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The Discursive Construction of Configurable Artifacts: Following Initial Steps of a Clinical Information System Implementation

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Résumé

Cet article aborde la question de l'adoption d'un système d'information clinique (CIS) dans deux centres multi hospitaliers pendant le période initiale (a) du choix du système et (b) de la pré-implantation. Avec une perspective théorique qui combine une approche structurationniste et l'analyse critique du discours, nous étudions comment les pratiques discursives de gestionnaires du projet CIS aident à donner du sens et à façonner la réalité. Ce processus discursif mène à des décisions et à des actions qui influencent la configuration CIS en développement. Bien que les gestionnaires du projet CIS semblent se rendre compte des risques et de l'impact de l'adoption d'un nouveau CIS sur leur organisation, leurs pratiques, décisions et actions au cours de la période examinée sont principalement dues à des contraintes financières et à une forte lutte de pouvoir entre différents groupes. La signification du CIS est construite dans un contexte de bonne volonté et d'incertitude. Néanmoins, ce projet est en train de produire également un phénomène institutionnel important et inattendu : la collaboration inter-organisationnelle entre deux institutions qui, jusqu'au début du projet, étaient en compétition dans le système local de service de santé.

Abstract

This paper addresses the issue of the adoption of a clinical information system (CIS) in two multi-hospital centres during the initial periods of CIS selection and pre-implementation. From a theoretical perspective that combines structurationist premises with a critical discourse analysis approach, we explore how the discursive practices of CIS managers help make sense of and shape reality and lead to decisions and actions that influence the CIS configuration being developed. Although CIS managers appear to be aware of the risks and organizational impact of the adoption of a new CIS, their discursive practices, decisions and actions over the period examined are mainly driven by financial constraints and power struggles between different groups involved in the process. The meaning of the CIS is therefore being constructed in a context of both willingness and high uncertainty. Nonetheless, this project is also generating an important and unexpected institutional phenomenon: the inter-organizational collaboration between heretofore competitors in the local health care delivery system.

Mots-clés

Clinical information systems; critical discourse analysis; IT implementation evaluation; structuration theory.

INTRODUCTION

> "The committee believes information technology must play a central role in the redesign of the health care system if a substantial improvement in quality is to be achieved over the coming decade. Automation of clinical, financial, and administrative transactions is essential to improving quality, preventing errors, enhancing consumer confidence in the health system, and improving efficiency."
>
> (Institute of Medicine – Committee on Quality of Health Care in America, 2003, p. 16)

As the above excerpt illustrates, the acquisition and implementation of new information technologies constitute one of the major pressures upon contemporary health care systems. Health care organizations display information-intensive business processes (Anderson, 1997). On one hand, health professionals actively seek to enhance their clinical practices by continuously keeping up-to-date on the best possible medical knowledge. On the other hand, contemporary health care delivery implies an increasing degree of complexity, which is more and more difficult to reach through the use of paper medical records (Shortliffe and Blois, 2001). Further, health care institutions need to be adequately organized and managed. In this context, the establishment of computerized information systems has been largely sustained by the assumption that information technology (IT) should facilitate and improve quality delivery and overall organizational performance (Neame and Kluge, 1999).

In the past, health organizations that adopted IT usually developed customized and discrete solutions, with information on patients being fragmented, and therefore often not readily accessible at the point of care. Nowadays, the pervasive trend towards integrated health care delivery systems has made a *clinical information system* (CIS), among several IT "solutions" available to the health care sector, appear to be crucial, since it is supposed to *integrate* all the clinical information across the hospital. A CIS has been defined as the health care information system designed to manage the clinical information pertinent to the delivery of patient care, including elements such as order entry, results reporting, care planning and clinical documentation (Department of Human Services of South Australia, 2001).

Despite the potential benefits of a CIS and the methodological care and/or high financial resources invested in its development, the use of CIS is still scarce (Ash et al., 2004; Poon et al., 2004). In addition, stories about the failure of the implementation of such projects are very common (e.g., Friedman and Goes, 2001; Waring and Wainwright, 2002). The present paper draws on a larger investigation through which we take on an in-depth examination of the processes of organizational change associated with the introduction of a new CIS in two Canadian university and multi-hospital health centres. Operating in the same city, MHOSP1 and MHOSP2 have decided to jointly undertake a process of selection and implementation of a new CIS that is intended to be interfaced with each hospital's feeder system – pharmacy, laboratory, radiology, etc. – and also to collect clinical information and clinical researchers' input.

CIS projects are often described according to technical (e.g., Agarwal and Prasad, 1997) and contextual dimensions (e.g., Miller and Sim, 2004; Sobol et al., 1999; Southon et al., 2004). Although both dimensions are important, they are very often kept separated from mainstream research on the implementation of configurable IT. In this investigation, we consider that *technical* and *social* aspects of the implementation of a CIS cannot be separated, but are *mutually constituted* (Berg, 1999). This assumption underpins our investigation, which is conceived as an

in-depth qualitative longitudinal case study framed in a critical interpretive tradition. More particularly, our intent in this paper is to examine how decisions and actions of CIS project managers contribute to the structuring of the new technological solution within two complex organizations in two periods: CIS selection and pre-implementation.

The remainder of the paper is structured as follows. After a brief literature review on CIS implementation processes, we present our theoretical frame for the study of the CIS project implementation, in which we combine structuration theory and critical discourse analysis. Then we explain our methodological choices. This section is followed by a short historical narrative of the CIS project, helping situate it within its broader context, as well as to identify the main actors in this period: the CIS top managers. Then our interpretations and explanations are presented. In the next section, we offer our reflections on the results of these initial phases of the CIS project, and the possible repercussions for future phases of the project. Our concluding remarks include a discussion of the implications of this paper and its results for theory and practice.

REVIEWING CIS IMPLEMENTATIONS

For decades, in order to meet their needs in terms of information systems, organizations have developed *in-house* applications, i.e., customized solutions tailored to their specific requirements. Current trends, however, rely on *configurable* technologies (McLoughlin et al., 2000). Configurable refers to technologies that are highly parameterizable: they are built up from a range of components to meet the very specific requirements of a particular organization (Fleck, 1993). By and large, the greater the configurable nature of the technology – i.e., the more it is composed of selections of components or parameters to meet local requirements – the more complex and risky its implementation and use are likely to be (Orlikowski, 2000). In order to produce a thoughtful application, organizations need to develop their ability to shape the technology as well as their ability to rethink local contingencies (Pozzebon and Pinsonneault, 2005). Configurable applications thus require that both sides – technological features and organizational requirements – fit each other. This necessary "fit" is not easy to achieve.

In this sense, the complex organizational features that characterize health care settings make this "fit" particularly difficult to attain. "Misfits" between technological features and health care contexts are in fact extremely frequent (Lehoux et al., 1999; Southon et al., 2004). Health care organizations have traditionally been social spaces strongly characterized by power/knowledge dependencies and the protection of actors' own interests. In this type of setting, power games among organizational actors are always behind the success or failure of any process of change. Hence, if the most powerful actors of health care delivery, namely, the physicians, perceive the CIS as ill-adapted to their requirements and needs, they do not easily conform to its use, even if managers try to make the adoption of the new technology mandatory. Most CIS implementations fail because, despite the high investment in terms of both time and financial resources, physicians simply do not use them (Anderson, 1997; Poon et al., 2004). Also, as Klein and Sorra (1996) outline, in order to be beneficial for the organization, an innovation like a CIS needs to be used by *all organizational end-users*, not just by a few (e.g., clinician researchers). Perhaps because of all these difficult contingencies, the proportion of hospitals that have computerized all areas is still low (Weiner et al., 2004). Furthermore, most of the time hospital information systems have supported administrative purposes, not clinical ones (Anderson, 1997).

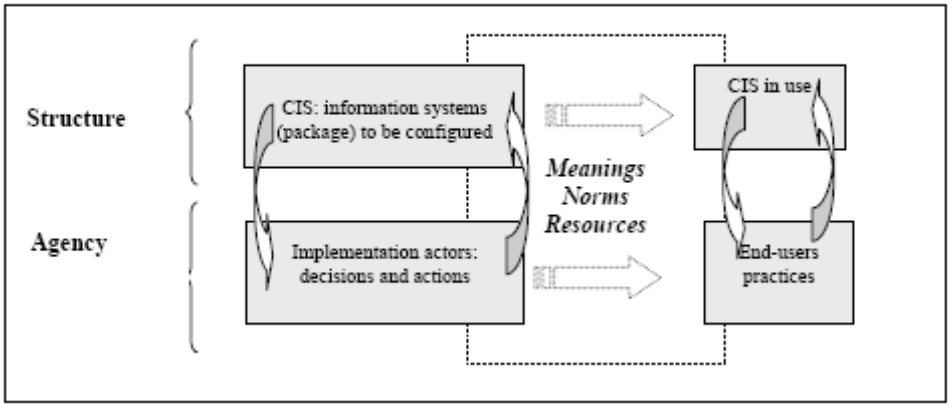
We therefore see a CIS implementation as a paradoxical and complex phenomenon to investigate. On one hand, according to prior experiences, a serious threat of failure overshadows the decision to undertake such a costly, time-consuming and risky process. On the other hand, the possible benefits seduce decision makers to embark on such projects: the improvement of reporting, organizing and locating clinical information; the improvement of physicians' decisions by providing protocols, reminders and alerts (i.e., the enhancement of "best practices"); the more effective coordination and collaborative management of patient care; and the enhancement of clinical and population health research.

COMBINING STRUCTURATION THEORY WITH CRITICAL DISCOURSE ANALYSIS

At the time of its formulation, structuration theory (Giddens, 1984) provided an account of the constitution of social life that challenged established theoretical positions and traditions (Cohen, 1989). Departing from the conceptualization of *structure* as some given or visible form, Giddens argued that although structure is what gives form and shape to social life, it is not that form and shape itself: structure only exists in and through human activities. While structural properties of societies and social systems are real, they have no necessary existence. Actually, they depend upon the regularities of social reproduction. Giddens also departed from the idea of agency as something "contained" within the individual or referring to people's intentions in doing things. He sees agency more as the flow of people's actions (Giddens, 1984; Giddens and Pierson, 1998). With Giddens, the basic domain of study of the social sciences becomes social practices ordered across space and time. The same can be argued regarding the study of technological artifacts: technology does nothing except when involved in human action.

Each decision regarding the CIS configuration is not merely technical, but a political choice that will affect end-users' practices, especially those of the physicians. People working on CIS implementation should be conscious of the consequences their "technical" choices will have on organizational practices. Furthermore, people that will be affected by such decisions should be listened to and truly involved in the entire process. The literature suggests that, in the case of CIS implementations, involving physicians and nurses in the project is an organizational challenge that needs to be managed *from the very beginning of the project*. A structurationist framework can help to understand and intervene in such contexts because it takes into account all these concerns (see Figure 1). Actors produce, reproduce and transform social structures through their daily decisions and actions. In the course of their daily lives, they mobilize rules (norms), resources and interpretations (meanings). Similarly, during the process of configuration of a new CIS, actors will set up a collection of interdependent decisions and actions regarding its future operation that will be perceived as enabling or constraining by the actors involved. Each decision regarding the configuration may either empower individuals and collectivities or impose barriers and limits on them.

Figure 1 – A structurationist framework in CIS implementation evaluations



In addition to our structurationist theoretical lens, we have also decided to adopt a discourse analysis view. Discourse analysis is a theoretical perspective, according to which social reality is constructed through the interconnection of various types of texts and their situated contexts (Phillips and Hardy, 2002). It is also a methodology because it involves a set of assumptions concerning the constructive effects of language (Wood and Kroger, 2000). Furthermore, discourse analysis also refers to a variety of very sophisticated methods for analyzing texts (Titscher et al., 2002). The use of a discursive view is particularly appropriate to our study because organizational discourse "is a useful way both to understand the conceptual world of organizations and to influence this world in the context of organizational change programs" (Heracleous, 2002, p. 254). The combination of structuration theory with critical discourse analysis has been recently proposed for the study of the implementation of configurable technologies (Pozzebon and Pinsonneault, 2005), and seems to be a valuable approach for understanding IT-based organizational projects.

METHODOLOGICAL APPROACH

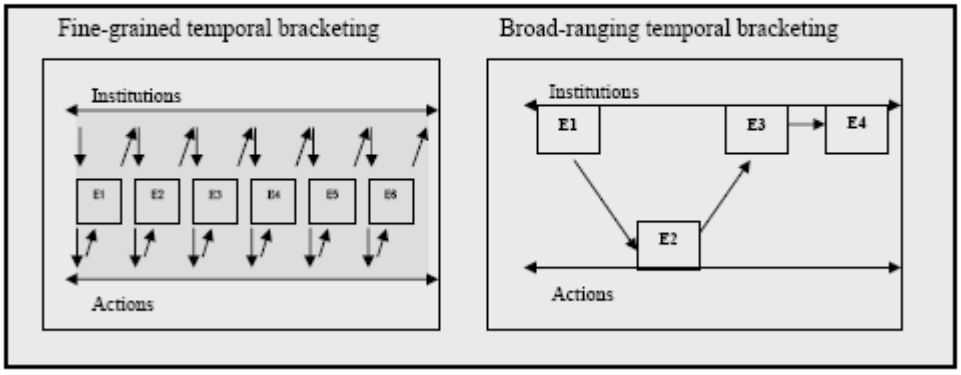
We have adopted a case-based inquiry as our research strategy. We particularly refer to the qualitative case study research strategy developed by Stake (2000), which is framed in a social constructivist tradition (Easterby-Smith et al., 2002). Using Stake's typology, this is a collective case study, each multi-hospital system being a case. Yet considering that longitudinal research appears to be crucial for attaining a rich understanding of organizational change (Pettigrew, 1990), this inquiry is better labelled a *longitudinal collective case study*.

For the project phases under examination in this particular paper – i.e., selection and pre-implementation – the empirical material is basically comprised of the minutes of 41 meetings that took place in the hospitals from the beginning of the CIS project in October 2001 to the end of the pre-implementation phase in June 2004 – 27 meetings of the CIS committee at the MHOSP1, and 14 meetings of the CIS committee at the MHOSP2. Other organizational texts distributed before, during and after these meetings (e.g., CIS project management plan, CIS schemes of governance structure, a number of working papers, vendor's milestones), as well as diary notes from our on-site participant observation in such committees, complete the archive of texts.

Consistent with the theoretical frame adopted, two strategies have been used for analyzing textual data: Fairclough's "three-dimensional" method and temporal bracketing strategy (Pozzebon and Pinsonneault, 2005). According to Fairclough's framework, each discursive event is simultaneously text, discursive practice and social practice (Fairclough, 1997). More precisely, Fairclough considers particular texts drawn from wider social discourses through discursive practices. Following this approach, we first selected and described local pieces of texts and then we interpreted them according to discursive "types" (i.e., themes) specific to the fields of IT and/or health services and policy – for instance, "end-users' involvement," or "CIS budgetary constraints." We had to restrict the examination of discursive practices to discursive types due to the particular genre of the text that constitutes the bulk of our archive, i.e., minutes of the CIS top managers' meetings. Then, also drawing on other complementary texts from the context (e.g., governmental documents, newspapers) and our previous knowledge of the institutional context within which these multi-hospitals evolve, we provided a plausible explanation, trying to unveil the power relations that underlie the production of those particular texts within their specific organizational and institutional contexts. Such systematic analyses across the corpus of texts allowed us to identify the *decisions* and *actions* that, over the period examined, contributed to shaping the CIS to be implemented.

The second methodological strategy is *temporal bracketing strategy*, which is considered a direct reference to Giddens' structuration theory (Langley, 1999). As noted by Pozzebon and Pinsonneault (2005), by bracketing discursive events over time, the analyst is able to examine how discourses cumulatively contribute to the structuring of a new technological solution within an organization, i.e., how discourses in one period help to make sense of reality and lead to legitimated decisions and actions that influence the configuration being developed. Furthermore, these authors propose two nuanced versions of temporal-bracketing, namely *fine-grained bracketing* and *broad-ranging bracketing* strategies (see Figure 2).

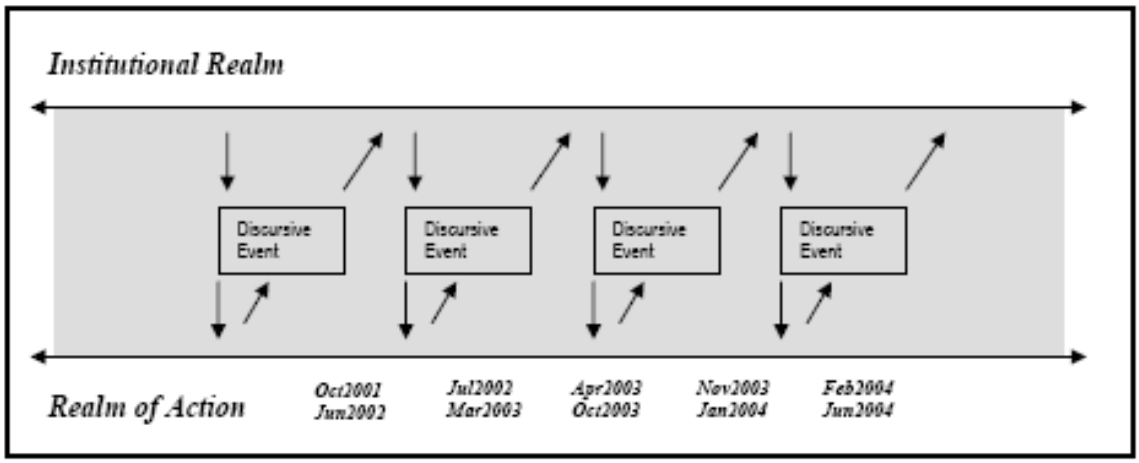
Figure 2 – Temporal bracketing strategies



Fine-grained bracketing purposively breaks down events into the effects of action on structures on one hand, and the effects of institutional constraints on action on the other, *over a brief continuum of time*. The second type, broad-range bracketing, is based on the analysis of sequences of events over time without breaking down each event in the same degree of detail as in the scheme previously described. Because we were able to achieve a certain degree of density

in the data (we are close to the empirical data and generate it intensively over time) we have applied here fine-grained modality (see also Figure 3)

Figure 3 – Temporal bracketing discursive events



For the sake of clarity, and before presenting our critical interpretations, we provide in the next section a brief narrative of the close context surrounding the CIS project. Also, we describe the main CIS stakeholders involved in the period under examination.

THE CIS PROJECT – DESCRIBING ITS CONTEXTUAL FRAME AND CIS STAKEHOLDERS

The decision to adopt and implement a new CIS in MHOSP1 and MHOSP2 was formally made in fall 2001. From the beginning, the CIS project has been intimately intertwined with a strategic research program – which we fictitiously call the "Rainbow Program" – triggered in July 2000 by the Canadian Foundation for Innovation (a federal research funding agency). Created over a period of 7 years, the Rainbow Program joins the efforts of research, clinical care and information services communities of several university hospitals in Quebec, in collaboration with various government agencies and private organizations. Its main goal is to create a clinical repository, a research data warehouse, and several research integration tools at the provincial level. The Rainbow Program – a powerful research program in terms of *material resources* (a CDN $28 million program) and *legitimacy* within the provincial clinical and research community (it involves 15 clinical research groups and about 50 researchers) – requires the development of an integrated information system covering the entire health care network in order to attain its main objective of developing a provincial data warehouse for clinical and health population research.

The emergence of the CIS project, and the decision made by MHOSP1 and MHOSP2 top directors to adopt the same CIS, should therefore be understood within this broad research context. Indeed, the CIS project can somehow be seen as part of the Rainbow Program. Nevertheless, due to the fact that the CIS is managed by MHOSP1 and MHOSP2 actors, the project has always been presented by CIS top management as *their initiative,* whose main objective is the clinical management of patient data at an individual level, i.e., the adoption of an

electronic medical record. In other words, the bargaining position of the CIS top management vis-à-vis the Rainbow Program is one of *complementary partnership* (i.e., interdependency), both initiatives being intertwined and needing each other in order to attain their respective goals: the former provides the *data* that the Rainbow Program needs for its provincial warehouse, and the later brings some *material resources* ($5 million per hospital) and increases the *legitimacy* of the CIS project.

Table I – Introducing CIS top managers

Groups	Description	How they are referred in the text
First group: *CIS Project Top Managers*	1. CIS Project Director	CIS Director
	2. CIS Project Managers (one from MHOSP1 and one from MHOSP2). They have the technical knowledge on the management of information systems projects	CIS Project Managers
	3. CIS Project Committees' Chairs in each MHOSP They have the organizational knowledge and legitimacy for coordinating the CIS project	CIS Committee Chairs
Second group: *CIS Project Committee Members*	4. Clinical representatives (e.g. physicians and nurses), departmental managers from the different sites of each multi-hospital system, and managers from ancillary services (e.g. archives)	CIS members
Third group: *External Actors*	5. Representatives of the Rainbow Program (only participating in MHOSP1 CIS Committee meetings)	Rainbow Program representatives

Our involvement in the field for 33 months enabled us to identify three groups of CIS stakeholders (see Table I). The first group is made up of the CIS top managers in each hospital, that is, the Director of the CIS project, who holds an "umbrella" position over both multi-hospitals; CIS project managers from MHOSP1 and MHOSP2; and the chairs of the CIS committees that both institutions have created: that of MHOSP1, which has been running since October 2001, and the CIS committee in MHOSP2 that was put in place later, in January 2003. The second group is composed of the rest of the members of the respective CIS committees; these are departmental managers from the different sites of each multi-hospital system, as well as clinical representatives (physicians and nurses) and managers from ancillary services, such as archives. Finally, the third group consists of the representatives of the Rainbow Program, who participate only in CIS committee meetings at MHOSP1.

In the next sections, we present our analysis of how CIS managers, through their interactions and decisions, discursively make sense of and shape reality. We also outline how initial and ongoing decisions and actions influence the configuration being developed (see Table II for a summary of data generation and analysis).

Table II – Summary of data generation and analysis

Phase	Period	MHOSP1	MHOSP2
Selection	October 2001 to June 2002	Defining local requirements and working on interfacing with other existing information systems *Meeting #1 to Meeting #5*	
	July 2002 to March 2003	Selecting the vendor and worrying for funds *Meeting #6 to Meeting #11*	Informing on the CIS selection process *Meeting #1a to Meeting #6a*
Pre-implementation	April 2003 to October 2003	Striving for funds and working on CIS project plan *Meeting #16 to Meeting #21*	Negotiating with the vendor and analyzing work practices *Meeting #7a to Meeting #12a*
	November 2003 to January 2004	Negotiating the contract with the vendor *Meeting #22 to Meeting #23*	
	February 2004 to June 2004	Critical power struggle between external and internal CIS high stakeholders *Meeting #23 to Meeting #27*	The battle for funds and the search for physicians' involvement *Meeting #12a to Meeting #14a*

MHOSP1 – THE STRUGGLE BETWEEN EXTERNAL PRESSURES AND ORGANIZATIONAL ISSUES

The CIS project in MHOSP1 has displayed a great complexity since the very beginning of its existence. In this hospital, CIS top managers' discursive practices, decisions and actions undertaken during the period prior to the CIS implementation suggest that, although aware of the impact and risks of the adoption of a new CIS on their organization, which will change flows of information and work practices, they neglected important organizational issues being raised by other CIS committee members, their decisions having been driven more by financial constraints and external interests.

Further, when critically analyzing the different voices participating in MHOSP1 CIS committee meetings, we identified two layers of power struggles, which sometimes were interrelated and sometimes followed their own path. The first reproduced a well-known battle in the field of health care: physicians versus nurses. We could perceive that the "weaker" voices were those more concerned with user involvement, training and resource distribution (the nurses'

representatives), whereas the "stronger" voices seemed to be more concerned with financial issues and external legitimacy (the physicians' representatives). Several important decisions made during these selection and pre-implementation phases reveal that the latter voices were the ones that prevailed. A second struggle was established between external and internal CIS stakeholders in the defence of their particular interests. For a detailed depiction of these processes, we have broken down the first 33 months of the CIS journey in MHOSP1 into five bracketed phases (see also Table III).

October 2001-June 2002: Defining Local Requirements and Working on Interfacing with Other Hospital IS

The selection phase of the CIS, for historical reasons led by CIS top managers from MHOSP1, began in October 2001. Two different methods were applied in order to favour a bottom-up process of identification of CIS requirements, and to facilitate the elaboration of a request for proposals according to clinical practices in use. First, an on-line 500-item questionnaire was mailed through their intranet to the more than 2,000 clinicians working in MHOSP1. The specific objectives of the survey were "to reach as many people as we could, get their feedback on some important points, have a better understanding of our audience, recruit for focus groups, and measure attitudes versus Physician Order Entry (POE)" (Meeting #2: December 4, 2001). The response rate was only 12%, with 93% of those reporting a positive attitude towards POE, and 76 clinicians volunteering to participate in focus groups (Meeting #3: January 18, 2002). In February 2002, 11 focus groups for detailing requirements were carried out. The low rate of response to the questionnaire and the difficulties encountered in staffing focus groups reveal the difficulty of getting end-users involved in the CIS project from the beginning. In any case, feedback from the focus groups was compiled and organized in order to be included in the functional requirements document.

The complexity of interfacing the new CIS with existing information systems and the more than 300 databases existing in MHOSP1 required the constitution of an 'interfacing and transition team', which produced a document "that details the CIS interfacing requirements. This document gives a high level view of interfaces required prior, during and after various phases of the CIS" (Meeting #4: March 15, 2002). A *technical focus* emphasis of interfacing was considered sufficient at this particular moment of the CIS adoption by CIS top managers. When other members of the CIS committee highlighted specific potential problems with, for instance, the emergency department, or alleged *organizational implications* of interfacing, as "sites work differently sometimes," the answer from CIS top management was that "this was more an implementation issue that than a request for proposals issue" (Meeting #5: April 19, 2002).

Another important issue discussed during the first sub-period of the CIS adoption concerned the need for MHOSP1 to structure a permanent clinical information department, with the aim of giving *meaningful clinical content* to the CIS configuration. As the following excerpts note, this point was repeatedly raised by a physician, working in the hospital but attending CIS committee meetings as a researcher representative of the Rainbow Program:

> "[Dr. H] shared his concern that at the MHOSP1 there is no Clinical Informatics group. He feels that this group should be a department (something that is permanent) not a committee. This group should be composed of multidisciplinary and multi-professional

> users. This type of department would be required before we go live with a CIS. Many participants in the group were in agreement." (Meeting #3: January 18, 2002)
>
> "[Dr. H] indicated that the role of the Clinical Informatics group should be to maintain the content of the CIS. This is the group that will establish the set of rules for the CIS. The CIS is only the tool. This should be a group with dedicated funds and time to maintain the clinical content of the CIS." (Meeting #4: March 15, 2002)

We consider that this issue is crucial in order to define the *norms* that will regulate the *meaningful use* of the CIS, and also to reinforce the *local knowledge* of the CIS future end-users vis-à-vis the *global knowledge* usually imposed by CIS vendors and external consultants. However, and despite the fact that this proposition was agreed upon by most of the CIS committee members, CIS top managers claimed that there were funding constraints and postponed the issue to the implementation phase.

July 2002-March 2003: Selecting the Vendor and Worrying about Funds

A Selection Task Force composed of 10 clinicians (physicians, nurses and allied health professionals) was created with the mandate of evaluating the demonstrations by vendors that responded to the request for proposals. Thirty-two (32) vendors initially applied. In order to deeply examine applications, four sub-committees in the Selection Task Force were created: technical infrastructure and interfaces, security, reports, and business proposal. Three of 32 met the minimum requirements and maximum cost allowance. Formal demos took place in January 2003. The CIS vendor was finally selected in March 2003.

Although the dominant issue during this sub-period was the selection of the CIS vendor, many concerns about the financing of the CIS, in terms of both the purchase of the system and the costs of its implementation, became the more and more explicit, raised in particular by nursing staff around the table:

> "Many users have great concerns about the financing of the CIS. For the proper integration and implementation of a CIS, funds must be made readily available not only to purchase CIS software but also for process re-engineering, training, equipment (PCs, printers, etc.), extra resources, etc. The user community has yet to see a firm commitment from upper management of MHOSP1 indicating that funds will be made available for the proper implementation of the CIS." (Meeting #9: August 16, 2002)
>
> "[LP] raised the issue about the cost of implementing the CIS. Internal costs such as training, additional resources, user time that will be necessary to properly set up are still a concern." (Meeting #11: October 25, 2002)

April-October 2003: Striving for Funds and Working on the CIS Project Plan

Once the selection phase was finished, an unexpectedly long pre-implementation stage began. Contract negotiations started then, and the definition of the project scope was undertaken at each MHOSP. Such processes were heavily tinged by the struggle to obtain a clear budgetary compromise from hospital upper management for the CIS, once it was already selected.

The battle for financial *resources* for the CIS led to the elaboration of three different budgetary scenarios: plan A, advance funding from the budget for a new MHOSP1 site; plan B, a 10-year loan authorization; and plan C, funds from the hospital foundation (Meeting #20: September 2003). At the same time, a global budget increase from CDN $15 M to $17 M per site was accepted by hospital upper management, funding from the Rainbow Program of $3.4 M in the first year of implementation remained secured (Meeting # 21: October 10, 2003). No clear decision regarding the source of the bulk of the CIS budget was then made. These were the circumstances that progressively placed the CIS stakeholders in a very difficult position regarding the *resources* needed for successful CIS adoption.

Concerning the scope of the CIS implementation project, three major phases were defined at the beginning: Phase 1 included 'results reporting' and 'data warehouse'; Phase 2 consisted of piloting the project in 1 or 2 clinical programs for 'order entry' and 'clinical notes'; finally, Phase 3 concerned rapid 'order entry deployment' and a more gradual 'clinical notes deployment' (Meeting #17: May 16, 2003). A few weeks later, a clear 4-phase implementation project was established, with Phase 3 for the large deployment of the order entry component, and Phase 4 for the clinical documentation deployment (Meeting #18: June 6, 2003).

Our first comprehension of this process suggests that CIS managers did not connect the two phases of selection and pre-implementation adequately, i.e., we did not perceive that the information gathered from the users to legitimate the selection was planned to foster the fit with the system's functionalities. The strong resistance that clinicians exhibit to the introduction of a new CIS is well documented in the literature and is cited as one of the strongest contributing forces in CIS failures. In order to deal with it, strategies for *end-users' involvement* are largely advocated. In MHOSP1, this issue is often mentioned by some members of the CIS committee, who repeatedly seek economic incentives to support physicians' involvement in the project, and ask for careful analysis and discussion of the changes that will impact physicians' and nurses' practices over the different phases of the CIS implementation. However, always alleging budgetary constraints, CIS top managers put off this discussion till the implementation phase.

Indeed, the analysis of CIS top managers' discursive practices suggests they are much more concerned with the expected outcomes than with the process. Further, they seem to lead the issue of *end-users' involvement* in a purely instrumental way: focusing on user involvement became important in order to increase the chances of project success, and then to satisfy the needs of a selected group of stakeholders (i.e., Rainbow Program members), as is nicely illustrated by the following excerpt:

> "The Canadian Foundation for Innovation (CFI), through [the Rainbow Program] is providing funding for the CIS project. However, since the CFI views [the Rainbow Program] as a high-risk project, it will benchmark the evolution of the CIS implementation and expansion of research capacity. The [Rainbow Program] is closely linked to the CIS implementation since it will use the CIS for both clinical care and research data entry at the point of care. The [Rainbow Program] must be included in the Phase 1 rollout of CIS to meet CFI benchmarks and avoid the possible loss of funding." [Meeting #17: May 16, 2003]

<u>November 2003-January 2004:</u> Negotiating the Contract with the Vendor

Contractual agreements with the vendor were established under the pressure of budgetary constraints. In this context, questions relative to timeline and the scope of services to be provided by the vendor were discussed. The issue of the intellectual property of the system also attracted great attention:

> "[CIS project manager] indicated that for the changes related to research, the idea would belong to the researcher but the incarnation of these ideas into the [CIS] product would then belong to [the vendor]. [CIS project director] indicated that lawyers had looked into this issue and that for [the vendor] this is a non-negotiable. They would not sign a contract that gave MHOSP1 and MHOSP2 royalties from the sale of their [CIS] product to other customers." [Meeting #22; November 14, 2003])

In addition, the vendor privileged a "vanilla" CIS implementation mode, which means that the software is taken *as is*, and a maximum of 30% customization will be tolerated. In this situation, the fit with the software will be achieved *by changing users' practices.* Making such changes is always risky and complex, particularly when it involves *harmonizing* local practices with those of a very different culture – MHOSP1 and MHOSP2 are indeed quite different and had been competing sites in the past. These initial management decisions draw a scenario in which careful rethinking of business practices and change management will be necessary in order to achieve standardization, not only internally, but also across different hospital sites and institutions. Our observations also suggest that, although CIS committee members have repeatedly raised the need to compile a list of business processes to be "reengineered" from the early moments of the selection phase, a careful discussion of how and when this will occur has always been postponed by CIS top management.

<u>February-June 2004:</u> Critical Power Struggle between External and Internal CIS Stakeholders

What significantly increases the high complexity of the CIS project in the MHOSP1 setting is the presence of an explicit "battle" between internal and external actors; that is between CIS managers and Rainbow Program representatives. The former look for *autonomy* vis-à-vis the latter, emphasizing the *meaning* of the CIS for the hospital at the individual clinical level (i.e., electronic medical record). For the latter, the CIS *has no individual meaning*, but just meaning as a tool for *aggregating data at clinical and population levels* (i.e., as data repository). The battle in the pursuit of respective interests, present from the beginning of the CIS project, was intensified during the sub-period prior to the signature with the vendor, early in July 2004.

In this sense, and due to the lack of budget for the whole CIS project implementation, a 'reduced scope of CIS project' was envisaged, favoured mainly by external CIS stakeholders:

> "The funding of [the Rainbow Program] ends in March 2006 and the [Rainbow Program] must have something to show such as data flow, research data study, etc. With this in mind, we could sign a reduced scope contract with [the vendor] so that we could get an early start. The reduced scope would be a scaling down of the project for research only. This scaled down scope still needs to be worked out so as to clearly identify how we would proceed with the deployment to the wards and the clinics for the [Rainbow Program] only." (Meeting # 23: February 23, 2004)

A new phase, called Phase 1A, was then established, and added to the contract to be signed with the vendor. However:

> "It is indicated that the lengthy negotiations between [the Rainbow Program] and MHOSP1/MHOSP2 were becoming a problem for [the vendor]. […] There is more and more pressure to sign a reduced scope contract between [the vendor] and the 2 MHOSPs whether the [Rainbow Program] contract is signed or not. […] [The Rainbow Program's representative] indicated that [the Rainbow Program] wanted to participate directly in all discussions between [the vendor] and the 2 MHOSPs so that things could move forward faster." (Meeting #26: May 14, 2004)

As a result, MHOSP1 was placed in a clear *dependent power position* vis-à-vis the Rainbow Program (i.e., external CIS stakeholders) during the weeks before the signing of the contract with the vendor. On one hand, MHOSP1 depended on the Rainbow Program for funds and, on the other hand, on the CIS vendor for its *global* CIS *knowledge*. Furthermore, this dependency on external CIS stakeholders had to be added to the lack of internal mobilization of CIS end-users. Indeed, the signing of the contract between both MHOSPs and the CIS vendor took place *before* the signing of the contract with the Rainbow Program in July 2004, thanks to a bank loan that allowed CIS hospital top managers to undertake the implementation of Phase 1A while waiting for funds for the whole CIS project implementation before December 31, 2004.

MHOSP2 – THE "EASY-GOING" BATTLE BETWEEN IT ANALYSTS AND BUSINESS MANAGERS

Compared with the power struggles recognized in MHOSP1, a quite different scenario can be found in MHOSP2 meetings. First, the CIS committee in this hospital was constituted just a few weeks before the CIS selection. Second, the absence of external actors – the Rainbow Program representatives participate only in MHOSP1 meetings – attenuated the power struggles, because here there were fewer conflicting interests. Further, now no major conflicting points of view between nurses and physicians emerged. Everybody seemed very concerned with *user involvement*, with the impact of the new system on physicians' and nurses' work practices, and with the importance of communication plans during the whole project.

The sole exception was the CIS project manager, an IT specialist. The battle in this arena was a well-known struggle in the field of information systems: that of IT analysts versus business managers. Such a conflict reflects the typical separation between technical and social aspects of IS implementation: people with a technical point of view sometimes neglect the social content of technical choices, and people with a business point of view sometimes neglect the technical complexity of costs of their managerial requirements. Indeed, a high degree of consensus was attained around the table. Nevertheless, the translation of MHOSP2 CIS top managers' discursive practices into decisions and actions that support their CIS implementation remained unclear over the period examined. In MHOSP2, we have broken down the period examined into three bracketed phases (see also Table III).

Table III - Illustration of temporal bracketing combined to critical discourse analytical techniques

MHOSP1	OCTOBER 2001 – JUNE 2002	JULY 2002 – MARCH 2003	APRIL – OCTOBER 2003	NOVEMBER 2003 – JANUARY 2004	FEBRUARY – JUNE 2004
Sub-period	*Defining Local Requirements and Working on Interfacing*	*Selecting the Vendor and Worrying about Funds*	*Start of pre-implementation: Striving for Funds and Working on CIS Project Plan*	*Negotiating the Contract with the Vendor*	*Critical Power Struggle between External and Internal CIS Stakeholders*
Texts	"[Dr. H] reiterated the need to have a Clinical Informatics group for the CIS, otherwise he feels that over time the CIS will lack in content if there is no continued input from clinicians."	"[LS] asked that it be mentioned in these minutes that there is a concern about having enough resources, time and budget for the implementation of such a project."	"All participants in the [committee] indicated that all care order must be part of Phase 2. This is not negotiable. [Dr. E] indicated that doing otherwise would create a huge potential for mistakes to happen, which is the opposite of what we are trying to achieve with the CIS."	"[Mr. H] indicated that lawyers have looked into this issue (the changes for research: the idea will belong to research but the incarnation of these ideas into Oacis product will then belong to [the vendor]) and that for [the vendor] this is a showstopper."	"It was indicated that the lengthy negotiations between [the Rainbow Program] and MHOSP1/MHOSP2 was becoming a problem for [the vendor]."
Discursive Practices (*agency*)	Advocating for the strengthness and legitimacy of local knowledge; technical focus in interfacing matters	CIS budget and budgetary constraints are emerging as the most crucial issues of the CIS project!	Advocating for the preservation of the "clinical" success of the CIS project	Signing the contract with the vendor; harmonization appearing feasible and able to bring benefits	Negotiating with Rainbow program representatives and assessing the consequences of such negotiation on hospitals relationship with vendor
SHAPING THE CIS IN USE (*structure*)	The initial meaning attached to the CIS is marked by a "technical" view but also by an awareness regarding the importance of local knowledge	The CIS selection and initial planning is being shaped by budgetary constraints, which overshadow the fear regarding the CIS risks and impact on clinical processes	Although CIS implementation planning keeps being conditioned by financial and external political issues, there is a deep concern regarding the clinical success of the CIS project	The CIS implementation planning is shaped by an emergent inter-organizational collaboration that becomes a contractual imperative – i.e. configuring the CIS with 70% standardization	The meaning of CIS – a tool for aggregating data at clinical and population levels or a tool for improving medical practices – is defined in a context of both willingness and highly uncertainty
Discursive Practices (*agency*)		CIS adoption might impact clinical processes.	Signing the contract with the vendor; harmonization appearing feasible and able to bring benefits; internal issues should have to attract much attention		Effective clinical end-users involvement is being very important for the success of the CIS project
Texts		"There are worries regarding the CIS adoption and the current management practices of access, the single sign-on, etc."	"The second version of the contract is received (delay of 3 weeks). The negotiation is going on. The Committee will be asked to ratify the section relative to the implementation scenario. The target date for the signature of the contract is still at the end of May."		"In response to the letter addressed to all physicians in which it was asked volunteers for participating in the CIS Project, 12 physicians expressed their interest."
Sub-period		*Informing on CIS Selection*	*Negotiating with the Vendor and Analyzing Work Practices*		*The Battle for Funds and the Search for Physicians' Involvement*
MHOSP2		JANUARY – MARCH 2003	APRIL 2003 – JANUARY 2004		FEBRUARY – JUNE 2004

January-March 2003: The CIS Selection Process

The discussions held during the first meetings of the CIS committee in MHOSP2 mainly involved monitoring the CIS selection ("The process of CIS selection is still going on, so the final decision is not made yet." [Meeting #2a: February 26, 2003]). Along with this, members of this committee appeared from the beginning to be very concerned about the impact of the CIS adoption on their business processes, as illustrated in the following excerpt:

> "There are worries regarding the CIS adoption and the current management practices of access, the single sign-on, etc. A discussion is held around current work on a number of applications. The preferred strategy is the following: the CIS utilization to integrate clinical information rather the implementation of a single sign-on technology for a set of applications." (Meeting #2a: February 26, 2003)

April 2003-January 2004: Negotiating with the Vendor and Analyzing Work Practices

Once the CIS was selected, MHOSP2 participated actively in the process of negotiation with the vendor. In this sense, CIS budgetary uncertainty and delays due to changes at the political government level were highlighted as puzzling:

> "Negotiations advance slowly. Certain crucial points remain unclear, in particular the date when the French version of the system will be available. In addition, the members of the committee are worried regarding funds. This appears very problematic, particularly within the context of the current budgetary exercise at MHOSP2 and the political context tied to the change in provincial government." (Meeting #7a: May 28, 2003)

During the CIS committee meetings in this hospital, it appeared clear that, although external legitimacy and image were important aspects of the CIS project, the MHOSP2 CIS top managers were much more concerned with their internal needs. Their stated purpose was to implement a CIS that would indeed provide accurate clinical information and that would help improve their clinical activities. Despite such concerns, a critical element emerging from our study is the need to harmonize the CIS package to at least 70% among all the other sites. The impact of such *harmonization* did not seem to have been really evaluated. What kind of impact will it represent on users' practices and day-to-day life in the different hospitals? How will users react to these changes? What kind of procedure will be put in place to align the existing functionalities of the solution that was purchased and the required changes in terms of user practices? Although the concern with user involvement and user practices seemed very high, the plan for how to deal with these concerns at a more operational level was not clearly discussed and formulated. Yet such concerns sometimes appeared to be trivialized, as is illustrated by the following excerpt:

> "[The vendor] agrees to an important reduction, which brings them to the same monetary level as their initial offer, although the scope of the project is now much more important than that included in the proposition. One of the conditions of this reduction is that 70% of the system must be identical for MHOSP2 and MHOSP1. [The CIS project director] indicates that the hospital CEO sees no problem with this constraint." (Meeting #9a: September 24, 2003).

February-June 2004: The Battle for Funds and the Search for Physician Involvement

As noted previously, the issue of end-users' involvement, particularly that of physicians, was constantly discussed in the MHOSP2 CIS committee meetings. This interest was increased once the decision to undertake Phase 1A was made. The committee decided to focus on physicians and other health professionals, members of the clinical unit pilots in the reduced-scope CIS implementation. Also along this line, CIS top managers were very concerned with strategies of *communication*. They clearly appeared to be aware that distorted messages could be very detrimental regarding the future acceptance of the CIS.

In addition, the battle for funds continued. Even if the Rainbow Program representatives never attended MHOSP2 CIS committee meetings, these negotiations had a great impact on the committee's discussions. Indeed, when support from the hospital's upper management was obtained for funds in Phase 1A – in other words, when they reached a greater bargaining power – it was for MHOSP2, the institution that first favoured signing the contract despite unresolved misunderstandings with the Rainbow Program:

> "MHOSP2 has already obtained the support from its Board of Governors in order to request the budget necessary for Phase 1A, and is seriously considering signing the contract with [the vendor] without waiting for the conclusions of the negotiations with [the Rainbow Program]. It is not clear at this moment if MHOSP1 will be able to do so. A last chance meeting will take place with [the Rainbow Program] on Friday, May 29." (Meeting #14a: May 26, 2004)

DISCUSSION – STRUCTURING A CLINICAL INFORMATION SYSTEM

Our purpose in this work has been to critically examine the process by which CIS project managers initiated the structuring of a new clinical information solution within two complex health care organizations. Over the almost three years considered, this process has been basically characterized by (a) financial uncertainty and restriction, (b) an emphasis on the technical elements of implementation, albeit with an awareness of the importance of organizational issues, and (c) the emergence of inter-organizational collaboration between former competitors. This conflictual arena stems from power dependencies emerging at different levels, such as between contextual political agents and CIS project managers, external and internal CIS stakeholders, and top managers and the other CIS project members.

The most pervasive issue during the CIS project phases examined refers to budgetary constraints. MHOSP1 and MHOSP2 make up part of a publicly funded health care system in which organizational budgets are allocated by the provincial health ministry through regional boards. Although recognizing the importance of the CIS project, approval for its purchase was not given during the period considered. This uncertainty tainted all the initial phases of CIS selection and pre-implementation, exposing CIS managers who are in a clearly dependent position vis-à-vis the political agents. A corollary of such external dependency was the pressure exerted by the CIS external group constituted of the Rainbow Program representatives, a program which contributes financially to the CIS project.

The influence of this financial uncertainty and restriction was present in the field from the very beginning. If we had analyzed the initial phases of the CIS project *a posteriori*, as is often the case in IT implementation evaluations, it would have probably been very difficult to comprehend

why CIS top managers made a number of decisions while avoiding others. However, because we followed the project in real time, the arena of external and internal power dependencies became progressively clear to us. This has helped us to identify and understand the "justifications," discursively built, behind organizational decisions and non-decisions. For example, CIS top managers acknowledge that end-user involvement, particularly physician involvement, is crucial for the success of any change in health care. Nevertheless, most of the strategies to get physicians involved in CIS implementations require a non-negligible financial envelope for, for instance, paying extra hours so that physicians can dedicate time to the project, or hiring new clinical staff with highly developed computerized skills. In current circumstances of financial restriction, CIS top managers have tried to convince themselves and the other participants that this issue may be addressed in further phases of the project. Yet the discursive activity they have displayed protects them from censure for their ongoing decisions, even if ultimately they are conscious of the negative potential consequences of some of them.

Related to this "big issue" of budgetary constraints and the dependency on external actors, CIS top managers' discursive practices, decisions and actions show a clear emphasis on technical aspects of the CIS implementation. As mentioned formerly, and according to the structurationist view that we adopt in this study, we believe that the consideration of technical issues related to a CIS implementation is not enough to favour its successful integration into the organization: social contextual processes at organizational and institutional levels must be taken into account. The use of information technologies is currently presented as an unavoidable trend for practicing effective medicine and efficiently organizing health care delivery (Shortliffe and Blois, 2001). In order for the fit among information technology, clinical practices and health care organizing to be successful, an appropriate "blend" between them has to take place. This implies a continuous process of mutual adjustment between technology and clinical practices in situated contexts.

These adjustments appear particularly difficult in the present case. On the one hand, the CIS top managers' powerful voices have prevailed over those of the rest of CIS participants, who also worry about financial resources, but appear to be more sensitive to the impact of the CIS on current hospital practices. Although this emphasis on technical issues is rather frequent in similar projects (e.g., Scott and Vessey, 2000), it is also common knowledge that CIS adoptions are likely to fail when they are seen as "purely technical implementations" instead of complex social implementations, and/or when organizational and political issues have been neglected – see for example Cooper and Lybrand (1994; quoted by Waring and Wainwright, 2000), who have reviewed unsuccessful experiences of information system integration in the British National Health Service. Moreover, this technical emphasis is being built around two ideas regarding the main goal of the CIS that, although not necessarily incommensurable, correspond to the interests of two different groups of CIS actors: a CIS as a means for aggregating data at clinical and population levels (the ultimate goal of the Rainbow Program), and a CIS as a tool for improving medical practices (the ultimate goal of MHOSP1 and MHOSP2). Due to the financial issues that have characterized this project so far, these "different" visions may generate difficulties in future phases of the CIS implementation.

On the other hand, and in order to minimize costs, 100% standardization is envisaged, at least 70% being mandatory according to the contract with the vendor. At first sight, the need of this degree of standardization appears quite risky, in terms of the creation of future end-user resistance to the new system. In addition, this contractual engagement situates both hospitals

(*local knowledge*) in a dependent position regarding the vendor (*global knowledge*). Propositions from certain CIS project members to create new formal structures within the hospital to work with the vendor in order to configure a CIS that is *meaningful at a clinical level* have been avoided by CIS top managers.

Despite all these issues, we have observed the emergence of new inter-organizational spaces within which clinicians and managers of both hospitals are dialoguing and working together. This issue of collaboration appears to be particularly significant due to the fact that these organizations are historically competitors in the local health care delivery system. And "competition" here extends beyond hospital walls, involving competing faculties and universities belonging to two culturally different communities. The ongoing construction of collaboration when the system functionalities meet the particular contingencies of *each hospital* remains, however, very challenging, particularly when taking into account the power dependency in monetary terms of the institutions vis-à-vis political decision makers and the Rainbow Program, the pressure from both founder and vendor for 100% standardization, and the lack of clinician involvement in the CIS project during the phases of CIS selection and pre-implementation.

In summary, the CIS selection and initial planning of its implementation have been shaped by budgetary constraints and dependency vis-à-vis external actors (i.e., the health ministry, the Rainbow Program, the CIS vendor). The importance given to financial issues has overshadowed other essential aspects of a CIS, such as the future impact of the new system on clinical practices. Thus, although CIS top managers are aware of the importance of considering organizational issues, as well as the potential negative effects when these issues are overlooked, from the onset the meaning attached to the CIS to be implemented was of a technical nature. From the over-emphasis of financial concerns follows the quick acceptance of at least 70% standardization, even if the "seven hospitals" involved in the project are quite diverse. At the same time, inter-organizational collaboration has become both a political (health ministry) and a contractual (vendor) imperative. This set of discursive and non-discursive actions establishes a very complex base from which future phases of the CIS project must emerge; this appears to be characterized by both willingness and a high level of uncertainty regarding the project's success.

IMPLICATIONS AND CONCLUDING REMARKS

> "What is done in organizations – for example, establishing rules – will always carry with it the possibility, and, in fact, near certainty, of having both intended and unintended consequences. This idea is a very powerful one. It suggests that whenever people act towards some purpose, the outcomes will be a mixture of what hoped for by the action and what was unforeseen and possibly undesired."
>
> (Grey, 2005, p. 29)

Being framed in a constructivist and critical tradition, we could not agree more with Grey's statement about intended and unintended consequences of decisions and actions in organizational day-to-day life. However, as Grey also recognizes, it appears that some unintended consequences "are more foreseeable than others" (Grey, 2005: 33). Recent research in the field of IT goes in the same direction: initial decisions in information systems projects serve to set up an arena with a number of characteristics that, although not immutable, help to shape certain consequences which are, at times, rather harmful for the organization (Pozzebon and Pinsonneault, 2005). In this project, (a) power dependencies vis-à-vis external CIS stakeholders, (b) focus on technical

issues, and (c) CIS top managers' neglect (despite awareness) of organizational issues have shaped the initial phases of the CIS implementation. In addition, they have set a frame within which future phases of the CIS implementation will most likely be puzzling.

The implications of this investigation are threefold. The first is *to put forward the crucial role played by top managers' initial decisions in the structuration of a CIS*. The lack of purposive strategies for involving physicians from the very beginning of the project, as well as the lack of purposive strategies for doing a preliminary diagnostic of existing clinical practices and the impact of the new system on these practices, can be understood as consequences of the path of dependency on external funding being built and accepted by all parts. If evidence about the critical factors for CIS project success exists, how do CIS top managers justify their disregard of these critical factors when making organizational decisions? The justifications, in our study, rely on "external" circumstances, i.e., beyond the CIS top managers' scope of responsibility. In such circumstances, top managers use a repertoire of discursive practices to convince themselves and others that they are doing the right thing with the resources they have. They are aware of some of the likely consequences of their initial decisions, and of the fact that they are setting up a path of dependency vis-à-vis external agents. Nonetheless, they put forward a discourse indicating that everything that is under their control is being well managed and that they are able to change or alleviate adverse consequences that may emerge.

Giddens' structuration theory emphasizes the knowledgeability of social agents. According to this premise, people are responsible for their choices, which, as noted before, have intended and unintended consequences. Politically speaking, the CIS top managers are playing their "expected" role: accepting the unavoidable trend of adopting information technologies for practicing effective medicine and organizing health care delivery efficiently – which is, indeed, a governmental premise. Socially speaking, the absence of the necessary conditions for increasing the chances of success in adopting a new technology could sustain the need for its temporary or permanent interruption (if already initiated).

We believe that the price of the CIS project failure would be rather high. In addition to the huge investments in terms of time and money that would have been wasted, such a failure could paralyze a hospital, or part of; it could cause serious harm to patients if wrong or no information is given at a given moment; it could produce innumerable problems for the clinical and administrative staff in their daily practices. The huge rate of failure, or partial failure, associated with IT projects worldwide suggests that a more prudent approach to IT investments would be beneficial for particular organizations, and also for society. In other words, it appears that managers should be strongly advised that, rather than insisting on the implementation of complex IT projects in the absence of "winning" conditions (e.g., financial and material resources, broad implication and motivation of concerned people, deep knowledge of work practices, and rigorous evaluation of the possible impacts of the introduction of the new technology), they should decide against adopting the new technology. This does not mean "doing nothing." Instead, it entails deciding with more caution! In such situations, managers should *first* focus on rethinking work practices and evaluating the possible impacts of the adoption of new IT, and then *condition* the beginning of any complex IT project to the *availability of the required resources*. Furthermore, the appearance of an unintended consequence of the CIS adoption makes the analysis of this project even more complex: the emergence of inter-organizational collaboration among historical

competitors, a dynamic that can generate important institutional changes in the regional and even in the provincial health care field.

A second implication of this paper concerns *theoretical and methodological issues*. As far as we know, the combination of structuration theory and critical discourse analysis, and then of temporal bracketing and critical discourse analytical techniques (Pozzebon and Pinsonnault, 2005), are approaches adopted neither in the implementation evaluation of clinical information systems nor in other technological projects in health care settings. As previously noted, we consider the adoption of a new CIS as an ongoing and contextualized structuring process where resources, norms and meanings concerning the new technological solution, as well as power dependencies among actors involved, are constantly reproduced over time. Furthermore, such a social reality comes to being mainly through actors' discursive activity. All these dimensions are considered in a frame that combines structurationist views with a critical discursive lens. Accordingly, the blending of temporal bracketing and a three-dimensional critical analytical technique offers a powerful device for exploring the structuring effects of discursive events over time. As such, it has helped us elaborate plausible interpretations and explanations about the initial phases of a CIS implementation in complex organizational settings.

Finally, a third implication of this work directly concerns *CIS practitioners*. Our interaction with CIS top managers and other project members was very intense in the field. From the beginning of the project, we elaborated and regularly delivered working papers and executive reports summarizing our conclusions and recommendations, with the notion that timely feedback is useful for decision-making. This is consistent with our critical interpretative position: in addition to understanding the context and process of the CIS adoption and implementation through different interpretations arising from social interactions, we avoid unreflective accounts by connecting these interpretations to broader considerations of social power and control, and by sharing this with the concerned actors. Furthermore, the knowledge generated, with strong theoretical and methodological grounding, may support not only the CIS implementation being examined, but also help understand, and be useful in similar CIS implementations elsewhere, particularly in publicly funded health care contexts such that of the Canadian health care system.

The CIS project is still ongoing. At the moment of writing this paper, we are accompanying the configuration and operationalization of the CIS in six pilot sites. Although an analysis is beyond the scope of this article, we are observing, in real time, the effects of the initial phases and decisions in the current developments. For the practitioners' community, and specifically the CIS top managers and project members, our contribution is being given "life." For the academic community, the examination of the new CIS implementation phases will be addressed in future papers.

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