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Research Article

A Rationalization Perspective of Innovation Capabilities in Public Bureaucracies

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Abstract

This paper aims to contribute to a better understanding of the innovation process in the context of bureaucratic organizations and institutions, and to identify how this specific context facilitates or inhibits innovation. Case studies from two different bureaucratic organizations were conducted to explore these questions. In both cases, major projects of digital transformation were studied: an e-government project for the public administration and an e-learning project for the university. The results showed that rationalization is one of the most influential components of the innovation adoption and implementation factor. However, it does not correspond to the type of rationalization presented in the literature, such as the professional rationalization or the industrial rationalization. We have identified and proposed a new, more adequate, type of rationalization with IT-based innovation adoption and implementation in the specific context of a bureaucratic organization. This new type of rationalization focuses more on the intervention process than the action itself.

Keywords: Innovation management, Rationalization, Information technology, Bureaucratic organization

Introduction

Bureaucratic organizations are very specific and complex type of organizations coming in a diversity of shapes. Indeed, bureaucracies are designed to reduce human subjectivity and arbitrariness and are characterized by a high rate of efficiency and effectiveness. Innovation is defined by creativity, a high learning potential, and uncertainty. At first sight, innovation seems contradictory with the rationalization behind bureaucratic organizations. But at the same time, it is critical for bureaucratic organizations to

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innovate, to cope with the technology progress, and to answer the growing and divergent needs of the stakeholders in order to remain effective and efficient.

Innovation can be defined as a learning process consisting of introducing and adopting a new product, service or process that involves change and presents risks for the organization. Analysing the innovation capabilities and process of an organization requires understanding of the context of innovation. As suggested by Teece (1996), innovation is often exclusively associated with large firms. They are considered as the natural leading players in new product development or process redesign. This biased conception, in the existing literature, reduces the role of the organizational type and design in the innovation process. The relationship between organization characteristics and innovation, and particularly for the bureaucratic organization profile, remains poorly understood. For this reason, the purpose of this paper is to contribute to a better understanding of the innovation in bureaucratic organizational and institutional contexts, and how to understand its role in facilitating or inhibiting it.

To study this question, we have selected different profiles of bureaucratic organizations illustrated respectively by two different public organizations from different contexts: a university (named EDU in the following) and a public agency (named GOP). We choose to focus our study on the e-learning project at EDU and the e-government implementation at the GOP to describe the complexity of innovation adoption within a bureaucratic organization. Both public organizations responded to the demand of innovation as they are expected to meet the needs of particular and very heterogeneous groups of clients, rather than achieving profit. At the same time, these public organizations are facing financial resources reductions and the continuous need to improve organizational performance.

This paper starts by examining innovation in bureaucratic organizations and the two main types of bureaucratic rationalizations behind innovation. Then, the research methodology adopted is explained followed by the description of the two case studies. Finally, this paper discusses how bureaucratic organizations develop innovation capabilities through a rationalization process.

Literature Review

Innovation in a Bureaucratic Organization

Innovation and bureaucracy are often considered as two contradictory concepts. Several studies consider this contradiction as a myth – bureaucratic organizations should be innovative and explore opportunities to innovate in their own environment as any other type of organization. Several cases such as Pfizer, GM, and GE were for a long period of time designed as bureaucratic organizations and, at the same time, were among the most innovative companies worldwide.

Actually, the most effective bureaucracies depend strongly on innovation and how successful they are in increasing and maintaining efficiency and effectiveness. Innovation is a necessity and a survival challenge for bureaucratic organizations in order to develop better ways of meeting needs, solving problems, and using resources and technologies more effectively. For example, public services need to innovate in order to contain cost pressure, increase efficiency and/or improve outcomes. Bureaucratic organizations had to adapt to the IT development and "technology-push", such as any other organization (Michael, 1994). They must adapt their processes or create new products or services to meet demands and survive. They had to maintain an organizational and an institutional legitimacy.

So, why is there this strong belief that bureaucratic organizations are not able to innovate? Actually, bureaucratic organizations and, more specifically, public bureaucracies are facing fierce constraints and limits to innovation. Some researchers have associated the obstacles to innovation in bureaucratic organizations to its very

definition. Clergeau de Mascureau (2002) shows that public organizations have institutional and organizational constraints to innovate, such as the organizational and process rigidity, weak incentive system, lack of leadership, an over reliance and dependence on norms and rules, just to cite some examples. Mulgan and Albery (2003) have also identified several barriers to innovation that require more attention from researchers based on the studies of seven public bureaucratic organization cases from different sectors (construction, education, energy, health, and transport). They highlighted that daily pressure and burdens on managers and employees leave very little space to think about new ways, improvements, and strategic plans. Short term budget and planning are also main constraints for more radical innovation. A lack of skills in risk and change management is also presented as an innovation inhibitor, even if there is motivation and opportunity to innovate. The lack of incentives to innovators, particularly in the public sector, is demotivating managers to engage in any type of improvement. Organizational design is a major factor of systematic innovation. Furthermore, innovation capabilities depend on the right fit of culture, structure, system, and management methods and processes. The over-reliance on high performers considerably reduces the effort towards innovation. Dealing with failure is also very problematic for bureaucratic organizations and the higher standards set tend to discourage innovation. Risk aversion is very strong in bureaucratic organizations characterized by continuity, standardization, and accountability, and may alleviate any innovation behaviour. The list of barriers and obstacles can be very long. With all these foundational limitations, it seems very important to further research the understanding of bureaucratic organizations' capabilities to innovate.

Innovation, as an organizational process, is directly linked to the ability of the organization to answer the different environment changes but it is also associated to the ability to leverage internal and rare resources needed to introduce effectively and produce any innovative idea (Teece, 1996). These internal abilities depend on the organizational design and structure and consequently shape the organizational capability to innovate. Examining the capabilities to innovate for bureaucratic organization requires an in-depth study of its context (Clergeau de Mascureau, 2002). Then, in order to reduce the obstacles and foster innovation capabilities, it is critical to explore the role of rationalization for an understanding of bureaucratic context for innovation and to build innovation capabilities.

Rationalization in Bureaucratic Organizations

The concept of rationalization, firstly explored by Weber, refers to the process by which modern society has increasingly become concerned with more efficiency, predictability, calculability, and more control of the human behaviour (dehumanization). Through the concept of "rationalization", Gadrey (1994) shows that service sectors are looking for more efficiency by achieving the maximum of results with a minimum amount of efforts and resources. He identified two broad types of rationalization: Industrial and Professional. In the following paragraphs we will explain both types of rationalization and their contribution to the understanding of innovation in bureaucratic organizations.

The industrialization concept had different meanings throughout history. Gadrey (1994) refers to the Aoki-Mintzberg Model (AM) of industrialization to describe the large western industry of the 60's and 80's. Three dimensions are identified: goods and materials production, specific production process, and new industrial performance criteria. Gadrey (1994) describes industrial rationalization by combining three different characteristics: the production of tangible goods or materials (ability to replace intangible services through the production and sale of objects that perform the same function), the access to a specific production process (operational work settled by highly specialized and standardized work processes, flexibility of the operators reduced, mass production of standardized goods, developed hierarchical line, relatively simple and stable environment), and the

reference to industrial criteria of performance (Management practices and performance measurement linked to the productivity gains). Industrialization in the service industry is often associated to the Fordist production model dominant in heavy industry (Miladi, 2010; Djellal and Gallouj, 2012).

Levitt (1972) in his "Production line approach to service study" recommends more efficiency and performance in the service sector to abandon the craft model and adopt a more systematic industrialization of services. This industrialization method of service production is at the roots of the success of heavy service providers, for example, McDonald's. The 80's and 90's add to the industrialization of the service, the industrialization of processes to reduce the heterogeneity and the complexity of service delivery (Shostack, 1984). This originates the adoption of new tools and techniques such as BPM, flowchart, blueprint, GANTT model, PERT model (Lovelock, 1992).

Tremblay (1998) adopts a broader definition linked to automated large-scale production. He underlines the distinction in the characteristics among the industrial production from the craft sector. The differences stand, firstly, in the level of capital required and the type of machine used for large scale production. Secondly, it requires a specific collaboration, and thirdly, workflow organization and division of work. The author measures the level of industrialization of a specific production sector by the level of capital, the role played by the machine in the production, and the organizational design complexity. In other words, the industrialization or development of a specific sector records progress in one or more of these three different dimensions.

Djellal and Gallouj (2012), in the objective of evaluating and improving productivity in the service industry, associate industrial rationalization to the "assimilation" of services to goods. They consider that industrial rationalization is assimilated to the materialization of services. They define services such as "goods like any other" to better control "intangible, interactive and subjective" characteristics. They rely also on the same mechanisms: standardization, mechanization of production processes and mechanization of the service itself to describe the industrialization.

Several research studies study innovation in bureaucratic organizations from the industrialization perspective, either to understand the pattern, the process, and/or the issues. This perspective is not linked to a specific type of innovation in bureaucratic organizations, such as the adoption of IT by public organizations or to a specific sector. In the literature, we can find a diversity of examples of innovations in bureaucratic organizations that are studied from an industrial perspective (Gallouj, 2002; Miladi, 2010). Guillemet (2005) collects and studies research studies using industrialization into a specific bureaucratic organization, the education sector. He cites Peters' research, which analyses and compares the education sector to the Fordist model. Peters (1967, in Guillemet 2005) applies industrialization to the education sector. He analyses the distance learning process, as per results, he compares it to the Fordism industrial model of production, highlighting the division of work between experts, the use of technology for mass production, the adoption of IT for efficiency, reducing resources and course standardization. This education system standardization is presented as a part of a social process that increases the accessibility to education in the context of developing countries. But other studies show that the process of industrialization is not fully covered. Some aspects are not impacted the same way as other activities and also different levels of industrialization effects should be distinguished (Deceuninck, 1998). Gallouj (2002), for example, adopts a broader view of the industrialization perspective named "assimilation" to address innovation in services. He emphasizes that most of the studies in innovation limit the "assimilation" to the "adoption" phase. He expands the "assimilation" to integrate adoption as well as determination, diffusion, production, and identity relation to better encapsulate the relationship between innovation, services, and technology. He argues that technology plays the main tool for assimilation.

Given the specific characteristics of services, industrialization is not the only way to address innovation. In the literature we can find different types of rationalization. Gadrey (1994) introduces the “professional” or “cognitive” rationalization (as opposed to industrial rationalization or industrialization) more specific to professional services. Based on Freidson (1985) conception of professional service, he defines this type of service as formalized knowledge-based service that allows professionals and experts more freedom and autonomy in their daily functions, activities, and decision making. Not anyone can be part of this professional body. They should fulfil required conditions of formation in reference to their specific profession and working in direct interaction with the final user or customer.

The professional rationalization consists of three interrelated strategies: 1) typification of cases (that is to say, identification of standard cases, standard contracts, standard solutions); 2) formalization of problem solving procedures (development of methods); 3) use of individual or organizational routines (automatic response programs to problems encountered); 4) performance assessment based on effects or impacts of the service on users more than productivity. For the author, the characteristics of the industrial model are not easily adaptable to the study of professional services. He cites different reasons: tangible goods are not produced; labour organizations cannot be assimilated to production chain and the increase of performance cannot be assessed with quantitative measures or productivity gain. Djellal and Gallouj (2012) indicate that professional rationalization favours "multi-criteria and multi-actor indicators, with an emphasis on monitoring performance and compliance with the profession's quality standards". The level of experience and the building memory of the organization mostly value this rationalization that they consider as “demarcation” strategy.

In opposition to industrialization, Fichez (1998), for example, considers innovation in formation as a type of professional rationalization. Based on a body of knowledge, she builds on the concept of "Servuction". In other words, she clearly distinguishes between the service as a "tangible" good and the relationship in the service. She demonstrates her statement using the case of e-learning, where she emphasizes the main role of human interactions over the used channel, whether it is direct, IT-based, or a combination of both (Fichez, 1998). Fichez also encompasses the resource production in the professional rationalization, as opposed to the industrialization, in which the production rationalization (back office) and time reduction in the front office are part of the professional rationalization. Resources production, as well as online supports, are both produced by qualified resources and are not outsourced for more efficiency.

Fichez (2002) highlights specifically in the educational environment the sharing and pooling of resources that she qualifies as "professional public rationalization" based on Gadrey taxonomy. Service innovation is considered here as added-value and diversification more than a substitution. For example, e-learning is not the reduction of in-class time for professors, neither to reduce physical presence of the student on the campus, but the enhancement of the professor-student relationship through diversity and improvement of activities and learning support. She also notes that universities leverage on internal core-competencies through the collaboration of an IT/education team to design and produce online courses. In brief, in whatever situation, Fichez (2002) considers that rationalization is more a professional one since the different actors codify the tacit knowledge and their pedagogy within tangible goods combining the knowledge, the support, and the interaction with the learners. This new product creates a new network of knowledge sharing and learning that is not obvious in the traditional teaching, where each actor is isolated.

Research Methodology

This paper attempts to better understand innovation and innovation adoption in specific bureaucratic organizations. It adopts an in-depth case research method for gathering evidence, which is the most appropriate technique when the research question is exploratory in nature and needs to be examined within the broader context. This requires a rich description of the environment, which allows the exploration of unforeseen relationships to offer better insights. Case studies were conducted on two bureaucratic organizations that are described in detail in the next section.

The sampling strategy utilized is based on Yin's (2002) case study design strategy typology, where the unit of analysis studied is at the project level. This sample strategy is appropriate because the study involves data collection from two different cases, from different contexts that allow collecting more data, to establish a description of two different bureaucratic organizations and to broaden triangulation possibilities.
The adopted research design was similar for both cases. It is based on the structured case study divided in two phases. The first stage consisted on an exploratory study and the second one was a grounded that will be detailed in the following paragraphs.

For both cases, the data collection methods utilize a case protocol which includes analysis of multiple documents and archival records, and individual interviews. A series of semi-structured interviews are realized (Table 1). Each interview is conducted using a standard interview guide to ensure reliability (Yin, 2002) using in-depth and open-ended questions. This broad-based approach utilizes documentation and interviews providing richness, depth, and validity of information for the study.

Case 1: Public Agency	Case 2: University
• Bureaucratic organizations: Public organization • Total of 22 semi structured interviews (member of strategic committee, Design and development members, members of team project, operational actors) • Observations (Reflection workshops, projects team meetings…) • Documentary data	Bureaucratic organizations: University Total of 40 semi-structured interviews (member of strategic committee, Design and development members, members of team project, administrative and technical staff, professors-authors, Professors, Tutors) Observations (Reflection workshops, projects team meetings…) Documentary data

Figure 1: Data collection process

The content analysis is based on the grounded theory approach (Strauss et Corbin, 1998). Given the exploratory nature of the research, different analysis techniques are used, including narrative strategy, explanation building, temporal bracketing, and pattern matching. With respect to the various sources of information, researchers are able to develop a qualitative in-depth compilation of data within the study's environment, as well as a storytelling of events and activities focused specifically on developmental issues on both projects and organizations.

The GOP Case Description

The GOP is one of the pioneers in the implementation of e-government in Canada. It is an autonomous public agency created in 1965 to manage pension plan annuities. It is governed by a board of directors who vote and allocate budgets, take decisions, and authorize major initiatives. The organization derives from its strategic plan a set of

objectives related to internal and external value creation, as well as a growth plan (including IT projects) based on a comparison to other public sector organizations and their business partners. 1998 marked a turning point in management leadership (result of a cabinet shuffle), and a new e-government vision was adopted. The GOP e-government development is part of a broader governmental "Service delivery renewal" initiative, which is seen as necessary to meet the demands of an aging public demographic and pressures for updated and more efficient services for its clientele. The intent of this project is to better service the increasing number of GOP recipients, while facing increasingly restrictive governmental funding for operational expenditures.

In retrospect, GOP's "Service Delivery Renewal" project is delineated into three main phases. The first of which (1998-2001) is presented as a strategic reflection phase where upper management and design teams specify and plan the e-government. The second phase (2001-2004) is an intensive period of technological development, characterized by a high level of uncertainty and a lack of knowledge. The third phase (2004-today) is marked by the top management change, close to the project completion. At this time, multiple organizational initiatives are launched, and consequently, this period changes its objectives to a qualitative focus in the e-government development.

Rationalization plays an important role in the e-government adoption and implementation performance. A first characteristic is linked to the establishment of a team dedicated and able to conduct this major transformational project. For six months, the leading members at the GOP spent a commensurate effort to sell the project as the most important one. They met individually with every single member to lobby and convince decision-makers and other managers to engage and support the project. This is not without difficulty due to diverging interests and political allegiances, resistances to change, and organizational power games. Leadership plays an important role in this effort and allows putting in place a strategic committee, a steering committee, and a design and development team. These different teams replicate the same process to champion the project in their own department, engage employees, and to compose dedicated and specialized e-government teams at a micro level.

The second aspect is the project definition and planning. GOP's strategic team, steering committee, and project team plan and design the main project titled "Service delivery renewal", which is seen more as a transformational innovation than only adopting e-services channel (technology). They spent two years meeting regularly and continuously brainstorming in order to collect information, understand every detail of the project, define the right vision and objectives, and plan the project. The GOP's project team tries to regularly rhythm (approximately yearly) the project through reviewing, repositioning and formulating a new plan at the end of each phase. This regular assessment of the project allows for re-assessment of the project scope, timelines, and progress, while providing enough flexibility to deal with lack of knowledge, uncertainty, and increasing complexity. For example, there is a constant effort to coordinate between strategic objectives and managerial actions in order to ensure that they converge. Concurrently, the GOP introduces enough flexibility to meet conditions of organizational change, integrate new ideas, and seize new technological opportunities and emerging initiatives.

The third element corresponds to the development of specific partnerships with different stakeholders. It was considered as an innovative practice at the GOP, given that the organization was known and used to an autonomous and autarchic management. The entire organization had to learn how to build new collaborative capabilities, identify strategic partners, and formalize inter-organizational partnerships. They started by working more closely and collaborating with other ministries and public institutions, particularly with ministries that have acquired strong technological knowledge and capabilities to develop solutions for e-

government technological issues. Another partnership and consortia was implemented with unions and legal institutions to solve information, legal, and privacy issues for e-government projects. They also benefited from the experience of other public organizations in the formation, management, direction, and regulation of the partnership. They also decided to set up agreements with stakeholders from the private sector to facilitate the e-government implementation and evolution. For example, they organized regular meetings with all financial institutions available in the territory in order to support them in informing the general public and help them build a retirement plan that is more adequate and better synchronized with workers premiums and contributions in Canada. They also developed communication channels with organizations specialized in information management. Throughout the project, they have acquired knowledge, improved their practice, and consolidated their partnership management.

Finally, we have observed a new division of tasks and specialization at the GOP. Members at different levels have to learn new skills, adapt to new practices, and acquire new knowledge. These changes have impacted the organizational design and culture. During this transformation, the organization faced several challenges and difficulties, as well as resistance, mainly due to the uncertainty, the lack of knowledge, the fear of losing jobs, and the difficulty of the seniors to acquire new knowledge and practices. Different strategies were implemented to overcome these challenges, such as pairing the senior employee with younger employees, intensive communication and information about the project progression, involvement and participation of the employees in the technological development. This process resulted in a successful organizational change.

The EDU Case Description

In the last thirty years, the higher education system in France was confronted with socio-economic pressures that push it to look for solutions. Universities have launched actions to transform their higher education systems by using different innovation means. The common point of those policies is to modernize higher education organizations in order to extend their public and their missions, and to reach an international level.

The EDU project starts in this context of higher education transformation introducing IT adoption as a potential solution to these problems. EDU is a "strategic" e-learning project defined by a consortium of five universities, which were selected based on the added value that each one can bring and/or because there are existing networks between these universities. This project is characterized by the support of five institutions as only one embedded project. A clear formation offer and the potential audience prior to the technical implementation phase also determine it. This new education system is developed in collaboration among the five partners based on each one main core competencies. For example, one of the universities is considered a centre of excellence in the technological capabilities, while another one shows a strong knowledge content capability.

The implementation of the EDU project demonstrates a rationalization. Firstly, a formalized structure is built. A committee composed of members from each university is appointed to the project. This steering committee is composed by innovators among professors that started lobbying these projects inside their own universities and ‘co-opting’ new members to the projects. The steering committee meets regularly to set up the project and make strategic decisions. This formalization was challenged by the lack of motivation of some professors. They resisted participating in those structures because of the weak acknowledgment of the online teaching in their career. They are evaluated on research, not on pedagogy.

Secondly, formalized methods are adopted, such as partnerships and internal agreements. This formalization gives rise to a set of rules with very precise articles and codes. For example, clear contracts regulate the course design, the graphical design used,

the relationship between the designer and the internal user (tutor) or the relationship between the different universities. This formalization is built from scratch involving every single member with his/her own contribution. However, the consortia logic implies challenges like the elaboration of an adapted legal structure, which universities face difficulties to define (modalities of collaboration, for example). This structure is already difficult to define because it seems to be in contradiction with the autonomy of universities in France. The collaboration is also not easy to reach because the status of the representatives of the e-learning project differs from one university to another. The participation and the management are unbalanced between the different universities involved in the project. The management of the projects is conducted by several steering committees where active members are not always present (such as professors and technicians). These meetings become political arenas where each one is defending his own interest and position in the university. We then notice a lack of participative and co-construction management. The lack of project management skills appears also through the resistance to the instructions of the legitimate leader in a structure where traditionally there is no hierarchy.

Thirdly, a division of work and specialization is introduced at different levels. The teaching activity is divided into several tasks implying many actors that force professors into a new collaboration where she/he lost her/his dominant traditional role that he/she used to have in class. For example, the different and multifaceted task of a professor in the traditional teaching channel is now divided among different experts, such as the designer, the tutor, the developer, the scriptwriter, the webmaster, etc. These new divisions of the teaching process and redistribution of roles is perceived as a threat to the traditional role of the professor. In other words, the IT solutions are impacting the core competencies of the professors. These new tools force a reinvention of pedagogy for which professors were not trained.

Discussion and conclusion

GOP and EDU are examples of bureaucratic organizations that have adopted and implemented innovation. GOP has implemented an IT-based transformation of the core-activity that is service delivery. EDU has set up an IT-based distance learning and created a virtual university which is an innovation that also has affected the core activity.

Despite the contextual differences, both GOP and EDU cases demonstrate clear elements of rationalization when adopting and implementing innovation. We have identified several aspects in EDU and GOP cases that confirm Gueissaz's definition of rationalization (1999) as a complex social process, where means and objectives of innovation are redefined and enrolled in more or less stable systems. The rationalization characteristics described in the previous section contribute to the positive progress in the respective innovation project in both cases. Both cases contradict what is described by the literature about bureaucratic organizations. Our findings demonstrate that the more the bureaucratic organizations rationalize, the more they progress in their innovation initiatives. This illustrates Miladi's concept (2006) of "IT-based innovation paradox". This rationalization is also supported by the presence of a strategic vision. As specified in the case, the GOP director shows a strong leadership in defining, regularly renewing the organizational vision, adapting to the environment, and developing a strategic partnership. The organization has not just adopted the e-government, as suggested by the Canadian Government policy; they have embraced this innovation as a long-term survival strategy.

IT-based innovation has an impact on the type of rationalization. Online campuses cannot be considered neither as industrial rationalization nor as professional rationalization. A new type of rationalization emerges with IT innovation. For example, the rationalization that we study in the EDU case cannot be associated with industrial rationalization. Firstly, it did not change the identity of Universities as professional bureaucracies. For Mintzberg (1982),

professional bureaucracy relies on expert and highly qualified professionals who are autonomous and responsible of their activity. The professional bureaucracies are based on clear line of authority and standard administrative practices. These practices may be built on standards set by law, regulations or independent external bodies, including professional bodies. Secondly, IT-enabled innovation did not affect the professional aspect of its core-activity. The cases deny Gadrey's characteristics of industrialization presented in the literature review. The relationship and interactive aspect of e-learning is emphasized in order to maintain a service relation and not fall into course mass production as tangible goods. Despite the formalization and precise norm definition, the professor remains the principal designer of the course delivery, both in terms of content and shape. The output of this e-learning is much more on trial and error process and standardized product. Moreover, quantitative aspects of the e-learning are not controlled yet. On the opposite, the online courses are very often more time- and resource-consuming, given that it involves several actors. Professors reject the use of course materials developed by other professors even if it may optimize and pool the resource required.

The cases fit neither the description of professional rationalization as neither the industrial rationalization. According to Fichez, online resources production and teaching assistantship are realized by professors prove the existence of professional rationalization. However, this is not realized in the objective to reach more effectiveness, but it translates to a resistant and controlling attitude from the professors. Cases also contradicts Fichez' arguments about public professional rationalization cited previously in the literature review. We can notice several difficulties, incompatibilities and even competition among universities in the e-learning project instead of resources pooling and optimization. Moreover, Fichez states the internalization of education material production as professional rationalization. The EDU case study demonstrates that internalization does not necessarily lead to collaboration and may even increase coordination costs. The EDU case is not adequately aligned with process formalization and cases typification, such as stated by Gadrey (1994). Universities continue to use a "learning by doing" strategy and sometimes even improvise.

Rationalization contributes to the success of IT-based innovation adoption and implementation in the specific context of bureaucratic organization. We observe the emerging of a new type of rationalization focusing more on the intervention process than on the action itself. The rationalization can be considered as a new collective (Hatchuel, 1997). Finally, we observe that rationalization led organizations learn new know-how that allows bureaucratic organizations develop innovation capabilities.

In conclusion, bureaucratic organizations could be innovative. However, an in-depth study and exploration of processes is necessary, given that the rationalization remains a strong part of the innovation process, specifically in the studied context. Further case studies should be conducted, particularly cases where we can observe a reverse relationship between innovations and rationalization in order to consolidate our findings.

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