. Introduction

Organizations have been facing several challenges to gain and maintain competitive advantage in uncertain, competitive markets (Magro et al., 2013). This scenario, characterized by new information technologies (IT), new information systems, and new business environments like *e-commerce*, converges and reinvents traditional knowledge about organizations (Rivard et al., 2004; Albertin, 2010).

One of the technologies that best represents these organizational transformations is that of *Enterprise Resource Planning (*ERP) and similar ones, such as *Supply Chain Management* (SCM) (Klaus et al., 2000; Souza & Saccol, 2003), whose main functions are to serve the company's sectors in an integrated manner and, in its most recent versions, to engage in the execution of its routine operations from other organizations or relationships with their customers, from the perspective of an Expanded ERP (Molinaro & Ramos, 2012; Zhang, 2013).

It is observed that, although the phenomenon of IS adoption emerges in contemporary organizational discourse aligned with the so-called flexibility paradigm, in its operationalization, signs of a possible relationship with the bureaucratic form of organization and management are being found. As Batista-dos-Santos and Nepomuceno (2009, p. 1) stated in research on ERP implementations, "the social phenomena occurring in companies point towards an improved and sophisticated, yet subtle, reinvention of the bureaucratic way of organizing." In the same interpretative line is the study by Ludmer & and Rodrigues Filho (2005), which compares ERPs to a new type of "iron cage."

Therefore, the study's general objective was to understand the relationship between IS implementation and bureaucratic thinking in times of flexibility. The following specific objectives operationalized this general objective: i) identify reasons for IS implementation, ii) describe IS implementation processes, and iii) analyze reasons and processes for IS implementation in the light of bureaucratic thinking.

In addition to this introductory section, the article contains the following parts: 2 Literature Review; 3 Methodology, whose approach is qualitative with process logic (Langley, 1999); 4 discussion and data analysis; and 5 Final considerations.

2. Theoretical Background

With the growth of organizations in the so-called glorious years of capitalism, there was an increase in the bureaucratic body, a fact that is evidenced by the comparison between the proportion of office workers in the first post-industrial revolution firms and the number of administrative workers in companies in the period that preceded the popularization of IS. Consequently, the controlling function was amplified, and the same principles of Taylor's classical theory were applied to the office, with the standardization of operational processes, the technical division of work, and the introduction of the first technologies (Braverman, 1987).

The emergence and popularization of IS, in turn, occurred in the context of recent organizational restructuring, touted as reducing bureaucracy, a time in which: i) the processes of *downsizing* increased, with a consequent downsizing of the administrative body; ii) revolutions in production systems have become frequent, with strong use of microelectronics; and iii) the way of managing was made more flexible through the use of various flexible tools. Given this scenario and the ideas implemented by the flexibilization discourse, the introduction of IS has been associated, at least *mainstream* in the area, with reducing bureaucracy in organizations, and never the opposite.

For authors like Albertin(2009), the world is witnessing the end of the bureaucratic organizational form. In his view, this gives way to a form more suited to the demands of the post-industrial era. Contemporary authors defending the "death of bureaucracy" have the evolutionary principle that "each generation develops an organizational form appropriate to its characteristics" (Albertin, 2009, p. 53). Heckscher (1994, p. 15) assures that "the compilation of these characteristics constitutes the post-bureaucratic ideal type."

Crozier (1981, p. 52), however, already pointed out that information technology is the "most perfect management instrument that man has ever had because it directly undermines human relationships" since its field of action is a "human phenomenon essential: communication." It is inferred, from the reading of this post-Weberian structuralist theorist, that the relationship between bureaucracy and "technologies," these taken a*side,* has been perceived since the emergence of the bureaucratic way of organizing and managing within companies as, even before the advent of the computer, there was already an attempt to reduce the need for oral communication, by standardizing and regulating routine activities in manuals.

The popularization of the computer in administrative spheres enabled the unification of the administrative work process, which began to be organized by computerized processes that cross different departments (reengineering), bringing with it the possibility of the emergence of a new bureaucratic class (IT professionals), repeating, in an updated way, the cycle that occurred in the automation of the production process during the classical school of thought (Braverman, 1987).

Another counterpoint to the vision of the end of bureaucracy begins with Tragtenberg (1974, p. 139), for whom "bureaucracy is confused with the organization itself" and, as such, cannot be extinguished.According to Faria and Meneghetti (2011), in both the works of Tragtenberg and Prestes-Motta, bureaucracy comes in three forms: organization, power, and control. In this context, bureaucracy tries to show itself as its opposite or constantly reinvents itself: "In political terms, it proclaims itself neutral. In administrative terms, it proclaims the easing of control and the organizational culture of tolerance" (Prestes-Motta, 2001 p. 86).

Boltanski and Chiapello (2009) point out that some pillars of bureaucratic thinking are objectives sought by the computerization of a business environment, such as control, rigid user profiles according to their functions, hierarchization of work activities, and constant monitoring, among others. As a consequence of achieving these objectives, bureaucratic dysfunctions also arise, the most relevant being the fact that procedures stop being work instruments and become the main objective of the work (Rego, Cunha, & Wood Jr., 2010). Batista-dos-Santos and Nepomuceno (2009) identified, based on empirical studies, IS as possibly structuring new bureaucratic organizational models that bring with them organizational and personal implications, which deserve further study. In this research, bureaucratic elements emerged strongly associated with an IS implementation.

3. Research Methods

The methodology adopted was qualitative, aiming to understand reality by deepening the understanding of the phenomenon studied (Dyer & Wilkins, 1991). For Stake (1998), a qualitative study does not seek generalization. Differently, it deals with the complexity inherent to the phenomena it investigates. We chose to use a qualitative methodology since, as Pozzebon & Petrini (2013) argue, it is imperative to adopt a qualitative perspective in information management due to the predominance of a rationalist tradition that limits critical analyses.

Data collection was carried out through interviews. In the interviews with the main managers of the companies, other users were requested to be indicated to be interviewed, in the style*snow ball* (Nicolaci-da-Costa, 2007).

In-depth narrative interviews were carried out with managers and end users of the systems. According to Jovchelovitch and Bauer (2004), the narrative interview is a form of in-depth interview with specific characteristics, starting from

a self-generating scheme of the "once upon a time" type based on the logic of telling a lived story.

The interviews sought to reconstruct the time lapse in the organizations studied, from the period that preceded the installation of the IS, to capture the drivers that led the company to make this type of decision, the implementation stage, to understand the emerging aspects of organizational change; and the period of use and the new structure of the organization. The purpose of this research strategy, with the rescue of a historical narrative, was to enable the understanding of the process as a whole and try to understand whether there are bureaucratization movements underway in these organizations with the use of IS.

All interviews were recorded, transcribed, and categorized using the thematic content analysis technique, which "consists of discovering the cores of meaning that make up a communication whose presence or frequency means something for the intended analytical objective" (Minayo, 2004, p. 209). The thematic categorization process was based on adapting the steps indicated by Bardin (2011) and R. Gomes (2013). The following process was adopted: i) immersion reading of the interviews; ii) selective reading of excerpts from the interviews; iii) identification of the meaning cores in the excerpts; and iv) thematization. All stages were operationalized through the software Atlas.TI.

The research field consisted of four companies of different sizes that had implemented or were in the final phase of implementing an IS. The type of activity was also considered in selecting the research field, with companies in the service, commerce, and industry sectors included in the sample.

As for the research subjects, the managers who decided to adopt/use the IS were interviewed; key users participating in the organizational change process; IT employees who were drivers of change, and end users. Figure 1 shows the list of subjects interviewed using fictitious names.

4. Results

In the exploratory analytical process, four main themes were identified that express the cycle of changes promoted by ERPs in the companies researched.

The first theme, Drivers of IS implementation, is associated with the decision to change to an IS, which does not happen in a timely manner. It is almost always preceded by a set of motivations that mature as a possible strategy the company can adopt, generally associated with growth. The speed at which this process occurs will depend on the organizational culture, the predominant management style, the pressure exerted by competition, strategic partners, and the forces of influence that act against changes.

The *drivers* of IS implementation, according to Albertin and Albertin (2009), can be the market, mainly customers, suppliers, and competitors; the organization, which focuses on the organization's internal needs; the IT sector, when there is a lack of technological knowledge among decision-makers; and the individual himself, generally the holder of power, as an agent of internal influence. Some authors suggest other factors, such as drivers who influence IT in the supply chain (Nath & Standing, 2010) or who work in outsourcing firms (Goo et al., 2000).

Interviews tend to confirm these studies. In the company Beta ME, the motivation for purchasing a system was because "all the competition was buying the same system, so in order not to be left behind, we decided to buy it too" (Kaiser). At Alpha Ltda, the director felt the need for reliable information and saw the possibility of acquiring a system. At Delta S/A, the pressure for a better system came from customers. Ômega S/A handed over the decision of which ERP to adopt to the IT department, which decided on the ERP based on emerging technologies, such as having data available in the cloud and for the construction manager from the remote point to be able to consult data through from your cell phone.

The theme of the IS implementation process is characterized by the beginning of the change action, a period in which there was much opposition from workers and the company's management. Among the reasons for resistance, the following were identified: because the workers were stealing systematically and wanted to continue doing so (Juliana; Fernanda), because they would lose power in the formal and informal organization (Vitória; Zé Maria), and also because they were afraid of not adapting to the new system and losing their job (Fabíola). Regarding resistance from management, it is clear that it was reluctant to submit to computerized management practices (Kaiser), or the change process lasted longer than expected by management (Zé Maria).

Guimarães et al. (2014) point out that the greater the technological gap in an organization, the greater the complications encountered after the day the ERP starts operating. For Prestes-Motta (2001), what happens in this phase of the project is the co-optation of leaders with two well-defined objectives: avoiding resistance and conflict, as well as integrating the dominated, making them hope.

The third theme, Results and consequences of the use of IS indicated that, with the full operation of the new system, the company began to obtain the expected results, with these effects strongly aligned with the theory of bureaucracy. As Wood Jr., Paula, and Caldas (2003) point out, with the adoption of IS, a *brother* organization, with

integration enhancing bureaucratic control, a similar result to that reached by Cardoso (2010) when identifying electronic surveillance as a means of corporate totalitarianism. Eminently, bureaucratic dimensions, among the benefits proclaimed by IS, emerged as subthemes of this third theme.

Integration, which was not just between departments or business units, also connected people through a legion of vigilantes. Each worker, in the new condition of a specialist in the activity assigned to him, controlled the results of those who preceded him in the business process, as well as being controlled by those who succeeded him. Information flowed transversally from the input of raw materials to the output of the final product to the customer.

The second subtheme that represents another success factor in ERP adoption was making routine activities increasingly agile, contributing to increased efficiency (Lunardi, Dolci, & Maçada, 2010), although, when analyzing the narrative, it is found that if a controversial speech, a sign of bureaucratic dysfunction. For Juliana: "There are now four or five windows to fill in," and, therefore, she highlighted that the procedure could be simplified. For Fábio, the global gain justified that some sectors had increased workload: "The data needs to be more detailed to generate all the necessary information, both managerial and for the next user."

Both the integration subtheme and the agility subtheme contribute to overall productivity gains**.** Productivity is, in the words of Gray (2010), the greatest legacy of scientific management and continues, even in times of modernity and flexibility, to be the ultimate objective of any attempt at change. Sara states that, previously, a construction engineer could manage a maximum of two works; now, he manages four. With the system, a management control that took three or four days to prepare the information, today, the information is updated in just one report.

Another expected result from using an ERP was to have control. The salesperson wanted to control his commissions (Zé Maria), the manager wanted to control the results of his salespeople and have this metric as a monitoring tool (Fernanda), the construction engineer controlled his stock (Sara), and the supervisor was able to know the level loyalty and customer satisfaction about each of its attendants, and thus control them (Juliana). The owner, or his agent (the manager), saw his main expectation met or perceived to have been met: to have total control (Valério).

Thus, the need for control was and continues to be, even in times of flexible discourse and new productive organizational and managerial practices, one of the greatest needs of organizations. In this sense, Paes-de-Paula (2008) points out that the death of bureaucracy is nothing more than a fallacy since several of the bureaucratic characteristics continue to be present in contemporary organizations, which is exemplified concerning the use of IS by studies by Batista-dos-Santos and Nepomuceno (2009), in private companies, and Cardoso (2010) and Silva (2017), in the scope of public organizations.

The last benefit resulting from the implementation of IS is the financial results. For Kaiser, having reliable numbers on how the business was doing allowed the company to close stores that were not showing satisfactory profits, as well as expand the sale of product lines that they realized were profitable and had high turnover. ERP made the business more profitable through administrative rationalization.

The fourth theme identified was named Need for continuous improvement. Although automation, through the adoption of computerized systems, has brought benefits and can minimize many bureaucratic dysfunctions, on the other hand, practice and growth in the system's learning curve have awakened, in the users and managers interviewed, new needs for change, new opportunities for improvements, generating an increasing cycle of bureaucratization, since improvements, in general, were associated with more control, more centralization of power aiming at greater productivity.

Therefore, it is correct to say that the process of implementing and adopting an IS does not end. The linear approach vision constitutes a reference for those who defend the death of bureaucracy (Bennis, 1966; Albertin & Albertin, 2009) or who decree that society is in a period of post-bureaucracy, in which virtual organizations, networks, or postmodern (Heckscher, 1994), as if this meant, in reality, the disappearance of the typically modern way of organizing and managing: the bureaucratic way. The data analyzed in this study leads us to diverge from this position. What can be seen is a convergence with studies that indicate that bureaucracy currently assumes its new facet of modernity: flexibility (Batista-dos-Santos & Nepomuceno, 2009; Paes-de-Paula, 2008; Paes-de-Paula, 2002; Ludmer & Rodrigues Filho, 2005; Cardoso, 2010; Silva, 2017).

5. Conclusions

The study offers empirical results that point to what could be called the paradigm of flexible bureaucracy (Paes-de-Paula, 2002) by identifying a cyclical pattern of the phenomenon of bureaucratization, made possible by the use of emerging information technology tools. In times of flexibility. In this sense, what is touted as the "death" of bureaucracy is characterized as a permanent process of searching for functionality, followed by the emergence of new bureaucratic dysfunctions, which begin to be corrected with a new cycle of bureaucratization, now of

a new type: technological bureaucratization. The company's growth amplifies these dysfunctions simultaneously as it becomes the cause for more changes, thus beginning a new cycle of computerization.

As a contribution applied to management practices, the article intended, by rescuing the original meaning of bureaucratic principles of organization, to alert managers to the need to understand and identify their dynamics within automated management practices, in which, as discussed, there are also all bureaucratic dysfunctions disguised (or not discerned) within the propagated aspects as a result of a radical organizational change, promoted by the adoption of an IS.

The research also sheds light on the behavioral aspects of subjects interacting with technological devices within an organization. New studies can contribute to examining possible behavioral dysfunctions that may arise from this process of technological bureaucratization underway in contemporary organizations. Thus, concepts such as "bureaucratic personality" (Merton, 1971) can be revisited for examination in business computerization that enhances the control associated with collective surveillance. Other approaches linked to people versus technological bureaucratization that can be used in new studies are: i) the generational aspect, in which the behavioral differences of workers from different generations are investigated, such as, for example, Generations X, Y, and Z; and ii) the psychodynamics of work, analyzing the man-work relationship, in these new organizational dynamics, based on the dimensions of this theoretical current, such as pleasure-suffering, subjective mobilization, defense strategies, etc.

The text presents itself as an invitation to dialogue and new studies.

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