

Generative mechanisms of projects related to Enterprise Systems use in Bureaucracies: An embedded case study in a French hospital

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ABSTRACT

While previous literature has emphasized that bureaucracy may be an obstacle to the implementation and use of Enterprise Systems (ES), the link between these phenomena has not yet been conceptualized. This paper aims to investigate how bureaucracy intervenes in the achievement of projects related to the ES use. We aim to answer this question by using the concept of generative mechanisms to unpack the concept of bureaucracy and to apprehend its influence on the outcomes of three projects. We propose an explanation of the mitigated outcomes of these projects in a French hospital by emphasizing the role of two conflictual generative mechanisms: a bureaucratic mechanism and a flexibility mechanism. These mechanisms were identified using an embedded case study that focuses both on the actualization of the causal power of a new organizational entity and on the combination of mechanisms and contextual conditions that led to specific outcomes in each project. Moreover, our study shows that these projects are not related to the management of this implementation process but are linked to the use of ES, which may be considered as only one of the elements that interacts with other organizational, technological and environmental evolutions. We suggest understanding these projects as being ramifications of the use of ES. Future research may more deeply investigate the nature and the mechanisms of these kinds of projects in different organizational forms.

Keywords: Enterprise system, Critical realism, Bureaucracy, Flexibility, Change.

RÉSUMÉ

Bien que la littérature ait mis en évidence le fait que la bureaucratie peut être un obstacle à la mise en œuvre et à l'utilisation des Systèmes d'Entreprise (SE), le lien entre ces phénomènes n'a pas encore été conceptualisé. Cet article vise à examiner comment la bureaucratie intervient dans la réalisation de projets liés à l'utilisation des SE. Nous répondons à cette question en utilisant le concept de mécanismes génératifs, qui nous permet de décortiquer le concept de bureaucratie et d'appréhender son influence sur les résultats de trois projets menés en lien avec l'usage des SE. Nous proposons une explication des résul-

tats mitigés de ces projets dans un hôpital français en mettant l'accent sur le rôle de deux mécanismes génératifs et conflictuels, un mécanisme bureaucratique et un mécanisme de flexibilité. Ces mécanismes ont été identifiés à l'aide d'une étude de cas enchâssée qui porte à la fois sur l'actualisation du pouvoir causal d'une nouvelle entité organisationnelle et sur la combinaison de mécanismes et de conditions contextuelles menant à des résultats spécifiques dans chaque projet. De plus, notre étude montre que ces projets ne sont pas liés au processus d'implémentation et post-implémentation d'un SE, l'usage du SE pouvant être considéré seulement comme un élément interagissant avec d'autres évolutions organisationnelles, technologiques et environnementales. Nous suggérons de désigner ces projets comme des ramifications de l'usage des SE. Des recherches futures pourraient approfondir la nature et les mécanismes de ce type de projets dans différentes formes organisationnelles.

Mots-clés : *Système d'entreprise, Réalisme critique, Bureaucratie, Flexibilité, Changement.*

1. INTRODUCTION

The implementation of Enterprise Systems (ES) is a major topic in information systems research and has generated a large body of research studies. These studies focus on ES during different stages of the ES lifecycle (Markus & Tannis, 2000; El-Amrani & Saint-Léger, 2013), with an emphasis on implementation (Grabski *et al.*, 2011). Overall, the implementation of ES is considered a global and ongoing project (Rowe, 1999; Davenport *et al.*, 2004), whose phases, i.e., pre-implementation, implementation and post-implementation, are connected. Consequently, the critical success factors required to achieve the benefits of ES are analyzed in relation to pre-implementation goals or expectations (Wagner & Newell, 2007; Morris & Venkatesh, 2010; Saeed *et al.*, 2010; Sykes, 2015). Authors have highlighted that there is an evolution stage which is focused on the optimization of the ES especially on technical aspects, meaning software upgrades, additional features, continuous re-engineering (Stefanou, 2001), or integration of more capabilities in the ES,

providing new benefits (Esteves & Pastor, 1999). Nevertheless, there is a lack of studies about new projects related to ES use without relationships to the implementation stages.

Among IS in healthcare sector (Ologeanu-Taddei & Paré, 2017), Electronic Medical Records (EMRs) are specific ESs that are implemented in hospitals (Poba-Nzaou *et al.* 2014; Habib *et al.*, 2017). EMRs are cross-functional software packages that are dedicated to collecting, storing, manipulating, and making available clinical information for the delivery of patient care. The challenges of EMR implementation are similar to those of ES implementation. The systematic literature reviews of Boonstra *et al.* (2014) and Sligo *et al.* (2017) show that an organizational culture that supports collaboration and teamwork facilitates implementation success in healthcare organizations. Moreover, EMR implementation is most likely to succeed in an organization with flexibility and minimal bureaucracy since EMR use enables rapid changes (Cresswell & Sheikh, 2013; Boonstra *et al.*, 2014; Sligo *et al.*, 2017). While literature on EMR implementation in hospitals has focused on the

professional group of physicians and their resistance to EMR implementation (Rivard *et al.*, 2005; Venkatesh *et al.*, 2011), little, if any, research has been geared towards developing a comprehensive understanding of the role of bureaucracy in projects related to ES use stage. Moreover, if flexibility is viewed as the opposite of bureaucracy (Harris *et al.*, 2009; Maruping *et al.*, 2009), it is not clear how exactly flexibility leads to the achievements of ES projects in this stage. Regardless of the sector, few studies have investigated the links between organizational form and ES implementation. From this perspective, Wagner *et al.* (2010) stated that the influence of organizational form on the system's evolution is an interesting topic for further investigation.

The aim of this paper is to fill two gaps: (1) the lack of conceptualization and evidence regarding projects related to ES use, and (2) the lack of in-depth understanding of the links between bureaucracy and the outcomes of the projects conducted during this stage. Consequently, this paper addresses the following research question: how does bureaucracy intervene in the achievement of projects related to ES use? We propose to answer this question by using the concept of generative mechanisms (Bygstad, 2010; Hendfridsson & Bygstad, 2013; Bygstad, 2017), which enables us to unpack the concept of bureaucracy and to apprehend its influence on project outcomes. Our analysis is based on projects related to ES use in a French hospital.

This research makes three main theoretical contributions. First, we suggest the concept of ramification to capture the nature of projects related to ES use beyond the implementation stage of ES. ES project ramification means that the projects are connected to ES, but not to the implementation of ES, in the sense that they do not threaten the success or survival of ES (Wagner *et al.*, 2010) and do not directly

influence the adoption and use of ES. These projects may be considered as socio-technical ramifications, meaning emergent projects related to the evolution of the ES, of the organization or of its environment. Second, the paper completes and expands the IS literature on the role of bureaucracy in the achievement of IT projects.

The next section will summarize prior research on bureaucracy, flexibility and causal mechanisms to disentangle different characteristics of bureaucracy and flexibility and their roles as mechanisms in projects. The second section will describe the research methodology, which is based on a critical realist framework. Finally, the case analysis will be presented and discussed.

2. THEORETICAL BACKGROUND

Several authors have shown that ES implementation and use require that bureaucracy be minimized and that organizations be flexible enough to adapt to change, which are major challenges for healthcare organizations (Boonstra *et al.* 2014; Cresswell & Sheikh, 2013). Nevertheless, this assumption needs clarification because these concepts are described in different manners by various theories. Below, we further conceptualize the concepts of bureaucracy and flexibility.

2.1. Characteristics of bureaucracy

Bureaucracy can be defined as a system of routines and standard operating procedures (Perrow, 1986) that are based on rule-bound behavior, which is "*expressed in an elaborate social edifice of rules, routines and formal role systems stipulating job positions, duties and jurisdictions and regulating interaction patterns*" (Kallinikos, 2004).

Bureaucratic rules enable the description of impersonal occupations and workplaces, and consequently the enfranchisement of employees and clients based on discretionary personal relations and power (Weber, 1947). Rules, hierarchical authority (centralization) and impersonality are strongly linked as the means of achieving equal treatment for both employees and clients (Weber, 1947; Mintzberg, 1979; Kallinikos 2004). Nevertheless, these characteristics lead to rigid organizations that inhibit change and stifle innovation. Weber used the metaphor of the “*iron cage*” to describe the rationalization of human activities in bureaucratic organizations based on rules and rational control (Weber, 1947). This metaphor expresses the ambivalence towards rules that both protect employees and clients from the personal will of superiors and constrain them because they inhibit personal initiative and adjustments.

For several decades, scholars have highlighted the dysfunctions and paradoxes of bureaucracy. Merton (1957) argued that adherence to rules turned them from means into ends-in-themselves, which he called the “*displacement of goals*”. Consequently, formalism and ritualism lead the organization to a rigid system that is unable to readily adjust in order to achieve the purposes of the organization (i.e., the clients’ asks). Crozier (1963) highlighted that this displacement of goals connected to an excessive functional specialization turned into an “*esprit de corps*”, that is, employees defend their entrenched interests related to their function (stratum). Moreover, Crozier showed that employees of the bureaucracy use this displacement of goals in order to protect themselves from the hierarchical authority of superiors. Moreover, because the formalism and emphasis of the rules impede the organization from working efficiently, employees develop a space of liberty that empowers them to act according to their personal good will in order

to perform tasks needed to achieve the purposes of the organization. This space of liberty is not formally recognized and thus creates a source of power for employees. For this reason, employees are not interested in changing the bureaucracy even though they are also frustrated by the inefficiency of the system. From this perspective, bureaucracy was defined by Crozier (1963) as having four interrelated characteristics: the development of impersonal rules, the centralization of decisions (and discretionary decision-making of a superior), the isolation of each stratum or hierarchical category and the development of parallel power relations around remaining uncertainty. Because rules are a key value in a bureaucracy, this organization cannot be changed because the unique mode of action of top management is to elaborate new rules, which increase centralization and, consequently, employees’ informal power, thus creating a vicious circle. For Crozier, “change in a bureaucratic organization must come from the top down *and must be universalistic, i.e., encompass the whole organization en bloc. Change will not come gradually on a piecemeal basis. It will wait until a serious question pertaining to an important dysfunction can be raised*” (Crozier, 1963, p. 240). Still, the rigidity of the bureaucracy requires a certain flexibility that enables bureaucracy to be preserved. Otherwise, this rigidity would trigger extreme inefficiency, leading to radical changes. Consequently, according to Crozier, the evolution of bureaucracy occurs through an alternation of stability and short periods of crisis wherein personal initiative and direct authority can express themselves and prevail over formal rules, but this can only occur within certain limits that do not threaten the bureaucracy or the restoration of the rules.

Hodson *et al.* (2012) go further and consider these dysfunctions as a Kafkaesque intrinsic logic of the bureaucracy. These

authors draw a bleak picture of the bureaucracy, which they characterize with four characteristics: chaos, patrimonialism, unwritten rules and divergent goals. Divergent goals consist of the various interests of various actors, which are brought, at best, into partial or temporary alignment (Hodson *et al.*, 2012, p. 263). Chaos results from “*the arbitrary use of bureaucracies by powerful actors who bend them to their own goals*” (Hodson *et al.*, 2012, p. 265). Chaos is viewed as the outcome of extreme formalism. Patrimonialism is considered particularism (vs. universal rules), which is related to the personal will (and to the arbitrary decisions) of some employees or managers who have power in informal networks (Hodson *et al.*, 2012). Unwritten rules are elaborated by informal groups, who deliberately brake the formal organizational rules (Hodson *et al.*, 2012).

Nevertheless, several authors have added nuance to this negative view (Lave & Wenger, 1991; Borys & Adler, 1996; Courpasson, 2000). Lave & Wenger show that bureaucracy can coexist with self-organized and self-selected communities of practice, which are developed “*interstitially and informally in coercive workplaces*” (Lave & Wenger, 1991, p. 64) and thus introduce flexibility within bureaucracies (Josserand, 2004). In the same vein, the concept of “*soft bureaucracy*” defines the coexistence of flexibility and decentralization and of more rigid constraints and structures of domination (Courpasson, 2000; Vaast, 2007). Nevertheless, this flexibility can be considered from the perspectives of the space of liberty and the alternation of stability and change, as conceptualized by Crozier (1963).

From a different perspective, Adler & Borys (1996) distinguish between coercive and enabling forms of bureaucracy. While the coercive form aims “*to force reluctant compliance and to extract recalcitrant*

effort” (Adler & Borys, 1996, p. 69), the enabling form is “*designed to enable employees to deal more effectively with inevitable contingencies*” related to work processes (Adler & Borys, 1996, p. 69).

2.2. Characteristics of flexibility

Contrary to the concept of bureaucracy as an organizational form, the concept of flexibility has not given rise to a significant literature. Flexibility seems to be considered a general feature allowing change, making it the opposite of bureaucratic rigidity. For example, in the project management literature, flexibility, as opposed to formal rules, is viewed as a more positive way to manage projects. Formal rules are related to formal planning, control and documentation with respect to schedules and budgets (Zmud, 1980). Authors have argued that the role of the project manager as planner, organizer, and controller has been replaced by a more flexible role, that of a facilitator who effectively manages the collaborative efforts of team members (Highsmith, 2003; Akhlaghpour & Lapointe, 2018). Conboy defines flexibility as the ability of a method “*to create change or to proactively or reactively or inherently to embrace change in a timely manner, through its internal components and relationships with its environment*”. (Conboy, 2009, p. 336). Vishnu *et al.* (2006) state that organizational forms based on hierarchical control should adopt self-organizing teams, pluralistic decision-making contexts involving stakeholders with diverse interests and goals, a collaborative environment and flexible practices. Therefore, flexibility involves mutual adjustment (Mintzberg, 1979), which is considered a response to environmental uncertainty; this distinguishes flexibility from formal control and bureaucracy (Harris *et al.*, 2009; Maruping *et al.*, 2009). This idea is defended by Adler *et al.* (1999, p. 44), who state that “*the*

Concepts	Characteristics
Bureaucracy	<ul style="list-style-type: none"> - Rules, hierarchy authority (centralization) and impersonality (Weber, 1947; Mintzberg, 1979; Kallinikos 2004) - Formalism, rigidity (Merton, 1957; Crozier, 1963) - Impersonal rules, centralization of decisions, isolation of each stratum or hierarchical category and the development of parallel power relations (Crozier, 1963) - Formalism and personal good will (Crozier, 1963) - A certain extent of flexibility among the interstices (Lave & Wenger, 1991) or in a soft bureaucracy (Courpasson, 2000; Vaast, 2007) - Unwritten rules, chaos, patrimonialism, divergent goals (Hodson <i>et al.</i>, 2012) - Enabling vs. coercive bureaucracy (Adler & Borys, 1996)
Flexibility	<ul style="list-style-type: none"> - Ability or method of creating or embracing change (Kirsch, 1997; Maruping <i>et al.</i>, 2009). - Self-organizing teams (Vishnu, 2006) and mutual adjustment (Adler <i>et al.</i>, 1999) - Informal mode of control (Kirsch, 1997; Maruping <i>et al.</i>, 2009).

Table 1: Summary of the key concepts.

features of bureaucracy impede the fluid process of mutual adjustment required for flexibility”, which is defined as innovation related to new tasks.

Flexibility can also be viewed as an informal control mode and therefore as the opposite of formal control (Kirsch, 1996; Maruping *et al.*, 2009), which is a type of managerial control that is defined as “*attempts to ensure that individuals working on organizational projects act according to an agreed-upon strategy to achieve desired objectives*” (Kirsch, 1997, p. 1). Formal control is exercised through formal rules and formal documentation (Kirsch, 1997) and may be focused on outcomes or on behaviors. Each control mode is reinforced by rewards or incentives (Kirsch *et al.*, 2002; Maruping *et al.*, 2009), which means that even the informal control mode is formalized as a mechanism of coordination recognized by the organization. From this perspective, the informal control mode is not synonymous with discretionary decision-making, as opposed to formal rules according to Weber’s conceptualization; the informal control mode is also not synonymous with personal will, which is a characteristic of bureaucracies according to Hodson *et al.* (2012), although clan control

can lead to patrimonialism and chaos when powerful groups fight for power (Mintzberg, 1979; Hodson *et al.*, 2012). The distinction between formal and informal control can provide better insight into coordination in the projects performed in relation to the ES.

Table 1 summarizes the key concepts related to bureaucracy and flexibility.

2.3. Generative mechanisms

From the perspective of critical realism (Bhaskar, 1997; Bygstad, 2017; Mingers & Standing, 2017), we consider the characteristics of bureaucracy and flexibility as generative mechanisms (Hendfridsson & Bygstad, 2013), that is, causal structures that generate observable events (Sayer, 1992). These mechanisms are causal powers that may manifest themselves through specific contextual conditions (Bhaskar, 1997, 2010; Mingers & Standing, 2017). Causality is contingent, meaning that the outcome depends on other mechanisms and on context (Elder-Vass, 2010; Sayer, 1992; Hendfrisson & Bygstad, 2013; Bygstad, 2017). In addition, the actualization (or lack of actualization) of the casual powers of a mechanism may lead to one outcome

in one context and to another outcome in a different context Mingers & Standing (2017).

Mechanisms exist in a real, ontological sense independently of observers' perceptions, although they are not directly observed. These mechanisms may be exercised in the actual domain, in a particular context and in interaction with other mechanisms, or they may not. This actualization leads to the outcomes, which are events observed in the empirical domain. The domain of the real contains the actual, which includes the empirical (Bhaskar, 1994; 2010).

The causal powers of mechanisms may also be actualized through their absence, that is, through "*absences as causes*" (Bhaskar, 1994; Mingers & Standing, 2017). Mingers & Standing (2017) summarize this idea as follows: "*if we have two events or entities A and B, causal claims are of the form 'If A had not occurred then B would not have occurred'. If A is a necessary (although not necessarily sufficient) condition for B, then the absence of A can be said to cause the absence of B. Of course, there may be other causes of the absence or presence of B as well. This can occur both in terms of events (not attending the exam caused not passing the exam) and mechanisms (not having a charged battery caused the car not).*" (Mingers & Standing, 2017, p. 180).

Mingers & Standing (2017) distinguish between the diachronic and the synchronic analyses of mechanisms and outcomes. Synchronically, the mechanisms and the context explain the outcomes at the same time; this is called generative causality. Diachronically, the relationship is sequential in time; it may concern the powers of the mechanisms, whether actualized or not (real causation), or the relationships between different events, triggered by different mechanisms and contexts (event causation).

In sum, the concept of generative mechanisms enables developing of a

configurational perspective that describes the evolution of ES-related projects as an outcome of multiple paths of interconnected contextual conditions and mechanisms.

3. METHOD

3.1. Overview of the case

The study was conducted in a French university hospital that has more than 10000 employees; the hospital provides primary care, all medical specialties, intensive care units and emergency care. An ES, i.e., an Electronic Medical Record, was implemented in 2012. The ES was deployed in all medical units, except emergency units. It includes computerized entry of physician orders, medical observations and prescriptions, and care sheets.

The problems and projects raised and conducted during the post-implementation phase of the ES are managed by the Hospital Information Delegation (DHI), the Information Systems Department (ISD) and the Medical Informatics Department (MID). The MID is in charge of the analysis of medical information specifically for reimbursement purposes, based on a national classification of diseases. The MID is also responsible for access to medical information. Other functional departments may be involved according to the aims of the projects considered, i.e., employees' training or clinical research using the ES. There is no hierarchical or formal cross-functional entity designed to elaborate strategies or to manage projects across the different functions.

3.2. Research design

Similarly to other studies (e.g., Hendfridson & Bygstad, 2013), we did

not begin our study with the intention to investigate the mechanisms underlying the projects related to ES use. We were interested in the role of the new entity (DHI) created for cross-coordination in the organization. Our observations of meetings involving this entity revealed that these meetings were focused on projects that unfolded in relation to specific problems whose resolution implied cross-functional coordination, which was a challenge for the bureaucratic organization of the hospital. This idea reoriented the study toward the investigation of the underlying generative mechanisms explaining the evolution of these projects.

We adopted the case study method because it is very well suited to capturing the complex interactions between mechanisms and context in a configurational perspective (Bygstad *et al.*, 2016; Bygstad, 2016; Mingers, 2017). Indeed, as required by the approach of the generative mechanisms, the case study provides rich, contextual insights into the dynamics of phenomena (Yin, 2003).

The aim is to examine the role of the generative mechanisms i.e., bureaucratic and flexibility mechanisms intervening in the achievement of projects related to ES use. This aim raises a major question regarding the optimal level of the analysis of the context and of the mechanisms. Indeed, the context may concern the environment of a project, i.e., the organizational context, and the entities and relationships among them in the project itself. Therefore, a mechanism may intervene as a general mechanism in the organization, targeting the relationship between the organizational entities, or as a local mechanism that occurs within a project. Consequently, we made two methodological choices. First, we choose a mix of single and multiple cases (Yin, 2003), meaning that the cases focused on the same organization with

the aim of analyzing the processes unfolding in three projects related to ES use (sub-cases, as labeled by Yin, 2003). The choice of one organization, i.e., a single organizational form, allows us to build a configurational perspective, whereas the single organizational form is considered a control feature (Yin, 2003) for the projects analyzed, meaning that it is a particular key feature according to which the projects may differ. Consequently, the complexity of the cases is reduced, facilitating the identification of the differences in the projects' outcomes and their explanations by a specific interaction between generative mechanisms and the local context of a project. Therefore, we will search for regularities (Bygstad *et al.*, 2016) in the projects' processes, which may be linked to particular mechanisms triggered by the organization form, beyond the singular contexts of the projects.

This study design also enables the identification of the generative mechanisms at both levels, i.e., the organization and the projects.

Second, we choose an embedded case, i.e., containing two units of analysis: a new organizational entity, the Delegation to the Hospital Information (DHI), which was supposed to facilitate cross-functional coordination in projects related to ES use, and the unit of analysis of three projects (subcases). The new organizational entity was chosen because its function is to enable cross-functional projects related to ES use, and, consequently, it may intervene as both context and causal power related to this goal. Hence, the outcomes of the projects selected may also be viewed as the actualization (or not) of this causal power.

In this way, we follow the advice of Bygstad *et al.* (2016) to use a variety of approaches and data sources to identify causal relationships and to control for bias. Therefore, the chain of evidence (Yin, 2003) will be

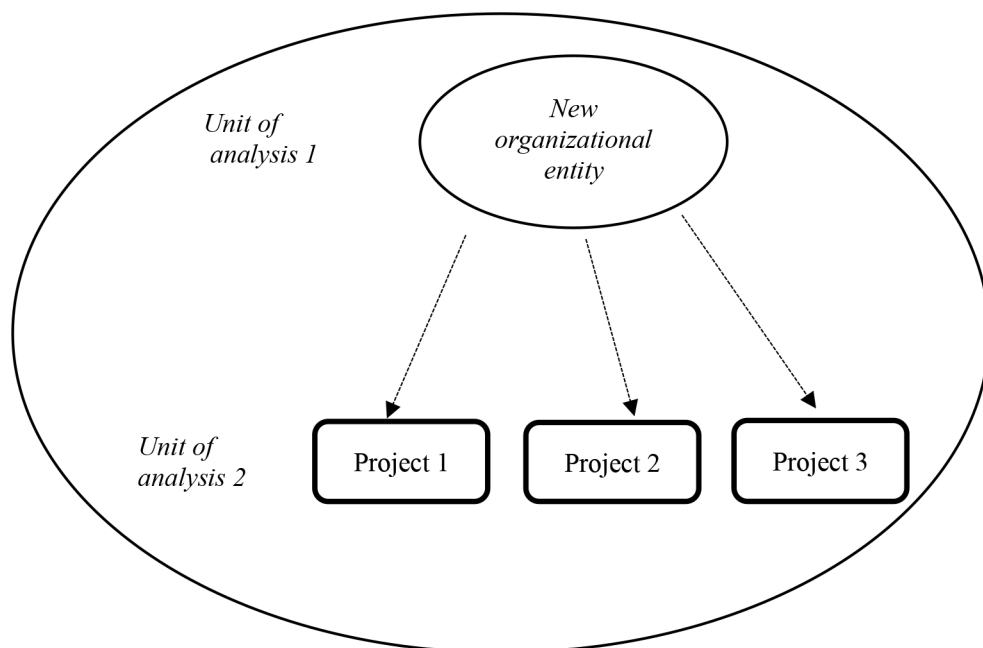


Figure 1. Research design.

strengthened, which is particularly important for the identification of generative mechanisms. Identifying these mechanisms is challenging because they are not directly observable, while they also consist of regularities that exist beyond singular situations (Bygstad *et al.*, 2016). The research design is summarized in the Figure 1.

3.3. Data collection

Data were collected during 18 months (from September 2014 to February 2016) from cross-sources, as is strongly recommended by Eisenhardt (1989) and Mingers (Mingers, 2003). Because the aim is to identify mechanisms and contexts according to the critical realism perspective, observation and archival documentation are the main sources of data used to capture “what it is” (Bygstad *et al.*, 2016). Observations were focused on the meetings that were held

on projects related to ES use, projects which involved the manager of a new organizational entity, the Delegation of the Hospital Information (DHI). Observations were completed by archival documentation and interviews with key organizational actors: the executive director, the DHI manager and a physician who is the associate manager of the DHI. The DHI managers were interviewed because the DHI was involved in the projects through its manager or through the other physician involved, according to the clinical implications of these projects. The questions asked of the DHI physicians focused on the reasons for the projects related to the EMR use, the process and the outcomes of these projects. The executive director of the hospital was interviewed about his vision related to ES use in the hospital. The data collection methods are summarized in Table 2.

Method	Description
Observations of the meetings concerning the projects related to ES use	– Extensive notes that documented the observation were written up during the meetings. At the beginning, notes were written on paper and computerized after meetings. Gradually, as employees grew accustomed to the researcher’s presence, notes were directly computerized.
Informal conversations before or after project meetings with their participants.	– Notes were written after every conversation.
Interviews	– 3 semi-structured interviews with key actors.
Archival documentation	– Approx. 1500 emails that were received by the DHI manager, which provided better insight into the project, the organizational policy and the DHI’s role. – Internal reports and official charts from meetings.

Table 2. Data collection methods.

3.4. Data analysis

The data analysis was conducted differently for the first and the second units of analysis.

First, in line with critical realism and the focus on the generative mechanism, we adopted a mix of generative causality (retroduction) and real causation (retrodiction) (Bygstad *et al.*, 2016; Bygstad, 2016; Mingers & Standing, 2017). Indeed, as Mingers & Standing (2017) stated, the explanatory process needs to be a constant interplay between retrodiction and retroduction.

The generative causality means that we looked for the identification of mechanisms, i.e., bureaucratic and flexibility mechanisms, to explain the outcomes of the projects. The underlying question of the project analysis is: what are the mechanisms and how do they interact to explain the outcomes?

Recent studies (Hendfrisson & Bygstad, 2013; Bygstad, 2016) have identified generative mechanisms using the framework of Pawson & Tilley (1997): Context – Mechanism – Outcome (CMO). Yet, this framework was used by Pawson & Tilley (1997) to conduct a realist evaluation of social programs, which the authors

structured through the identification of the context and of the mechanisms that lead to particular outcomes of these programs (intended and unintended consequences). Nevertheless, the mechanisms are not observed but may be inferred from the analysis of the context and of the outcomes (Bhaskar, 1997; 2010); for this reason, we decided to adapt the CMO framework into Context-Outcomes-Mechanisms (COM). More precisely, this framework requires the identification of (1) the context, i.e., the entities of the case and their relationships; (2) the outcomes, which were analyzed by the extent of achievement of the goals defined at the beginning of the projects; and (3) the mechanisms that explain the outcomes. Using this framework in relation to the theoretical background, we will focus on the identification of the bureaucratic or flexibility mechanisms, at the organization’s level and at the projects’ levels.

When focusing on the DHI as our unit of analysis, we proceeded differently. Because the DHI is a new entity unit, we analyzed it as a potential causal power (Bhaskar1997; 2010), i.e., flexibility through cross-functional coordination and mutual adjustment, which may be actualized or not.

The underlying question is: is this causal power actualized and, if it is, under what conditions? The analysis of the projects' process and of the role of this entity in the projects' achievements allows us to answer the question. Therefore, the analysis framework is Causal power – Outcome – Context – Mechanism.

Both generative causality and real causation are creative and iterative processes during data collection and analysis, which make our data analysis close to abduction (Bygstad *et al.*, 2016). Moreover, we searched the data for evidence regarding the other notions emphasized in the theoretical background, i.e., project control modes.

4. CASE STUDY

4.1. Analysis of the projects

In this section, we will present the analysis of the projects using the COM framework and the notions already presented in the theoretical background section above.

4.1.1. *Uploading and indexing radio pictures*

- *Context*

This project is led by an ISD radio technician and involved several actors: the DHI manager, secretaries' representatives, the ISD the manager of the Identity & Access Committee (which controls the rights to access the EMR), and a manager from the Quality and Safety department. Meetings were initiated to solve two problems: the diversity of paths for uploading and indexing images, which may result in errors regarding patient identity, and the workload that these tasks induced.

More precisely, indexing radiology images required secretaries to copy digital images from a CD-ROM (containing radiology images of exams made outside of the hospital) brought by patients, upload them into the EMR, and index them into the patients' existing medical records. This task was not part of secretaries' formal job descriptions. Moreover, as one representative of the secretaries said, "*There are diverse paths for downloading and indexing digital images from CDs into EMR, creating a risk of errors*" (Secretaries' representative).

Secretaries taught themselves how to upload and index the images, but they were not sure they were doing so correctly and were afraid of making errors, which had already occurred. For example, a patient complained that the MRI scans he received from a secretary on a CD were from another patient. A further concern among secretaries was that they would unintentionally register a patient in the system twice. This would mean that two different medical records existed and physicians would not know which one to use.

The task of image uploading and indexing required 21 steps (10 steps for uploading and 11 steps for indexing) and an average of approximately 20 minutes, resulting in an increased work overload, as the number of CD-ROMs brought by patients has increased. Until the initiation of this project, this task was performed by secretaries in some departments and by radio technicians in other departments.

The participants to meetings focused on two goals: (1) to elaborate guidelines on the optimal way to upload and index images in order to reduce both the time needed for this task and the risk of errors and (2) to decide if this task had to be performed by secretaries or by radio technicians. The DHI manager stated: "*It's necessary to put a better analysis in place to formalize this task. But it's also*

necessary to resolve the differences in the practices used by secretaries. It is better if we formalize these tasks for all secretaries.” Nevertheless, it was difficult to find a solution through mutual adjustment, as revealed by the following quotes from observation notes:

Radio tech: “It is not possible to ask to radio techs to index all the images.”

Medical secretary coordinator: “We have to avoid assigning this task to secretaries, who are already overloaded.”

Meetings were places for discussing the state of the art and for finding solutions collectively. Six meetings were held. During the interval between meetings, all the participants performed operational work that was related to the project, which was led by the ISD radio technician, as decided in the meetings. For example, a secretaries’ representative monitored the number of images that were uploaded by secretaries in their departments to assess the time consumed by this task. Moreover, a new question emerged during the meetings: would it be possible to purchase software to automate the steps of image uploading? The project leader tested different software options that could be used and evaluated the number of licenses that would be needed, as well as the costs of these options.

- *Outcomes*

The tutorial for secretaries was proposed by a secretaries’ representative and modified and adopted by all the participants. Yet, no software was purchased to automate the uploading task. Indeed, acquiring new software required arbitration from the DSI manager, who decided that the costs were too high. With regard to the tasks of uploading and indexing images, there was no consensus. Consequently, secretaries and radio technicians continued to perform those tasks as before.

- *Generative mechanisms*

Two concurrent generative mechanisms may explain these outcomes. First, a flexibility mechanism, through mutual adjustment, allowed the project to happen and allowed the elaboration of a tutorial. However, the bureaucratic mechanism, meaning the existing formal roles and divergent goals of employees according to their functional department, impeded the outcome of formalizing new roles, which would have required a redefinition of the secretaries’ roles throughout the hospital.

The overall analysis of the project is summarized in Figure 2.

4.1.2. E-learning project for residents

- *Context*

The DHI manager established mandatory training for all residents. He has become an informal project manager for the implementation of an information workflow to teach residents about e-learning so that they can gain the right to prescribe using EMR. Nevertheless, his role as project manager has not been defined by formal rules. More precisely, he manages the entire process of informing residents and performs all the operational tasks, such as gathering lists of residents and sending emails to all residents; he does this every 6 months, which is the length of the residency. Therefore, the DHI manager informally performs the task of sending the e-learning instructions by email to all the residents, using an email management tool that he implemented on his own. He also performs the task of answering all emails from residents regarding problems with accessing or validating the e-learning. The ISD was very involved in the process because inaccuracy of the lists leads to lack of reception of the emails and, consequently,

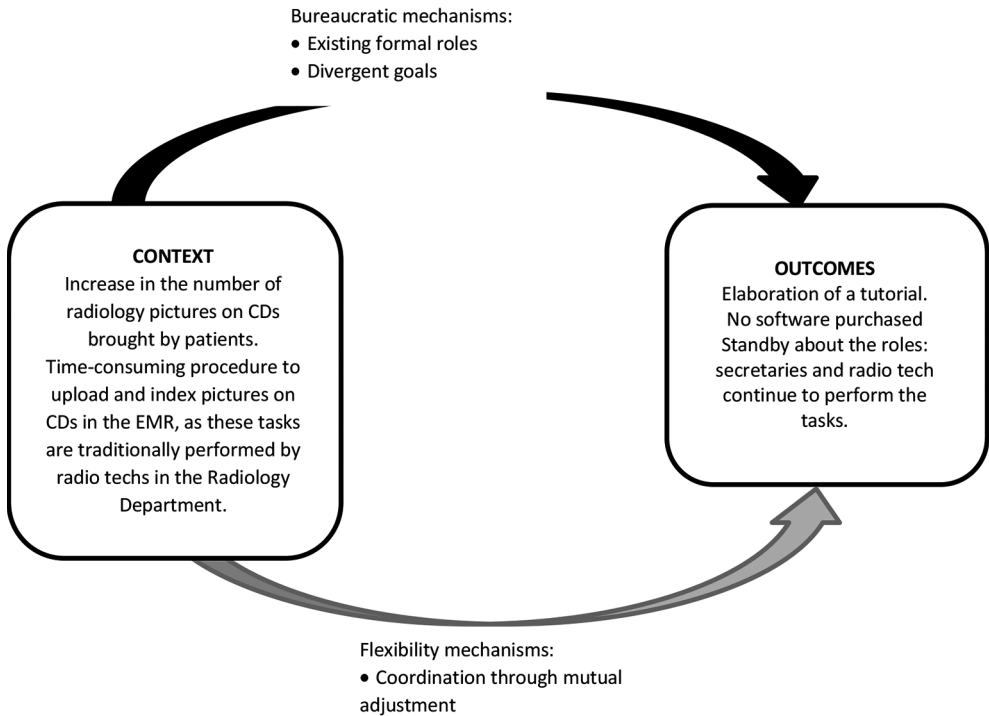


Figure 2: Analysis of the context-outcomes-mechanisms of the project of uploading and indexing radio pictures.

lack of rights to prescribe. If this occurs, residents make urgent calls to the ISD hotline to obtain these rights. The ISD wanted to decrease the frequency of these calls and the allocation of rights to those who did not follow the e-learning process because of errors in information transmission.

Faced with the problem of inaccurate or late lists, the DHI manager has initiated meetings with the employees of the ISD, the Medical Human Resources Department and the Human Resources Department regarding this problem, but he has no authority to decide who performs which tasks and when. The more difficult and recurrent task is to obtain the eight lists of the correct emails of the different categories of residents (based on the different paths that were identified by the DHI

manager as specialties and prior work experiences in Alpha hospital). The lists have many errors, which require iterative modifications in collaboration with the ISD and the Medical Human Resources Department. Several meetings have been conducted regarding the optimization of the configuration and the communication of the lists. However, without a formalized procedure, this process is negotiated again every 6 months in response to employees turnover or the prioritization of their tasks.

The DHI manager leads the project according to the self-control mode but he depends on the “good will” of the Human Resources Department manager and employees, who prioritize their own work based on different criteria that are not the same as the DHI manager’s criteria.

The functional differentiation focuses on business processes and delays. Indeed, the Medical Human Resources Department has its own rules, procedures and schedules, as illustrated by these quotes from observation notes:

HID manager: "We need accurate lists several days before the beginning of the internship."

Medical Human Resources Department manager: "We cannot. We need to validate the administrative information first."

—

HID manager: "We have the same discussion every year (about how to anticipate and receive the lists of all residents who have to start their sessions of training). Could we improve the process?"

Medical Human Resources Department manager: "No, we can't, because of the deadline for residents to choose the department of their training, as decided with the faculty."

- *Outcomes*

This project may be considered a success but, nevertheless, the process was never formalized. While the top management supported the project, there were no incentives and no human resources allocated to the project. Therefore, performing the process depends on the energy and "the good will" of the DHI manager, who agreed to lead the project and to carry out all the operational actions that are required when residents change their medical traineeship. The project also depends on the "good will" of the MHRD.

- *Generative mechanisms*

A flexibility mechanism through mutual adjustment made possible a change in the existent organization, i.e., the implementation of the mandatory e-learning. Nevertheless, the bureaucratic mechanism,

i.e., divergent goals related to the bureaucratic organization and "good will", impeded a formalization of this new process, which would formalize interdependencies between the DHI and the Medical Human Resources Department (MHRD).

The overall analysis of the project is summarized in Figure 3.

4.1.3. Connected prescription project

- *Context*

Meetings highlighted that automating the interface requires the validation of computerized lab prescriptions by nurses because the nurses obtain the lab samples and send them to labs for analysis. Yet, this validation was considered a prescribing task and associated with physicians' rights to access the EMR. The ISD manager initiated meetings to solve a problem related to expanding the rights of two nurses who were involved in the automatic prescribing workflow; resolving that problem would enable the nurses to report prescription orders.

- *Outcome 1*

The project was in standby mode, thereby running the risk of preventing the implementation of the new software for laboratories. The manager of the Genetics Labs, whose position was at a high level in the hospital, argued to the top management that the delay was leading to high costs for the hospital, especially because external clients of the hospital could not use the new system as it was planned; she also noted the risk of not obtaining a certification provided by a national assessment agency.

The actors were divided over the "pros" and "cons" of the new roles according to

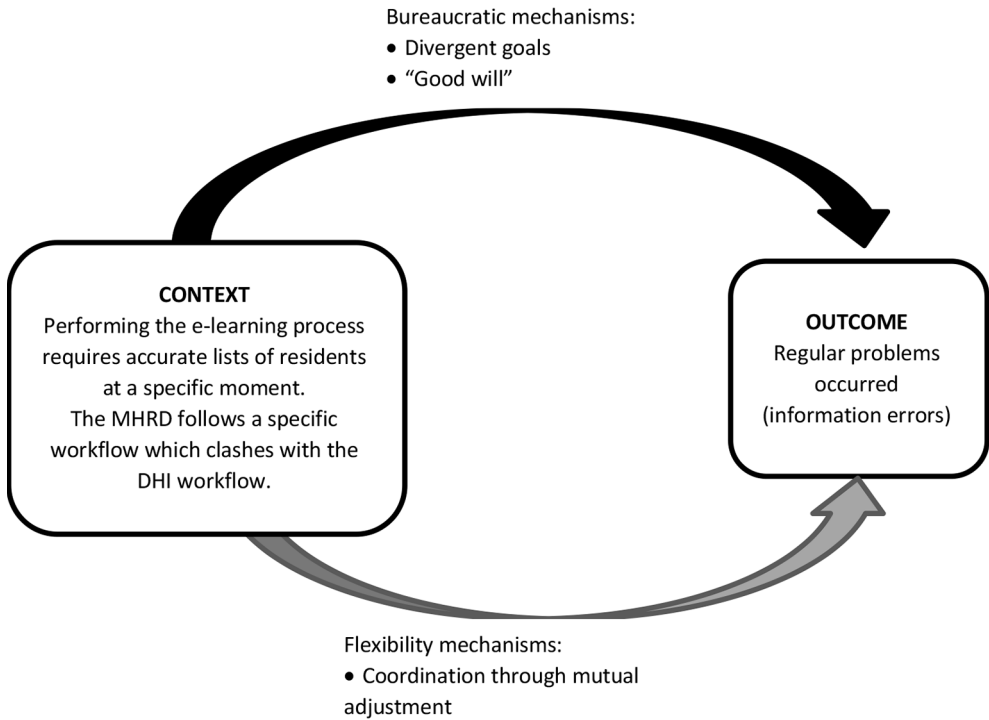


Figure 3: Analysis of the context-outcomes-mechanisms of the E-learning project.

their different views of control in the project. The managers of the Nursing and Care department and of the Identity & Access Committee were opposed to the new roles, as they had a bureaucratic view of nurses' rules and of the formal control of behaviors; their view did not accept changes to the universal existing nurses' roles. For these managers, the new roles contradicted the rules related to the nurses' roles and tasks in all the departments, and this objection was based on a bureaucratic view of a common rule for all. The new roles were advocated by the laboratory manager and the DHI manager, who held a more flexible view of rules and roles in order to implement IT-enabled organizational changes.

• *Generative mechanisms*

The flexibility mechanism makes possible the discussion of “pro” and “con”. This mechanism also underlines the “pro” positions, while the bureaucratic mechanism, i.e., formal roles, underlines the “con” position. A bureaucratic mechanism, i.e., divergent goals, impeded a consensus.

• *Outcome 2*

Consequently, the manager of the Genetics Labs Department and the DHI manager asked the Hospital Associate Director during a Directors Board meeting to solve the problem.

The memo of the meeting of the executive committee charged with making decisions highlighted the diversity of the involved departments and their divergent goals.

The DHI manager says that the objective of the executive committee is to obtain an arbitration that is related to the delegations to the nurses in genetics for access rights because a consensus was not achieved on the subject during the Identity & Access Committee management meeting.

The physician of the Medical Informatics Department recalled the rules that are applicable to the prerogatives of nurses. He says that the Identity & Access Committee made this decision in light of the texts that specify that the hospital could be held responsible if prescribing rights were given to unauthorized personnel (only physicians have prescribing rights). (Quote from the official memo from the Executive Committee

of the Hospital, 21st of September 2015, related to the blocking point of electronic prescriptions).

- *Generative mechanisms*

Finally, the arbitration made by the Hospital Associate Director, who decided to create the new roles for the nurses, revealed discretionary decision-making (as opposed to rules-based decision-making) which made possible by hierarchical authority (centralization) as the main feature of the bureaucracy. The mechanism of bureaucracy (centralized discretionary decision-making) and the counterbalancing mechanism of flexibility (new specific roles) concurred on outcome 2.

The overall analysis is summarized in Figure 4.

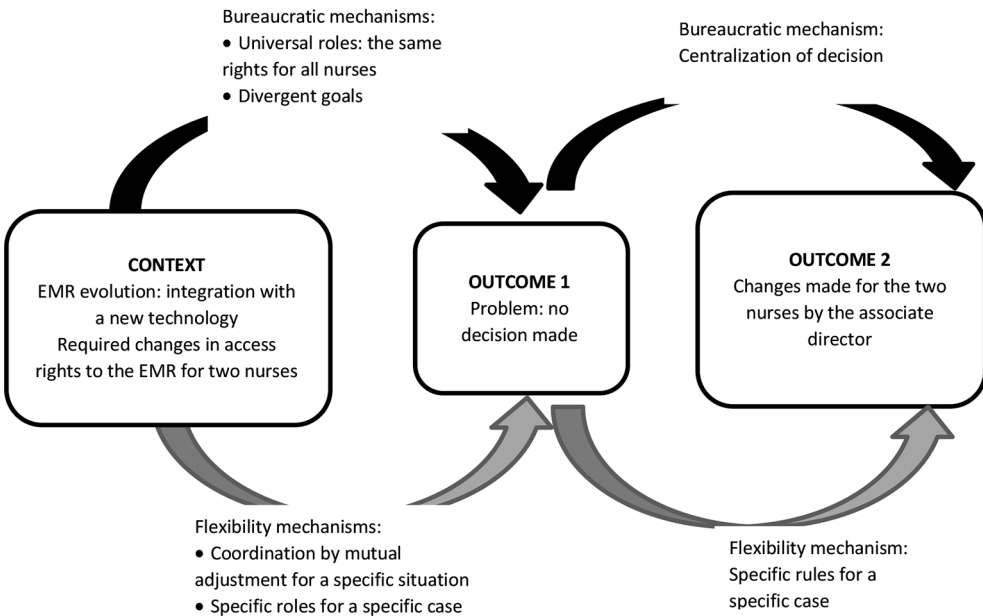


Figure 4: Analysis of the context-outcomes-mechanisms of the E-learning project.

4.2. Actualization and non-actualization of the casual power of the DHI

- *The causal power of the DHI*

The DHI is a peculiar organizational entity because it is not a department but rather a delegation. Although present in the organizational chart, the delegation is not defined by the rules of procedure. In French public hospitals, only departments have a formal definition, financial and human resources, and a clear hierarchical relationship within the organization. Neither formal nor informal, the delegation is an in-between and vague entity. In contrast to departments, which are medical or administrative, the delegation has no clear hierarchical relationships between its employees.

In 2013, the policy of the Alpha hospital formalized the role of the DHI as organizing, coordinating and evaluating – in conjunction with the MID, the ISD and other involved departments – the policy of establishing an information system and overseeing the management of medical, nursing and administrative data. Although the DHI is expected to stimulate cross-coordination, there is no formal chart or organizational policy concerning the roles of these departments in the projects related to the EMR implementation stages.

The DHI is composed of two physicians (the DHI managers) and a pharmacist, who is involved only in the projects related to the use of ES for pharmacy.

The DHI manager has informally enrolled referents of different occupations (physicians, medical secretaries, clinical researchers, and biologists) and different departments (ISD, MID, Quality and Safety managers, Nursing and Care department) in order to strengthen the role of the DHI. Their tasks and roles are not formally defined

and the departments involved continued to follow their own rules and schedules. No resources were provided for the DHI or the projects involving the DHI.

A clearer chart, which was still a work in progress at the beginning of 2016, states that the DHI is composed of representatives of management staff; medical, dental and pharmaceutical care; medical secretaries; and clinical researchers. Because the chart has not been signed by the representative of the Medical Informatics Department, it remains in a “grey zone” of the organizational rules and procedures.

The mission of the DHI manager, as is the case for the DHI as a whole, is unclear in terms of the extent and the functional areas of the DHI, the coordination arrangements and supervision. The ambiguity is strengthened by the inclusion of representatives of the ISD and of the MID in the DHI office.

The chart specifies two DHI committees: EMR indexing of folders and EMR Identity & Access. Each committee has a manager, but the roles of these managers and of the DHI manager are not defined. Therefore, we can consider that the causal power of the DHI is partial.

- *Outcomes*

The outcomes of the projects are mitigated. Cross-functional coordination and mutual adjustment successfully produced a tutorial. There were no changes to the existing roles of project leads. The standby of the connected prescription project was solved by a discretionary decision at the hierarchical level. The process of the e-learning project reveals that the role of the DHI's manager is very personalized. As for the other employees in the cross-functional projects, their roles are not formalized.

When considering the projects as outcomes and searching for the achievement

of cross-functional coordination, we find that cross-functional coordination is informal and still depends on the “good will” of employees. All these projects involved cross-functional employees but lacked prioritization as well as formalization of project schedules and responsibilities. There was no specific allocation of resources for these projects. Overall, there were no formal roles for each actor in the project, and there were no incentives to complete the projects. Thus, coordination was achieved by mutual adjustment, and the control mode was self-control or lack of control and “good will”, considering that there were no incentives for actors to complete these cross-functional projects.

Data from regular, informal meetings between the two DHI managers strengthen this interpretation. The DHI physicians emphasize the difficulties of carrying out projects because of the “good will” required of the actors involved. The DHI manager, like other actors enrolled by the DHI manager, complains about this situation and calls for arbitration by the hospital director. The quotes below, collected from a meeting involving the DHI manager, illustrate these difficulties:

Quality and Safety manager: We have to move to an institutional policy of EMR implementation.

Quality Officer: The Information Systems Department is not connected to the DHI (for each project). It is always the same old story: who prioritizes? We are exhausted by working on projects that are not achieved. The ISD, the Medical Activity Department, the Human Resources Department, the Informatics Medical Department, everyone has their own priorities and resource allocation. I would prefer that the CEO arbitrate and say no to some projects, this would be a clear line for us.

The DHI manager: For every project as well as for all resources and deadlines!

- *Context*

The general contextual conditions of the projects are the lack of control modes, resources and incentives, while the hospital top management, under external pressure from the national minister, searches for cost savings, including reducing number of employees.

With regard to the DHI manager, we have to mention that he is a physician and because of his professional autonomy (he is not an administrative employee) and expertise, he can perform the e-learning project as he wishes, according to his “good will”; thus, he may involve himself in conducting a process, which unfolds successfully until it requires the collaboration of other departments.

- *Generative mechanisms*

We suggest that the flexibility mechanism, meaning cross-functional coordination, is partially actualized by the DHI's participation in the projects. Indeed, the DHI manager does not play the role of a project manager or leader who manages the realization of cross-functional coordination. He tries to contribute to this cross-functional coordination through mutual adjustment, but he cannot sufficiently arbitrate the definition of new roles. Therefore, the flexibility mechanism is thwarted by the bureaucratic mechanism, leading to existing formal roles and rules and divergent goals (isolation of functional strata).

This analysis is summarized in Figure 5.

5. DISCUSSION

The projects analyzed are similar considering the roles of the flexibility mechanism and of the bureaucratic mechanism (formal roles, divergent goals). Some differences in

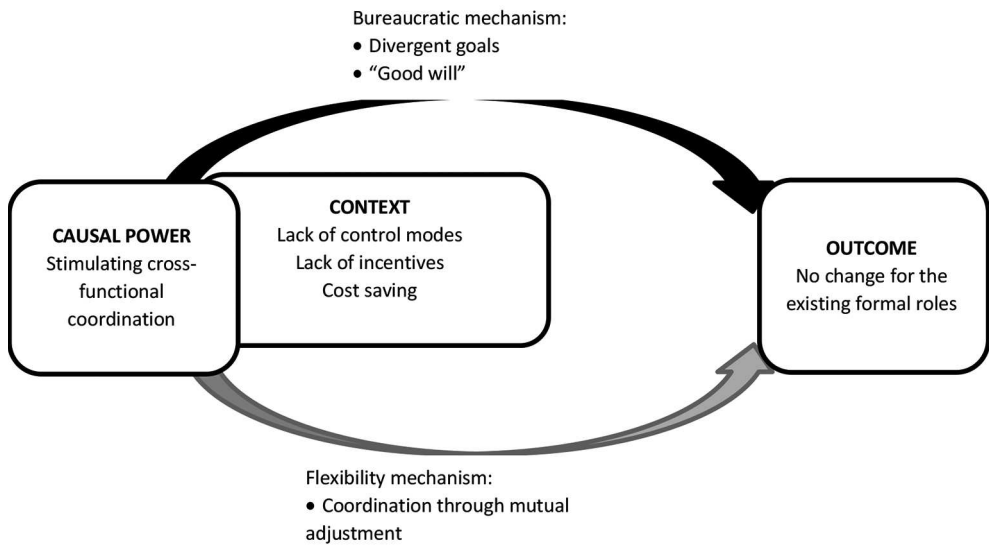


Figure 5: Analysis of the causal power-context-outcomes-mechanisms at the organizational level.

the outcomes may be explained by different contextual conditions. Therefore, the arbitration made for the connected prescription project was motivated by a high degree of urgency (Mainardes, 2011): in the case of paralysis of this project, the implementation of the software for laboratories would fail, thereby resulting in loss of money for the hospital. Nevertheless, the decision made was underpinned by a bureaucratic mechanism, i.e., the centralization of decision-making.

The question raised is whether these two mechanisms are really different and conflicting. As mentioned above, Crozier (1963) argued that even the most rigid bureaucracy requires sufficient freedom and a certain degree of flexibility in order to get work done in everyday life. Moreover, the flexibility manifested in the involvement of the DHI manager and other actors in the different projects is also related to their "good will". This "good will" is precisely one of the characteristics of bureaucracy illustrated by Crozier (1963), who asserted

that the employees of a bureaucracy try to avoid being interdependent with other employees and consequently to increase their freedom. This aversion to interdependency (Crozier, 1963) seems to be the main obstacle to cross-functional coordination.

Thus, the flexibility mechanism we identified may be considered a "soft" mechanism, tolerated by the prevailing bureaucratic mechanism. This assumption is supported by the lack of control (either formal or informal) of the projects and by the lack of resources and of incentives for both the cross-functional projects and for the DHI. The creation of the DHI reveals significant organizational flexibility, which could be interpreted as an illustration of soft bureaucracy (Vaast, 2007), meaning the coexistence of flexibility and decentralization in a bureaucracy, but without radically altering the existing structure of resource allocation, control and decision-making (Vaast, 2007). Flexibility may require control modes (Foss, 2003). Indeed, Foss (2003) showed that the lack of control in project management may

lead to coordination problems because it is hard to ensure efficient time and resource allocation to every project, while project teams were created rapidly and flexibly in order to combine the right skills in a flexible manner, and employees were free to join the projects.

In contrast to Vaast's arguments (Vaast, 2007), our analysis is in line with Crozier's assumption that changes in bureaucracy requires radical transformation. Crozier emphasizes that change is very difficult in bureaucracies and, given the three characteristics described above, it "*must come from the top down and must be universalistic – i.e., encompass the whole organization as a bloc.*" (Crozier, 1963, p. 196). In the absence of this radical change, the DHI seems to be a "glass cage", which is characterized by invisible constraints, the illusion of choice and the presence of freedom only inside the cage (Gabriel, 2005), namely the "iron cage" of the bureaucracy as described by Weber (1947).

In addition, by emphasizing the existing formal roles instead of the rules, we reformulate the bureaucratic vicious circle drawn by Merton (1957, p. 200) and reinterpreted by Crozier (1963): (1) An effective bureaucracy demands reliability of responses to regulations, which are formal roles. (2) Such devotion to these roles leads to their transformation into absolutes; and they are not considered as relative to a set of purposes. (3) This transformation into absolutes interferes with ready adaptation under special conditions not considered by those who drew up the general roles. (4) Thus, the very elements that are conducive to efficiency generally produce inefficiency in specific instances. The response of the bureaucracy to this inefficiency is to create new roles – this role is precisely the role of the DHI.

The divergent goals, the importance of the "good will" of the actors, and the lack

of resources and control modes for the projects may also illustrate the concept of chaos (Hodson *et al.*, 2012). Based on our data, we suggest that such chaos is not an outcome of the arbitrary use of bureaucracies by powerful actors, as suggested by Hodson *et al.* (2012), but rather an arbitrary use of lack of control, which transforms every actor into a powerful one, in line with Crozier's argumentation. By virtue of its ambiguity and unpredictability, chaos can facilitate the emergence of ideas and innovation and can thus be viewed as flexibility. However, innovation can be lost in chaos if no effort is made in the organization. Thus, chaos allows different actors in the studied organization to initiate projects.

- *Contributions*

Our paper makes two main theoretical contributions. First, we suggest the concept of ramification in order to highlight specific issues and projects that are used by the projects related to the ES but are not a part of the pre-implementation/implementation/post-implementation phases of the ES, in the sense that they do not threaten the success or survival of the ES (Wagner & Newell, 2010) and do not directly influence ES use and adoption. The connected prescription project is a project that aims to integrate the ES with another system. The e-learning project is the evolution of informal e-learning by residents. The project of uploading and indexing radiology pictures is related both to the integration of other technologies (computerized repository for radiology pictures) and to the increasing number of radiology pictures brought by patients on CD. These projects are related to ES use, to the evolution of the environment and to the implementation of new IT. The projects are connected to ES but not to ES implementation considered as a general project. Therefore, they may be viewed as socio-technical ramifications, meaning that

they are emergent projects related to the evolution of the ES, of the organization or of its environment beyond IT governance and management. Accordingly, we suggest referring to these projects as ramifications of ES use. This concept emphasizes both the use of ES and the different paths taken by every project from the “tree trunk” of the ES while remaining connected to it.

Second, our paper opens the “black box” of bureaucracy and flexibility by conceptualizing the role of different bureaucratic and flexibility characteristics in the achievement of projects that are ramifications of the ES and their contradictory and counterbalancing relations.

This paper also provides methodological contributions. It complements the IS literature on generative mechanisms (Bygstad, 2016). While previous studies highlighted the interaction of mechanisms (Hendfridsson & Bygstad, 2013), their dependencies (Strong *et al.*, 2014) and the interaction between high-level and low-level mechanisms (Strong *et al.*, 2014), our study highlighted conflictual mechanisms and their degrees of “strength.” Moreover, we have proposed and applied two new frameworks. First, the lens of Context-Outcomes-Mechanisms (COM) is adapted from the Context-Mechanisms-Outcomes (CMO) framework (Pawson & Tilley, 1997; 1998; Hendfrisson & Bygstad, 2013; Bygstad, 2017) to emphasize mechanisms as inferred from the analysis of the context and of the outcomes, in order to better align the claims of critical realism with the data analysis. Second, the framework Causal power – Outcome – Context – Mechanism allows researchers to begin their analysis of the potential causal power in order to “track” actualization or lack of actualization.

Our study offers insights for managers of bureaucratic organizations. The emphasis on the generative mechanisms and especially on the prevailing bureaucratic mechanism

shows how difficult it is to enact change in a bureaucracy. Cross-functional coordination and overall flexibility require a radical transformation of the existing strata and of the importance of the existing formal roles. The decision made for the only project constrained by the external environment and by the risk of money loss suggests that the environment could be the contextual condition that strengthens the flexibility mechanism. This idea converges with the assumptions of Adler & Borys (1996), who considered that the triggers for enabling a bureaucracy against a system of rigid roles and rules were the clients’ demands and the social constraints of accountability and transparency. All these triggers come from the external environment. Managers in bureaucracies should be aware that while reducing costs is an important goal, the status quo of the rigid functional strata drives high costs through time-consuming and less efficient projects.

Future studies may address several limitations of our work. First, our research is based on a single case. In line with the critical realism perspective that was adopted for this study, the identification of generative mechanisms, which means regularities beyond specific contexts, requires comparison with other cases studies (e.g., Henfridsson & Bygstad, 2013), to be conducted in different organizational contexts with different and similar organizational forms.

Second, as generative mechanisms are not directly observable but inferred from the observable outcomes to which they give rise, we do not claim that we have discovered all mechanisms relevant for the observed outcomes. Moreover, the literature using the mechanism lens used a different level of granularity and mode of argumentation in the identification process. For example, Bygstad *et al.* (2016) and Volkoff & Strong (2013) argue for identifying generative mechanisms through affordances. In this

regard, affordances are a specific general set of mechanisms related to technology's potential causal power. For Volkoff and Strong (2013), any ES in use by any manufacturing organization generate the same affordances as the ones they have observed in the actual case. Adopting a different perspective, Hendfridsson & Bygstad (2013) suggest the existence of three mechanisms i.e., adoption, innovation, and scaling, to explain a digital infrastructure evolution. For these authors, decentralized control is considered as a contextual condition, while it could be argued that the mode of control is causal power. Therefore, future studies could investigate our case and the cases previously presented in the literature review by examining alternative mechanisms, as suggested by Bygstad *et al.* (2016) and Mingers & Standing (2017).

Third, the prevalence of one mechanism in the conflict between two conflictual mechanisms has not been addressed in previous literature on generative mechanisms and thus requires further inquiry in various research settings.

CONCLUSION

This paper proposes an explanation of the mitigated outcomes of projects related to the use of ES in a French hospital by emphasizing the role of two general and conflictual generative mechanisms: a bureaucratic mechanism and a flexibility mechanism. The mechanisms were identified using an embedded case study that focused on both the actualization of the causal power of a new organizational entity and on the combination of mechanisms and contextual conditions leading to specific outcomes in every project. Our results highlight the relevance of Crozier's seminal work on bureaucracy (Crozier, 1963) for understanding how the bureaucratic mechanism inhibits the

flexibility mechanism and, overall, inhibits changes that are required for cross-functional coordination to go beyond divergent goals. We suggest that this approach may be applied in further studies in different and similar organizations in order to develop a better understanding of the subtle links connecting the organization's form and the outcomes of the projects conducted within this organization.

To date IS research has focused on the implementation of ES, including the pre-implementation and post-implementation phases. Our study shows that there are projects, based on problems to be solved, that are not related to the management of this implementation process but that are related to ES use, which may be considered as one element interacting with other organizational, technological and environmental evolutions. We suggest seeing these projects as being ramifications of ES use. Future research may more deeply investigate the nature and the mechanisms of this kind of projects in different organizational forms.

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