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Abstract	This study focuses on how knowledge sharing across boundaries of merging entities during an information system (IS) implementation project in a shared services center (SSC) context affects the resulting system functionality. Although the literature stresses the growing adoption of the SSC as an outsourcing model, there is a lack of studies that examine shared services as a dynamic process of knowledge sharing across the organizational boundaries. We draw on a sociomaterial practice perspective and on the theory of workarounds to analyze an IS implementation project in a healthcare organization resulting from a merger of previously independent hospitals. The results suggest that new technology can be enacted in different ways as it links up with practices of different communities of users. We propose a multilevel process model that indicates at the end of the project a resulting mix of formal and informal (workarounds) practices that emerged from a dialectic process of resistance to, and negotiation of, the IS configuration during its implementation.

Keywords (separated by '-')	Shared services center - Knowledge sharing - Sociomaterial practice - Perspective - Workarounds - Performativity - Sociomaterial assemblages

Sharing Knowledge in a Shared Services Center Context: An Explanatory Case Study of the Dialectics of Formal and Informal Practices

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1 Introduction

Outsourcing arrangements are among the key mechanisms for organizing modern information technology (IT) activities [1, 2]. The literature on IT Outsourcing (ITO) shows that while the first decade of this century was characterized by the adoption of various outsourcing models [3], in the last five years, due to a continued pressure on profit margins linked to the aftermath of the 2007–2009 world recession and to a growing concern regarding data privacy and security, there has been a trend towards insourcing among private and public companies with a preference for the *Shared Services Center* (SSC) model [4, 5]. A report released in 2012 by HfS Research and PwC [6] finds that nine out of every ten firms use a shared services sourcing model.

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An SSC is a rather independent organizational unit that provides services to various other organizational units. This sourcing model solves the problem that each business unit is engaged in tasks that do not belong to its core business. SSCs enable efficiency improvement by standardization of services [7]. The main reason for choosing an SSC model stems from the organizational need to manage costs and working capital and have visibility and control over the business processes. The promise of the SSC comes from a hybrid conception of traditional models aimed at capturing the benefits with centralized and decentralized arrangements. For the former, this should result in economies of scale, scope, and standardization. For the latter, this should result into a flexible and efficient alignment of IT with the needs of business [8, 9].

Shared services have received limited research attention [cf. 10, 11]. Prior literature has focused on the motivations and drivers for SSC and its implementation issues [4, 12]. However, little is known about the challenges associated with SSCs. For example, sharing services across the organizational boundaries can be viewed as a dynamic process in terms of knowledge sharing practices. Indeed, any form of outsourcing can be viewed as a knowledge-based activity [13] and efficiently sharing and integrating knowledge is a key challenge [14]. As explained by Davenport and Prusak [15], transmitting information is not sufficient to share knowledge, due to the possibility of meaning variance [16]. Therefore, sharing information is not sufficient to share knowledge. In the same way, within organizations sharing knowledge is a social process in which it is not enough to group together the different 'bits' but instead, collaborative initiatives are required [17, p. 13].

Research has shown that success of IT-based cross-boundary collaborative initiatives highly depend on effective knowledge sharing [18–20]. Although these studies were not conducted in an SSC context, they have shown that cross-boundary knowledge sharing develops collective competencies on building complex information systems [18, 21] and relies on team social bonds during common projects [19, 22, 23].

Several authors have proposed a number of knowledge processes and practices [24–26] for overcoming issues related to knowledge sharing in an ITO context. These practices aim at developing a shared understanding among the firms involved in the ITO, and the literature emphasizes the critical role of understanding the other ITO parties' context. However, this rational approach has limitations particularly when it does not consider internal dynamics. Indeed, employees in organizations may attempt to achieve formal goals through the establishment of formal coordination and role distribution. At the same time, the literature suggests that unplanned processes, such as improvisation or workarounds, emerge in order to fulfill formal objectives [27, 28]. Consequently, these two structures, formal and informal, need not be in conflict with each other. But, aren't they? Or are they complementary?

In the workplace, a workaround represents a goal-driven change to an existing work system in order to overcome a technical or an organizational constrain [29]. Several authors view workarounds as an understudied topic of research [30–32]. Recently Alter [29] proposed a theory of workarounds that includes different perspectives on situations in which actors will either enable or intentionally perform actions going against one or more routines, instructions, expectations, prerequisites, specifications or organizational regulations.

In this research we aim at understanding how knowledge sharing during an SSC-driven IS implementation project affects the resulting system-enabled practices. To do this, we draw on the concept of workarounds [29] and on a sociomaterial practice perspective [33, 34] to provide the theoretical foundation for a case study. The sociomaterial practice perspective, studies information technology as a "technology at work" [33], where the focus shifts from the impacts of technology to the dynamics that attach meaning to a newly implemented system. In this context, the material (the technology in an organizational context) and the social (the users or actors) continuously create and re-create one another while the actors socially negotiate their IT-enabled practices to share their knowledge. The actors share a common set of practices within a field of practice (e.g. business unit or department) in pursuing a joint interest [17] and knowledge is an integral part of these practices [18]. Through practice, actors formalize their membership in a certain field while differentiating themselves from actors in other fields. Because an SSC arrangement involves actors from different organizations, we posit that those organizations represent distinct fields of practice. Where practices are not shared, individuals have different assumptions and interpretations of the organizational context [20]. Thus, cross-boundary collaboration in an SSC context involves the negotiation of multiple domains of knowledge by actors who often understand only part of domains other than their own [35]. A sociomaterial practice perspective will help us better understand the dynamics of cross-boundary knowledge sharing by suggesting that actors engage in formal planned practices and informal workaround practices. This can be illustrated as a dialectical interplay during the process of developing and implementing a new Information System in the context of a shared services center.

We conduct a case study within a large university healthcare center (UHC) resulted from a merger and consisting of two adult sites and a children site. The case is the Laboratory Information System (LIS) implementation project, representing a collaborative effort between the members of a team comprised of site-based lab clinicians and technologists and ITServ (the shared service center) specialists.

The main contribution of this research is a process model explaining the dynamics of the formal (planned) and informal (workarounds) practices during the IS configuration and implementation. The model is based on one of the four types of mechanisms or "motors" that drive organizational change [36]. We are interested by the dialectic motor, which embodies a "pluralistic world of colliding events, forces, or contradictory values that compete with each other, for domination or control" [37, p. 517].

The rest of the paper is organized as follows. We begin by presenting the conceptual foundations of our study. We then describe our research methodology, followed by an analysis of the case data. A discussion of the findings and theoretical explanations follows. We conclude with implications for research and practice.

2 Theoretical Background

2.1 Knowledge Sharing Across Boundaries as a Multilevel Construct

Knowledge cannot be reduced to an object that may be computerized. As a resource giving a competitive advantage [22] and as an individual interpretation [38], knowledge

needs practices involving individuals to be actually shared. This is particularly true across boundaries and for Newell et al. [19] "developing these independent Intranets […] reinforce existing functional and geographical boundaries with what could be described as 'electronic fences'" (p. 94). Thus, developing and implementing a new IS in the context of a shared services center may reinforce such electronic fences, leading actors to engage in formal planned practices and informal workaround practices to share knowledge across boundaries.

Indeed, knowledge transfer is not reduced to the transmission of information and integrates sensegiving and sensereading processes as introduced by Polanyi [39]. Such processes lead someone to create his/her own knowledge from information (sense-reading) or to create information from his/her own knowledge (sensegiving). Figure 1 illustrates these processes, i.e. the way we create information from our own knowledge, and vice-versa. Davenport and Prusak [15] stated that "transfer = transmission + absorption (and use)" (p. 101). Then transmitting information is not sufficient to share knowledge, due to the existence of individual interpretation in sensegiving and sensereading processes [39].

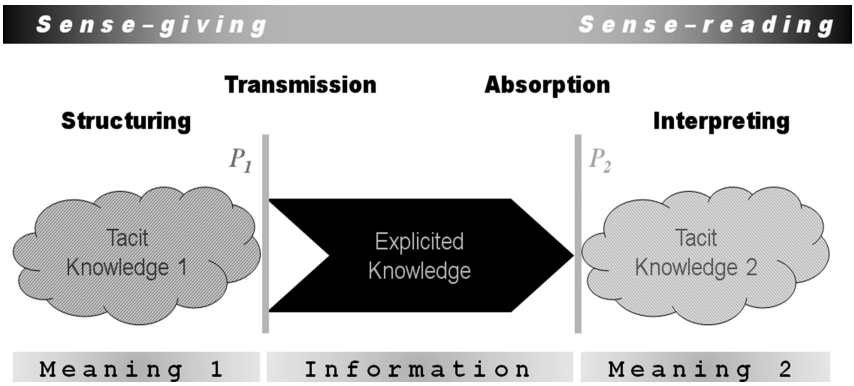

Fig. 1. Sensegiving and sensereading-based knowledge transfer (Source: [16])

Maznevski and Chudoba [40] consider that digital interactions often lead to incidents that may be resolved through face-to-face interactions. In the same way, for Walsham [41] increasing the number of digital communications will not improve human communication. That is notably the reason why we consider that sharing knowledge requires focusing on the way individuals and practices may be managed.

Sharing knowledge relies then on individuals and practices management. According to Stockdale and Standing [42, p. 1091], neglecting social activity leads to "meaningless conclusions". So we cannot be satisfied only with a technological approach and Jordan [43] insists when she stresses that knowledge is not only based on the group but is also tacit, embodied in individual minds: "we believe that there is yet another dimension that needs to be explored and that is the knowledge that is not only group-based but also tacit, implicit, embodied, and not articulated." (p. 18). It is on such another dimension, which is tacit and embodied in individual minds that rely formal and informal practices

to share knowledge during the development and implementation of a new information system in the context of a shared services center.

Organizations are complex and multilevel phenomena [44] and therefore, IT-driven organizational change (such as the implementation and adoption of a new information system) is best framed as a process theory that explains how a sequence of events that unfolds through time leads to some outcome and provide explanations on how one micro-level event leads to and affects the ensuing one [36]. *Events*, the main elements of the sequence, can be defined as being instances of social action relating to the IT adoption process. The resulting view of the process tells a rich and comprehensive story of the events taking place within a specific situation by explaining how significant conditions interact, such as user perceptions and institutional factors, IT functionality, and the nature of knowledge (tacit or made-explicit knowledge) that needs to be shared during the IT implementation /adoption, how they collectively lead to future action, and what constrains them.

Important change processes in organizations, such as the introduction of a new IS that significantly changes organizational practices, can be explained over time by four different theories of change or "motors": life-cycle, teleology, dialectic and evolutionary [37]. Life-cycle and evolutionary are prescribed modes of organizational development and change because the process unfolds in a pre-established order; teleology and dialectic are constructive modes of change as the development is discontinuous and unpredictable. Moreover, life-cycle and teleology depict the development and change of a single organizational entity, while evolutionary and dialectic depict multiple organizational entities.

With regard to the implementation of a new IS, the multilevel process of IT-driven organizational change can be considered as being managed by a dialectic motor. At the individual level, during the configuration and implementation process each team member forms his own perceptions about the new technology and the relevant knowledge that needs to be shared in order to collaborate. These perceptions are continuously adjusted according to the individual's values, assumptions, goals and aspirations [45], while using a new technology. The individual-level decisional events influence further how the user community in the organization uses the new technology. Moreover, group-level events shape those individual-level events given the reciprocal influence between technology and its social and historical context [34, 46].

2.2 The Sociomaterial Practice Perspective (SPP)

The introduction of a new information system triggers a set of complex interactions. In particular, users' practical appropriation of a technology, which is strongly influenced by an organization's values and institutional characteristics, affects whether the "technology-in-use" becomes collaborative or not [47]. Thus, the characteristics of a specific technology do not fully determine its ability to entice individuals to use it. There is a dynamic process created by recursive interactions among the technology, human agency, and institutional norms and values. Emerging sociomaterial practice perspectives [33, 34, 48, 49] have accepted the challenge to focus on both social context and the materiality of the technological artifact. A central assumption of these approaches

is that neither technology nor social agency can be constituted independently. Rather, social and material phenomena should be theorized as inextricably interrelated [50]. Sociomateriality represents a commitment to holding meaning and matter together in the conceptualization of technology [34].

Two different sociomaterial approaches have emerged in the literature. One perspective, called the *agential realism*, is normatively attentive to how technology defines the ways in which actors and meanings come to matter in sedimented organizational practices [33, 34]. It is based on the tenet that there is no social that is separate from material and therefore, there is only the sociomaterial. In explaining her view on sociomateriality, Orlikowski [33] adopts Barad's [51] argument that "we have tended to speak of humans and technology as mutually shaping each other, recognizing that each is changed by its interaction with the other, but maintaining, nevertheless, their ontological separation. In contrast, the notion of constitutive entanglement presumes that there are no independently existing entities with inherent characteristics" [51, p. 816].

The other perspective, the *critical realism,* is instrumentally concentrated on how users use technological affordances in situated organizational practices [48] and considers time as a determinant factor in the process of sociomaterial "becoming". The main conceptual difference between the two perspectives is that on one hand, critical realism's main tenet is that the social and the material are indeed separate entities that are put into association with one another, but they become inseparable only through human agency occurring over time. On the other hand, agential realism considers the "sociomaterial" as something that is already ingrained in individuals' perceptions of technology [49]. Each approach highlights important aspects of sociomaterial practice. While critical realism perspective highlights how sociomaterial practices have a trajectory, or a forward moving direction [49], the agential realism perspective focuses on how sociomaterial practices have boundaries, or are defined inside and outside [33, 34]. Both approaches are essential to forming a sociomaterial explanation of technology use. Orlikowski [34] rejects the so-called "ontology of separateness," arguing instead that no a priori assumption of separate agencies exists. Technologies are theorized as an apparatus of the ongoing process of interaction where boundaries, such as "subject" and "object," get created.

In this study we adopt an agential realism perspective to sociomateliaty because we are interested to understand how sociomaterial practices have *boundaries*. Boundaries show how practices have an inside and outside as technology defines what "counts" as a problem worthy of solving. A certain boundary formed by a sociomaterial practice can generate subjectivity for certain agents at the expense of others. For example, Barad [52] showed how high-resolution ultrasound images enact subjectivity for unborn fetuses by creating powerful visual representations. Rather than seeing a computerized image, people see the ultrasound image as a correspondence with the fetus in the womb. This taken-for-granted meaning is made by the technology which performs here as an apparatus, part of an already entangled practice that makes normative distinctions.

The agential realism perspective advances the concept of *sociomaterial assemblage* [51] which illustrates this constant agency shift between the material (IT) and the social (practices performed by the organizational members). In this view, an information system represents a sociomaterial assemblage that "emerges from practice and defines

how to practice" [46, p.279]. In order to make sense of their practices, the sociomaterial assemblages reflect individuals' shared understandings within the organizational context [53]. Here we define *practices* as referring to coordinated activities of individuals and groups in doing their 'real work' as it is informed by a particular organizational or group context [46]. Through practice, agents formalize their membership to a certain field of practice and, at the same time differentiate themselves from agents from other fields. A *field of practice* may represent business units, departments or goal-driven groups, in which individuals who share practices are in pursuit of a joint interest [17]. In order to make sense of their practices, members of these fields develop sociomaterial arrangements that would reflect their shared understandings within the organizational context [53].

An information system is configured based on the belief that a collection of practices (i.e., industry-based best practices) can be extrapolated from general to particular settings. According to SPP, the dynamic relationship between organizational actors and ISs is reflected in practices and is referred to as *performativity*. This is a dialectic process of resistance and accommodation that produces unpredictable *reconfigurations* of the sociomaterial assemblage [46]. In the SPP view the intimate entanglement of technology and human elements are both made of matter. Hence, separation between humans and non-humans is radically challenged; their micro-entanglements need studying so as to understand the constitution of meaning. The SPP focuses attention on the flow of practice and by using the term *performativity* it provides a new vocabulary to describe how actors, technologies and meanings are dynamically brought into being through the continuous flow of practice.

In their analysis of an enterprise's information system implementation, Wagner et al. [46] clarify the concept of performativity by comparing the differences between sociomaterial assemblages of the same IS to the differences between the games of American football and rugby. The American football game, as a sociomaterial assemblage, emerged from the UK game of rugby, as those playing the game altered over time the sociomaterial assemblage that we call rugby. The former is quite different from the latter in terms of rules, equipment, physical skills required for the athletes, and the discourse that surrounds the practice of the game. Thus, from the standpoint of the SPP, professional-based communities tend to promote practices that have a local character based on an departmental or goal-based context despite their engagement in the same shared practices [54]. This is to stress the fact that there are always differences even when organizational members are supposedly engaging in the same practices.

Information systems are subjective and bear within them the traces of their social history. Individuals draw differently on their experience to transform and create different organizational patterns [33]. In this sense, an IS represents an adaptive assemblage of material and human components that assumes a practical meaning when it is used in a specific situated social and material context [45]. Best practice routines are not rooted in an IS, but rather are enacted by users that draw upon the software in their situated practices. Practices are emergent and often improvised during the complex process of adoption that precedes a working information system [27]. By engaging in improvisations or workarounds during organizational change, employees take advantage of existing technological resources in new ways to enact new practices [55].

2.3 The Workarounds Theory – an Informal Approach to Organizational Practice

A workaround represents a goal-driven change to an existing information system in order to overcome a technical or an organizational constraint [56]. Alter [29] proposes a theory of workarounds that includes different perspectives on situations in which actors will either enable or intentionally perform actions going against one or more routines, instructions, expectations, prerequisites, specifications or organizational regulations. This theory attempts to address two types of workarounds. The first takes place during a work process, when one or more actors face an obstacle that prevents the execution of an optimal performance during a work assignment. Barriers may be a result of anomalies, exceptions, lack of information, knowledge and skills on the part of the actor, or lack of technological capacities. The second represents a misalignment between objectives and incentives of actors, principles and stakeholders (e.g., lack of understanding, inadequate communication, confusion or inattention). The latter usually emerges during an IT-driven organizational change [cf., 27, 56].

The persistence of workarounds in a work environment is explained by the need for balance between bottom-up constraints (operationalization of the daily tasks) and top-down pressures (regulatory entities, physical constraints) [31]. There is a dichotomy between the negative perceptions and the need for workarounds that deepens in highly standardized work environments. Indeed, lower level management in these environments will often tolerate workarounds [32, 57]. Organizational challenges during the process of change are due to a combination of different perspectives on workarounds. These perspectives are comprised of the ability to operate despite the obstacles, adopt an interpretative flexibility, balance between personal, group, organizational and authorized interests and learning emerging changes.

Some researchers consider workarounds as violating and resisting managerial expectations [29] and business process activities [58]. The main assumption of this perspective is that employees tend to resist top-down pressure due to conflicting goals. Others suggest that workarounds represent a problem-solving strategy [59]. In this perspective, workarounds are presented as creative acts and sources of future improvements. Workarounds can be essential sources to analyze and learn policies, procedures and issues [60], or necessary for generic IS and as a part of the daily tasks [55]. Workarounds can also enable positive resistance by ensuring the continuity of an IT-based work task [61].

3 Methodology

We adopted an explanatory theory-building-from-cases approach [62]. Explanatory models seek to find relationships between an "observed state of a phenomenon and conditions that influence its development" [63, p. 428]. Given the research objective of this study, the first author spent a significant period of time at a purposely chosen company, focusing on the subjective descriptions of users' practices and knowledge sharing activities. The subjective and context-dependent nature of knowledge implies

that interpretations of reality depend on individuals' thoughts and feelings and on other influences that may operate within the social context.

The selected organization was the University Health Centre (UHC – not its real name), a Canadian 1,400 beds-tertiary care teaching institution. The UHC is the result of a "merger of equals" of three independent teaching hospitals with over 1 million patient visits per year: two Adult hospitals (the Downtown and the Midtown) and the Pediatric Hospital. The merger, announced in 2001, had the goal of creating a mega-hospital to provide 21st-century health care by implementing a "best practices" business model for coordinating care. The shared services center, ITServ (fictive name), was founded as a non-profit corporation with 150 employees in 1992 by the Downtown and Midtown hospitals. Its role was to provide information technology services to the two hospitals. ITServ was considered as being a necessity to centrally manage the two hospitals that, albeit remained independent, were using the same platform (mainframe) for the Patient Care System and the same software (ADT – Admission-Discharge-Transfer). After the merger was announced, the Pediatric site IS department was taken over by ITServ and its director became one of the associated directors under the newly appointed CIO. The newly merged technology architectures triggered a major structural reorganization of the SSC in order to clearly define the boundaries between the skill-based services offered. User-centric authentication was implemented based on a "contextless" concept with a "no site"-bound user authentication. This approach imposed a unique organizational identity.

Although studies have shown that the participants in organizational processes do not forget key events in these processes (the interviews for this study were carried out during spring-fall 2010), it is possible that a participant-informant in a retrospective study may not have judged an event as important when it occurred and therefore may not remember it later [64]. To avoid these shortcomings, we obtained access to a number of emails that team members exchanged during the system implementation. We also followed Leonard-Barton's [64] recommendation to engage in informal conversations (e.g., at lunch or in hallways) with individuals who were members of the project teams because useful data may emerge from this type of interaction. Interviews were the main method of data collection. Informants were selected using a snowball sampling procedure. We interviewed key stakeholders, in particular project development and implementation committee members (i.e., department managers, ITServ professionals, project managers, and clinicians) who had participated in the ISD project. The interviewees were significant as agents, since they influenced the knowledge sharing process due to their roles, status, power and experience. Fifteen interviews were conducted on site, and lasted between 45 to 90 min. We interviewed five lab physicians, three lab technologists, three lab managers, three ITServ professionals and the ITServ project manager.

The interview protocol combined three interview strategies [65]. Each interview started with an *informal conversational strategy* in which questions surfaced from the context and usually were tailored to each individual. This approach was followed midway through the interview by a *guide strategy* with a standard format that clearly spelled out the topics and issues that needed to be covered. The interviews ended with a *standardized open-ended interview* in which respondents answered the same basic questions in the same order. This last part was necessary to get systematic data, thus

increasing comparability of responses that allowed cross-case comparisons [66]. The interviews were recorded and transcribed. In a few instances, when clarifications were required, follow-up questions were asked via phone or email.

Interview questions focused on understanding, from the participant's standpoint, the history of the IS implementation project's collaboration practices, differences in practices, claims of relevant knowledge, and differences in IS's functionality between the initial and the go-live phases of the project. Data collection was terminated when the interviews revealed no new information. The data were triangulated using archival sources, including project documentation, organization documents (management strategy documentation, communication plans, and emails). We used the case narrative for the data analysis. The coding process involved the creation of a list of categories and codes prior to the interviews.

Most of the coding categories were based on the three theoretical constructs introduced in the previous section on the sociomateriality practice perspective: *practice*, *performativity*, and *reconfiguration*. The interview transcripts were entered into a database, read carefully and relevant portions highlighted. The highlighted portions were then keyed into the database into a field called "evidence" as chunks of rich text. The interview data were analyzed in NVivo, in an iterative process by cycling between data and relevant literature [62]. This approach provided us with a rich understanding of the case.

4 Main Findings and Analysis

4.1 The Laboratory Information System (LIS)

In 2004, upper management acquired a software program package to provide common best practices for its unified Laboratory departments. The software, developed by Labsys, was based on formal industry standards and provided flexibility to accommodate, to a certain degree, idiosyncratic practices. The role of a software package is to "meet general needs of a class if organizations, rather than unique needs of a particular organization as is the case in custom software development" [67, p. 2]. Thus the initial design of the LIS embedded a set of practices based on Labsys' approach to best practices and on UHC upper management requirements. It was expected that these practices would be implemented in all three laboratories with the help of the shared services center. Concretely, the UHC wanted to develop a common test index for the three laboratories in order to standardize the collection of statistics and reporting, and create a unique test index for the future LIS.

In a hospital an LIS automates laboratory clinical, financial and managerial processes and enables lab staff to maintain accurate tracking, processing and result recording, while avoiding lost and misplaced specimens. UHC's three laboratory services were using three different workflows supported by different legacy ISs. At the outset of Phase I, in order to supervise the implementation work of the project team, a Clinical Consultative Committee (CCC) was set up. Its role was to decide on the project scope and direction. The CCC included representatives from the upper management and lab physicians and proposed guidelines for the standardization of practices in the three main laboratories.

In collaboration with ITServ, the committee created an LIS project team that included laboratory technologists, physicians and IS specialists from the SSC. During Phase I, the three lab services were asked to standardize their practices (lab request workflow). Even though the typical lab workflow (scanning barcodes that include laboratory number, patient identification and test destination – hospital department/physician) seems to be straightforward, each of labs was using different sequence steps and different legacy ISs. During this phase, the lab clinicians struggled to find common ground in the specimen management processes. Consequently, the team members decided to adopt a "retain" approach, i.e. to try to accommodate as many old procedures and workflows as the new system would accept. At the end of 2005, Labsys advised UHC that it would provide a new version of the LIS.

Early in 2006, Phase II commenced with the ITServ's members of the LIS team re-starting the process of programming the system's database from scratch on the new LIS platform. During Phase II, the nature of the group dynamics changed, as upper management brought several well-known laboratory physicians into the project, hoping they could bring about the much-needed collaboration between team members. Not only was upper management exercising constant pressure to speed up the development, but also the team members realized that they should agree on common procedures reflecting industry standards. Therefore, the weekly team meetings produced a mix of compromises and executive decisions that influenced the final system functionality.

After almost three years of testing and implementation, the new LIS was deployed at Downtown, followed by Midtown and Pediatric after 6 months. While the initial functional configuration was based on best practice standards, the final system configuration revealed a blend of industry standards and local pre-merger idiosyncrasies.

4.2 Data Analysis

Fields of Practice and Boundaries. For UHC upper management, the new LIS would bring best practices to laboratory and standardize them across the sites. Even though a typical medical lab workflow seems to be quite forthright, the lab services at the UHC were presenting a different reality. The three site-based lab services were using three different workflows, each with a different set of practices:

> *"We had Downtown working one way, Midtown working another way, Pediatric working a different way. That was as if 'Joe' works at this bench. 'Jim' works on the same bench […] You take these two people with different visions of doing the same work, and you multiply it by three sites." (Downtown laboratory technologist)*

Labsys provided the members of the project team with a remote access to a mock-up LIS database at the company's headquarters. The database was populated with fictive organizations and patients. The ITServ specialists were able to learn or to verify their knowledge about how to build and configure the new system by using this tool. On a regular basis they were testing LIS prototypes and organizing simulation sessions with the lab technologists. Not only did the ITServ specialists have to learn the programming language of the Labsys-based platform, but they also had to understand the labs' workflow and procedures. The importance of the latter aspect is emphasized by one of the interviewees:

"LIS is supposed to help lab people to do their work so we [ITServ specialists] need to understand that everything starts on the bench. It's what you do in the lab that you should be able to do a good programming to get, it's not supposed to be Labsys that will tell you what to do." (ITServ manager)

At the beginning of Phase I, the context of the project featured a high level of novelty that prevented the project team members (the agents) from correctly assessing differences in knowledge of each other's practices and the dependencies between the team members.

"When it came to building the system, this was something new for everyone. This was having three feeder systems go into one feeder system. This was the first time…" (Downtown laboratory technologist); "I felt sorry for them [LIS team members] because they were thrown in cold. This was very novel for most of them." (ITServ specialist); "I looked at it as a complete new challenge" (Midtown laboratory technologist); "I was working with people that I didn't know." (Pediatric lab technologist)

The level of dependence among the members of the project team was also high:

"We we're very dependent on the technologists because [of] what they do – so the assistant chief tech even to this day when we have a protocol meeting they're still included because they know exactly at the bench level what's going on." (ITServ specialist)

Under these conditions, sharing knowledge was not possible until team members understood the differences between the practices of the three laboratories (end of Phase I).

"It was seeing how the other person thinks. If you come with an understanding of how institutions work – and not all institutions work the same – and ours is different for a lot of reasons, the way we've evolved. Just as blood taking has evolved totally differently at the Downtown site." (Midtown laboratory technologist)

At the same time, different interests emerged among the lab clinicians when they realized that they must transform the knowledge they had invested in their own practices.

"Physicians from different labs in the same discipline could not agree on what to do with tests, or with procedures. They couldn't standardize." (Downtown laboratory technologist)

The need for a unique set of lab practices was clearly conveyed by the upper management to the laboratory clinicians:

"Not only do they [management] count they're going to start using the same system, but the system will work the same way for all of them. Suppliers are not going to develop a specific need for a specific site." (ITServ manager)

The evidence suggests that resistance arose right from the outset due to the new LIS imposing a new sociomaterial assemblage upon the lab clinicians. This set up a need for negotiations and adaptations if the new LIS were to be adopted and used by the labs user community.

Dialectics of Resistance and Accommodations (Performativity). During Phase I, the agents reluctantly engaged in knowledge sharing to identify shared understandings about how to standardize their work procedures.

"It was difficult because the members selected for the LIS team were not selected by the manager of the LIS at the time. Upper management selected them, so there was this "keeper of the knowledge" mentality, and trying to gather information was difficult." (Downtown laboratory technologist)

The general feeling among the team members was that they should not have to change their respective laboratory procedures just because upper management had decided to replace the three legacy systems with a single common laboratory IS.

"Physicians from different labs in the same discipline could not agree on what to do. So why? Probably politically, because they did not have any background information on why they're doing a test in a certain way." (Pediatric lab technologist)

Some of the agents saw the implementation of the new LIS as a means to reify their loss of organizational identity. They felt that by using the system they would eventually lose the control over the rules of the game within their respective fields of practice. Some of them felt like "immigrants" in an adoptive country. They were not comfortable engaging in a game based on unfamiliar rules.

"They didn't give us a chance to mourn […]. We were losing the identity that we had as standalone areas" (Midtown laboratory technologist); "You always recognize yourself with the site that you're at, but also being part of a bigger [entity], let's say you're an immigrant. You move to a place and you're part of where you are but you're also part of what you were as well." (Downtown laboratory pathologist)

During Phase II, the sense of urgency to standardize practices, along with pressure from upper management, made the agents engage in negotiations of trade-offs to ensure that eventually some of their pre-merger practices would be preserved while a number of new laboratory procedures would be adopted.

"What we did is that if there were some different clinical practices, we allowed some exceptions. The Pediatric site had very different protocol, and we've had to make more exceptions. So we had fights, and finally we agreed to some exceptions, but for the Adult sites we did a lot of work to try to get to a consensus." (Midtown microbiologist)

During lengthy meetings, proposals emerged on how to standardize some practices or keep them unchanged. However, in order for them to be successfully embraced, care was taken not to present these trades-offs as ideas that came from one of the three fields of practice.

"It's always about being careful that it's not taken as a Midtown idea or a Downtown idea. This was during meetings. You didn't say, 'You know, at the Midtown site we do it like this and it works, or at the Downtown site we do it like this and it works'… Industry standards! This would be the better way to go." (ITServ manager)

Our data analysis suggests that the negotiation process resulted in accommodations that enabled emergent sociomaterial assemblages, some of them based on workarounds implemented by the ITServ specialists. The following example is illustrative:

"We do syphilis tests, typically about 100 a day. At the beginning, I'm laughing because they would have to click each individual syphilis results. I was getting calls, 'this is impossible!' because you could be here until night doing the results. Finally I called one of the [ITServ] specialists who figured it out that we could verify it without doing a hundred clicks. So what

normally would have taken about two hours of signing, it took ten minutes now." (Downtown physician)

LIS-based Resulted Practices and Workarounds. While neither the UHC upper management nor the lab user community got their wishes - the former to impose new practices and the latter to keep its pre-merger workflows - the new sociomaterial arrangement gained enough support from both sides to reach a stable environment:

"What we did is that there are some different clinical practices we allowed, but we tried not to make too many because it's too difficult to keep on with quality." (Midtown physician)

In a CCC post-implementation report it was mentioned that every task performed with the new LIS was taking more steps and time to complete than before with the old system. Workload had increased, lab technologists were working a maximum amount of overtime, and physicians were not receiving reports in a timely fashion. Some lab clinicians informally were asking the ITServ specialists to create workarounds to 'get their job done'.

"We thought that there was one way of working with the system, common to all the sites. But a year after the implementation, we did a follow up. We found out that some people were expressing their concerns about the functionality and we found out that they [ITServ specialists] resolved it. But they didn't tell anyone about this. So we found out that there were some different practices … workarounds depending on the problem." (Downtown lab manager)

The workarounds implemented by the ITServ specialists enabled the three lab communities preserve some pre-merger practices (i.e., the order entry), while accepting new practices (i.e., the lab requests and access to results). Thus, the new LIS unified all laboratory protocols across the sites and linked the laboratories in one common system. Also, the laboratories had to change how their staff was managing the laboratory requests because the LIS imposed one set of common practices. However, at the same time, the workarounds made it possible for the Pediatric site to keep its pre-merger order entry procedures and for a number of laboratory technologists from the Adult sites to accommodate some pre-merger practices.

5 Theoretical Explanation

This research investigates how social and material dynamics influence activities of knowledge sharing during an IS implementation project that affects the combination of formal (planned) and informal (workarounds) practices in a context of a shared services center. Two important themes emerged from these results.

Performativity: An Outcome of the Social and Material Dynamics. The evidence suggests that the formal practices based on industry best practices adopted by the UHC upper management involved the imposition of new practices and shaped the context of the LIS implementation project. At the outset of the project there were three different fields of practice, each defined by historical and local information management-based norms. Therefore, significant differences were between the pre-merger site-based practices on one hand and between these practices and the new planned formal practices on

the other hand. Moreover, the ITServ specialists that were involved in the project were not aware of the differences in practices between the three labs. Resistance from physicians and lab technologists from the three merging entities ensued. Negotiation was critical to introduce modifications and keep some of the pre-merger sociomaterial assemblages.

The concept of performativity clarifies how relationships between agents and technology were never fixed. Although the adoption process happened in the same organizational context and regarded the same technology, the resulted sociomaterial assemblages varied unpredictably across the three sites. The sociomateriality practice perspective, thus, emphasizes the process, and assumes that practices are constantly changing even when agents are supposedly engaging in the same practice: "Pursuing the same thing necessarily produces something different" [68, p. 894]. It also shows that new technology can be enacted in different ways as it associates with practices of different fields of practice.

However, these different enactments were influenced at the UHC by the technical limits imposed by the technology (material) and by the common interests and field-based values that were at stake (social). While what the new technology *is* did not change during the implementation process, what it changed was what *it does*. In all three lab communities, performativity depended on the material properties of the LIS, as well as on agents' perceptions of whether that materiality afforded their ability to engage in effective lab practices. This situation triggered resistance that was followed by negotiations with the management. The resulted arrangements undermined the planned outcomes of the implantation project.

A Multilevel Process Model of Sociomaterial Assemblages. Our findings suggest that at the individual level, agents' actions were formulated by their understanding of others' practices while engaged in knowledge-sharing activities and of what the new LIS can and cannot do. The workarounds were supposed to reflect what the new technology should do taking into account the idiosyncrasies of the three fields of practice.

The lab clinicians and technologists followed a similar process, in which individual actions (resistance, negotiation, accommodation, acceptance of practices, etc.) were the product of the interplay between opposing forces: the formal practices imposed by the material properties of the new technology *vs*. the informal practices based on team members' knowledge sharing practices. Our multilevel process model, presented in Fig. 2, illustrates the operation of the dialectic motor of change during the process of a post-merger IS implementation.

First, we posit that the decision to impose new formal practices will reveal existing pre-merger practice-based field boundaries. Then, we conjecture that users affected by the IS-enabled changes in practices, will resist system's implementation. In this context, team members will negotiate and propose accommodations through reconfigurations (workarounds) of the system during implementation. Thus, the initial functional design of the IS may be different from the final functionality at the end of the implementation. The resulting view of the process tells a rich story by explaining how the dynamics of performativity (individual level) generate new sociomaterial assemblages, which collectively lead to future action (organizational level). At UHC, the upper management through its shared

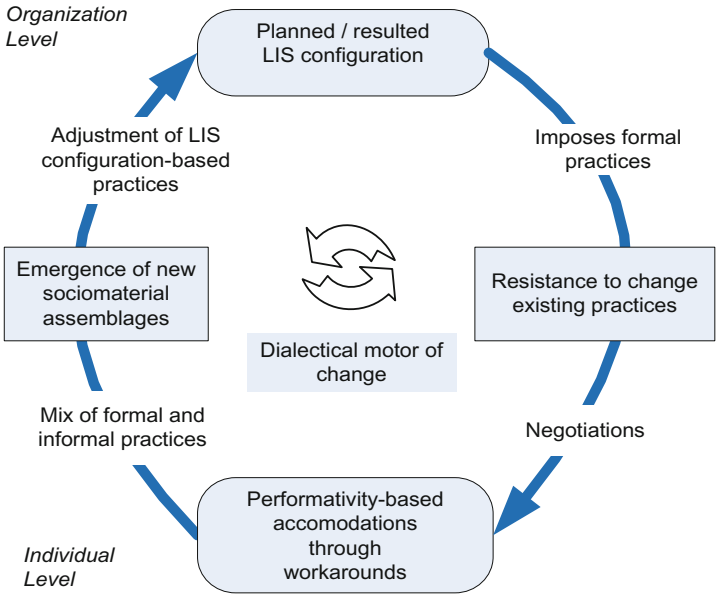

Fig. 2. A process model of dialectics of formal and informal practices

services center, decided to implement a common LIS that caused resistance from the site-based lab services clinicians (struggling to come up with a standardized lab workflow). The subsequent negotiations resulted in a workable system that enabled a common set of formal lab practices and accommodated some pre-merger practice idiosyncrasies via workarounds (mix of practice transformation and preservation).

Moreover, the lab clinicians were able to use the new LIS in unintended ways, which proved to be beneficial to them. The resulting dialectic leads to an iterative process of resistance and negotiation of common interests (at the individual level), followed by a change of the existing sociomaterial assemblages (at the organizational level) implemented by the SSC, which reflects a mix of formal and informal practices in contradiction with the original, planned ones. Agents' actions and technology's materiality are distinct from one another, and it is only once they become assembled in specific ways that they can then create new or recreate existing sociomaterial assemblages [33]. Thus, at the organizational level, change of practices is driven by the actions of agents, who seek to negotiate their field-based lab practices (see Fig. 2). Depending on whether they perceive that a technology affords or constrains their goals, the agents made choices about how to link social and material agencies based on practices and norms defined at the organizational level.

Thus, the multilevel process model depicted in Fig. 2 provides a more complete explanation of the different outcomes regarding the adoption of a new technology at the organizational level. In this view, emergent outcomes are products of indeterminate interplay among opposing forces and are difficult to predict a priori [69].

6 Conclusions and Future Research

Through sociomaterial assemblages, agents and technological artifacts meet in a particular manner. Such a manner is notably induced by the context, the situation and the purposes agents and artifacts interact for. While authors such as Oshri et al. [25] and Hawk et al. [26] insist on the importance of formal practices during the implementation of a new IS to support knowledge sharing, others such as Orlikowski [27] and Pavlou and El Sawy [28] suggest that informal practices like workarounds are at the basis of efficient knowledge sharing.

The main contribution of this article is to consider the dialectics of formal and informal practices during an SSC-leading IS implementation project in the context of a merger. Formal practices may have been imposed by the material properties of some new technological artifacts, whereas informal practices may be based on team members' knowledge sharing practices. This is particularly true in the context of merging entities and a shared services center, where organizational and/or country boundaries are crossed. Our study highlights two important topics: (1) the concept of performativity, which clarifies how relationships between agents and technology were never fixed, and (2) the process of emerging sociomaterial assemblages, which provides a more complete explanation of the different outcomes regarding the adoption of a new technology at the organizational level. By proposing a multiple-level process model, our research provides new insights on the adoption of a technology in the context of shared services center-driven organizational change. The results demonstrate that negotiated practices are part of a normal course of action in a new technology implementation across the boundaries of merging entities and that it is therefore preferable: 1) not to have a strict "formal" approach at the outset of a project; and 2) to take into consideration the unavoidable emerging "workarounds". This study also sheds light on how knowledge is shared in the context of a SSC. These are important takeaways for practitioners that may provide interesting insights to the management of an organization engaged in a process of a merger.

The main limitation of this study might be that it attempts at generalizing only from empirical statements to theoretical statements in developing a process model from a case study [70]. However, it has been shown that statistical, sampling-based generalizability may be an unbefitting goal for qualitative studies [71]. The UHC case is built on strong historical foundation and deals with issues of central importance to our research, which makes it purposeful [65].

Future research avenues could further build on the SSC and IT-enabled organizational change literatures to investigate other contexts and extend our multilevel process model in order to better and deeper understand the dialectics of formal and informal practices.

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