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Abstract

In this paper we explore how the implementation of an Enterprise System (ES) is related to organizational change, using an institutional theory lens. Our paper responds to recent calls by institutional theorists to first, better understand the ways in which macro, field-level logics of action are framed and applied in micro practices within an organization and second, to understand how material objects contribute to institutional stability and change. Our findings show the interplay between macro logics and the process of local framing through which these logics become locally interpreted, leading eventually to new institutionalized practices. Our study suggests the possibility of co-mingling contrasting and competing logics in the local context. We do this through the interpretive exploration of a rich case study of an ES implementation in India. This is an ideal case to examine because the institutional logic inscribed in the ES is developed within one organizational field, but is applied in a very different organizational field, thus allowing us to explore the macro-micro dynamics as well as the role of technology as a carrier and stabilizer of institutional structures and practices.

1.Introduction

The role of technology in contributing to institutional stability has been under-explored, despite the fact that it is material objects generally, and IT specifically, that help to make 'organizing durable' (Czarniawska and Joerges 1996, Lyytinen et al. 2009), 'scaffolding' social practices (Orlikowski, 2007). Moreover, IT can play a significant role as a carrier and diffusion vehicle for institutional change across an organizational field. This is especially the case in relation to packaged software, which organizations increasingly resort to rather than developing custom-built software. Such packages, hereafter referred to as Enterprise Systems or ES, are material carriers of institutional logics – of beliefs, norms and rationalities about how best to structure different kinds of business activities (Gosain 2004). However, despite the rhetoric of software vendors, an ES implementation does not automatically transfer the institutional logic of action inscribed in the software into the practices of the adopting organization (Grant et al. 2006, Hall 2005, Dery et al. 2006). Research has demonstrated that this is because the logic inscribed in the ES can clash with the existing, structures, beliefs and practices, that is, with the legacy institutional logic, of the adopting organization (Yoo et al. 2007). Nevertheless, most organizations do 'muddle through' with their ES and eventually create a 'working information system' (Wagner and Newell, 2006), albeit this often relies on significant customization (Brehm et al. 2001, Glass 1998) as well as organizational change (Volkoff et al. 2007). Customization indicates that the institutional logic inscribed in the ES has been modified in some way to accommodate certain local beliefs and practices (Pollock and Williams 2008). Thus, an ES implementation can be characterized as an encounter between the ES inscribed institutional logic and the legacy institutional logic that is embedded in the existing technology-supported practices in the adopting organization. Implementation of an ES, thus, provides the ideal opportunity to explore how micro-level processes within an organization are activated to translate the ES institutional logic.

In this paper, then, we explore the implementation of an ES in India through an institutional theory lens where we focus on the process of translating the ES in the local organizational context where there existed a competing institutional logic - the local legacy logic which was very different to the global logic inscribed in the software. Some literature suggests that change occurs when one logic is overthrown by another (Thornton 2002) through a dialectical process (Seo and Creed 2002). On the

other hand, others have suggested that competing institutional logics can co-exist (Marquis and Lounsbury 2007, Purdy and Gray 2009, Reay and Hinings, 2009) even though they are contradictory (Smith-Doerr 2005). While some argue this co-existence occurs through separation (Lounsbury 2007), others indicate that actually people can tolerate living with contradictions, mobilizing one logic in the context of one decision or action and another in the context of a different decision or action (Swan et al, 2010). In this paper we contribute to this debate by focusing on the clash in temporal logics (Orlikowski and Yates, 2002) between the ES and legacy practices and examine how this clash was eventually resolved. Moreover, we also explore the role of material IT artifacts in this interplay since IT is an important, but under-discussed issue in the institutional literature (Czarniawska 2008). Thus, we consider how the ES serves as a material carrier of a particular institutional logic. In the following section, we outline the theoretical framing of our paper; then we outline our methodology before describing and analyzing our case study.

2.Institutional Theory

A social structure is classified as an institution when the practices associated with this structure exhibit a repeated pattern because those involved have come to accept a shared understanding of reality, or in the words of Berger and Luckman (1967, 54): 'a reciprocal typification of habitualized action'. Institutions emerge from social interactions and come to acquire a reality-like status so that their social origins, which may well have involved tensions and conflict, are forgotten (Zilber 2002). Institutionalized practices are thus taken-for-granted (Zucker 1977). They are also assumed to be legitimate; that is, they are assumed, by those involved, to be the 'right' (even the only) thing to do (Colyvas and Powell 2006) because they comply with wider social norms, beliefs or laws.

Suddaby (2010) distinguishes between those who take an external, structural ('Macro' for Clegg 1990) versus internal, ideational ('Micro' for Clegg 1990) approach to examine institutionalization. External institutional theorists have focused on understanding the wider social elements (e.g., coercive, mimetic and normative pressures, DiMaggio and Powell 1983) within the environment that influence how particular structures and practices become perceived as legitimate (variously described as institutional logics of action, schema, cultural resources/scripts, systems of meaning, Creed et al. 2002) across an organizational field. Internal institutional theorists, of which there are fewer, focus on the internal processes through which particular structures and practices become institutionalized (taken-for-granted) within a specific organization, focusing on ideational elements such as myths and rituals (e.g., Tolbert and Zucker 1996). Of course there are links between these two approaches in that the structures and practices that become organizationally institutionalized (taken-for-granted) are likely to be consistent with the norms, beliefs and laws in the wider field (have legitimacy). But there has been little research that focuses on this dynamic interplay (Pache and Santos 2010).

In terms of understanding the processes surrounding change in the context of competing institutional logics, Creed et al. (2002) advocate the use of the framing since it is through framing meaning and expectations about a particular logic that institutional entrepreneurs can help to create common understanding and acceptance of the structures and practices associated with the logic within a particular community. Here we use the concept of technological frames - 'a subset of members' organizational frames that concern the assumptions, expectations, and knowledge they use to understand technology in organizations' (Orlikowski and Gash, 1994; 178). So a packaged software artifact inscribes a particular institutional logic. But the ES inscribed institutional logic has to be made sense of (Weick 1995) by people in the adopting organization – they develop a cognitive frame related to the technology and communicate this to others (sense-giving) so that some agreement develops (sense-making) within a particular community of practitioners. In this paper, we explore the way that the new packaged IT system was framed over time and how this related to the ES and legacy institutional logics. In doing this we focus in particular on the clash between the temporal logics in the ES and legacy system. Thus, there are multiple ways of experiencing and thinking about time (Legge 2009). Objective time refers to clock time that is treated as invariable, linear and external to any particular task. Subjective time refers to rhythmic time that is variable and dependent on the tasks being undertaken. As we will see, the ES and legacy systems were very different in terms of their assumptions about time and reconciling these differences was central to the achievement of the 'working information system'.

In sum, in the context of an encounter between an ES inscribed institutional logic and a legacy institutional logic, we explore how local agents reinterpret, and in turn, translate the macro external ES inscribed logic through micro internal processes of technological framing. Therefore, the questions that will be used to explore the case are: How do different groups frame the adopted IT-packaged system and how is this related to the ES and legacy logics? How do the frames change over time within and across groups?

3.Methodology: Interpretive Longitudinal Case Study

Institutional scholars have noted that to explore the micro processes of institutionalization and institutional change, particularly in relation to the macro aspects of institutional logics, qualitative methods are extremely useful (Colyvas and Powell, 2006). Also, as Zilber (2002, p. 237) notes, the institutional approach and interpretivist qualitative methodology go hand-in-hand. Epistemologically, both adhere to a constructionist and a cognitivist perspective (Scott, 1995). Ontologically, both assume a social construction of reality (Berger and Luckmann, 1967) emphasizing organizational members' inter-subjective experiences and ideational aspects of organizations. As such, our research was designed with a processual analytic focus (Dawson 1994), since it is especially suitable to our emphasis on meaning making and technology framing (Czarniawska-Joerges, 1992). Applying an interpretive perspective to a longitudinal case study approach (Walsham, 1993) enabled us to access rich qualitative field data.

The first author conducted the field study in a Western multinational organization located in a South Indian state that had an ongoing implementation of an ES. The South Indian state was a particularly favorable location since the society in the state seemed to be based on a temporal logic that was very different from the ES-inscribed temporal logic (Carmel and Tija 2005, Winkler et al. 2008). Also, being a native of the South Indian state provided the fieldworker with a cultural advantage. The organization, West India (pseudonym), also had unique features that provided the opportunity to examine different institutional logics present: a) although owned by Westerners, West India was famous for its traditional Indian style, b) a Western Managing Director [MD] (present in the company) with the remaining employees Indian, and c) the geographical location in a local silicon valley. Above all, the fieldworker could observe the ongoing implementation of ES from the start of the work on the first module right through to full implementation and use, with good access to data including all meetings.

Primary data that was triangulated with data from other sources came from 60 semi-structured interviews each lasting 60 minutes or more and weekly direct observation spanning continuous eight months (except a two week hiatus for preliminary analysis). The fieldworker interviewed 90% of the employees directly involved in the implementation and a group of employees not directly involved. To track the changes in individual's interpretation and meaning production (i.e., framing) the fieldworker conducted multiple interviews of the same person over time at multiple locations. The fieldworker audio taped, and transcribed verbatim all interviews, meetings and many member conversations. The credibility and trustworthiness of our data and related analysis is the result of triangulating source data, prolonged field engagement, systemic observation, researcher reflexivity, and peer debriefing/interlocutor checking (Lincoln and Guba 1985, Onwuegbuzie and Leech 2007). We followed grounded theory methods (Glaser and Strauss 1967, Strauss and Corbin, 1988) and used Atlas-ti software to aid in content analysis.

In addition to this primary data analysis we also undertook a content analysis of vendor websites that promote ES in order to examine the discourse that surrounds these kinds of integrated IT systems. In this paper, because of space limitations we do not provide our analysis of this secondary data but rather present our findings from this discourse analysis as the basis for exploring the ways that the clash in temporal logics between the ES and legacy systems played out in our case company.

4.Analysis: Institutional Logics and Technological Framing

Table 1 presents our analysis of the institutional logics inscribed in the ES (based on an analysis of popular discourse) and the institutional logics existing in the legacy environment (based on interviews

and observations)[1]. Analysis of the empirical data collected at the case focuses on understanding how these very different institutional logics were reconciled through micro-processes of framing. This led us to identify that different groups framed the ES in particular ways and that these framings changed over time. More specifically, we identified 4 different frames that emerged from our data analysis, with these different frames being articulated at different points in time, as those involved learnt more about ES through the implementation experiences. The frames, thus emerged at different stages of the ES implementation – the dominant framing at the initial stage of requirements analysis, for example, being different to the framing that was later prevalent during the implementation of the first few modules, which again changed as more modules were implemented and those involved could reflect on their experiences with the ES. We link these framings to the two temporal logics outlined below in the following analysis of the ES implementation.

Legacy temporal logic	ES-inscribed temporal logic
Norm	Norm
Flexible temporal order	Rigid temporal order
Temporal imprecision	Temporal precision
Schedule slippage	Schedule adherence
Meaning	Meaning
Time as flexible	Time as rigid
Time as less bound	Time as more bound
Rationality	Rationality
Logic of flexibility	Logic of efficiency
Subjective temporal logic	Objective temporal logic

Table 1: Contrasting Institutional Logics: ES inscribed and Legacy temporal logics

ES as delay reducer (Stage 1 Technological Frame): In the beginning period of the implementation, most employees directly involved in the implementation came to frame ES as a delay reducer, and in turn, an efficiency increaser through saving time. Thus, the employee conversations, interviews, the meetings as well as the archives were replete with statements such as 'ES is a modern solution to delays in production and data processing' that would provide West India with 'systematic planning and scheduling'. While the managers and engineers developed these understandings from the information that they got from various ES sales presentations, media including websites and professional magazines and informal discussions, the officers and supervisors developed them mostly from the managerial discourse. For example, an excerpt from the MD's note to the employees states: "The main concern is to get rid of our widespread delays through ES..adopting ES's best practices will result in increased efficiency".

From such comments those involved in the implementation not only developed an understanding that ES is a delay reducer that is universally applicable, but also an expectation that the mere adoption of ES's standard practice would result in delay reduction, and in turn, efficiency increase, as described in a production manager's interview: "I think, from their talk and other sources most of us thought that is the only way. That means [ES] has standard practices. You need to just accept these practices. Its implementation leads to delay reduction and, in turn, efficiency increase". The actors thus, discursively translated the globally legitimated outcomes of ES implementation (i.e. efficiency increase) into a locally and contextually salient outcome (i.e., delay reduction) resulting in the reproduction of the meta-discourse - ES as a global solution to organizations' local problems (Davenport 2000). The consultant-manager coalition (hereafter referred to as the dominant coalition group following Child, 1972) used this technological frame of ES to influence other employees' sensemaking; i.e., as a sensegiving device (Gioia and Chittipeddi 1991, p.442).

However, although the discourse during this initial period was dominated by the delay reducer frame, some employees were not convinced about the expectations the frame had generated. A publicly expressed critique of this expectation occurred as early as in the second meeting with the consultants when a particular manager (A) expressed his reservation against the plan to adopt ES

[1] Given space limitations we are unable to fully describe this part of our analysis that was based on detailed examination of ES vendor materials and the legacy systems in place prior to the ES implementation in the case.

practices. In the meeting, which was aimed at providing an overview of the different ES modules, the consultants emphasized that the adoption of the standard ES would produce better results including delay reduction. But, when the consultants explained that in manager A's module (as in other modules), there should not be much modification to the standard ES since this would dilute delay reduction, Manager A opposed arguing that the blanket adoption would not result in delay reduction. Gradually, a few engineers and officers joined the manager and started opposing the delay reduction claims and the manager became an informal leader of this opposing group. It is not that Manager A and his supporters came out with an opposing frame. Rather, they also believed that the ES could lead to delay reduction, and in turn the desirable efficiency increase, but not through the way the dominant group had suggested. For example: "[The ES] can reduce delays. As an engineer I can see that the integration and automation can easily reduce delays…But, in our context, it [ES] can reduce delays and increase efficiency [better] by automating and [then] accommodating best aspects of our procedures. That should be the way, not mere adoption [of the ES standards]" (Manager A in an informal taped conversation with the fieldworker).

ES as disciplining agent (Stage 2 Technological Frame): As employees started to use the ES, managers began to realize that to achieve delay reduction, beyond mere adoption of the standard ES practices, employees needed to actually enact them. For example, a production manager states: "In our practices there are start dates and finish dates. They are flexible, what we call guidelines. That means you could change them. In ES, now, I understood you can't change these dates that easily. It's hourly based..and makes us time bound..more efficient, professional and reduces delays. That means for us there are many differences". Thus, the logic of time inscribed in the ES (e.g. temporal rigidity and time boundedness) and its enactment (e.g. adherence to schedules and executing tasks 'in time') started to be framed as the normal, logical, and professional way to do things, while the logic of time institutionalized in the legacy systems (e.g. temporal flexibility) and its enactment (e.g. schedule slippage) were framed as non-logical and unsystematic. The consultants fuelled such discourse.

Associated with this characterization of ES practices as 'good' and simultaneously legacy practices as 'bad', the dominant coalition also started to suggest that the ES had the potential to bring about positive aspects of discipline: "ES makes us perform better, and forces us to record data timely and properly. This..reduces delays. This makes customer delivery dates more accurate, as it should be. This is very important for [West India]. Many customers see us as a traditional company that never does things in time. This occurs because we don't have proper records and time sensitivity. We need more discipline... ES helps here…We've been making them [other employees] understand it" (Design manager in an interview).

However, as with frame 1, an opposing group led by Manager A did not buy into this positive framing of the disciplinary aspects of the ES. Rather they perceived the ES as a control tool that increased employee visibility and monitorability. They, thus, presented an alternative interpretation of discipline as constraining employee action and rendering them open to panoptic surveillance (Foucault 1977) rather than discipline as enabling creative power where employees produce behaviors beneficial to them and the organization: "The ultimate result may be loss of efficiency…In the existing system, we deviate from the procedures and no one questions. It gives West India a lot of flexibility that we are losing now [by replacing the legacy practices with the ES practices]. In ES, the violations will be visible to others and that makes us more monitorable". (Engineer interview)

As this quote illustrates, not only did this group interpret the ES as a managerial disciplinary tool but they also began questioning the desirability of the logic of efficiency pointing to its potential negative effect, quality deterioration. Thus, this group began to oppose the logic of efficiency by articulating a competing logic of flexibility. However, the dominant coalition played down this alternative discourse, emphasizing the negative aspects of flexibility. For example: "(E)veryone follows one's own style; no standards, no systematism. The production is completely in individual AEs' [Assistant Engineers] and supervisors' hands. Whichever AE comes in the morning [shift], everything depends on him. If he decides today this [order] should not be run rather I'll take it up tomorrow, he will divert the whole stuff into another [order] production. He'll take up the production [of the order] of the customer who pressures him most. We've such unwanted flexibilities" (A production manager in an interview).

The dominant coalition were, then, not tolerant of the opposing framing and those articulating this opposition became fearful about speaking out. This fear was further deepened when Manager A and some operators who had objected to the ES were terminated and other employees who had produced the negative disciplinary tool discourse were excluded from the ES training.

ES as transparency increaser (Stage 3 Technological Frame): While the negative disciplinary and flexibility reduction discourse was still continuing, at least in informal channels, some of the managers started a new discourse that interpreted ES as a transparency increaser. In some ways this was an attempt to counter the opposition. The lack of transparency in performance appraisal was a source of constant conflict between the engineers and supervisors (those involved in the opposing framing) on one side and the frontline workers on the other side. During this period labor relations were tense between these two groups: "ES will show the exact reasons for the delay…It may show that the operators did not work full hours..When we show them [operators] the output, they will be convinced..The fight between the supervisors-engineers and the operators will die off..good for all..especially beneficial to supervisors" (Production Manager in a group discussion with the supervisors and engineers).

Many employees reproduced this discourse of transparency increaser. Still, many supervisors, officers, and engineers did not accept this framing, although they did not express their dissent publicly, as is illustrated in this interview with a supervisor: "The other way, on a fine day if commanded to enter only in ES, everyone will obey, though unwillingly ..[Without explanation] demanding me to act in a particular way on a fine day onwards is like creating a smoke shield before me. I will know only the 3-4 windows that I enter the data into. And this doesn't increase the transparency! The breakdown [of tasks and time] may increase efficiency. But since a team is assigned this duty, we can't speak out…we are made not a part of it. We have to keep our mouth[s] shut..or there are risks…easy and safe to pretend we agree". This quote shows that some employees appeared to be making sense of ES as a transparency increaser but this did not reflect a genuine consensus on the meaning of the ES because they did not feel that they had any greater overview of the operations they were responsible for. Nevertheless, the apparent consensus resulted in a smooth adoption of ES's standard practices in the modules that were being implemented during this early period. The embedded efficiency logic in the ES modules was not significantly modified (i.e., customized). Instead, the local practices and the underlying norms were modified to make ES work for the organization, despite reservations from some. The seeming early 'success' of implementing the 'vanilla' ES, was not followed with the later modules where the production managers and design managers argued for incorporating some local practices into ES. This was accompanied by a flip in the technological frame from efficiency increaser to flexibility reducer.

ES as flexibility reducer (Stage 4 Technological Frame): While so far the dominant coalition had represented some local activities as "unsystematic practices", now the production and sales managers, and some other managerial employees came to interpret the same practices as "flexibilities" of the West Indian system. Managers began to interpret ES practices (e.g., production scheduling) and their outcomes (e.g., production schedules) as not practical and disconnected with the day-to-day reality of customer pressure and the need to be responsive. One production manager stated: "Take the September example that you [the fieldworker] observed. Due to customer push-in [a local practice] we could not meet the due dates. We could inform the customer only after we missed [the date]. In ES, if this happens, we'll be able to inform the customer in time. But, the flexibility to change the order preference [part of customer push-in] will not be and cannot be eliminated..They are practical daily needs..ES cannot become a flexibility reducer". These were the same managers who had labeled local practices such as customer push-in as unsystematic practices when supervisors, some officers and engineers had interpreted them as flexibilities. Further, although the consultants sternly warned that "accommodating the flexibilities" would upset the schedule adherence, these managers now insisted on incorporating some local practices such as customer push-in. Following the managers, other employees also started increasingly interpreting ES as a flexibility reducer. Thus, the managers' flipped the technological frame - from an efficiency increaser to a flexibility reducer. This change in framing occurred mainly based on the managers' reflections following the trial use, when they recognized the limitations of not being able to respond to particular customers.

Initially, the consultants argued that given the system limitations, it was nearly impossible to incorporate the local practices. However, the production managers insisted on the modifications, arguing that the company's survival depended on such customer responsiveness. Finally, the consultants divulged that they had no access rights and had to contact the vendor to make the changes, and that this would take more time and effort. After two months of discussions, the consultants together with the vendor agreed to make the modifications, resulting in significant changes in the standard ES. The customizations included the development of a customer preference interface (specific to West India) that linked the Sales module, Production module and Materials module, redesigning of some of the materials management sub- modules that resulted in less links with the Production module, and a number of changes that enabled the user to manually change the reservation of the material for production before the material is issued. These modifications enabled the users to change the production schedules manually even after they had been confirmed along with sales orders. Through these customizations the temporal rigidity of the ES schedules was reduced. Still, in other modules time bound action was maintained. For example, in the material management schedule, the users had to enter the data at the moment the material was received or issued for production. Thus, by customizing the standard ES West India constructed a working ES that embodied conflicting institutional logics, the logic of temporal rigidity and efficiency and the logic of temporal flexibility. These enactments were made possible by applying the different logics to different decisions.

5.Discussion

We summarize the main points of our analysis in Table 2. The table shows how the dominant coalition framed the adopted ES over time, and how this was related to the ES-inscribed and the legacy institutional logics. It also shows the opposing discourse that was evident, although often suppressed. The last two rows of the table highlight the institutional change that occurred over time and the institutional logics that underpinned the 'working information system'.

Stages →	Stage 1	Stage 2	Stage 3	Stage 4
Tech frame	Delay reducer-efficiency increaser	Disciplining agent – efficiency increaser	Transparency increaser – efficiency increaser	Flexibility reducer – efficiency reducer
Promoters	Consultant-manager coalition	Consultant-manager coalition	Managers	Managers
Dissenters & their critiquing discourse	Manager A & a few engineers argued for need to adapt ES to local practices	Manager A & a few engineers argued ES was managerial disciplinary tool and flexibility reducer	Manager A & a few engineers argued ES reduced transparency	Consultants argued against the flexibility reducer framing
Institutional logic	Efficiency Logic	Efficiency Logic	Efficiency Logic	Flexibility Logic
Institutional change	ES practices and norms replaced legacy practices and norms	ES practices and norms replaced legacy practices and norms	ES practices and norms replaced legacy practices and norms	Legacy practices and norms replaced some ES practices and norms

Table 2 Summary of the implementation analysis

In the initial stages, the widely legitimated logic of efficiency that was inscribed into the ES influenced manager's sense making. The consultants played a pivotal role here, as the management fashion-setting literature would predict (Abrahamson 1996). They were actively involved in framing the ES as a 'ready-to-wear' structure (Czarniawska and Joerges 1996) that would transfer 'best practices' to West India. Many managers accepted this framing so that a dominant coalition frame

emerged – consultants and managers spoke with one voice about the meaning and expectations of an ES. Over the first three stages, the different frames reflected the global logic embedded in the ES but in ways that gradually localized the interpretation of this logic. That is, the first three frames did not undermine or change the ES-inscribed logic but rather helped to make sense of this logic in ways that were locally meaningful; the frames augmented the inscribed global logic so that the ES became the solution to what were perceived to be West India's problems – delay reducer, then disciplining agent and finally transparency increaser.

There was a very strong objective temporal logic underpinning this framing of the ES that stood in stark contrast to the subjective temporal logic (Legge 2009) of the legacy system and that was a reflection of a dominant institutional logic in India (De Reincourt 1960, Paniker 1976, Sahay 1998, Winkler et al. 2008). Thus, the dominant coalition's framing included expectations from the ES, such as delay reduction, time saving, and discipline (all very much part of an objective temporal logic) as well as the negative framing of the legacy system as being unsystematic and undisciplined (consistent with a subjective temporal logic). This framing by the dominant coalition was used as a sense-giving discursive resource to distinguish the 'good' (efficiency logic of the ES) from the 'bad' (flexibility logic of the legacy system). Through their sense-giving actions, this framing came to influence many organizational members' sense-making. Thus, most organizational members reproduced the technological frames that claimed the efficiency logic during interviews and in observations. The overall result was a smooth replacement of the legacy practices and the underlying logics. The early stages of the ES implementation, thus, appeared to show a simple transfer of the new institutional logic into the company through the ES adoption, albeit with some local translation to provide meaning in the particular context. However, as we discuss next, this changed over time as West India reflected on the changes that they were instituting. This is an important finding and suggests that researchers wanting to study technology implementation as an occasion for institutional change need to take a longitudinal perspective.

While the dominant framing was thus initially aligned with the macro logic of ES as an efficiency enhancer through increasing temporal objectivity, this framing was contested. The contestation came in two forms that gradually undermined the global ES logic. Initially, a small group of engineers and managers contested the dominant coalition's framing of ES – they portrayed the ES as a managerial disciplinary tool that threatened worker autonomy and ultimately would undermine flexibility. However, this opposing discourse did not gain momentum since this group lacked the power to get others to buy-into their opposition. More importantly, the dominant coalition, sensing the threat to their framing of the ES, deployed an array of political strategies aimed at silencing this opposition. This included intentional domination (e.g., the cycles of negative characterization of legacy practices and simultaneous-positive characterization of ERP practices), manipulation (e.g., the manipulative attempt to align supervisors' interests with that of the coalition through the transparency increaser framing), and the creation of coercion (e.g., through terminations and exclusions). All these political strategies involved using frames as a sense-giving discursive resource to retain the legitimacy of the efficiency logic (manipulation) and/or undermine the opposition (domination). These strategies certainly worked to silence those who were trying to present a different interpretation of the ES, and although this group did not give up this opposition, the ES implementation was not undermined and legacy logics and their associated practices continued to be replaced by ES logics and practices.

The second point of contestation involved the managers themselves who came to oppose their own frame and so be at odds with the consultants involved, even though these two groups had been in unison up until this time. Managers had initially accepted the global rhetoric of the efficiency rationality, but following use, they started to argue that the ES schedules were not practically feasible. Thus, managers challenged ES's theoretical rationality in favor of the practical rationality (Townley 2002) they identified. This practical rationality emphasized dealing with day-to-day difficulties, for example, being able to respond to customers. These practical challenges led to a new framing that now portrayed the logic of flexibility with its temporal subjective orientation as 'better' and more practical than the ideal and so 'best' but 'impractical' logic of temporal (objective) rigidity that the efficiency logic epitomized. The outcome in West India was that these two seemingly opposing logics were co-mingled through customizations to the ES. Thus, in the initial stages, the ES, with its inscribed institutional logic challenged and replaced the institutional logics that underpinned the legacy model of organizing. In later stages, the institutional logic of the legacy model of organizing

challenged and shaped the ES inscribed logics, at least as they were enacted in the case company. In this way the two logics were co-mingled, with each being 'artfully mobilized' (Friedland and Alford. 1991) in different situations that they had come to define as requiring flexibility **or** efficiency.

Interestingly, the two instances of contestation differed in terms of a) the way flexibility was framed: in the first case flexibility implicated worker autonomy and in the second case it implicated customer responsiveness, and b) the proposed nature of rationality: substantive in the first case and practical in the second case. Nevertheless, the pattern of unpacking and translating the rationality of the ES inscribed logic through framing and reframing, and in turn, advancing a new logic remained the same. The process of framing and reframing was an inherently political process. Actors used framing as a 'strategic process' (Gioia & Chittipeddi, 1991) and frame as a sense-giving discursive resource to advance their interests and facilitate collective action. In this way institutional logics and frames influence each other. Our analysis thus demonstrates the interplay between the macro logics that local organizations may be pressured to adopt and the process of local framing through which these macro logics become locally interpreted, leading eventually to new institutionalized practices. In our case this resulted in a hybrid of global ES inscribed and local legacy logics.

The fact that the end product was an ES that co-mingled the ES and legacy logics is interesting given that the two logics are contrasting and arguably contradictory. Thus, while the logic of efficiency embedded into the standard ES necessitated adherence to standard procedures and temporal rigidity, the logic of flexibility allowed deviation from the standard procedures. While the extant research on logics emphasizes how a dominant logic uniformly shapes organizations (Lounsbury 2007) overthrowing competing logics (e.g. Seo and Creed 2002), our study suggests an alternative - a possibility of co-mingling contrasting and competing logics in the local context.

Our analysis also shows that once consensus around a particular logic of action is achieved it can be translated into a material medium (such as software) that can help to subsequently maintain the agreed structures and practices of this logic. Our study, therefore, highlights the dual role of the technological artifact (in conjunction with the human actors) in the process of institutional change and institutionalization. First, artifacts function as material substrates onto which actors (e.g., software designers) inscribe their legitimated models of organizing. In this sense, artifacts such as IT programs are material carriers of ossified institutional patterns of organizational action with associated meanings, norms, and rationalities (Gosain 2004, Lyytinen et al. 2009). Second, the translation of the logics into material medium makes the logics more enduring adding to the durability of organizing, and in turn, institutional stability. How users perceive material agency of the ES has the capacity to produce preset outcomes even when users resist. As a result, user behavior is structured in a particular way and this influences their framing. In the context of an adopting organization, actors such as those involved in implementation, unpack the ES-inscribed institutional logic about how a particular practice is 'best' done through a process of framing and reframing. As experience is accumulated with the new IT, frames may be changed and the localization is taken a step-further as advantages of the legacy logic, and corresponding disadvantages of the ES logic, surface.

Once an ES system is in-use, there may still be drifting (Ciborra 2000) but the translation of the logic that has gained consensus into a material medium (e.g., software supported practices) can make the logic more enduring (i.e., more strongly institutionalized). It comes to be seen as irrevocable and less amenable to change. In the case of as ES, the irrevocability and lack of changeability comes from various factors such as the complexity of the technology, access rights issues, and time-budget constraints (Kallinikos 2004). The irrevocability and unchangeability add to the durability of organizing (Czarniawska 2008). This ossification of the model of organizing coupled with a high degree of automation and limits to the local actors' control over the software infuses ES with a material agency: a capability to produce preset outcomes, even when users resist. The experience of such material agency comes to influence actors' framing. An example is the attribution of disciplining agency to ES in our case study that was partly based on the trial use. Also, the material agency comes to structure the temporal behavior of the users (Kandathil 2009, Lee and Liebenau 2000). An example from our case is the ES enforced time bound action. The experience of such structuring was one of the factors that provoked the actors to critically reflect on the inscribed logics and enabled them to come up with alternate technological frames that eventually led them to modify the ES; that is to change the institutional logic inscribed in the software based on the legacy institutional logic.

Apart from the contributions already mentioned our study also contributes to the literature on technological frames. IS studies generally examine technological frames as an outcome, neglecting the process of framing (Davidson 2006). Our focus on the process of framing brought out the unpacking of ES inscribed institutional logics and the resultant co-mingling. Also, IS studies emphasize the cognitive aspect of technological frames (e.g., the sharedness of sense-making or a collective understanding, cognitive shift in frame salience), while our study illustrates the use of frames are a political device - a strategic sense-giving discursive resource. Thus, our case shows how interested actors' use technological frames as an emergent sense-giving discursive resource; that is, as a political device (Sillince and Mueller, 2007). Thus, we extend the role of discursive resources in facilitating changes in social institutions (e.g., Suddaby and Greenwood 2005, Zilber 2002) to technology inscribed institutions. Our study illustrates the benefits of examining ES implementation as a socio-technical and political (see also Lyytinen et al. 2009) process that influences institutional orders.

A final contribution is that we focus on a less investigated aspect of institutional logic, the temporal aspect. Broadly, the temporal aspect of organizations' belief systems and material practices is a relatively neglected topic in IS studies (Lee and Whitley 2002, Orlikowski and Yates 2002). In particular, the dynamics of modifying temporal meanings or logics embedded in a technological artifact such as software as well as organizations' material practices has rarely been examined (Kandathil 2009, Orlikowski and Yates 2002). Our study generates insights into this dynamic.

6.Limitations and Future Research

Although we have brought out some complexities in the process of technology inscribed institutional change, due to space constraints and the need for a high level of abstraction, we have presented a somewhat linear process of change. We did not account for the micro noises in the process, for example the variation within actor groups in the interpretations of flexibility or disciplining. Instead, our focus has been the interactions between and among groups. Also, our study is based on a single case study. But, we believe that our analysis can be extended to many forms of institutionalization and institutional change processes that involve material artifacts as carriers of institutional logics.

Going beyond the limitations, our paper identifies a fertile topic for further research, technology inscribed institutional change. Under this topic, this paper raises many questions for future research. We list some of them here. Why and under what circumstances do institutional entrepreneurs choose co-mingling as a resolution technique? Broadly, what factors drive institutional entrepreneurs' choice of a particular technique to resolve institutional contradictions? What are the challenges to institutionalizing and maintaining technology inscribed institutional change? How are they similar to or different from challenges involved in changing other intra-organizational institutions?

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