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Picking Up the Pieces After a "Successful" Implementation: Networks, Coalitions and ERP Systems

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ABSTRACT

The empirical focus of our paper is an Enterprise Resource Planning (ERP) system implemented in a major University, itself formed by the merger of two independent establishments in October 2004. We found that the new ERP system replaced existing legacy systems for political as well as functional reasons. Within the University setting, we identified three distinct networks containing powerful actors who influenced and dictated the outcome of the ISD project. We show how an effective coalition between top management and the software supplier was able to transform the administrative structures of the University and inscribe the organizational new arrangement with the software. However, this was achieved by marginalizing the end users who were left to cope alone with many of the inadequacies of the new system through improvisation.

Keywords: Socio-technical systems, social process, process models, information systems development (ISD), ERP implementation, BPR, success and failure, Actor Network Theory.

INTRODUCTION

In adopting ERP systems, organisations are supposedly able to connect different functions together. Thus many problems of using diverse legacy systems can be ameliorated, if not solved (Elbanna, 2007). Therefore, ERP systems are claimed to have had the most profound effect on organisations compared with any other IT innovation (Rajagopal, 2002, Shang and Seddon, 2002). ERPs are now considered by many to be "the price of entry for running a business" (Kumar and Hillegersberg, 2000) and they have enjoyed a rapid world-wide growth in their numbers[2]. As part of this phenomenon we have also witnessed an increase in the number of universities turning to large scale ERP systems in order to improve their front and back-office capabilities (Scott and Wagner, 2003; Pollock and Cornford, 2004; Wagner and Newell, 2004).

The purpose of this paper is to analyse through a case study critical events experienced during a top management-led planned Enterprise Resource Planning (ERP) initiative in a major University which we call Cornfield[3]. Cornfield, itself is a product of a merger between two universities [here given the pseudonyms Vulcan and Umbra] in 2004. In particular, we focus on the success of implementing ERP. But, we take a different spin by not focusing directly on why these systems succeed but rather on the events in their contexts and negotiations of change that occur during ERP implementation. The study presents process accounts of the actors involved in the project within the University. We apply Actor Network Theory (ANT) as our process theory, particularly in highlighting the conflicts, compromises and sense-making events that unfolded diachronically, and which seem to be characteristic of an organisation that undertakes a major information technology (IT) initiative (Scott and Wagner, 2003).

This study is guided by the following research questions:
- What are the key actor networks in the development process and how do the networks develop and interact diachronically?
- How is the 'best of breed' ERP system implementation in The University of Cornfield regarded by the different groups post implementation?
- What are the implications for research and practice resulting from our findings, particularly for similar institutions?

The paper begins with a summary of the ERP literature. This is followed by a brief summary of Actor Network Theory. We then describe the research approach including a description of the case study used. This is followed by a section that describes our findings, where we highlight how the management of the implementation processes influenced the project outcome. The findings are analysed with ANT and the implications for future research, including those for academics and practitioners, will be discussed. The paper ends with conclusions from the study.

PRIOR RESEARCH

By streamlining data flows throughout the organisation, ERPs promise dramatic gains to a company's efficiency and profitability (Davenport, 1998; Fahy, 2001, Maliranta and Rouvinen 2003). This is manifest in an ERP's ability to increase data visibility and thereby improve intra and inter functional processes (Scott and Kaindl, 2000; Quattrone and Hopper, 2005) leading to reduction of cost in operations; increases in customer responsiveness, and improvements in tactical and strategic decision making (Ross and Vitale, 2000). However, implementing ERPs comes with high risks. According to Escalle *et al.* (1999), ERP spending can run as high as 2-3% of company revenues. Negative outcomes of several major ERP projects are well known as cases like FoxMeyer, Mobil Europe, Dell, Dow Chemical (Davenport, 1998), Siemens, Panasonic and Bruno Magli (Robey et al., 2002) testify. This controversial picture – success stories vs. catastrophic failures – invites more research into the anatomy of IT-based organisational change, and how these change can be effected. An ERP system's ability to transform and streamline organisations cannot be taken for granted, but should be subjected to rigorous process investigation (Quattrone and Hopper, 2005).[4]

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[2] A study by IDC anticipated that worldwide spending on ERP software and related functions would grow at a compound annual rate of 13.5% between 2001 and 2006, hitting $187 billion in 2006.

[3] Not its real name. Anonymity was a pre-requisite of gaining access and conducting the research.

[4] Owing to space considerations, we will not be addressing the complex question as to what constitutes success and failure in ERP implementation in this paper. Where the matter is not obvious, we will adopt a stakeholder view which may involve multiple and conflicting opinions on the subject. It transpired that we needed this view in understanding the phenomena we observed.

Features that affect ERP implementation outcomes vary across cases. However, some critical factors recur that researchers have identified and linked statistically to outcome measures. For example, top management support is considered an indispensable success factor (Martinsons, 2004; Bingi *et al.*, 1999; Chen, 2001). In his study of eight ERP projects in China, Martinsons (2004) reports that top management initiated ERP projects in five of his eight cases. Four of these five were judged to be successful implementations, whereas all three cases promoted by IT managers were deemed failures. Reimers (2002) shows that more enlightened forms of management (e.g. consensus-building, empowerment) are crucial to implementing ERP systems suggesting that if you delegate ERP implementation responsibilities to middle managers and the IT group, this will be seen by other stakeholders as a signal that the ERP project is not highly critical to the organisation.

In contrast to the factor study approaches process studies link the history of systems development events that occur diachronically in work and project processes and dynamic contexts to explain outcomes (Newman and Zhao, 2008; Robey 1994; Barki and Hartwick, 1994; Newman and Robey, 1992). In summary, process modelling sees IS implementation as a sequence of critical events and seeks to explain how and why observed outcomes unfold over time (Boudreau and Robey, 1999). This is the research framework we adopted in this study[5].

The organisational setting is also likely to be crucial to our understanding. Hardy (1991) addressed the differences between universities and other professional bureaucracies using the concept of configuration (see also Heiskanen et al. 1998). Universities are particularly difficult organisations within which to innovate because of their de-centralised structure (Scott and Wagner, 2003; Wagner and Newell, 2006) resulting in what some researchers have referred to as "fiefdoms" each controlled by a baron (Heiskanen et al., 1998; Noble and Newman, 1993).

Actor Network Theory

While we adopted a process framework for our research we needed a theoretical "engine" to account why things change the way they change. To this end we adopted Actor Network Theory (ANT) which provides an appropriate over-arching explanatory theory behind the process history by focusing on actors (both social and technical) and their roles during the implementation of the system and how they interact within established networks. Latour (1987) argues that science and technology have to be studied in action, and that we must focus on the dynamics of actors' interactions in these socio-technical systems instead of their stability. According to ANT, humans and non-humans are linked together into actor-networks. The theory assumes that society as a whole is inhabited by actors pursuing certain interests (Hanseth and Monteiro, 1996). ANT seeks to trace the transformation of these heterogeneous networks comprising people, organisations, agents, machines and other objects (Tatnall and Gilding, 1999). This suggests that the outcomes of ERP implementations can never be taken-for-granted. The process is subject to conflict, sense-making and continual (re-)negotiation as various actors contest the high ground. These behaviors are especially apparent in higher educational settings (Scott and Wagner, 2003; Wagner and Newell, 2006). Elbanna (2007) employed ANT in a study of ERP implementation in a large international organization. She focused on "organizational othering" which is implied in the theory as it emphasises the differences between actors in the network: the "exclusion, labelling, ….and black boxing of some groups in order to marginalise them". We shall see that this was significant in understanding the role of the end users in their relationship to the ERP implementation.

In this study we will also focus on the process of inscription, which is the result of the translation of one's interest into material form and is fundamental to building durable actor networks .The theory claims that actors pursue interests which can become inscribed in technical and/or social arrangements (Hanseth and Monteiro, 1996). Buying into ERP solutions (an inscription of work processes) involves a large degree of "lock-in" in to specific ways of working. Likewise, these systems cannot be removed without large financial and organisational penalties. Indeed, technology as actant can be viewed as "…political, capable of being shaped by domain experts but also limited by design in the way they can be modified." (Scott and Wagner, 2003).

RESEARCH APPROACH

The field work was conducted during the summer of 2007, between May and July and all the methods employed during the study are characteristic of the interpretive epistemology perspective. The tools adopted for the research include: semi-structured interviews and the collection and interpretation of official confidential Cornfield project documentation. Intranet information was also employed where appropriate.

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[5] The research framework is described in Newman and Zhao (2008).

We conducted 17 interviews with project members, members of the finance office and the wider University community who had direct involvement with the system in terms of implementation, support and use[6]. Four out of five main stakeholder groups were studied – end users, IT experts, management (including senior management) and system developers. A fifth group, vendors, were not willing to participate in the study despite the researchers' repeated efforts to involve them. Interviews were tape-recorded and verbatim transcripts were produced (see Table 1 below) then forwarded to the interviewee for correctness of information and approval. Notes were taken during the interviews and a research journal was used in order to supplement the process of transcription of the interview.

Date (dd/mm/yy)	Title of participant interviewed
14/05/07	Deputy Head IT Services
01/05/07	Students Systems Project Manager
10/05/07	Senior Technical Manager
03/05/07	University Registrar / Vice Principal
14/05/07	Programme Manager
12/07/07	Senior Finance Officer
24/07/07	Financials Project Manager
02/07/07	Faculty Finance Officer
02/08/07	Project Team Member
19/06/07	Senior User 1
16/07/07	Senior User 2
29/05/07	End User and Functional Trainer
22/05/07	End User 1
25/05/07	End User 2
25/05/07	End User 3
25/05/07	End User 4
25/05/07	End User 5

Table 1: The Interview schedule

During some interviews, documentation was provided to the researchers as part of the interviewee's personal account and contribution. These documents were analysed in conjunction with the interview transcripts in order to piece together the critical events that occurred during the project.

The Field Site

The research was conducted at a major University which was formed in 2004 from the merger of two University institutions. The fieldwork took place in the first year of system use between the summer months of May and July 2007. While the present University was formed in 2004, its constituent parts enjoyed long histories. Cornfield has the largest number of full-time students in the country, with over 11,000 postgraduates and approximately 33,000 undergraduate students.

The President and Vice-Chancellor, has been leading an ambitious strategic plan, to make the University one of the top 25 universities in the world on commonly accepted criteria of research excellence and performance. As a result of modernising its administrative IT infrastructure, top management with the help of external expertise in the form of management consultants decided on an overhaul of all administrative systems. PeopleSoft (and their implementation partner CIBER) were selected to co-develop and implement a 'Best of Breed' Enterprise Resource Planning (ERP) system. This paper specifically centres on the implementation of the Students System implementation. We will concentrate on ways in which the different organisational stakeholders negotiated through an IT-led change initiative in an attempt to create a campus wide enterprise system to replace the two legacy infrastructures.

RESULTS

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[6] The interviews lasted between 20 and 66 minutes with a mean time of 45 minutes. We are grateful to Ms.Chyrsa Tzoga for her assistance in collecting data and conducting three of the interviews.

Case Description: Antecedent Conditions

As part of an overall objective to improve the University's central administrative IT systems, in March 2001 the Registrar and Secretary commissioned a review of the current student system for the Vulcan University. The review concluded that:

> *"the current system, whilst providing the functionality necessary to effect the basic functions of student administration, such as admissions, registrations including fee predictions, academic progression and record closure, and some external and internal statistical reporting, lacks integrated functionality to provide a 'cradle to grave' administration for all enquirers, applicants, students, graduates, alumni and life long learners."*

> Student System Project – Business Case, Release 2.0 (October 2004)

The reasons for replacing both legacy systems was multi-dimensional and involved politics, vision and strategy, improving functionality, improving quality and accessibility of information. All of this took place whilst they were undergoing a merger of the two major institutions and competing for resources in the complex and dynamic environment of higher education. Before Project Neo (the name of the new project) and the impending merger, the existing infrastructure and systems at Vulcan were sufficiently larger; and business processes / configurations very different to those at Umbra. However the political drive to tender for a new system was due to the powerful influence of members of the much bigger Vulcan institute who:

> *"…exhibited a culture to have an expensive and very glossy system."*
> Senior Technical Manager (10/05/07, p. 2)

In terms of vision and strategy, the legacy systems were not web-enabled, robust or future proof, therefore making them no longer fit for purpose moving forward. The functionalities for improvement of the Students System revolved mainly around the student lifecycle "cradle to grave" approach. The old systems were not adequate enough in providing sufficient and world class services in these specific areas. In summary, the historical picture of ISD at Cornfield was generally positive. However, neither legacy system was fit to embrace both institutions. Therefore the decision was made to tender for a new system in October 2003.

The New 'Best of Breed' ERP System

The implementation of a new student record system gave The University of Cornfield the opportunity to re-engineer its processes and realise its vision for 2015 through modernisation and delivery of world-class services. A key aim is to sustain delivery of benefits through continuous improvement. This would be achieved with implementation of the PeopleSoft Student Administration system. An example of the benefits anticipated through implementation of the PeopleSoft solution and business process improvements is given in the Table 2 below[7]:

Strategic Benefits	Operational Benefits	Financial Benefits
Meeting the University vision for 2015.	Improved management and availability of information.	Increase Postgraduate offer to registered student conversion rate by 5% (representing an increase of 620 registered students at a turnover of $12m per annum).

Table 2: Example of expected benefits of the new system

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[7] Table 2: Source – Student System Project Business Case document.

The Project Implementation

The Acquisition of the PeopleSoft System

The new 'best of breed' ERP system was bought from PeopleSoft as an off-the-shelf package with scope for added customisation of modules for Cornfield. The infrastructure development was to be conducted by PeopleSoft's implementation partners CIBER. The selection of the right system had to satisfy five key areas: functionality (localising the product to work on local higher education structures), fully web-enabled, superior software architecture, methodology and access to global best practice. These were agreed upon by the project sponsor and technical user with PeopleSoft / CIBER.

The level of customisation, functionality for localisations and timeframe were the primary concerns of management. Cost was a tertiary factor as a sufficient budget had already been agreed for the Students System project. However, during the implementation, relations soon became strained and management began to express dissatisfaction towards PeopleSoft / CIBER. This was due to a number of reasons. Firstly, the vendor software had not been proven in the local higher education market: at that time only one other University in the country was in the process of implementing it. Secondly, when the key country-specific modules for UCAS[8] were delivered they contained multiple errors and the feedback from the supplier was poor. It also lacked certain key functionalities, such as the ability to generate value-added letters, marketing and enquiry management, degree classifications and finance modules.

The Project Team

The project team consisted of approximately 60 people, 40% of resources pooled from different levels of the University with the remaining 60% external functional appointments in the form of business analysts, consultants and management from PeopleSoft / CIBER. The entire programme was overseen by an IS Programme Board (ISPB), chaired by the Registrar (also the program sponsor).

Project Process

The concept of implementing a new system to improve the University's administrative IT systems began in October 2001 when the council at Vulcan approved review recommendations to set up a project. One year later, in October 2002, the initial Investigation Phase of the project was approved along with the project budget by an Executive Project Board (EPB). Project Neo was formally ratified on 6th March 2003. During the summer of 2003, users (over 100 from both Vulcan and Umbra) were approached in order to gather requirements and input for the new system and in September of the same year, an invitation to tender was approved by the EPB.

In October 2003, the invitations to tender were sent out to the OJEC (the European Tendering system) and by late January 2004, the tenders were received back from prospective suppliers and vendors. Then followed a series of evaluations and demonstrations to select the best supplier for the system and by April 2004, PeopleSoft / CIBER were selected and a business case approved.

During this time, key changes took place at a senior level within Vulcan management and several new staff appointments questioned the University's decision to replace its legacy systems. As a result, the project and business cases were audited by KPMG to ensure that senior management were reassured that the tendering process and the feasibility studies produced for implementing a new system followed due process. This was significant as it delayed the project start date by 3 months. Contracts were signed and project teams formed during the summer of 2004. In October 2004, the institutions of Vulcan and Umbra merged and project Neo began.

The implementation began immediately with a milestone of October 2005 set for the delivery of the specific localisation modules, essential for the system to work in the country's higher education market. The admissions legacy system was also scheduled to be phased out at this point moving forward.

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[8] Universities and Colleges Admissions Service - a central service through which HE students apply for University entrance.

The admissions module for the new system went live in December 2005; which meant that new data now had to be entered into the new system. Training was given in a modular fashion, i.e. as and when a new module was released. For the admissions module this began a few weeks before go-live. The implementation teams were, however, still developing the system after the decision was taken to go live with Postgraduate admissions. They were developing the major part of the Undergraduate admissions ready for 33,000 students registering online for the first time in June 2006.

In August 2006, the Students Records system went live and the entire legacy system that previously supported student's records and administration at Vulcan was phased out in September 2006. A post implementation review was conducted in November of that year in a bid to address any issues and problems which users were experiencing with the new system. The project was due for completion on the 31st July 2007.

At the time of writing this paper, the project is in its final phase as data migration was still taking place and training was ongoing on all parts of the system. Additionally, functionality issues and operational problems were still at the fore-front as users constantly discovered missing functionality. The legacy system at Umbra was still in operation, mainly for functional, data migration and research purposes, with a view to phasing it out in September 2007.

The Three Actor-Networks in Play

We now attempt to explain what happened during the ERP implementation process using Actor Network Theory. From analysing the case we identify three distinct intersecting actor-networks: top-management, the project team, and end users that emerged and were connected to the ERP as the actant..

The Top-Management Network

Historically within the pre-merger University, the IT governance that operated was a devolved tri-partite administration where responsibilities were delegated from the centre to faculties and schools. Shortly after the merger, there was a substantial drive towards further decentralisation by the President for power to be given to the individual schools. This strategy has now changed once more and there is a new drive back to a more centralised approach. In one sense this could be viewed as an attempt to be more inclusive, to create a shared model and allow the ownership to stabilise as the University adapted to its new structures. More cynically, we can see the move as top management taking greater control of the organisation by centralising decision making. This was done by enrolling the technology supplier in a coalition and inscribing the new administrative processes into the ERP software.

The Top-management network envisages technology as an enabler. In particular the Registrar and Vice President spoke of a need to quicken the pace of work, the importance of communication across departmental lines, and the notion that Cornfield was a complex 'business'. This was mirrored in other stories from senior management, with an overall sentiment that Project Neo was not all about implementing 'another IT system'; rather the University leaders became enrolled in a powerful network with a belief that seeking outside expertise would secure a prosperous future for them all. This is expressed during an interview with the Registrar / Vice President, where he places Cornfield as an actor in a network of universities seeking to establish relationship with powerful software vendors:

> *"PeopleSoft were involved already in the North American and Australasian higher education market, with products and services that had a good and well-proven track record. PeopleSoft kept abreast with changes in the computing environment, and also issues like student funding etc, and they had an idea of the sort of issues that might arise in years to come with regards and coupled with their deep knowledge in the area of higher education, they were the best choice. There was already an existing partnership with Oracle in place at the University of [Cornfield]."*

Registrar / Vice Principal (03/05/07, p. 1)

In the above account the Registrar / Vice President indicates the sort of deep partnerships which universities must make with IT vendors, where both parties must fully commit to each other and understand the intricate details and issues if the system is to succeed. He also highlights the fact that the University also had a pre-existing relationship with Oracle Corporation, which illustrates that there is already an established network containing tangible interests and a strategic partnership. Therefore the impending addition of PeopleSoft / CIBER as an actor and the new ERP system as a non-human actor within this network

would effortlessly connect the University to the software vendors, through the software design which inscribes the interests of these actors.

The approval of the project marked the beginning of a new era in the life of the newly formed University. The strategic vision spear-headed by top management was so powerful that it created a durable network where multiple agendas were accommodated through a single story of Cornfield's future. In each interview, actors expressed that top management support was the corner stone of the purchase of the ERP technology and the implementation was supported with a passion and determination for it to succeed. The irreversibility of this network remained steadfast over time throughout the University.

Actors within this top management network had a program of action to create a centre of administrative leadership scripted into the University's future, as a result of the experiences and knowledge gained from other similar networked ventures. The next section analyses the irreversibility of the top management vision through the creation of a project network that attempted to translate different working rhythms in order to negotiate a single project outcome.

The Project Team Network

Many actors came together to form the project team network. Creating a project team with collective momentum was difficult to achieve. This difficulty was compounded by the size of the project and the organisational ethos (Hardy, 1991; Heiskanen et al., 1998; Noble and Newman, 1993).

The increased visibility of PeopleSoft / CIBER ERP experts within project teams expressed the commitment of the vendor to affirm its relationship with the University, thus strengthening the bonds between the various actors in the network. However these bonds would become weakened during the project lifecycle as deficiencies crept into the implementation of the system and relationships between the vendors and top management became strained, as so vividly put by the senior technical manager:

> *"The only real nightmare was the consultancy firm [CIBER] who were terrible. They lied on numerous occasions especially during the tendering process, made poor decisions and were extremely expensive."*
> Senior Technical Manager (10/05/07, p. 11)

This apparent lack of trust shows a misalignment between the goals and vision between different actors in two different networks. In a bid to ensure that the project network was strong and powerful enough to last the duration of the project, in May 2004, the University contracted external auditors to conduct an audit for implementing a new system to ensure that it followed due process. The involvement of external auditors in the project network re-iterates the stronghold of the top management network in promoting the shared vision across the entire Cornfield community. In another sense the audit process could be seen as "window dressing".

The End Users Network

The network of end users became a source of constant problems with the new actant (the ERP system). These were highlighted during periods of implementation, user acceptance testing and post implementation review. It shows how important the network became in identifying potential short-comings in the system and failures to inscribe but also revealed a misalignment with the other two networks in the organisation; top management and the project team. There was a uniform agreement between all the end users interviewed that they were not consulted and that the ERP system did not reflect their needs. This led to high levels of anger and frustration as illustrated in the statement below:

> *"One of the main issues raised was to do with fees collection (bench fees [9]). There was a genuine concern that the information that was previously inputted into the old legacy system regarding bench fees for students would appear in the new system. This reassurance was not upheld and in fact such information was missing. Therefore some students have subsequently not been invoiced for bench fees totalling in the hundreds of thousands ………......"*

> End User and Functional Trainer (29/05/07, p. 1)

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[9] A fee paid depending on the project a student is currently on. This fee is paid to supplement the use of equipments, chemicals etc.

Some other core fundamental problems experienced by end users involved incorrect data held within the system, which led to erroneous output and bad reporting. From a usability point of view, the interfacing properties of the new system were poor and many end users complained that there were "so many screens" to access in order to get to the required information. In contrast, according to their accounts, the legacy system was a much better and more user-friendly system.

End users attempted to leverage their own network of resources, to make their voices heard on a broader project basis and achieve tactical concessions in the flow of organisational strategy. However, communicating these concerns was also a big issue. Cornfield's academic network enrolled enough powerful actors bound together by the top management and project team interests that the administrative (end user) interests had little choice but to accommodate them. This induced a lot of resistance to the new system. Top management attempted to coerce end users by cutting them off from other networks by closing down the legacy systems and forcing the users to go only through the new technology (a so-called passage point in ANT). However, administrators found the system cumbersome and inefficient to use. Unsurprisingly, several work-a-round or shadow systems emerged – improvisations - "bolted-on" to the authorized system (e.g. customised spreadsheets), in order to "make life easier" and ensure that data was correct and output reports were accurate, for example.

It is not clear from the stories whether this set of functionality (user related inscriptions) was purposefully excluded from the system. However, this was a cause for concern for the end users as basic functionality such as reporting and value-added letter generation tools, marketing and enquiry management, calendaring, degree classifications, finance modules were missing or not working properly. It was also clear from the off that communication was a constant issue throughout the project and as one end user expressed:

> *"...users were told of problems at the last minute and were informed that certain functionalities won't work when the system went live."*

<div align="center">End User (22/05/07, p. 3)</div>

Once the system went live, users were not well positioned to adopt the ERP system completely because it had been inscribed mainly with the interests of PeopleSoft / CIBER, top management and the project team. However, they felt powerless to reject the system outright.

DISCUSSION

Returning to our first research question:

- What are the key actor networks in the development process and how do the networks develop and interact diachronically?

Each network will attempt to use its resources of power and authority to try to influence other actors in the process of negotiation between other networks with aligned or misaligned interests. In this study, we identified three such networks: top management, the project team and end users, each with its own unique set of actors (and technological artefacts, actants) as they tried to influence the outcome of the ERP implementation. As the project was top management led[10], this network proved dominant throughout the organisation as they used forms of professional bureaucracy (Hardy, 1991) to translate their interests into the workings of the system and thus disseminate them to the other networks within the organisation.

We see from the findings that the relationships between the three networks identified were complex as each network continually negotiated about aligning interests in order to achieve stability in the socio-technical order (Hanseth and Braa, 1998). With the new technology designed and inscribed with meaning, the various interests of these actors were translated into technological solutions (actants) and organisational procedures in order to make the network to work properly.

The second question concerned success and failure:

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[10] Generally seen to be good practice and related to successful ISD (Martinsons, 2004; Reimers 2002).

- How is the 'best of breed' ERP system implementation in The University of Cornfield regarded by the different groups post implementation?

At Vulcan and Umbra, there were relatively successful histories of systems development. Of its two legacy systems, one was relatively new after undergoing a radical re-engineering initiative and the other system was implemented by Oracle, a major actor in the current top management network. Both were well-liked and adapted to the structure of the organisations. As a result of such positive pattern of work and system adaptation and adoption, it is more than likely that the new ERP system would be implemented successfully. In the case of Cornfield the system development experienced an escalation of resources during the customisation phase to fit the requirements of individual schools and faculties. This event, however, did not affect the overall budget and timescale of the project.

In summary, the evidence suggests that top management as a group would claim that the PeopleSoft system was successfully delivered on time and within budget and has now been adopted for all the primary administrative systems in the University. It has enabled the transformation of the University's decision-making structure from a relatively autonomous, decentralised arrangement where much power was vested in the Schools and Faculties, to a more command and control system, where decision-making is primarily centralised. This has been achieved by reaffirming the long-established coalition with the software supplier (now owned by Oracle) and with the willing assistance of the project group. But it has also been achieved at the cost of the user group and the wider University community who according to the stories felt universally ignored and excluded from the project decision-making. Administrators have been coping with the shortcomings of the software by developing work-a-rounds or shadow systems in order to "make life easier", especially after the plug was pulled by senior management on their legacy systems. In short, they were left to pick up the pieces after a "successful" implementation.

The last question points to the contribution of the study to research and practice:

- What are the implications for research and practice resulting from our findings, particularly for similar institutions?

Universities are special places. Generally, their decentralised decision-making structure (Hardy, 1991) has evolved over many decades and control and power has been vested in local "barons" controlling their "fiefdoms" (Heiskanen et al., 1998; Noble and Newman, 1993), using IT in well-proven legacy systems. When you try to innovate in a university, as in the case of Cornfield, by introducing an extensive command and control ERP system and at the same time iron out the differences between the two merged component universities, you are piling layers upon layers of complexity. This results in many struggles between stakeholders as our findings show. The **contribution of using a process approach** is to reveal the twists and turns of this process before the system can be finally delivered[11] and before the ERP system can be inscribed as the materialisation of the new order in Cornfield with top management firmly in control (Quattrone and Hopper, 2005). In contrast to a process approach, a **simple factor study** might attempt to correlate a measure of user involvement (in our case a low figure) with the success of implementation (apparently a high measure in our case if assessed by the top management group)[12]. This correlation not only contradicts received wisdom but is impenetrable to further analysis. Because we followed a process approach, our analysis shows how the top management group single-mindedly enrolled the IT experts, the vendor and consultants into a powerful network that could override the interests of others – the end users - at least in the short term, marginalizing them (Elbanna, 2007). We suspect that this will not be the end of the story and that the end users will reassert their influence at a latter date in an unpredictable manner when the networks are white-boxed and broken.

The implications for practice are several. First you should know the **type of organisation** you are dealing with. Oracle already had experience with the University through Vulcan so the transition to implement an ERP system was not as great as it would for companies and consultants with no experience. Second, the reason the implementation was "successful" for the dominant coalition was not because of the quality of the technology (it had many failings) nor was it because of the outside consultants, CYBER (they were generally disliked and thought to be too expensive). Our analysis shows it was because of **a strong top management group** who had a consistent vision for the use of IT at Cornfield (it was not to be "just another IT system"), provided enough resources to build and deliver the system, enrolled key partners from other groups and sustained their supportive stance. This was very much a managerial-led project. It would be difficult to see anything but a long drawn-out failure if the senior managers had abdicated responsibility and the IT people been in charge. If such cases arise, and

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[11] The details of this process will be the subject of a more extensive research manuscript.
[12] Of course, factor studies are statistically based and rely on many such examples of projects often from several organizations.

senior figures do abdicate leadership responsibilities, our study would suggest that practitioners should resist such calls to take charge of large ISD projects regardless of how attractive that may be.

CONCLUSIONS

Within the University setting, we found networks containing powerful actors who influenced and dictated the outcome of the ISD project. Alongside our process study we employed Actor Network Theory to explain the intricate details that connect the actors to the technology and how the various actor-networks are formed and interact with each other. We showed how an effective coalition between top management and the software supplier was able to transform the administrative structures of the University and inscribe the new arrangement in the software - but only in an incomplete manner. This was done by marginalizing the users, who were left to deal with the inadequacies of the system. Despite its limitations the study contributes to our understanding of process research into the complexities of ISD.

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