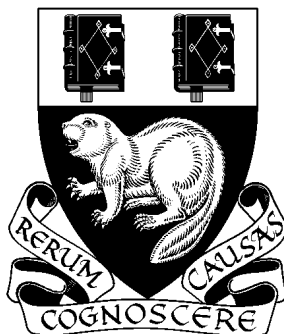


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**“ERP 'Trials of Strength': Achieving a Local University System from the 'Global' Solution”**

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# ERP ‘Trials of Strength’: Achieving a Local University System from the ‘Global’ Solution

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## **ABSTRACT**

*This paper analyzes one of the first ERP implementation projects within a prestigious US university, an initiative that opened organizational ‘doors’ to multiple unknowns whose presence challenged system localization efforts and involved the University in ‘trials of strength’. Through an interpretive field study, we analyse narrative accounts of change that were produced during the software project initiative. These stories highlight in situ moments of negotiation amongst individuals and groups as they worked to localize a system that would provide an integrated, enterprise-wide platform whilst being flexible enough to meet the needs of faculty and administrators. The power of ERP technology to embed standardized business models within organizations has generated case research illustrating the power of the technology to dominate the change process. We employ a temporally sensitive actor-network perspective in order to highlight the progressive nature of change during which local work practices are negotiated into the priorities of powerful networks.*

## **1. INTRODUCTION**

Enterprise Resource Planning (ERP) technology promises to replace homegrown systems with an integrated, enterprise-wide infrastructure that will streamline organizational activities and eliminate duplication of effort and data (Davenport 2000). Software vendors successfully sell these packages as appropriate ‘solutions’ for multiple markets (Soh et al. 2000). However, it is important to note that the current generation of ERP systems evolved from technology designed for the manufacturing industry (Klaus et al. 2000). The software embeds a template of “best business practices” based on a “traditional, hierarchical [and] functional view of organizations” (Soh et al. 2000), which limits the extent to which the technology can be customized to meet local organizational needs.

The power of ERP technology to embed standardized business models within organizations has generated case research illustrating the agency and role of the technology in negatively subverting the progress of these projects (Cornford 2000; Hanseth & Braa 1998, 1999; Hanseth, Ciborra & Braa, accepted for publication 2001). In addition normative ERP implementation literature gives the impression that creating an integrated, technological platform is somehow a linear process and that technology often controls the success or failure of a project (Bancroft 1996; Bancroft, Seip & Sprengel 1998; Parr, Shanks & Darke 1999). This research argues that it is rarely that neat and tidy. Rather, we highlight the political and social negotiations involved in achieving a local system from a global standard and argue that organizational priorities are re-defined during the everyday work of systems implementation.

In this empirically-based study we draw upon an interesting current case within a prestigious US university in order to answer the following research question: how does this organization ‘manage’, despite conflict, to achieve a working information system – one that binds disparate individuals and groups together for

better or for worse? Our analysis is based on narrative accounts of change that were produced during the software project initiative. These stories highlight *in situ* moments of negotiation amongst individuals and groups as they worked to localize a system that would provide an integrated, enterprise-wide platform whilst being flexible enough to meet the needs of faculty and administrators. Attending to these distinctive oral accounts focused attention on the everyday politics of systems implementation and highlighted the interconnectivity of choices made at different moments in time. The authors draw upon actor-network theory (ANT) (Callon 1986; Latour 1987) as a theoretical lens through which to communicate our findings. For purposes of this short conference paper we focus primarily on the work of Kavanaugh and Aroujo (1995) whose article helps us conceptualise the localization of software as an achieved outcome that results from progressive negotiations within and between actor-networks. After this work is introduced in the next section, we present the study's research methodology. The main body of the paper begins with the case description. This is followed by our analysis wherein we present three *narratives of the unknown* that impacted the project. The paper concludes with a discussion of our findings.

## 2. THEORETICAL GROUNDING

This section introduces the theoretical grounding of the study in order to provide the reader with a basic understanding of the research perspective. Conceptual tools from actor-network theory were chosen for two reasons. First, the approach provides a construct for theorizing technology and its role in social life: an area of central importance to information systems researchers (Orlikowski & Iacono 2001). Actor-network analyses remind us that technology is not just a static artifact, able to be introduced within a variety of organizational contexts without conflict. Rather, these non-human entities are interpreted as political actors, capable of being shaped by domain experts but also limited by design in the way they can be modified. Second, the researchers were inspired by ANT's overall premise, which focuses on how the work of society is accomplished (Monteiro 2000). This agenda extends ethnomethodology (Garfinkel 1967) in order to conceptualize human and non-human actors as working together to create social environments. Insight into these negotiations can be gained over time if researchers follow processes of translation (Callon 1986), where the political interests of actors become aligned with others, and inscription (Akrich 1992; Akrich & Latour 1992) where those interests materialize within artifacts, work processes, software programs or official procedures.

This paper is particularly concerned with highlighting the nature of change, where the outcome of an information system results from successive negotiations between disparate individuals and groups. In order to understand how local ways of working are negotiated into the priorities of powerful networks, we draw from the work of Kavanaugh and Araujo who, in one of the only papers explicitly connecting temporal issues with ANT, take the epistemological position that time is a socially constructed phenomena and therefore exists in multiple and varied forms<sup>1</sup>. They propose that ANT is a particularly useful tool for making visible illusory temporal characteristics because it focuses on the processes by which the social is constructed (Kavanaugh & Araujo 1995). The paper develops a long standing, but under-emphasized, ANT argument that "times are what are at stake between [network] forces" (Latour 1988). The authors employ origami, the craft of paper folding, as a metaphor for the achievement of a stable information system. The premise is that significant events during a project initiative represent "folds in time" and each consecutive fold limits and enables potential futures: just as folds in origami paper progressively influence the resulting artifact whether it be a bird, a swan or a boat.

These folds in time are the result of progressive trials of strength between actors vying for a dominant position within the network. The origami artist embeds her temporality within the object by making successive paper folds based upon her program of action (Akrich & Latour 1992). She moves forward and backward in time, conscripting (Akrich & Latour 1992) past events and envisioning future scenarios in order to help her decision making in the present moment and propel her toward the desired outcome.

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<sup>1</sup> Social theories of time are increasingly considered within IS research. See for example the International Conference on Spacing and Timing, Palermo, Italy, November 2001.  
<http://www.emp.uc3m.es/~quattron/conference/home.html>

Similarly actors involved in change efforts reflect upon previous choices, consider current options, and attempt to create folds in time that will secure their preferred future. This highly progressive and non-linear process of translation illustrates the way in which small, punctuated moments are interwoven to affect change and result in the future becoming colonized through a series of seemingly innocuous, past events (Kavanagh & Araujo 1995). Following *in situ* relationships between actors provides insight into the nature of project work before these activities become black boxed – hidden from observation (Vidgen & McMaster 1996). The research methodology for accomplishing this is the focus of the following section.

### **3. RESEARCH METHODOLOGY**

This research study adopts an interpretive epistemology (Walsham 1993) supported by a qualitative research approach and focusing on a longitudinal case study. A narrative approach was chosen in order to capture *in situ* moments of negotiation amongst individuals and groups as they worked to create a local information system from a global standard. Narratives do not provide researchers with the ability to uncover 'the facts' surrounding an event despite a narrator's claim to have access to 'the truth' or 'the real story of what happened' (Gabriel 2000). Commensurate with the study's interpretive stance, a narrative approach emphasizes the existence of multiple perspectives and is valuable because it facilitates recognition of different interpretations of the same event. The official story of a software project which is recorded in organizational documentation, represents the dominant interpretation of the initiative but it does not represent what 'really happened', merely what managed to be remembered. In other words, official documentation becomes a powerful, black box – a sedimented narrative – that cannot be reopened in order to elicit alternative versions of the story.

The particular narrative approach informing this study draws primarily from the work of Bruner (1986, 1990) who argues that "paradigmatic cognition" is only one of two 'modes of knowing' and although it is legitimated by scientific practice, the "narrative mode of cognition" is the more common way in which people articulate their world. As such, narratives provide a vehicle for understanding how particular cultures attribute meaning to their constituent actions and practices (Bruner 1986). Czarniawska (1998) within the field of organization studies and Boland and Schultze (1996a, 1996b, 1997) in information systems address some of the most relevant aspects of Bruner's work for process-oriented research. Individual accounts of change do not *create* change. Rather, it is only through coordinated action that change takes place over time (Boland and Tenkasi 1995). However, woven into individual narratives are connections and politics that highlight the basis for coordination (Bruner 1990). Narratives include not only the narrator's interpretation of current reality but also their attempts to construct future reality for the benefit of their audience. When gathering and analyzing narrative data, the aim is understand the processes and patterns revealed in multiple interpretations. Narratives tend to be constructed as a convincing explanation of 'why things are the way they are'.

This research was conducted at an Ivy League university, which will be referred to by the anonym 'Ivy' in order to evoke an archetype through which readers can relate their experiences. The fieldwork took place between June 1999 and August 2000 during which time the researcher conducted four field site visits each lasting an average of eight weeks. A total of one hundred and twenty interviews were conducted with forty-two software project members and University employees. The majority of the interviews followed the narrative interviewing convention, which provides a temporal frame of reference (for example, "Describe the last project phase to me.") and then allows the interviewees to narrate, without interruption, their interpretations of important moments of negotiation in front of them at that time (Bauer 1996). All the interviews were tape-recorded and verbatim transcripts were produced which facilitated the process of analysis (Riessman 1993). In addition, detailed notes were taken during and after all interviews to supplement the transcripts with information about pre/post interview banter, non-verbal cues, and the interviewee's interpretation of events. Throughout the fieldwork the researchers also observed critical meetings and collected internal and external documents related to the project, which were analysed as other organizational narratives.

Important issues and actors referred to in narrative accounts set the agenda guiding the researchers to the next round of interviews. This allowed the researchers to gain multiple perspectives by interviewing not

only organizational allies but also controversial actors who may have otherwise remained 'silent voices' (Star 1991). When a reference was made to a group, or to non-human actors, an interview would be arranged with a delegate actor (see Adam 1995; Pouloudi & Whitley 2000 for further discussion of technology speaking through human delegates. See Callon 1991 regarding language as a window into delegate roles). This incremental and participant-led process meant that the researchers took up opportunities to reach interviewees and collect narratives that reflect *in situ* sense-making and rhetorical perspectives.

Any collection of narratives is likely to be partial; on a practical level one cannot collect data all the time, from everyone. However, when abstracting from the empirical material the researchers found that the majority of narratives clustered around important political processes occurring at the time; for example, impending deadlines, user group requirements or controversial work practices. The analysis of these narratives highlighted the variety of perspectives that existed within the University at a given moment in time and the researchers organized them into clusters in order to illuminate the socio-technical processes at work. These storylines focused on resolving an unknown future and took the researchers 'backstage' to provide insights into complex localization processes. The next section presents an overview of Ivy University's project initiative in preparation for the data analysis focused on three trials of strength that influenced the way in which the ERP package would be localized within the organization.

#### **4. DESCRIPTION OF EMPIRICAL MATERIAL: IVY'S PROJECT INITIATIVE**

The Vice President (VP) for Finance and Administration had just arrived at the University when he began communicating to a 'core group' of middle managers his vision to "partner with industry" in order to create an "administrative center of excellence, putting the school on the map and creating a state of the art system" (interview with VP). ERP software companies were seeking to penetrate untapped markets in order to widen their customer base by selling Y2K compliant technology. Several vendors approached Ivy about developing an 'industry specific solution' that could be sold to universities worldwide. The VP was keen to have Ivy chosen as the model organization over its rival institutions and when offered the opportunity, University officers unanimously approved the initiative.

Ivy University created an alliance with Oracle Corporation to become their "showcase customer" (official documentation) in order to develop and implement flagship technology. The breadth of this project encompassed the replacement of administrative systems and their underlying business processes in three key areas: financial management, human resources and payroll and grants and contracts administration. The project scope was unprecedented for an historically self-directed university administration and the timing of the project meant external IT experts were entering an untapped market not yet understood through the lens of ERP. Later that year, the University Provost and Vice President for Finance and Administration officially announced the project initiative to the community through an article in its newspaper:

'We write to inform you of an important University initiative... that will benefit the working environment of the entire [Ivy] community... [Ivy] must upgrade its administrative systems in order to accommodate the changes needed to record the year 2000... In addition, our obsolete computer systems and outdated business practices impede the efforts of faculty as well as staff... Consequently we have chosen... a comprehensive project combining systems replacement using newly developed software from Oracle and substantial business process reengineering made possible by the new software.'

The choice to work with a single ERP vendor was predicated on their willingness to develop a comprehensive grants management capability that did not exist in their product line. The grants and contracts environment for research universities had become increasingly risky and any enterprise-wide system would require the development of a grants module in order to meet compliance issues between funding bodies, principal investigators (PIs - academic faculty awarded a research grant), and institutional custodians. This grant accounting functionality was quite complex to integrate within the existing ERP suite and the vendor required Ivy's expertise if they were to be successful.

During this time the project structure formed and a project director with experience implementing ERP software in large business organizations was hired to lead the initiative. However, his inexperience with university operations meant that day-to-day leadership of the initiative was driven by the Vice President's 'core group' of middle managers, the majority of whom were considered functional business experts with only a cursory understanding of ERP technology. The development priorities of Oracle were to modify existing ERP technology quickly and inexpensively whilst the core group spent time considering possible business process changes that would support the grant accounting model. They were later criticized for being focused "30,000 feet above sea-level" and "not opening the box and installing the software to see what it did" (interview with technical leader).

Two years into the project, a rapidly approaching Y2K fiscal year deadline led the VP to secure local ERP expertise by hiring a technical Director of Administrative Systems. The VP told the Director that his number one priority was to: "meet the Y2K fiscal year deadline - no matter what" (interview with Director). The VP was so concerned about the Oracle's development delays that he traveled 3,000 miles by plane to their corporate headquarters, and informed top management that the partnership would cease if the custom ERP modules were not delivered in a timely manner and with high functionality. Ivy received 'bare bones' technology in time for 'going live' but this meant that only "essential" (interview with project leader) ERP functionality was operational on the first day of the new fiscal year. What was previously supposed to be a single, 'big-bang' implementation was re-defined by the project team as having multiple phases with the remaining work to be completed during 'phase-two' implementation.

Whilst a small group of departmental end-users were consulted throughout the initiative, the phase-one system very much reflected the interests Oracle and the VP's core group of managers. In an effort to illustrate this shaping process we focus on the transition from phase-one into phase-two of the project implementation and use the example of the Principle Investigator Report (PI Report), to highlight relevant issues. The PI Report illustrates the extent to which the ERP project initiative was driven by administrative agendas that, despite the promise of "higher quality administrative services to faculty students, staff, alumni, donors, and sponsors" (Ivy University newspaper), neglected the wider university community.

#### **4.1 The Principle Investigator Report**

Faculty administrators provide the vital link between academic agendas and University reporting requirements. As direct consumers of the phase-one system, they found themselves unable to provide their faculty PIs, with a report detailing vital information about their financial commitments and could not answer the fundamental question "How much money from this grant do I have left to spend?". Suddenly, a group who had been told to expect a reduction in 'hassle factor' as a result of the new system, were unable to accomplish key aspects of their job.

This led faculty administrators to garner the support of powerful academics. Together they met with the VP and his core group where they demanded that the legacy system which generated the 'old world' PI Report remain live until new tools were developed as part of phase-two implementation. This compromise was particularly hard for the project team to agree since from their perspective the PI Report represented an outdated mindset in conflict with the 'new world' grant accounting model. The VP's core group had purposely created a system that did not allow for tracking financial commitments to the penny. Rather, they felt that faculty should be "taught to prefer" reports that presented their funds based on "time-phased" spending scenarios. A senior financial manager bluntly articulates this:

'I would say that the mentality that we've had... for managing is **primitive** to say the best and it's **very** old-fashioned... the *corporate* world left it **many years ago**... Many faculty... think of things **fundamentally wrong!** They think of [their finances] as a *checkbook*...we want to move people towards a *management model* where we're going to ask [them] to put together a [time-phased] *business plan*'

However, the project team quickly realized an important omission in their development priorities for the phase-one system. The core group had deemed the faculty's time-phased reporting tools as 'non-essential'

and re-scheduled its development as a phase-two deliverable. Once the team realized their error in judgment, the legacy system concession had to be agreed.

The project team remained at the mercy of Oracle to deliver ERP functionality that supported a viable time-phased reporting environment. Until that time, their immediate goal was to create a temporary ERP solution as quickly as possible. The project team shifted phase-two development priorities and took a crude intermediary step in which the old style PI Report was temporarily bolted onto the ERP system. They then shut down the legacy system and forced a user migration to the new technology. However, faculty administrative staff found the ERP process cumbersome and inefficient and as a result, a new wave of shadow systems emerged.

The core group of managers spent another six months trying to create grant accounting tools they felt supported the preferred time-phased business plan for faculty. However, this process was much more complicated than expected because they underestimated the determination of faculty to maintain their 'checkbook' style of financial management. The core group entered into an unexpected back-and-forth process of report development with faculty but they remain unable to completely break the hold of the 'old world' shadow systems. A year and a half after going live with the phase-one system, the majority of faculty administrative staff import data from the ERP system into customized spreadsheets that re-create the faculty PI Report.

Despite the faculty's success in achieving compromise on this issue, over time the PI Report appeared more and more like a 'border skirmish', rather than a revolution. The investment in the project initiative has grown so large that the ERP system as a whole is undisputable. Issues such as the PI Report are being 'talked away' in the dominant success stories that are taking place:

'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 its pretty and whether various people are *happy* with it - **its got to get done!** The project couldn't be a failure.' - senior project manager

So, we argue that this is not just a story about the powerful 'winning'; that would be far too straightforward. Although the ERP will become 'part of the furniture' at Ivy, it does not resemble its original definition; instead its design, use and detail will reflect to varying degrees the constitution of interests being articulated within the context of its development. The next section analyses the project initiatives as three *narratives of the unknown* in order to consider how progressive trials of strength influence the way in which standard ERP technology is modified and in turn, localized within the University.

## 5. ANALYSIS AND DISCUSSION

This section presents three narratives of change each belonging to a powerful network that came to dominate at different moments in time during the project initiative. The narratives are analysed in order to highlight the interconnectivity of trials of strength without imposing a linear and rational interpretation of change. We argue that these trials led the progressive 'folding' of Ivy's future: first influencing the University's choice to implement a standard ERP package and subsequently allowing it to be compromised. Our analysis begins with the presentation of the VP's network whose concerns about an uncertain future for higher education are expressed in his narrative of a *global unknown* which impacted the commissioning of the ERP project, setting in motion a powerful temporality that would influence Ivy's future. This is followed by the project team's narrative of a *collective unknown*, which further colonized Ivy's future through the creation of a durable, boundary-crossing network imposed upon the working rhythms of its administrative staff. The final subsection highlights the faculty network whose narrative delayed the localization of the ERP technology by negotiating a voice for the *local unknown* which had been relegated to the periphery during the project initiative. It is the progressive nature of these narratives that enabled and constrained the future of Ivy University's working life.

### **5.1 The VP's network: A global unknown**

The horizon of the 1990's was overshadowed by fears of computer problems associated with Y2K, the hubris of the 'internet economy' and enterprise-wide organizational transformation (see Financial Times 1999). Universities, traditionally defined as "loosely coupled communities of scholars" (Weick 1976), were feeling pressure to adopt a corporate, business model (Reed 2000) in order to compete within an increasingly complex and competitive global, higher education marketplace (Barnett 2000). It was in this environment that a new Vice President for Finance and Administration arrived at the University and was charged with positioning Ivy against the litigious hazards and potential reputation risk posed by antiquated accounting and finance practices. A powerful Oracle sales narrative conscripted Y2K and ERP media-hype as non-human actors in order to cast doubt upon the reliability of Ivy's legacy system. Executive agreements ushered in an additional temporal zone; Ivy's local times were introduced to ERP's standard working rhythms. The VP's strategic vision drew together leading-edge business logic and prestigious intellectual ethos with the aim of colonizing the unknown global future. It was presented to Ivy as an opportunity to set the global standard for academia.

The approval of a "strategic partnership" by University officers marked an important fold in time where certain futures were prescribed based on the newly formed alliance with industry. No longer were Ivy's administrators "masters of their own destiny". Rather they were "in bed with" Oracle for whom the higher education market represented a miniscule percentage of their total business and were committed to implementing a technology that was not yet fully developed and which embedded a different temporal working rhythm.

The approval of the project initiative marked the beginning of what was commonly referred to as the "VP's vision" or his "number one baby". His strategic narrative was so powerful that it had the affect of black boxing the negotiations preceding the purchase of ERP technology. The appropriateness of a standard software package for university operations was unquestioned, and took on "matter of fact" (Latour 1999) status within the organization. The irreversibility (Callon 1991) of this network proved quite phenomenal over time as it maintained the enrolment of almost the entire university community who were unable to recall a time when alternatives to this vision existed.

The VP's "programme of action" (Akrich and Latour 1992) to create a centre of administrative leadership had become "scripted" (Law 1997) into the University's narrative of an unknown future. This fold in time had resulted from a trial of strength involving global and local actors whose agendas were both complementary and divergent. The next subsection analyses how the VP's network further colonized Ivy's future through the creation of a durable project network that successfully translated the disparate interests of a project unknown.

### **5.2 The project network: A collective unknown**

Ivy opened its doors to actors representing the alien ERP assumptions and timeframes of project, process and milestones. The external experts lacked contextual understanding of Ivy's ethos and workflow, making it difficult to develop a common basis for a collective ERP team narrative. A core group of middle managers adapted their knowledge of embedded and embodied Ivy work-times to a broader project temporality; opening a dialogue focused on developing "divergent knowledge" (Baskerville et al. 2000) about one another's expert domains.

For the VP and his Ivy managers, the project became their top priority, subsuming previous commitments. However, for the ERP delegates this was one small project among many, whose temporal markers and commitments had to give way to macro corporate goals of return on investment. This led to trials of strength between the various actors in a struggle to maintain preferred temporal priorities. The core group was constantly attempting further enrolment of ERP programmers, whose temporal resources would often be pulled away elsewhere.

The transformation of Ivy was not all shaped by the work of dissipated external vendor conquistadors. Fuelled by the VP's narrative of the university as an intellectual hotbed for both academic and managerial



ideas, the core group thrived upon conceptualising the future. A frequent phrase during the first two years of the initiative was “now is the time” which was underpinned by a powerful narrative of organizational transformation that implied a fleeting ‘window of opportunity’. The innovations brought to the table by Ivy team members were added to the development agenda – folded into the project initiative, creating “scope creep” and putting additional pressure on the already recalcitrant ERP project management timeframe.

With the approach of an immovable Y2K deadline, the VP became concerned with the project’s progress. Clock time was running out and the ERP remained largely enrolled within the Oracle network. He decided to enhance his local network and acquire an Ivy technical director to subvert Oracle’s hold over Ivy’s future. This culminated in the VP’s flight across multiple time zones in an attempt to conscript Oracle and the ERP technology back into his own time. The Director reflects on this crucial period:

‘We were going to tell Oracle that we were going to chuck them...we were going to come up with an alternative strategy. That would have been very bad news for them because they want to sell this [higher education] market. We really meant business - if they couldn’t execute - we were not going to install. So [the VP] carried that message out to them.’

This VP’s trip triggered a compromise whereby Oracle delivered generic modules by moving, what they defined as, “non essential” to a phase-two time zone that became added to the project plan.

The creation of the phase-one system resulted in another fold in time that impacted the way in which Ivy’s future would be colonized. The VP and his core group had not created strong enough networks to embed the technology as a local solution. Whilst the project initiative had constituted the ‘right time’ to inscribe the core group’s priorities into the ERP, its members neglected important ‘other times’ held by the wider university community. The next subsection highlights the faculty network whose narrative created an unexpected fold in time and delayed the localization of the ERP technology into the wider Ivy community. The faculties’ trial of strength negotiated a voice for the local unknown which had been relegated to the periphery during the project initiative.

### **5.3 The faculty network: A local unknown**

The working rhythms inscribed in the phase-one system were initially at odds with those of faculty and their administrative staff who refused to accept the proposed ERP. Previously silent actors exhibited their recalcitrance through narratives of resistance during the first six months of the systems’ use. This prominent controversy is highlighted by the ‘border skirmish’ involving the *PI Report*. Users couldn’t opt out of the ERP system completely because by this time it was inscribed with folds in time, which resulted during the project initiative. The ERP system now represented a significant ‘sunk cost’ for the university whose narrative of the future was ‘folded into’ its success.

However, the focus of this controversy broke an implicit set of trust relationships between the project team and the wider University community and tested the irreversibility of the VP’s vision. Powerful faculty conscripted narratives from the past to act as delegate actors on their behalf in order to remind the VP of his official promise to support and improve University working rhythms through the new system. The faculty leveraged their own actor-network, to make their voices heard in the broader project narrative, and achieve tactical concessions in the flow of organizational strategy. The extent to which the VP’s vision and the grant accounting model would become Ivy’s dominant temporality was at stake.

The network of faculty interests enrolled enough powerful actors to conscript the VP and his project team, who without an alternative network solution in place, were forced to turn on the legacy system. The failure of the project team to negotiate faculty interests into the phase-one ERP system was an omission that had cost them powerful allies. Unable to conscript Oracle, whose post Y2K working tempo was itself an immutable mobile (Walsham 1997), the team worked to increase the stability of their network through quick trials of strength. First the team inscribed the ‘checkbook’ temporality within the ERP system by creating a ‘bolt-on’ report generator. They then conscripted users into their network by closing down the legacy system and creating an obligatory passage point (Callon 1991) through which they

expected the enrollment of faculty interests. This trial of strength succeeded in closing down the legacy system and the temporal working rhythms embedded within it, but it failed to translate user interests.

The 'bolt on' remained unused by administrators who instead created shadow systems that translated basic accounting details from the ERP system into customized checkbook reports. These systems were shared amongst actors within the network and resulted in a grassroots development effort underpinned by Ivy's 'old world' temporality. This act of political recalcitrance delayed the acceptance of the ERP technology into the wider Ivy community and it influenced the extent to which the system was localized. At the time of writing, The VP's core group of managers is still working to enroll faculty and administrative staff into the working rhythms of the time-phased business plan. The shadow systems have become an adjunct part of the local ERP system and maintain an important place within the faculty network.

This analysis foregrounds the political artistry involved in project initiatives and highlights the localization process as an achievement of order resulting from progressive negotiations between disparate actor-networks. As Latour (1999) says, when their goals are frustrated actors take detours through the goals of others resulting in a general drift. The narrative of one becomes intermingled with the narrative of the other and the drift that emerges represents not solution two overtaking solution one, but a fusing of multiple interests. Ivy's future is colonized to such an extent that the ERP is *will happen* and the best that the faculty hoped to do was leverage a moment, create a fold in time, and get themselves written into Ivy's narrative of an unknown future.

#### **5.4 Discussion**

We argue that it is useful to conceptualise daily work life as flat, one-dimensional origami paper, which represents our taken-for-granted social time. The multiplicity of our time zones becomes punctuated during change processes where we confront many narratives of the unknown and attempt to make sense of them during trials of strength. Local times only regain invisibility (Bowker & Star 1999) – flatness – by moving through complex negotiations with other times. Folds in the paper build on one another to create a complex, interconnected structure that is simultaneously similar and different to that with which we began. During periods of dramatic change, the constitutive nature of our taken-for-granted time is forever replaced, at first by a multi-dimensional and obviously foreign temporality and later, by a conflated, newly localized, taken-for-granted time. The seemingly one-dimensional nature of our local temporality is an achieved state that operates silently until thrown into high relief during negotiations with others.

Attending to the temporality and texture of creating a local system contributes to our understanding of project dynamics and may provide valuable insight to those involved in such strategic initiatives. We have argued that conceptualising technologies as dynamically constituted and inscribed by complex socio-technical networks is especially insightful when trying to capture how a system becomes localized. However, it is misleading to represent ERP project initiatives as driven primarily by contentious and powerful technology. Rather, we should seek conceptual tools that encourage the exploration of change dynamics in order to develop a more robust understanding of the way localization is achieved. Latour (1999) calls for researchers to 'follow the actors' in order to 'attend to the relationships between entities whether human or non-human'. This study attends to his research agenda by providing an empirically informed analysis of actor-network theory in use.

This paper argues that the power of narrative devices, as opposed to more general qualitative methods, for information systems field studies, rests in exploiting narrative at all stages of the empirical work. This gives researchers the 'eyes to see' the interconnectivity of stories and to follow the change process as it unfolds. Post-hoc narrative analyses of data that were gathered as part of a more general qualitative research program, may surely fail to harness the full power of a narrative approach, which resides in the ability to gather multiple accounts of change over time. The researchers argues that a longitudinal narrative study helped us understand the ways in which computer-based information systems are revised and will render the work of software projects more comprehensible.

Creating a local information system from a 'global' software packages presents unique challenges for universities as they struggle to make meaningful decisions in the face of unknown futures that persist beyond the localization of the ERP technology. For many, implementing standard technology such as ERP requires multi-year project initiatives involving collaboration with disparate organizational networks and external experts. Not only are these alliances difficult to negotiate during the initial implementation project; they remain an important influence over local temporalities in the longer term because of system upgrades and maintenance contracts. As scientific and teaching enterprises become 'big business' and universities throughout the world struggle to revamp their identity within an era focused on "commercialising higher education" (Noble 1998), software vendors are increasingly viewing the education market as a lucrative "industry" (Winner 1997), potentially worth several hundred billion dollars in revenue (Lehman Brothers study quoted within Noble 1998). The growing popularity of ERP technology within today's uncertain educational environment has the potential to redefine intra-organizational operations and transform administrative functioning within many North American universities. In addition, if vendors are able to successfully market their US-model as a viable "industry solution" for multiple cultural contexts, higher education operations may become standardized worldwide (e.g., Educom and Oracle Corporation websites as well as the Newcastle Higher Education Symposium 2000 on The Future of Universities). Research focused on how communities manage to negotiate a platform for their local agenda in the midst of powerful, trials of strength should take precedence as organizations from a variety of contexts embark on standard technology projects.

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