

5-25-2010

Understanding Project Survival in an ES Environment: A Sociomaterial Practice Perspective

Erica L. Wagner

Portland State University, elwagner@pdx.edu

Sue Newell

Bentley University, sue.newell@sussex.ac.uk

Gabriele Piccoli

Grenoble Ecole de Manage, gabriele.piccoli@grenoble-em.com

Follow this and additional works at: <https://aisel.aisnet.org/jais>

Recommended Citation

Wagner, Erica L.; Newell, Sue; and Piccoli, Gabriele (2010) "Understanding Project Survival in an ES Environment: A Sociomaterial Practice Perspective," *Journal of the Association for Information Systems*, 11(5), .

DOI: 10.17705/1jais.00227

Available at: <https://aisel.aisnet.org/jais/vol11/iss5/1>

This material is brought to you by the AIS Journals at AIS Electronic Library (AISeL). It has been accepted for inclusion in Journal of the Association for Information Systems by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Journal of the Association for Information Systems

JAIS

Research Article

Understanding Project Survival in an ES Environment: A Sociomaterial Practice Perspective*

Erica L Wagner

School of Business, Portland State University, USA
elwagner@pdx.edu

Sue Newell

Bentley University, USA
Warwick University, UK
snewell@bentley.edu

Gabriele Piccoli

Grenoble Ecole de Manage, France
gabriele.piccoli@grenoble-em.com

Abstract

Modern organizations are increasingly choosing to adopt off-the-shelf software applications (e.g., Enterprise Systems, ES) rather than develop tailor-made solutions. However, many studies have shown that adopting prepackaged software is difficult with these highly integrated systems amplifying the potential for organizational conflict; especially once the system is rolled out to users. There is a gap in the literature related to this changing pattern of systems development, and researchers have begun investigating it. We contribute to this emerging literature while also shifting the focus of ES implementation research by offering a new perspective to understand the processes of mutual adaptation of the technical and social during system implementation and maintenance of large scale systems (ES). We focus on the turnaround process by which a troubled project at go-live becomes a working information system. Much IS literature to date has focused on the problems associated with configuration and implementation or the immediate (often negative) reaction to, and use of, packaged software. Yet, there is significant evidence that projects often do survive and yield a working information system in the face of, and despite, a negative release. Based on data from an intensive qualitative field study within a university, we find that practices are negotiated through processes of use rather than being permanently and systematically selected at a particular moment in time and, in so doing, we offer one of the first works to address the issue of sociomateriality and its implications for understanding the evolution of large scale IT systems.

Key words: 'best practice', Enterprise Systems, ERP, practice, project survival, implementation, sociomateriality, negotiation, case study.

Volume 11, Issue 5, pp. 276-297, May 2010

* Kalle Lyytinen was the accepting senior editor. This was submitted on October 12, 2009 and went through two revisions.

Understanding Project Survival in an ES Environment: A Sociomaterial Practice Perspective

1. Introduction

Research suggests that there is a higher occurrence of implementation problems associated with packaged software as compared to custom-built efforts (Sia and Soh, 2007), with significant capital outlays “often hidden and unrealized at the outset” (Keil and Tiwana, 2005 within Chiasson and Green, 2007, 543). The main problems stem from the need to address misalignments between “best practices” embedded in the product and the legacy practices within the adopting organization (Lucas et al., 1988; Sia and Soh, 2007; Leonardi and Barley, 2008). As Berente et al. (2007; 14-15) note: “Enterprise systems are different. They represent a rationalization, encoding and abstraction of ‘best practices’ that, while being congruent with the logic of certain functional areas of some organizations, can be in conflict with others.”

Recognizing these problems of packaged software implementation, some research calls for early detection of misalignments during product selection and configuration (Sia and Soh, 2007). However, this same research concedes that certain, more complicated, misalignments and those subject to external regulations “may only surface later during implementation” (p. 582). Indeed, recent literature recognizes that “while intense efforts and conflicts surface early in the development-use cycle for custom-built software, packaged software seems to postpone this intensity to the ‘translation phase,’ that is, implementation” (van Fenema et al., 2007; 586). This indicates that misalignments need to be worked through in the post-rollout period. We focus on this period in the paper and explore the turnaround process that occurs between the misalignments that become evident at rollout and the final emergence of a working information system. A working information system is one that is accepted and used by the various communities of practice involved, even though it may not be ideal from any one perspective. We refer to this turnaround as project survival.

While several studies over the years have focused on the post-go-live phase and the turn-around of IS projects (Orlikowski, 1996; Boudreau and Robey, 2005; Berente et al., 2008), there has yet to be an attempt to introduce and frame the phenomenon of project survival. Following the seminal work of Orlikowski (1996) on situated change and post-go-live metamorphoses, a few ES researchers have conceptualized what happens during the turnaround phase. Boudreau and Robey (2005) describe the post-go-live period as one where users moved from inertia, through situated learning, to reinvention. Berente et al., (2007) conducted a meta-analysis, assessing previously published ES studies and concluded that the fate of such projects “is determined not by initial reactions [at go-live] but also through eventual reconfiguration of the relationships among communities over time as they figure out how others react and how that might affect their own local practice”(12).

Our work extends this analysis through exploring how project survival occurs through processes of mutual accommodation and adaptation of social **and** technology actors during the post-rollout phase of an ES project. More specifically, in order to explore how the material features of an ES intermingle and co-evolve with the social in the post-rollout period, we adopt a sociomaterial practice perspective (Orlikowski and Scott, 2008). This perspective recognizes that the material and the social mutually and emergently produce one another, as people, entangled with a variety of technologies, carry out their daily practices. From this perspective, then, material objects are interwoven with, and inseparable from, social activity (Orlikowski, 2007). An ES is, thus, a sociomaterial assemblage that enables and constrains what can be practically accomplished within an organization. Given misalignments between the best practices underpinning the software package and legacy practices achieved through the previous sociomaterial assemblage, there is likely to be resistance at rollout, and for the project to survive, this resistance must be accommodated. In this paper we explore **how, when, and where** resistance to an ES assemblage is accommodated through sociomaterial adaptations in the post-rollout period to enable a troubled project to survive. In doing so, we advocate for a change in discourse from best practice to “negotiated practice.”

This change recognizes how survival in contested situations can depend on negotiations that can extend well beyond the roll-out phase. We address the following research questions: What is the nature of ES project survival that enables the realization of a working information system? Specifically, how, where, and when are contested best practice configurations negotiated during this process? We

address these questions through a qualitative field study in a university where we followed an ES implementation project. The project involved significant changes to the research grant management process, which had historically been managed in a decentralized, loosely coupled manner. Evidence suggests that misalignment is likely to be highly observable in organizations that are structured in a loosely-coupled manner (Berente et al., 2008), and yet, there is a trend toward adopting ES in such organizations in an effort to mitigate institutional risks through standardized administrative activities via an integrated technology platform (Wagner and Newell, 2004; Allen and Kern, 2001; Mahrer, 1999; Pollock, 1999). Nevertheless, there is likely to be a dichotomy between implementing integrated, standardized ERP technology and the traditional, fiefdom-like structure of universities where information systems develop organically to support the values of academic freedom and “scientific separateness” (Allen and Kern, 2001; Cornford, 2000; Pollock, 1999). This suggests such organizations may be good sites in which to study how misalignments are overcome to enable ES projects to survive.

In the next section we present the theoretical perspective informing the study, followed by the research design. The case findings make up section four, and these are directly followed by a discussion of the findings in section five. The paper concludes with implications for both IS research and practice.

2. Theoretical perspective: Sociomaterial practice

Custom-built software applications presuppose a high degree of congruency between the system and the supported business routines; this is not the case with packaged software where the application is not built to the specifics of the organizational context and processes, but rather to a set of assumed best practices (Berente et al., 2007). In order to understand how this difference can influence the application's roll-out, we need to explore the misalignment between these best practices and legacy practices within an organization and examine how this misalignment is resolved. In order to frame project survival, it will be important to focus on people's practices and how individuals produce and reproduce their practices to create structure and meaning in a particular historical and social context (Levina and Vaast, 2005; Schatzki et al., 2001). Moreover, given our interest in understanding how the material aspects of technology are entangled with the social in this production and *re*-production of practice, we adopt a sociomaterial practice perspective (Orlikowski and Scott, 2008). This perspective is grounded in the notion that what people do is always locally defined and emergent and that this local emergence includes the material (i.e., technology) as well as social structures and processes (Orlikowski, 2000).

The essence of this sociomaterial practice perspective is that the material and the social are mutually constituted and, therefore, inseparable. In this sense, the structures and processes (e.g., the rules and routines associated with a best practice configuration) of an ES are enacted and emergent as users draw upon the software in their situated practices. Thus, the practice perspective recognizes that the material features of technology are only consequential when human actors draw upon technology in their practices (Jones and Karsten, 2008). The sociomaterial practice perspective, therefore, follows the long tradition of IS research emphasizing the importance of process theories of change that refute the idea that there are static technical or social factors that causally influence one another (Markus and Robey, 1988; Robey and Boudreau, 1999). However, as Volkoff et al., (2007) point out, many of the theoretical perspectives that have been applied to study these processes are limited because they either place too much emphasis on individual agency, thus ignoring material structures, or they put too much emphasis on the material structures and so can underplay the actions of the human actors. Blending the two, the sociomaterial practice perspective pays attention to both the material and the social aspects of technology change, focusing on their mutuality.

Orlikowski and Scott's (2008)¹ practice perspective identifies not only the sociomaterial aspects of practice but also the performativity and relationality qualities of practice. We define these below, since we will subsequently use these concepts to frame how, when, and where project survival is

¹ These ideas were elaborated upon at a recent conference at the London School of Economics www.lse.ac.uk/collections/informationSystems/newsAndEvents/2009events/sociomateriality.htm organized and chaired by the authors of this paper.

negotiated in our case.

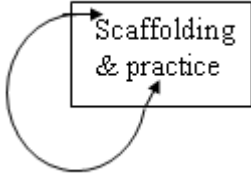
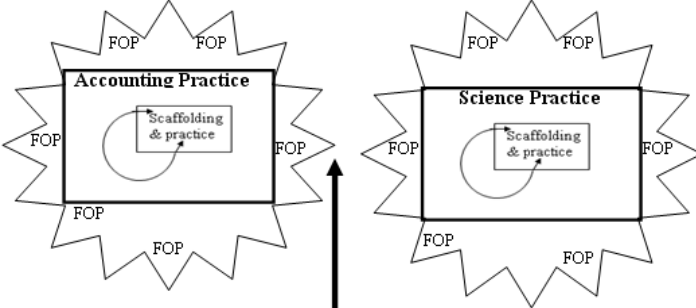
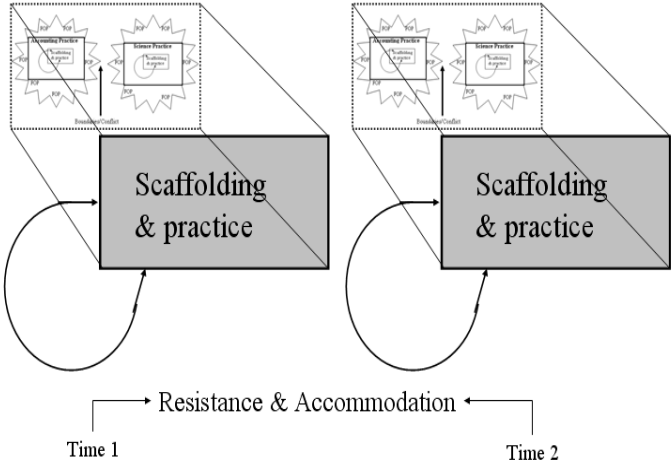
First, we have already identified how a key defining feature of practice perspectives is their rejection of the agency/structure (or voluntary/determinist, individualism/societism - Schatzki et al., 2001) dualism inherent in most modernist and positivist social theories. As Jones (1998 within Orlikowski and Scott, 2008) importantly notes, "Rather than seeing humans with clearly-defined goals applying technologies with clearly-defined properties to achieve clearly-defined organizational effects...we need to understand the process of information systems development and use as an ongoing double dance of agency" (p. 299). The notion of a sociomaterial assemblage (Orlikowski and Scott, 2008) captures this aspect of a practice perspective. The material and the social both have agency, but this agency is never known in advance and is only revealed in practice. From this perspective, an ES is a "composite and shifting assemblage" of the material (IT) and social. Therefore, our research needs to examine how this assemblage changes over time as those involved draw upon the ES to provide meaning, to exercise power, and to legitimate actions (Giddens, 1984).

Second, particular communities-of-practice develop preferred sociomaterial arrangements in order to interact in a manner that is understandable and justifiable to them. Those involved in a particular practice are able to draw upon these sociomaterial arrangements in a way that provides meaning for them (Nicolini, 2007) and a sense of identity (Wenger, 1998; Nicolini, 2007), as well as enables them to be seen as competent and credible (Garfinkel, 1967). However, all work exists within a broader field-of-practices (Schatzki et al., 2001), where there are multiple communities, which both unite and divide agents (Levina and Vaast, 2005; Berente et al., 2007). The relationality construct reminds us, then, that just as people and things are constitutively entangled as sociomaterial assemblages, these assemblages exist in relation to other assemblages. That is, within a field-of-practice such as accounting, common interest unites agents, while across fields, where accounting must communicate with scientists for example; differences in practices will create boundaries and potential conflict. The introduction of an ES that is designed to cut across functional areas and, as a consequence, across fields-of-practice, will shift the sociomaterial arrangements and upset the fragile balance existing between interconnected practices. Practice perspectives can help us explore these interconnections by focusing our attention on how boundaries are formed and changed (Levina and Vaast, 2005).

Finally, the concept of performativity emphasizes how relationships between humans and technology are never fixed. Instead, the sociomaterial assemblage emerges from practice and defines how to practice. For example, American football emerged from the UK game of rugby, as those playing the game evolved the sociomaterial assemblage that we now call American football (Clark and Staunton, 1989); this assemblage is quite different from rugby in terms of rules, equipment, skill set required of the athletes, league affiliations, championship playoffs, and the discourse that surrounds the practice. Practice perspectives, thus, emphasize process, and assume that practices are constantly changing, albeit some changes are very small. This means that there are always inconsistencies, even when people are supposedly carrying out the same practice: "Pursuing the same thing necessarily produces something different" (Nicolini, 2007; 894). It is in the act of practice that the relation (between the material and social) is defined; and each act produces (or performs) a different relationship. Pickering (1995) provides a useful way to look at this performativity, which he describes as a dialectic process of resistance and accommodation that produces unpredictable transformations in the sociomaterial assemblage (or mangle). By focusing on mangling of the social and technical, we are able to see how people and technology are actually co-constituted through practice.

Language, as a form of practice, has particularly important performative properties in that what people (e.g., managers or project team members) say (here about an ES) can be persuasive, convincing users to change their work practices to accommodate the ES. Language can then help to create a relatively stable order through establishing consensus about the meaning and legitimacy of the nature of ES and its consequences. However, language can also fail to persuade so that alternative discourses come into play about meaning and legitimacy. Exploring the resistances and accommodations across multiple practice communities as they act/practice with and talk about the ES can, therefore, help us to explore how the sociomaterial assemblage is performed over time. This performativity depends in part on the intentions and adaptive abilities of the people involved. Therefore, it is important to explore the transformations by following the sociomaterial assemblage, as it is re-configured across the communities over time through a process of negotiation.

Figure 1: Core concepts in our Practice Perspective

Definitions	Depiction of Key Concept/Aspect of Negotiated Practice
<p><i>Sociomaterial Assemblages</i> People and things exist only in relation to each other:</p> <p>Material objects “scaffold” social activity (Orlikowski ,2005), enabling and constraining but not dictating what is possible</p>	 <p>How can accommodation be achieved by sociomaterial adaptations?</p>
<p><i>Relationality:</i> Assemblages exist in relation to other assemblages across the organization:</p> <p>People are invested in their practice so fields of practice (FOP) unite within but divide across other FOP. As such, it is at the field of practice boundaries that conflict is likely to arise. A change of practice in one FOP (accounting practice) potentially disrupts other practices (science practice).</p>	 <p>Where have boundaries between communities been disrupted?</p>
<p><i>Performativity:</i> The sociomaterial assemblage emerges from practice as well as defining how to practice:</p> <p>Given differences in practice a dialectic process of resistance and accommodation will occur which depends in part on the intentions and adaptive abilities of the people involved; the outcome will therefore be unpredictable and constantly emergent.</p>	 <p>When do negotiations take place?</p>

The three concepts introduced above are presented diagrammatically in Figure 1 and should be interpreted as inter-related. Those within particular localized communities draw upon an ES to provide meaning, exercise power, and legitimate actions on a daily basis. These stakeholders confront resistances and find sociomaterial ways to accommodate their needs over time and across practice communities where necessary.

It is this ongoing negotiation process emerging after go-live in an ES project that we focus on here. Our choice of practice perspective was based on its relevance and distinctiveness (Table 1) for theorizing ongoing processes of packaged software use, and it helps us to develop an understanding of project survival as a central tenet of packaged software implementation. In doing this, we seek to explain how

contested ES projects can survive through a process of negotiated practice; a process by which actors, seeking a cooperative outcome, reexamine the best practice ideal in order to create a good enough solution for all involved (i.e., a working information system). In doing so we respond to calls for more process-oriented IS research that seeks to find ways to describe and analyze the dynamics of IS change (Lyytinen and Newman, 2008). Our main point of departure from previous accounts of such change is to present our account in sociomaterial practice terms, meaning that we explore the cumulative history of relationality between the social and the material. This is subtly, but importantly, different from more traditional socio-technical accounts in the IS literature. Socio-technical accounts assume that the social and technical are discrete, albeit interacting elements that can be independently mapped over time and that may be more or less in equilibrium. However, from a sociomaterial perspective, material things have no meaningful existence aside from their entanglement in a particular social context, so that the goal is to describe this entanglement within and across communities over time. This also makes our perspective somewhat different from Actor Network Theory. In an ANT perspective, both material objects and humans have agency; while in sociomaterial parlance, agency resides in the assemblage not independently in either the material or the social.

Table 1: Practice Perspective: relevance to ES and distinctiveness

Concept	Relevance to ES	Distinctiveness and challenge
Sociomaterial assemblages	Need to explore how sociomaterial assemblages are drawn upon to provide meaning, exercise power, and legitimate actions	Does not treat the social and the technical as discrete entities (unlike socio-technical theory) with fixed structure and meaning; requires us to develop new ways to think about the consequences of IT which are not pre-defined
Relationality	Need to explore how boundaries are created and recreated during the implementation of an ES	Does not assume uniformity across practice communities affected by the ES; requires us to explore how practice boundaries are affected and changed over time
Performativity	Need to explore the 'double dance of agency' as a series of resistances and accommodations	Does not treat the meaning of IT as static but rather dynamically emergent; requires us to undertake process research

Based on the distinctiveness of the sociomaterial practice perspective that has been outlined, we can unpack our original research questions about how, where and when best practice configurations are negotiated to enable project survival when resistance is encountered due to misalignments becoming evident at rollout. The idea of a sociomaterial assemblage that is always "becoming" in practice indicates that our research must examine the unanticipated as well as the anticipated consequences of an ES and accept that any unanticipated consequences should not be dismissed as either poor design or poor user acceptance. Therefore, we ask, "How is accommodation achieved by sociomaterial adaptations?" The relationality concept indicates the importance of exploring where boundaries between communities have been disrupted by the ES and how sociomaterial accommodations can restore the resulting cross-community conflicts. Therefore, we ask, "Where has the ES disrupted boundaries between communities?" Finally, the performativity concept directs us to conduct longitudinal, processual research in order to capture how the sociomaterial assemblage is resisted and accommodated over time. We ask, "When do negotiations over the ES take place?"

3. Research Design, Sampling and Data Analysis

This study is motivated by the need to understand the nature of ES project survival by investigating **how, where, and when** practice is negotiated. As such, our field research was designed to access sociomaterial arrangements that constitute an ever-shifting reality, through the collection and interpretation of language, symbols, and artifacts (Klein and Myers, 1999). Pragmatically, this meant that first, we adopted a sociomaterial epistemology (Orlikowski and Scott, 2008), where we viewed non-humans and humans as inseparably linked and second, that we followed practice over time in order to "see" the material and social assemblage that was produced and how such arrangements were resisted and accommodated within and across practice communities as per our depictions in Figure 1 (Pickering, 1995). We made these empirical observations at an Ivy League university during

an ES project. We present a brief case description next and follow it with an explanation of our data collection and analysis approach.

3.1. Case Description: OldU

OldU had historically been organized in a decentralized manner. However, an increasingly complex operating environment called for more transparent accounting practices in order to manage institutional risk, comply with regulatory bodies, avoid litigious hazards, and act as competent fiduciaries. In the summer of 1996, OldU's board of directors endorsed moving away from discrete silos of activity to adoption of the [GlobalSoft] enterprise solution because of the strength of its financial package, which was considered a best practice product that would support an integrated approach to accounting and budgeting (refer to Figure 2 for the Chronology of Key Project Events). The VP for Finance saw this as enabling a welcome shift away from what many in central administration considered antiquated and simplistic practices – known as Commitment Accounting (CA)² – to a more corporate model of budget and planning called Time-phased Budgeting (TPB).³ However, not long after implementing the ES, tensions between faculty and their support staff (FSS) became evident, in particular because of the exclusion of CA functionality. Rather than acquiesce to the ES's design, faculty and their staff began to mobilize resources in an attempt to reinstate their legacy accounting practices – opening lengthy post-roll-out negotiations. Seeing the difficulties their staff were having in trying to work with the ES and being worried that the new academic year would bring complications, several faculty members approached the sponsors of the project with their concerns. It was at this point that the rhetoric of the project team changed. In an attempt to move the troubled project forward and to get the faculty to work with the ES, the team agreed on three courses of action: first, to leave the legacy CA system running until commensurate ES functionality was created; second, to mimic CA practices in the ES environment by customizing the software; and third, to make organizational changes that would support the transition to an ES-enabled environment. The project team saw these changes as temporary fixes. However, they still exist at the time of this writing. Thus, while TPB failed to take hold at OldU, the ES is up and running and being used successfully across OldU.

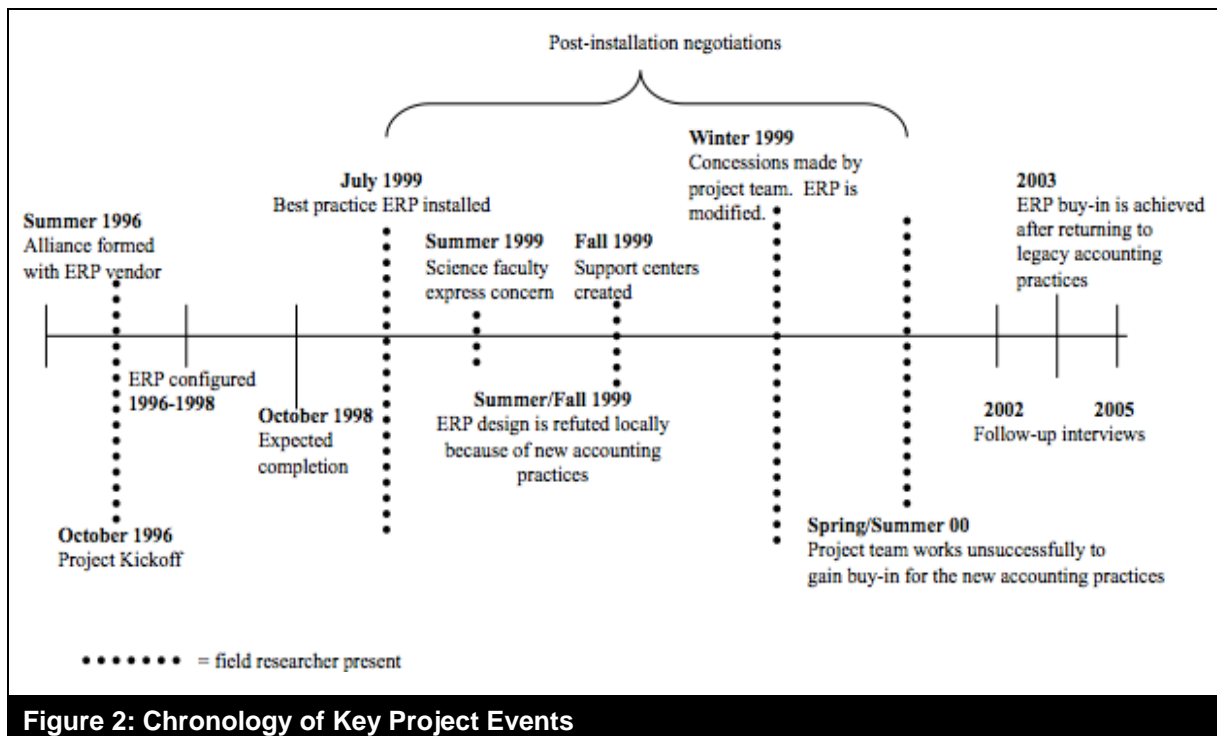


Figure 2: Chronology of Key Project Events

² This is an approach similar to balancing one's checkbook. The remaining balance equals all debits and credits as well as a hold for items where monies have been committed.

³ An approach to budgeting that requires the allocation of funds across the grant's timeline. The focus here is not on a remaining balance but on evaluating one's actual financial position against their budgeted expectation.

3.2. Sampling & Analysis

From 1992-1995 OldU employed the first author as a staff accountant. In this way she had an insider-outsider perspective that allowed her to understand OldU norms and to communicate using University colloquialisms. Then, in 1996 the first author was employed as a summer-contractor on the general accounting team of the ES project. She subsequently received permission to conduct longitudinal research on the initiative. The field study was conducted between June 1999 and August 2000, with follow-up interviews in 2002 and 2005. The first author made four visits of eight weeks each to OldU during the post-roll-out phases of the project. (Refer to Figure 2 for presence in the field and Table 2 for data collection procedures). In total she conducted 129 interviews with 56 unique actors over several different phases of the project (refer to Table 3).

Table 2: Field work research methods

Methods	OldU
Field work	4 visits each lasting 8 weeks over a period of 18 months
Timing	Post-roll-out
Narrative interviews	129 with 53 different stakeholders Recorded and verbatim transcriptions
Field journal	Pre and post interview notes and observations, transcribed
Documentation	Yes
Follow-up contact	Yes

Table 3: Interviews conducted at OldU

Number of unique Actors Interviewed	Field- of-Practice	Summer 1999	Winter 1999	Spring 2000	Summer 2000
6	Central administrative leader	3	1	5	3
9	Project managers ⁴	8	5	6	6
17	Project team members	17	12	11	11
12	End user	6	5	12	5
9	Faculty	0	4	6	3
53	Total interviews by phase	34	27	40	28

Recognizing the performative nature of some language, we adopted the narrative interview convention in order to avoid asking leading questions. The narrative interview convention provides a time frame to structure the interview ["Tell me what happened since we last met"] and then encourages uninterrupted storytelling related to issues of central importance to the interviewee (Bauer, 2000). Verbatim transcripts were produced from the initial rough copies including the "spoken features of discourse" such as tone, mood and pace of the narration through a formatting convention adopted by the field researcher (for example bolded text representing an increase in the volume of an interviewee's voice) (Riessman, 1993).

Directly following each interview, the field researcher produced a rough transcript in order to identify key actors and issues. Those agents that emerged became the focus of the next round of interviews. In this way we gathered multiple perspectives of the same situation and developed an understanding of the negotiations that were taking place. This approach was also helpful for reaching those actors who might have remained silent voices (Star, 1991), because this sampling approach was guided not only by interviewee referrals, but also by contacting allies and controversial agents whose names arose in the interviews. When a reference was made to a group, cause, or action attributed to nonhumans such as the ES itself, we interviewed a delegate and reviewed technical documentation (Pouloudi and Whitley, 2000).

After the fieldwork was complete, a systematic and careful reading of the verbatim transcripts facilitated our sociomaterial analysis where we began to see the social and material worlds at OldU constituti

⁴ Two of these managers were employed by the software vendor.

vely entangled and emergent over time. We reflected on issues and themes that existed within and across narratives, which tended to focus upon the relationships between entities as they expressed political and social interests and attempted to influence others over time (Pickering, 1995; Knorr-Cetina, 1997; Latour, 2005; Orlikowski and Scott, 2008). Given the importance of looking at how the sociomaterial assemblage is emergently performed over time, we elected to analyze our data using the Pickering (1995) framework, where we identified the sequence of resistance and accommodation. This enabled us to explore our how, where, and when questions as illustrated in Table 4 below.

Table 4: How, Where & When Resistance is Accommodated			
Event/Project Feature	Sociomateriality: How	Relationality: Where	Performativity: When
Imposing a best practice	ES configured to support TPB practices but not CA		
Encountering resistance	FSS try to use ES but frustrated by inability to do CA and so continue with some legacy practices through using ES and spreadsheets	During initial roll-out FSS threaten to abandon ES and project team can no longer ignore FSS concerns. Team attempts to convince FSS that ES is 'best'	
Accommodation	CA functionality added to ES and support centers set up	Project team recognizes the needs of FSS and while may not agree begins to take their perspective into account	Gradually, after roll-out seen as not successful, project team become appeasement oriented and negotiations begin

Our research is designed to seek "validity...not [from] the representativeness of the case in a statistical sense, but on the plausibility and cogency of the logical reasoning used in describing the results from the case and in drawing conclusions from it." (Walsham, 1993; 15). As such, we turn our attention to the case findings.

4. Case findings

Our analysis of the data is based on key events that help us explain how, where, and when the ES project was turned around despite a high level of contestation that could easily have derailed the initiative.

4.1. Imposing a best practice

In order to understand how the OldU ES project was eventually turned around, we must begin by considering the best practice configurations that precipitated the need for negotiations. This configuration represents a particular sociomaterial assemblage of people and things existing in relation to each other and is the result of designing material objects to "scaffold" administrative activity, thereby enabling and constraining particular types of work (how). The need to create such scaffolding was championed by OldU's newly hired Vice President (VP) for Finance and Administration, who sought to professionalize administrative practices by overhauling all support systems with the financial management function acting as the main project driver:

"I heavily leaned in [the] direction of wanting to go with the strongest financial system. I thought that the largest pay-off from the project, when you really looked at it, ultimately would be in better financial data and the ability to do more interesting things on the clinical and grants management side." [summer 1999]

The inability of OldU's legacy system to directly report on relevant financial activities created a

number of shadow systems that would reclassify financial data from the general ledger and facilitate the planning, reporting, and monitoring of expenditures for an academic audience. Central management argued that a system that enabled such decentralized work practices posed a substantial institutional audit risk. The VP sought and gained the support of central administrative leadership within accounting, budgeting, and grants management areas who all advocated for a more rigorous internal control environment within the academic departments. GlobalSoft's financial management module supported an integrated approach to accounting and budgeting that those directly involved in the project believed would be able to force change:

"By making a decision to go with [GlobalSoft] financials, senior management either consciously or semi-consciously - I think it was the former - was making it impossible for [OldU] to continue doing business in fragmented silos. Like it or not, you've got to work with a new way of accounting. It's integrated - it's slower, it's a pain in the ass. And the faculty who used to do it the old way for years decide it's absolutely terrible - they don't want to do it 'cause it's not [OldU's] way. But implementation is about setting up an environment. You make a set of decisions - a set of changes at the top that force change regardless of whether it's consensus or not...you just can't do grants like you used to...You don't like it? You are out of the consensus picture."
[Project team technical leader, summer 2000]

Specifically, it would enable individual departmental financials to be automatically "rolled-up" to a University-wide corporate budget. This was a welcomed shift away from the CA approach that many in central administration considered antiquated and simplistic:

"We have a 1.3 billion dollar operating budget and [we] can't afford to do things in an ad hoc way anymore...Higher Ed has become an incredibly complicated business, even though we're not for profit." [Budget Director, summer 2000]

With the introduction of the ES, central administrative leadership sought to modernize administrative practices by introducing discourse around what they considered best practice financial management – TPB. This performative use of language was successful in gaining the support and agreement of certain key actors, including central administrative managers, super-users, and, most importantly, the project team. Given this shared ontological perspective, the project team selected configuration options in an effort to set up a new environment and force change through material objects (Schatzki et al., 2001). However, at go-live, the project team members found they were unable to realize the change they wanted: In fact, the material objects they designed to scaffold social activity were unable to dictate action. It is this sociomaterial assemblage that set up the need for adaptations if the system was to be accepted and used within OldU (how).

4.2. Encountering Resistance

Resistance at go-live is the warning bell that there are misalignments and indicates that negotiation is necessary. Our focus on resistance in this section shows that the issues that are likely to need accommodation through sociomaterial adaptations (how) arise at the boundaries between communities, which are disrupted by attempts by one field of practice to impose new practices on another (where). Academic constituencies were prepared to move to an integrated operating environment knowing it would require retraining of staff and a steep learning curve. However, they were perplexed to find that the ES was designed without their valued CA practices:

"Why did the integrated technology have to be TPB when we had [CA] that worked for the faculty? I mean the legacy [CA] system could have been fully integrated as an ES - it was technically supported as one, but was only ever managed and used at the departmental level. Why not design [CA] as the integrated, standardized technology???? It worked for faculty for years...I hope you understand that it's not [the ES] itself that's the issue. It's the lack of understanding and regard for the people bringing in the money and the people doing the work that's so frustrating."
[Academic manager, follow-up email 2002]

In contrast to TPB, the legacy CA application was designed specifically to give faculty a snapshot view of their academic enterprise in terms of a remaining balance figure on their grants. In the ES-enabled environment, they were unable to get this information because the project team determined

that the remaining balance figure was a misleading measure for evaluating the fiscal health of a grant. Soon after implementing the ES, tensions between faculty and their support staff (FSS) became evident:

"One of my [FSS] is quitting. She came out of a meeting sobbing after talking with a new hot-shot faculty member from the United Nations who said, 'I will get the information I need one way or another, you give it to me or I will get consultants in here to get it for me. [This ES project] is an excuse that you have been using for far too long'. She said to me, 'I can't deal – I shouldn't have to deal – I don't want to take work home like I have been.'" [Academic manager, spring 2000]

This frustration with the ES was widespread, with academic constituencies across departments resenting the decision to exclude CA functionality:

"We don't know of even one research school that is using this methodology. We've done some research as an institution and no university we know of is using the [Time-phased] method as implemented in the [OldU] ES." [Academic manager, spring 2000]

Faculty approached the sponsors of the project with their concerns:

"The Economics professor [who was] the Provost and used to be the VP for Finance and Administration [for OldU]...called the [current] Provost really angry because he couldn't read his grant report. The [Financial Controller] sat down with him and every concept he was asking for was on that report. But he couldn't see it and his [FSS] couldn't explain it, so she's been making him Excel reports. This guy's smart - he knows what he's doing and he can't even read the report and I thought that was pretty telling. So now faculty aren't using the ES and what we have as a result is a very expensive data repository and still a lot of silos of micro-computing." [A project manager, summer 1999]

Thus, the FSS rejected the ES because their practices were inconsistent with what the project team designed (Levina and Vaast, 2005). The academic constituencies were invested in a particular way of working (Carlile, 2001) and deemed a number of processes in the ES – of which TPB becomes the poster-child – unsatisfactory in the "lack of understanding and regard for the people bringing in the money and the people doing the work" [Academic administrator, follow-up email 2002]. Powerful constituencies contacted the Provost, including the professional school that brought in the majority of all OldU's grant dollars, as indicated by this school's Finance Director:

"We struggled for quite a while [with the ES] but eventually - in listening to our end users say 'we have to have commitments' and the [project team] saying – 'oh, they're just used to the old system, eventually they'll get over it', it became clear - not only to them - but to us, that no, that isn't the case, there's always going to be a need for being able to do commitments. So what we did, we took that message over to the [project team], and I said, 'Look guys, departments really need commitments. We have looked at every creative way of using the ES in either budgeting, reporting, whatever, and it's become clear to us that we need a commitment [accounting] system.' And I said, 'We're poised at [our professional school] to create our own commitment system but what I would like is to present this as a University issue and I want to know whether or not you would like to join us in this effort?'" [spring 2000]

Thus, while the project team and central administration considered the development and implementation of the financial module a success, the FSS had a different interpretation:

"...you look at the faculty and they say, 'Well, what do you mean [the ES's] a success? I don't have my reports. I have no idea how much my grant account or my grant balances are'. So there is an enormous disconnect..." [Project member, spring 2000]

The fact that there were very different perceptions of the ES success illustrates how materiality is only consequential when human actors draw upon it in their practices. It was our ability to continue the analysis beyond implementation that enabled us to explain "how use affects redesign" (Leonardi and

Barley, 2008; p. 166). Focusing on the relational differences (Osterlund and Carlile, 2005) across fields-of-practice, we saw how different perspectives of what is best practice between administration and FSS fostered conflict in the post-implementation phase. The change in grant accounting practice supported by the ES sociomaterial assemblage disrupted the scientific work practice, so it was at this field of practice boundary that tensions emerged (where).

It is well documented that material constraints and affordances embed power relations that play a part in negotiating for changes (Foucault, 1980; Callon, 1986; Law, 1986). Our case demonstrates that this negotiation happens at the boundaries between fields-of-practice. The entire definition of accounting practice was called into question at OldU when TPB was presented as the best practice for grant accounting. The assemblage of material and social forces that emerged in the ES-enabled environment undermined the legitimacy of CA “by setting up an environment...and a set of changes at the top that forced change.” [Project team technical leader, summer 2000].

4.3. Accommodation

It is through the process of accommodation following resistance that sociomaterial assemblages are emergently re-assembled around a negotiated set of practices once the ES is rolled-out (when). In fact, FSS and academic managers “struggle[d] for quite a while [with the ERP]” and only after finding that their needs could not be met through the TPB design did they use their resources in a power play and claimed to be ready to “create their own commitment system.” Other genuine attempts at compromise by FSS, who “tried to work with it”, illustrate an emphasis on turning around and ensuring project survival. In the same vein, the central administration and project team network became increasingly “appeasement oriented” and allocated time and development resources to “build things that could create and manage commitments” (how, where, when):

“We became appeasement oriented and so when people began hurting us, we said ‘yes.’ And so we started building these things that could create commitments and manage commitments...even though it was against our original ideas about what was the way forward for [OldU].” [A project manager, summer 2000]

Thus, to remedy faculty resistance, the project team reorganized post-roll-out (when) development priorities and created ES-based commitment functionality within 60 working days:

“...Boom, boom, boom. All of a sudden it just happened like overnight. They had a working group that very quickly went into designing a customized system...We identified the issue, we got a very small group who really knew what they wanted to design, we refined that design...and then got the resources targeted to work on it...and it’s a done deal within two months time....I guess that’s a very good example of us starting to listen to end user needs – realizing that we needed commitments - I mean at first we talked to the faculty and staff and said ‘well what if we create a [TPB] report where we massaged it here and massaged it there?’ and finally [we] woke up and said ‘you know, as much as we try, it’s really not going to work, we’re trying to go around the issue rather than facing it head on’. We finally did face it.” [Academic manager, spring 2000]

In addition to software modifications, an interim transaction support center (TSC) was created to pick up the extra administrative work that resulted from the ES’s corporate budget design (how). One central administrator called the center OldU’s “fully trained temp agency” [summer 2000] designed to assist FSS whose responsibilities had increased in the ES-enabled environment. An academic manager involved in the project described the creation of this center:

“So I recommended that there be some type of a support center for giving departments a crutch...We thought modernization - it should be quicker. Well I think the question has to be asked, quicker for whom?...what used to be a faculty appointment form became 25 screens of entry...there was a real need for having this place where they could just handle a lot of these transactions until we came up to speed. At least that was my argument ‘cause I knew [they] weren’t going to go for something on a permanent basis. So I said, let’s try six months...we quickly went forward and brought the [Center’s manager] on board and then we staffed it and it’s really taken off.” [Summer 2000]

These accommodations resulted in a sociomaterial assemblage that is workable within OldU.

4.4. Achieving a Negotiated Practice

A key issue in the case was that people began talking about persevering to get a working ES:

"I'll tell you right now, [OldU] will not yield to a computer system. It hasn't yielded to anything else so far - so it's not going to yield to a computer system. We'll figure it out, we always do." [Central administrative leader, summer 2000]

Despite the best efforts to define the support center and the custom ES application as temporary fixes, they still exist at the time of writing, and TPB has not been used at OldU. In a 2005 follow-up interview, the new budget director, who previously expressed a strong belief in the concept of TPB, shifted her interpretation:

"We're still struggling with the commitment vs. projection [TPB] approach...We have been successful...in having them pull the automated commitments from the system on the last day of the month, and combine those with actuals and projections. That way they can at least take advantage of the [ES] system functionality related to budgeting and planning. Many departments are doing this, but I think they often manually supplement the information with other commitments they can't get automatically and create Excel reports for their faculty. As far as the time-phased approach goes, that is pretty much a non-starter here. I don't even support it myself."

Last, a project manager illuminated the ultimate goal of the OldU ES:

"The VP, who was the father of this project...was willing to compromise on the strategic goals that he wanted to achieve to get to the end game - which was - to get it done...more than anything else, failure is not an option! Regardless of whether it's pretty - it's got to get done! The project couldn't be a failure!" [summer 2000]

Thus, while neither community ultimately achieved its ideal grant accounting design, the modifications to software and organizational arrangements encouraged enough support from each community to reach a (temporary) stable environment. Since artifact designs reflect network viewpoints (Monteiro, 2000), rather than being "things" that dictate routines (Pentland and Feldman, 2008), we see that the post-implementation sociomaterial designs are delegates (Walsham, 2001) for a cooperation approach.

Our data show how negotiated practice takes form, first by a change in perspective following resistance, and then a shift in action. The central administration and project team's rhetoric evolved from dictatorial to conciliatory. Similarly, the faculty and staff network became willing to "make things better.". Finally, through the development of various artifacts – setting up the integrated Accounting & Budget department, the temporary support of the legacy application, the development of a custom CA application, and the Transaction Support Center — the negotiations were stabilized, at least temporarily. This demonstrates that material objects do things that cannot be attributed to social practice alone (Leonardi and Barley, 2008). Indeed, without the material re-configuration of the ES and the addition of the support centers, it is likely that the ES would not have been used to the extent it is today. It is through processes of negotiation and cooperation, formally configured or customized in the artifacts produced, that previously disparate communities start to unite. Note that this process unfolds over 12 months. Moreover, what is expected to be only temporary modification became a permanent design. Adhering to the standardized best practices underpinning the "vanilla" ES was no longer the highest priority. This is an indication of having achieved negotiated practice, where social structures emerge that enable the IT to become part of everyday work (Levina and Vaast, 2005) with previously disparate communities merging enough to allow for the development of a working information system.

5. Discussion

Consistent with recent post-implementation ES studies (Boudreau and Robey, 2005; Berente et al. 2007, 2008), our analysis shows the circumstances under which packaged software engenders

conflict and thereby creates the context for project survival.⁵ Our unique contribution is in illuminating the nature of ES project survival that enables the realization of a working information system (Research Question 1). In this discussion section, we explore the negotiated practice associated with project survival through the three key characteristics of our practice perspective – relationality, performativity, and sociomaterial assemblages (Orlikowski and Scott, 2008) and consider survival strategies (*how, where, and when*) for handling contested best practices so that they might be turned around and made to work during the post-go-live phase (Research Question 2). We summarize the key strategies associated with our initial theorizing of project survival in Table 5.

Table 5: Strategies of project survival	
Observed Project Features	Survival Strategies: How, Where and When
Sociomaterial assemblages	HOW: Selective Accommodation of practices
The ES was specifically configured to legitimate one community's view of best practice, which delegitimized alternative views. Given that people and things exist only in relation to each other, it is not possible to force the social to work in a preferred way with material objects.	Recognize that there is always interpretive flexibility no matter how strong the material design: Project survival depends on understanding alternative interpretations and selectively moulding together critical established practices and aspects of the proposed best practices by distinguishing the essential debates from issues of preference alone and reassembling the material and social to support these negotiated practices.
Relationality	WHERE: Focus on alliance building across communities
Different practice communities saw the consequences of the same ES very differently.	Recognize that people are invested in their practice and so anticipate the collision across fields-of-practice: Achieving a working information system exists not in removing conflict but in achieving cooperation between communities which will often involve compromise. This should not be taken as a sign of failure.
Performativity	WHEN: Plan iteratively and into the post-roll-out period
The project went through periods of resistance and accommodation in the post-roll-out period that were not anticipated.	Recognize that there will be elements that cannot ever be planned for: Project survival depends on gradually learning to understand when to negotiate during the post-go-live period as individuals begin to deploy the IT in their everyday practice. Provide time for experimentation and learning that will inevitably be necessary. It is likely to be necessary to modify the material objects and social structures that scaffold human activity as this phase evolves.

5.1. How to Survive: Selectively accommodating practice

Others have similarly shown how best practice claims are contested in practice, but conclude that eventually resolution is found, which is embedded into the software itself (Yeow and Sia, 2008). Such a view is in keeping with the socio-technical perspective that depicts implementation as cycles of technology — organization adaptation until a socio-technical fit is achieved (Leonard-Barton, 1988; Lyytinen & Newman, 2008). In contrast, the notion of negotiated practice recognizes that the materiality of a technology exists only in relation to the humans who use it, so the material design is always subject to interpretive flexibility. Moreover, from this perspective, implementation is never finished, since this co-evolution will be present through the life cycle of the ES (Truex et al., 1999). Consistent with the findings of other studies, then, (Orlikowski, 1996; Boudreau and Robey, 2005;

⁵ We are not considering here whether project survival is the right thing to do as opposed to for example, abandoning the project. We are simply outlining the mechanisms that can support project survival if those involved consider this to be appropriate.

Berente et al., 2007, 2008), negotiated practice implies that one cannot count on forcing software-based best practices upon a population. Rather, one should come to expect a need to negotiate by rearranging the sociomaterial elements of a practice. Post-roll-out negotiations, if appropriately channeled, will engender a willingness to discover design assemblages that move the organization toward a working information system.

Building on this previous research on post-roll-out negotiations, our study suggests *how* this can be achieved. In particular, our study shows that respecting competing practices and carrying forward *some* legacy practices (i.e., selective accommodations), can help smooth the post-roll-out phase and avert failure, despite the fact that this may make migration and future upgrades more difficult. Exemplary of this phenomenon in our case is the parallel offering of CA and TPB as a way to mitigate resistance. Our findings also suggest, however, that project survival does not depend on benevolently accommodating everyone. We have focused in this paper on the accommodation to the CA functionality, but there were other examples in our data where suggestions for customization were rejected. For example, the hiring process was far more complex in the ES than in the old HR system, but the VP for HR rejected clerks' requests to simplify the user interface. Our findings do not, therefore, suggest that all preferred legacy practices should be accommodated and incorporated into the new sociomaterial assemblages. Rather, it is important to mould together critical established practices and the aspects of the proposed best practices— creating a mangle of practice (Pickering, 1995). Central to understanding how projects survive is the notion of selective accommodation where one must distinguish the essential debates from issues of preference alone. The idea of selectivity as it relates to system initiatives has only begun to be addressed. Recent work identifies “critical issues” that should be addressed by project management because of their potential to stall the project (Ramiller, 2005; p. 72).

Future research should seek to focus on the post-go-live phase not only to further test the selective accommodation phenomenon itself, but to try and classify the types of practices that are likely to need negotiation and how this is achieved by social and technical adaptations. Using cross-sectional analyses, one might verify whether our case is representative, in that there are often just a few functionalities that are deemed critical, which, if accommodated, will facilitate project survival. If this is the case, the long tradition of work devoted to user requirement elicitation (Ives and Olson, 1984; Browne and Rogich, 2001; Hickey and Davis, 2004) should provide a solid basis for research on the characteristics of these critical functionalities.

5.2. Where Survival is Found: Focus on alliance building

The IS literature has long identified the political and conflict-based undertones of new IT projects (see Jaspersen et al., 2002 for a review), including ES. Our study certainly shows the occurrence of conflict and recognizes this as emerging from the relationality between people and the material artifacts that constitute their practice. When relationships are disrupted by a new sociomaterial assemblage — users resist and conflict occurs. Our study shows *where* this conflict is likely to occur — in particular, at the intersection of fields-of-practice where people are forced to become more interdependent by the integrative nature of an ES.

Volkoff et al.'s (2007) field study corroborates our finding that some of the most challenging post-roll-out issues relate to user groups needing to consider the up- and down-stream implications of their activities. Moreover, it is also likely to be more evident in packaged software implementations designed for tight coupling across the organization (Berente et al., 2007, 2008) as opposed to custom-built applications that are easier to design to meet the needs of different user communities. The interesting aspect of our case, however, is not the existence of conflict, but rather the motivation toward cooperation that was observed, with both sides coming to realize that they would need to compromise if the project was to survive. Thus, the more important dynamic at play at OldU was the willingness and effort toward reparation of discord culminating in the achievement of stability — not through the dominance of one community, but rather through the coalescence of interests just enough to create a jointly viable solution.

This finding is in opposition to the Volkoff et al. (2007) study that found ES changed the relationship between organizational routines and roles by embedding those relationships into the system. As a

result, in the post-go-live environment, “honor accrued to those individuals who best understood *proper use* of the ES. The ability to work around the system, a respective competency in the legacy system environment, was considered disruptive” (842; emphasis added). Initially in OldU, we observed central administration identifying only one acceptable version of what the sociomaterial assemblage should be and dismissing the notion that there could be an alternative. In doing so, administrators ignored the relational boundaries between administration and faculty, assuming that faculty would be forced to change their practices. Faculty, on the other hand, assumed that the ES was being designed with their existing practices in mind and so were shocked when they found that their practices were not accommodated in the new sociomaterial assemblage. At that moment the ES project was particularly vulnerable. However, it is also at that moment that both ‘sides’ began to recognize the practice boundaries that divide them and that these were not easily ignored if they wanted the ES project to survive. This suggests that, in general, project survival in contested situations depends on first recognizing the relational boundaries and alternative performativity discourses present, and then working to create a sociomaterial assemblage that can support different practices in the new ES environment. This was perhaps observable because of the university context, where those resisting could not be forcibly coerced into using the system, unlike in for-profit cases where particular communities may be unable to get their preferred practices selectively accommodated. In these cases, employees are likely to find other ways of accommodating their preferred practices, for example, by using shadow systems (Robey et al., 2002).

The influence of organizational form on the nature of the system’s evolution is an interesting one that deserves further investigation. The university environment provides a good setting in which to study project survival because the integrated nature of ES products is likely to lead to misalignments within the loosely-coupled university structure. The context in which our study took place highlighted selective negotiation in the post implementation phase where shared power between faculty and administrators, along with mutual dependency, is a key reason why both parties entered into negotiation. Future research is needed to investigate the types of practices that are negotiable and the associated groups who are able to leverage such negotiations. For example, very little support was found for changing the procurement process at OldU to involve less data input by purchasing clerks, despite those clerks complaining about an inefficient ERP-enabled workflow at go-live. In addition, research on negotiating practice outside the university context, where users are perhaps less powerful, would help to extend our understanding of survival techniques used in the post-implementation phase of ES projects.

5.3. When to Focus on Survival: The importance of iterative planning

The rules and routines associated with a best practice are not embedded in information technology, but rather are enacted and emergent as users draw upon the software in their situated practices. It is *because* practice is emergent that go-live is not a destination but a required, and sometimes painful, passage toward a working information system. Even comprehensive testing will be insufficient, as practice needs to emerge in the interaction of employees on real problems rather than simulated environments. Thus, our study shows *when* negotiated practice is important, i.e., in the post-roll-out period.

Project survival, thus, depends on gradually learning to understand how to negotiate through the post-roll-out period as individuals begin to deploy the IT in their everyday practice. This insight explains compromise as a necessary characteristic of negotiating practice, not to be viewed as an indication of failure to force change. Rather, cooperation amongst sociomaterial elements must be sought in order to effectively negotiate a workable practice, and this requires time for experimentation and learning. Thus, our case shows that conflict over a particular practice, subsequent negotiation, and conflict resolutions may be necessary aspects of the post-roll-out phase, where attention and some creative thinking can help substantially. This suggests scholars recast IS appropriation/assimilation from what has traditionally been considered the relatively static final phase of development where users eventually overcome a steep learning curve, to a time of negotiation and change amongst the various sociomaterial relations that must be accounted for, legitimized, and, most importantly, studied (Swanson and Ramiller, 2004; Leonardi and Barley, 2008). Moreover, as the timing of this negotiation is predictable (i.e. go-live), planning and preparation is possible, not for the specific issues to be negotiated, but for the need and nature of the process leading to a negotiated

practice. This finding is supported by evidence from other longitudinal ES studies where post-go-live represented a watershed through which accommodations of practice became common (Boudreau and Robey, 2005; Berente et al., 2007, 2008).

Finally, the practice perspective reminds us that work practices are strongly held legitimizing devices for actors and, therefore, when considering the packaging of best practice concepts into software, it is important to recognize that this de-legitimizes other practices. Strict adherence to the best practice ideal will, therefore, likely create resistance. The point at which the OldU project team became appeasement-oriented demonstrates the power of language to shape action: Successful negotiation was first a matter of *thinking* and *speaking* differently about the project's objectives. A change in perspective precedes shifts in action and, as such, before practice can be negotiated, opposing perspectives need to respect alternative interpretations of what is best. Our data suggest that the less focused on an ideal solution competing practice-communities are, the more likely it is that the negotiation (cycles of resistance and accommodation) will be successful.

Future research could usefully consider the role of discourse in both the resistance and the accommodation phases to better understand the role that performative language plays in first escalating the conflict and then subsequently de-escalating and finding accommodations between competing communities. Additionally, longitudinal field studies would be useful to explore this co-evolutionary negotiation over an even more extended period in order to identify possible patterns that emerge. In particular, most companies will upgrade their ES as new versions come out, and it would be interesting to explore the patterns of negotiated practice that occur during these migration phases. An important challenge for such work will be to investigate sociomaterial adaptations around large-scale IT systems in different industry settings. We note that a university, the context of our study, represents a distinctive setting where resistance to integrated IT systems may be magnified because of its decentralized structure (Markus, 1983), with academic departments typically enjoying significant autonomy (Newman and Noble, 1990). Getting agreement on best practices is likely to be especially open to negotiation in such settings where the use of absolute power is antithetical to the fiefdom-like structure of universities (Allen and Kern, 2001; Cornford, 2000; Pollock, 1999). Thus, in universities, faculty have significant power, and even though it may be the faculty administrators who will be more heavily involved as day-to-day users, faculty have a vested interest in ensuring that their administrators are comfortable with the system, since they do not want to be bothered with administration details themselves. It is perhaps not surprising in OldU, therefore, that both sides ultimately chose to negotiate and find compromises that enabled the working information system to be created around a sociomaterial assemblage very different from that initially envisioned. In other settings, the organizational structure, power dynamics and vested interests may make negotiation less likely, so there may be less inclination to develop customized add-ons and new resource centers. However, this does not mean that users will not find other ways to continue with their legacy practices using different kinds of sociomaterial work-arounds (Boudreau and Robey, 2005). Thus, as McGann and Lyytinen (2008) note, improvised adaptations are necessary to achieve alignment between technology and social processes in any successful system implementation. In other settings, however, these sociomaterial adaptations may be more informal and local than was evident in OldU. Whether ultimately it is better for organizations to formally negotiate a collective sociomaterial assemblage or for informally negotiated sociomaterial assemblages to emerge clandestinely, is a matter for future research.

This study offers an early example of applying sociomaterial concepts that are emerging as a new research stream (Orlikowski and Scott, 2008). We have applied ideas and language that demonstrate an assemblage orientation where the unit of analysis is the cumulative history of relationality. While sociomateriality does take the material seriously, the move away from things in themselves having material attributes that are separated from the human attributes is significant. As Suchman (2009) noted when questioned about how social and material elements relate: "[I] understand the desire to take the material seriously but sociomateriality does not see a thing in itself – it is not an entanglement of two a priori things, rather the entanglement is a result of practice — it is actually always a cumulative history." The ongoing challenge for researchers attempting to move away from materiality, in itself, toward sociomateriality is to develop nuanced language that does not betray the relationality orientation. We found it quite challenging to keep the material in the storyline

without falling from one side to another – either leaving the material realm unexamined, or emphasizing the agency of the material to the detriment of understanding the entangled practice.

6. Conclusions

Our contribution to IS literature consists in focusing attention on the sometimes extensive set of post-roll-out activities that enables troubled packaged software projects to survive and result in working information systems. Thus, one of the primary contributions of our paper is an initial attempt at theorizing project survival in the packaged software environment by framing the strategies for project survival as they relate to characteristics of negotiated practice. Negotiated practice depends on illuminating issues of **how, where, and when** this turn-around takes place. Changing our discourse from best practice to negotiated practice recognizes how survival in contested situations can depend on negotiations that can extend well beyond the roll-out phase. Proactively managing this process, and identifying the critical areas where compromise is needed, will likely smooth out complex implementation efforts. In exploring this negotiated practice, we have adopted a sociomaterial practice perspective that focuses on sociomaterial relationships within and across practice communities as each community seeks to continue to perform knowledgeably in the face of change.

This is one of the first manuscripts to address the issue of sociomateriality through a substantial field study; albeit a single case. Yet our work is supported by other recent ES studies that focus on the post-go-live environment. There are plenty of opportunities for further research that can help to refine our understanding of evolution of large-scale packaged software systems. Note, however, that this research agenda is fundamentally at odds with a so-called best practice ideal associated with packaged software promotion because of the epistemological position that in-use negotiated practices are best for organizations.

Our demonstration that troubled projects can survive in spite of initial fears of non-use is a first important step; future research should seek to generalize and extend our findings. In a context where project abandonment was not considered a viable option, there was a need to find ways to move forward, and this was achieved by cooperation and compromise. As Robey et al., (2002) have shown, in other settings managers may be able to impose an ES that does not fit with users' work practices. However, they also demonstrated that users will still find ways of continuing their existing practices, e.g., by adopting work-arounds. We suggest, therefore, that our notion of negotiated, rather than best practice, may have broad practical relevance to those involved in implementing this kind of packaged software, and that adopting this perspective may lead to improved exploitation of these complex systems. As noted, this requires a fundamental reconceptualization of the way software packages are viewed.

Longitudinal studies designed to follow troubled projects through their post-roll-out phase would be helpful for further developing the negotiated practice concept and add to our understanding of the processes of mutual social and material adaptation during system implementation and maintenance. Specifically, it is important to explore project survival in different organizational settings; given the uniqueness of the university environment, future research needs to identify whether the ways in which practice was negotiated in our case are similar or different in less democratic organizational environments and, perhaps more importantly, whether the dimensions of our sociomaterial practice perspective can be effectively applied in other environments. Another golden opportunity for research in this area is provided by studies based on a re-analysis of IS "failures" by studying their eventual outcomes and any working information system that emerged (c.f.e. Mahring et al., 2004). We believe that in many cases the results would be surprising and instructive – helping us to further develop our understanding of the evolution of large scale IT systems. Changing the discourse surrounding project work is a necessary first step to shifting project actions. Organizations can and should plan the project, but at the same time also trust and use post-roll-out creative errors – which of course, so defined, are not errors at all but an integral part of the survival process.

Acknowledgments

Thank you to Kalle Lyytinen and the anonymous reviewers whose constructive feedback helped to improve the quality of this manuscript. Thanks also to Susan V. Scott and Wanda Orlikowski for their insights related to sociomateriality.

References

- Allen, D.K., and Kern, T. "Enterprise Resource Planning Implementation: Stories of Power, Politics and Resistance", in *Realigning Research and Practice in Information Systems Development: The Social and Organizational Perspective*, N. L. Russo, B. Fitzgerald and J. I. Degross (eds.), Boston, Kluwer Academic Publishers, 149-154, 2001.
- Bauer, M.W., and Gaskell, G. (Eds.) *Qualitative Researching with Text, Image and Sound: A Practical Handbook*, SAGE Publications, London, England, 2000.
- Berente, N., Yoo, Y., and Lyytinen, K. "Alignment of Drift? Loose Coupling over Time in NASA's ERP Implementation," International Conference on Information Systems, Paris, France, 2008, <http://aisel.aisnet.org/icis2008/180>
- Berente, N., Lyytinen, K. and Yoo, Y. "An Institutional Analysis of Pluralistic Responses to Enterprise System Implementations," International Conference on Information Systems, Montreal, Quebec, Canada, Dec. 9-12, 2007, <http://aisel.aisnet.org/icis2007/96/>
- Boudreau, M.-C., and Robey, D. "Enacting Integrated Information Technology: A Human Agency Perspective," *Organization Science* (16: 1) 2005, pp. 3-18.
- Browne, G.J. and Rogich, M.B. "An empirical investigation of user requirements elicitation: Comparing the Effectiveness of Prompting Techniques," *Journal of Management Information Systems* (17:4) 2001, pp. 223-249.
- Carlile, P. "A pragmatic view of knowledge boundaries: Boundary objects in new product development," *Organization Science* (13:4) 2001, pp. 442-454.
- Carlile, P. "Transferring, Translating and Transforming: An Integrative Framework for Managing Knowledge Across Boundaries," *Organization Science* (15:5) 2004, pp. 555-568.
- Callon, M. "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Breiuc Bay," in: *Power, Action and Belief: A New Sociology of Knowledge?* J. Law (ed.), Routledge & Kegan Paul, London, 1986, pp. 196-231.
- Chiasson, M. and Green, L.W. "Questioning the IT Artefact: User Practices that Can, Could, and Cannot be Supported in Packaged-software Designs," *European Journal of Information Systems* (16:5) 2007, pp. 542-554.
- Clark, P. and Staunton, N. *Innovation in Technology and Organization*. London: Routledge, 1989.
- Cornford, J. "The Virtual University Is...The University Made Concrete?," *Information, Communication and Society* (3:4) 2000, pp. 508-525.
- Foucault, M. "Truth and Power," in: *Power/Knowledge: Selected Interviews and Other Writings*, C. Gordon (ed.), Pantheon Books, New York, 1980.
- Garfinkel, H. *Studies in Ethnomethodology*. Prentice Hall. New Jersey, 1967.
- Giddens, A. *The Constitution of Society: Outline of the Theory of Structuration*, University of California Press, Berkeley, CA, 1984.
- Hickey, A., and Davis, A. "A Unified Model of Requirements Elicitation," *Journal of Management Information Systems* (20:4) 2004, pp. 65-85.
- Ives, B., and Olson, M. "User Involvement and MIS Success: A Review of the Literature," *Management Science* (30:5) 1984, pp. 586-603.
- Jasperson, J., Carte, T., Saunders, C., and Butler, B. "Review: Power and Information Technology," *Research: A Metatriangulation Review, MIS Quarterly* (26:4) 2002, pp. 397-460.
- Jones, M. R., and Karsten, H. "Giddens's Structuration Theory and Information Systems Research," *MIS Quarterly* (32:1) 2008, pp. 127-157.
- Keil, M., and Tiwana A., "Beyond Cost: The Drivers of COTS Application Value," *IEEE Software*, Vol. 22, No. 3 (May/June), 2005, pp. 64-69.
- Klein, H., and Myers, M. "A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems," *MIS Quarterly*, (23:1) 1999, pp. 67-93.
- Knorr-Cetina, K. "Sociality with Objects: Social Relations in Postsocial Knowledge Societies," in *Theory, Culture & Society* 14(4) 1997, pp. 1-30.
- Latour, B. *Reassembling the social: An introduction to actor-network-theory*, Oxford University Press, Oxford, 2005.
- Law, J. "Editor's Introduction: Power/Knowledge and the Dissolution of the Sociology of Knowledge," in: *Power, Action and Belief: A New Sociology of Knowledge?* J. Law (ed.), Routledge and Kegan Paul, London, 1986.
- Leonard-Barton, D. "Implementation as Mutual Adaptation of Technology and Organization,"

- Research Policy (17) 1988, pp. 251-267.
- Leonardi, P.M., and Barley, S.R. "Materiality and Change: Challenges to Building Better Theory About Technology and Organizing," *Information and Organization* 18 2008, pp. 159-176.
- Levina, N., and Vaast, E. "The Emergence of Boundary Spanning Competence in Practice: Implications for Information Systems' Implementation and Use," *MIS Quarterly* (29:2) 2005, pp. 335-363.
- Lucas, H., Walton, E.J. and Ginzberg, M. "Implementing Packaged Software," *MIS Quarterly* (12:4) 1988, pp. 537-549.
- Lyytinen K., Newman M. "Explaining Information System Change: a Punctuated Socio-Technical Change Model", *European Journal of Information Systems* (17:6) 2008, pp 589-613.
- McGann S., Lyytinen K. "The improvisation effect: a case study of user improvisation and its effects on information system evolution," *Proceedings of the 29th International Conference on Information Systems*, 2008.
- Mahrer, H. "SAP R/3 Implementation At The ETH Zurich: A Higher Education Management Success Story", *Proceedings of The Americas Conference on Information Systems*, Baltimore, MD, 1999, pp. 788-790.
- Mahring, M., Holmstrom, J., and Montealegre, R. "Trojan Actor-Networks and Swift Translation: Bringing Actor-Network Theory to Project Escalation Studies," *Information Technology & People* (17:2) 2004, pp. 210-238.
- Markus, M. L. "Power, politics, and MIS implementation," *Communications of the ACM* (26:6) 1983, pp. 430 - 444.
- Markus, M. L. and Robey, D. "Information Technology and Organizational Change: Causal Structure in Theory and Research," *Management Science* (34:5) 1988, pp. 583-598.
- Monteiro, E. "Actor-Network Theory," in: *From Control to Drift: The Dynamics of Corporate Information Infrastructures*, C. Ciborra (ed.), Oxford University Press, 2000, pp. 71-83.
- Newman, M. and Noble, F. "User Involvement as an Interaction Process: A Case Study," *Information Systems Research* (1:1) 1990, pp. 89-113.
- Nicolini, D. "Stretching Out and Expanding Medical Practices: The Case of Telemedicine," *Human Relations* (60:6) 2007, pp. 889-920.
- Orlikowski, W. J. "Improvising Organizational Transformation Over Time: A Situated Change Perspective," *Information Systems Research* (7:1) 1996, pp. 63-92.
- Orlikowski, W.J. "Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations," *Organization Science* 11 2000, pp. 404-428.
- Orlikowski, W.J. "Material knowing: The Scaffolding of Human Knowledgeability," *European Journal of Information Systems* (15:5) 2005, pp. 460-466.
- Orlikowski, W.J. "Sociomaterial Practices: Exploring Technology at Work," *Organization Studies* (28) 2007, pp. 1435-1448.
- Orlikowski, W.J., and Scott, S.V. "Challenging The Separation Of Technology, Work And Organization," *Academy Of Management Annals* (2:1) 2008, pp. 433-474.
- Osterlund, C. and Carlile, P. "Relations in Practice: Sorting Through Practice Theories on Knowledge Sharing in Complex Organizations," *The Information Society* (21) 2005, pp. 91-107.
- Pentland, B., and Feldman, M.S. "Designing Routines: On the Folly of Designing Artifacts While Hoping for Patterns of Action," *Information and Organization* 18 2008, pp. 235-250.
- Pickering, A. *The Mangle of Practice, Time, Agency and Science*, University of Chicago Press, Chicago, 1995.
- Pollock, N. "The Virtual University As Accurate and Timely Information," *Information, Communication and Society*, (3:3) 1999, pp. 1-17.
- Pouloudi, A., and Whitley, E.A. "Representing Human and Non-Human Stakeholders: On Speaking with Authority," In R. Baskerville, J. Stage, and J.I. DeGross, (Eds), *Organizational and Social Perspectives on Information Technology*, Kluwer Academic Publishers, Boston, 2000, pp. 339-354.
- Ramiller, N.C. "Applying the Sociology of Translation to a System Project in a Lagging Enterprise," *Journal of Information Technology Theory and Application* (7:1) 2005, pp. 51-76.
- Riessman, C.K. *Narrative Analysis*, Sage, London, 1993.
- Robey, D., Ross, J.W., and Boudreau, M-C. "Learning to Implement Enterprise Systems: An Exploratory Study of the Dialectics of Change," *Journal of Management Information Systems* (19) 2002, pp. 17-46.

- Schatzki, K., Knorr-Cetina, K., and von Savigny, E. (Eds) *The Practice Turn in Contemporary Theory*, Routledge, London, 2001.
- Sia, S.K., and Soh, C. "An Assessment of Package-Organisation Misalignment: Institutional and Ontological Structures," *European Journal of Information Systems* (16) 2007, pp. 568–583.
- Star, S.L. "Power, Technology and the Phenomenology of Conventions: On Being Allergic to Onions," in: *A Sociology of Monsters: Essays on Power, Technology and Domination*, J. Law (ed.), Routledge, London, 1991.
- Suchman, L. *Exploring sociomateriality: expanding frames and accountable cuts*, Developing Theoretical Innovation: A Workshop on the Issues Surrounding Sociomateriality, The London School of Economics and Political Science, London, England, 2009. <http://www.2009.ac.uk/collections/informationSystems/newsAndEvents/2009events/sociomateriality.htm>
- Swanson, E.B., and Ramiller, N.C. "Innovating Mindfully with Information Technology," *MIS Quarterly* (28:4) 2004, pp. 553-583.
- Truex, D., Baskerville, R., and Klein, H. "Growing Systems in Emergent Organizations," *Communications of the Association for Computing Machinery* (42:8) 1999, pp. 117-123.
- van Fenema, P.C., van Baalen, P.J., and Koppius, O.R. "Implementing Packaged Enterprise Software in Multi-site Firms: Intensification of Organizing and Learning," *European Journal of Information Systems* (16:5) 2007, pp. 584-598.
- Volkoff, O., Strong, D.M. and Elmes, M.B., "Technological Embeddedness and Organizational Change," *Organization Science* (18:5) 2007, pp. 832-848.
- Wagner, E.L., and Newell, S. "Best for Whom: The Tension between 'Best Practice' ERP Packages and Diverse Epistemic Cultures in a University Context," *Journal of Strategic Information Systems* (14:4) 2004, pp. 305-328.
- Walsham, G. *Interpreting Information Systems in Organizations*, John Wiley and Sons, London, 1993.
- Walsham, G. *Making a World of Difference: IT in a Global Context*, John Wiley and Sons, London, 2001.
- Wenger, E. *Communities of Practice: Learning, Meaning, and Identity*, Cambridge University Press, New York, N.Y., 1998.
- Yeow, A., and Sia, S.K. "Negotiating 'Best Practices' in Package Software Implementation," *Information and Organization* (18) 2008, pp. 1-28.

About the Authors

Erica Wagner is an associate professor in the department of Management at Portland State University's School of Business. She earned her Ph.D. from the London School of Economics and has an undergraduate degree in accounting. Her research interests focus on the ways software is 'made to work' within different organizational contexts, with particular emphasis on how work practices are designed into artifacts, standard processes, and methods of accounting. Her research has been published in a variety of outlets including *The Journal of the Association for Information Systems*, *Information and Organization*, *Communications of the ACM*, and the *Journal of Strategic Information Systems*.

Sue Newell is the Cammarata Professor of Management, Bentley University and is also a part-time Professor of Information Management at Warwick University, UK. She graduated in psychology from University College Cardiff, where she stayed on to do her PhD. Sue's research focuses on understanding the relationships between innovation, knowledge and organizational networking (ikon) - primarily from an organizational theory perspective. Sue has published over 85 journal articles in the areas of organization studies, management and information systems, as well as numerous books and book chapters.

Gabriele Piccoli, Ph.D., is Professor of Information Systems at the Grenoble Ecole de Management (France) on leave from the University of Sassari (Italy). His research and teaching expertise is in strategic information systems and the use of technology to enable customer service. His research has appeared in *MIS Quarterly*, *Communications of the AIS*, *Communications of the ACM*, *Decision Sciences Journal*. He is the author of *Information Technology for Managers: Text and Cases*, edited by Wiley.

Copyright © 2010, by the Association for Information Systems. Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and full citation on the first page. Copyright for components of this work owned by others than the Association for Information Systems must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers for commercial use, or to redistribute to lists requires prior specific permission and/or fee. Request permission to publish from: AIS Administrative Office, P.O. Box 2712 Atlanta, GA, 30301-2712 Attn: Reprints, or via e-mail from ais@gsu.edu.

Editor
Kalle Lyytinen
Case Western Reserve University

Senior Editors			
Michael Barrett	University of Cambridge	Robert Fichman	Boston College
Dennis Galletta	University of Pittsburgh	Varun Grover	Clemson University
Jeffrey Parsons	Memorial University of Newfoundland	Suzanne Rivard	Ecole des Hautes Etudes Commerciales
Carol Saunders	University of Central Florida	Avi Seidmann,	University of Rochester
Ananth Srinivasan	University of Auckland	Bernard Tan	National University of Singapore
Michael Wade	York University	Ping Zhang	Syracuse University
Editorial Board			
Steve Alter	University of San Francisco	Kemal Altinkemer	Purdue University
Michel Avital	University of Amsterdam	Cynthia Beath	University of Texas at Austin
Michel Benaroch	University of Syracuse	Avi Bernstein	University of Zurich,
Anandhi S. Bharadwaj	Emory University	Marie-Claude Boudreau	University of Georgia
Susan A. Brown	University of Arizona	Andrew Burton-Jones	University of British Columbia
Traci Cart	University of Oklahoma	Dubravka Cecez-Kecmanovic	University of New South Wales
Patrick Y.K. Chau	University of Hong Kong	Mike Chiasson	Lancaster University
Mary J. Culnan	Bentley College	Jan Damsgaard	Copenhagen Business School
Elizabeth Davidson	University of Hawaii	Jason Derdrick	University of California, Irvine
Samer Faraj	McGill university	Chris Forman	Carnegie Mellon University
Peter Gray	University of Virginia	Ola Henfridsson	Viktoria Institute & Halmstad University
Traci Hess	Washington State University	Qing Hu	Iowa State University
Jimmy Huang	University of Warwick	Kai Lung Hui	National University of Singapore, Singapore
Bala Iyer	Babson College	Hemant Jain	University of Wisconsin-Milwaukee
Zhenhui (Jack) Jiang	National University of Singapore	Bill Kettinger	University of Memphis
Gary Klein	University of Colorado, Colorado Springs	Ken Kraemer	University of California, Irvine
Mary Lacity	University of Missouri-St. Louis	Liette Lapointe	McGill University
T.P. Liang	National Sun Yat-Sen University	Kai H. Lim	City University of Hong Kong, Hong Kong
Lihui Lin	Boston University	Ji-Ye Mao	Renmin University
Anne Massey	Indiana University	Ramiro Montealegre	University of Colorado at Boulder
Michael Myers	University of Auckland, New Zealand	Fiona Fui-Hoon Nah	University of Nebraska-Lincoln
Fred Niederman	St. Louis University	Mike Newman	University of Manchester
Brian Pentland	Michigan State University	Geert Poels	Katholieke Universiteit Leuven
Jaana Porra	University of Houston	Sandeep Puro	Penn State University
T. S. Raghuram	Arizona State University	Dewan Rajiv	University of Rochester
Neil Ramiller	Portland State University	Matti Rossi	Helsinki School of Economics
Suprateek Sarker	Washington State University	Susan Scott	The London School of Economics and Political Science
Ben Shao	Arizona State University	Olivia Sheng	University of Utah
Choon-ling Sia	City University of Hong Kong	Carsten Sorensen	The London School of Economics and Political Science
Katherine Stewart	University of Maryland	Mani Subramani	University of Minnesota
Burt Swanson	University of California at Los Angeles	Jason Thatcher	Clemson University
Ron Thompson	Wake Forest University	Christian Wagner	City University of Hong Kong
Dave Wainwright	Northumbria University	Eric Walden	Texas Tech University
Eric Wang	National Central University	Jonathan Wareham	ESADE
Stephanie Watts	Boston University	Tim Weitzel	Bamberg University, Germany
George Westerman	Massachusetts Institute of Technology	Kevin Zhu	University of California at Irvine
Administrator			
Eph McLean	AIS, Executive Director		Georgia State University
J. Peter Tinsley	Deputy Executive Director		Association for Information Systems