When a sure thing goes awry: Implementing an Enterprise System at IST Ltd.

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ABSTRACT

An Enterprise System (ES) is a type of information technology system that integrates all necessary business functions in an organisation into a single integrated system with a single shared database. Despite the widespread take-up of ES systems, they are notoriously difficult to implement. There are, as a result, any number of prescriptions in the literature for a successful ES implementation. The question that remains, however, is why projects continue to be mismanaged, when the risk factors are well-documented, and the technology itself should, after 15-20 years of practice, be maturing.

The answer, according to some researchers, lies not only in the content of the software or even the project management process, but rather in the context in which the project takes place. In order to explore the notion that context may affect an ES implementation, this study discusses a case in which contextual issues were critical. The research question guiding the case study is therefore "How, if at all, did the context of this particular company affect the implementation of the ES?" The case in question is that of a small-capitalisation South African company facing ongoing and emerging organisational complexity.

The case history is provided in some detail, followed by a discussion which links the case to the literature in order to provide specific lessons for managers who may be considering, or be involved in, an ES implementation. The lessons that emerge are that the context may affect the evaluation process, the timing of the implementation, and the user acceptance of the system. Interpreting how the specific organisational context might affect a project in any particular situation, and managing project risk appropriately, is the essential management task of an ES implementation.

INTRODUCTION

The implementation of an Enterprise System (ES) is known to be a challenging endeavour. Very often it is undertaken with the intention of improving integration, co-ordination and control in an organisation. This study describes a case where the attempt to improve co-ordination and control required an extended and expensive implementation effort. This is typical of what often happens in ES implementation, and probably resonates with the experiences of managers about to undertake, or in the middle of, an ES implementation. As such, the case and the discussion should be of interest and assistance to managers of ES projects.

The study is structured as follows: It starts with a brief discussion of Enterprise Systems (ES) and their implementation, followed by a short justification for the use of the case and some details of the research methodology employed. The case history is presented followed by a discussion which links the case to the literature in order to offer specific lessons for managers who may be considering, or be involved in, an ES implementation. A short glossary of technical terms which may be of assistance to non-IT managers is provided.

AN ENTERPRISE SYSTEM AND ITS IMPLEMENTATION

An Enterprise System, also known as an Enterprise Resource Planning (ERP) system, is a type of information technology (IT) system that integrates all necessary business functions in an organisation (for example, finance, manufacturing, human resources, distribution and order management) into a single integrated system with a single shared database (Gordon-Brown and Whittaker, 2002). Such systems can be contrasted with stand-alone systems that service various functional areas independently. An ES brings all functional areas into a

single system in order to solve the problems of fragmentation of information within large organisations. At the core of an ES is the database that collects data from, and feeds data to, a variety of modular applications that support virtually all of an organisation's business activities. This means that when new information is entered at one point, related information is updated automatically throughout the whole system. Thus, an ES should integrate key business activities and provide consolidated management information. The ability to view and manage an organisation's network of suppliers, alliances and suppliers as an integrated whole should further provide the organisation with drastic declines in inventory, reductions in working capital, and abundant information about customer needs (Escalle, Cotteleer and Austin, 1999).

Enterprise Systems are typically provided in the form of packaged software, by ES vendors such as SAP, Oracle and JD Edwards. Initially ES vendors targeted only large companies but in the late 1990s, as the large-company market reached saturation levels, vendors also started to look to mid-size and small companies. Vendors that focus on these markets include companies such as Great Plains, Solomon and Accpac, which have used their existing accounting software as the base and developed or bought in broader ES modules around it. The move into these new markets proved successful for the vendors. Research conducted in the United States of America in early 1999 by IT research group Gartner, showed that nearly two-thirds of its middle-market sample had evaluated the viability of ES solutions for their companies (Wayson, 1999).

In South Africa, the implementation of ES software started in the early 1990s. By 1999 almost 70% of South Africa's Top 200 companies had an ES solution in place, or were planning to have one in place by the end of the year, and by 2000 the total ES market was estimated to be worth R519 million (Gordon-Brown and Whittaker, 2002).

Despite the widespread take-up of ES systems, they are extremely difficult to implement. In an industry where only about 30% of projects are successful (*Chaos Demographics*, 2004), ES implementation, being large in scope and increasingly popular (Robey, Ross and Boudreau, 2002), often account for the more spectacular failures. For example, Mobil Europe spent hundreds of millions of dollars on a system, only to abandon it when its merger partner objected (Davenport, 1998). Dell Computer found that its system would not fit its decentralised model (Davenport, 1998). Confectionary manufacturer Hershey reported a 19% drop in year-on-year profits in the third quarter of 1999, something which the Hershey CEO at the time blamed on the failed implementation of new business processes based on SAP (Pender, 2001).

Of course, as Jeffcot (2001: 2) notes: "Failure is not a simple concept, ranging as it does from cancellation or termination, through late delivery and cost overruns, through to non-compliance with specifications and/or the demands and expectations of clients and user". Of the multitude of problematic implementations "only" 20% are shut down prior to implementation (Cooke, Gelman and Peterson, 2001). Nonetheless, implementation that result in "sore employees… sterile results… and sour software" (Taylor, 1998: 235) are poor, although common, reward for the effort and investment that an ES implementation requires. ES systems have garnered a reputation for not living up to their promises of streamlined and more efficient business processes. A major contributor to lower investment in, and user-disillusionment with ES, is the lack of substantial realised benefits attributable to ES implementation (Zrimsek and Genovese, 2001).

There are, as a result, any number of prescriptions in the Information Systems literature for successful ES implementation. Mostly these address project risk factors, such as employee involvement (Barker and Frolick, 2003; Sumner, 2000), project size and complexity (Francalanci, 2001), executive sponsorship (Muscatello, Small and Chen, 2003), scope creep, change management, project management (Al-Mashari and Al-Mudimigh, 2003; Sumner, 2000), organisational fit, systems design, and technology planning (Grossman and Walsh, 2004; Sumner, 2000). All of these are very important factors that need to be managed in an ES implementation, and in most failures, at least some of these will not have been properly dealt with.

The question that remains, however, is why projects continue to be mismanaged in this way, when the risk factors are well-documented, and the technology itself should, after 15-20 years of practice, be maturing. The answer, according to some researchers (Serafeimidis and Smithson, 1996; Pettigrew, 1985), lies not only in the content of the software or even the project management process, but rather in the context in which the project takes place, and the particular "human and organisational practices and patterns of belief and action" (Sumner, 2000: 318) that the context implies.

In order to explore the notion that context may affect an ES implementation, this study discusses a case in which contextual issues were critical. The research question guiding the case study is therefore "How, if at all, did the context of this particular company affect the implementation of the ES?" The case in question is that of a small-capitalisation South African company facing ongoing and emerging organisational complexity. The IST Ltd.[1] Group, a 20-year old engineering and information technology company, sought to implement an ES in order to improve its management information and project management systems. This implementation was - based on the criteria of time, functionality and overall cost - somewhat less than successful.

A number of factors should have mitigated against ES implementation failure at this company. Firstly, IST Ltd. is a technology company itself, and its core business is managing technology projects. Secondly, the major focus of the request for proposal (RFP) and selection process was on the functionality of the system, and the ability of the supplier to support this functionality. Thirdly, the software package was purchased from a large and reputable software provider, with the support of a value-added reseller (VAR). Fourthly, the defective state of the existing systems should have provided a compelling rationale for change. In the end, as will be described in the case, IST Ltd. had to scale back considerably on the functionality initially specified, and ensure the working of that functionality themselves. There was also some resistance on the part of the users to adopting the system.

The detail of the case shows how both the organisation and the circumstances of the ES implementation were in fact *contextually* complex, thus demonstrating how the specific organisational context can complicate the process and outcome of the ES implementation. This case is therefore a little different from many other "failure" cases, in that although the "story" describes the project, the analysis addresses not only the project factors (as for example in Al-Mashari and Al-Mudimigh (2003)), but the organisational context as well.

METHODOLOGY AND PRESENTATION

The case is presented in this study as a single atheoretical narrative. Thereafter management implications of the case are reviewed, with reference to the related literature. That is, the case itself is not scientifically or paradigmatically conceived (Wagner, 2002), but rather presented as a story that orders events in a meaningful way. The authors believe that this narrative itself is important in the extension of our understanding of ES implementation. As Boland and Tenkasi (1995) point out, narrative is not an idle luxury, but a fundamental cognitive process through which communities of practice are constructed and maintained. The human disposition to tell such stories "exploits the richness of the existing repertoire of stories and plots, but it also enriches, challenges and develops this same repertoire" (Czarniawska-Joerges, 1995: 13), particularly where a multiplicity of perspectives are provided. A narrative, story or case description can convey "the rich tapestry of organisational realities" (Soin and Scheytt, 2006) to help us make sense of a broader situation (Weick, 1995).

Although this story is presented as a single narrative, a multiplicity of views were sought out within the research context. The data for this case was collected over an extended period from October 2000 to March 2002, with updates in August 2002 and 2003, as the latter stages of the implementation unfolded.

The initial audit was conducted as a consulting assignment, although the audit report was also used as documentary evidence in the case study. In conducting the audit, one of the authors spent two days interviewing the Management Information Systems (MIS) manager and 12 divisional directors. The purpose of the audit was to review the organisation of the IT function, the IT Infrastructure, the IT applications and the management and control functionality provided by the ER system. Risks facing IST Ltd. through its current and planned implementations were also assessed. At least partly as a result of the audit (and as described in the case below), an ES implementation was begun.

Just over a year into the ES implementation, in-depth interviews were conducted with seven staff members of the implementing team. These included the managing director, the new MIS manager, the finance director, the managers of three of IST Ltd.'s divisions, and the person employed to project manage the implementation after its initial failure. At this stage, an in-depth interview was also conducted with the managing director of the value-added reseller (VAR). The update interviews took place with the MIS manager. The objective of these interviews was to determine both the nature of the unfolding events, and the reasons for these events, as attributed by the various participants.

Documentary data was also collected, in the form of the initial system audit, the request for proposal (RFP), responses to the RFP, project documentation, and meeting minutes. This documentary evidence was used to triangulate with the evidence provided in the interviews in order to derive the single narrative that is presented below.

The story as presented here is thus a record of the implementation of the system. The various theoretical lenses through which the authors view the narrative, in drawing out the management implications, are an after-the-fact construction in terms of both the events themselves and the narrative interviewing process. In other words, the data analysis took place in two ways. Firstly, the narrative thread of events was extracted from the various sources of evidence, and translated into the case story. This case was then verified and approved for dissemination by the management of IST Ltd., and the VAR involved in the case. Secondly, a number of themes were identified in the case story in response to the overarching research question, which was: "How did the context of this particular company affect the implementation of the ES?"

THE ENTERPRISE SYSTEM AT IST LTD.

The history of IST Ltd.

The Pretoria-based IST Ltd. was established in 1980 by two entrepreneurs who saw a gap in the market to supply advanced electronic equipment to the defence industry. By

2000, when the company decided to implement an ES system, it had a market capitalisation of about R26 million, 300 employees and five divisions which were run quite autonomously by divisional managing directors (MDs), and staffed by highly-skilled technical project managers. A number of the staff had PhDs in engineering and related fields.

IST Ltd. is focused on large, long-term projects delivering turn-key technological solutions to its customers. Initially the company's activities revolved around project management, but as the company grew, manufacturing came to play an increasingly important role in two of its divisions. Nonetheless the manufacturing activities also have a project focus, as IST Ltd. manufactures large, complex items (such as helicopter missile turrets and fibre optic communications systems) on a project basis.

In February 2000 net profit had dwindled to R8 million from R20 million in 1999, and it became clear that project managers had been hiding financial irregularities, thus leading to an artificial reflection of the company's financial position in previous years. Consequently, the two major corporate shareholders appointed a strategic management services company, Coronation FRM, to restructure IST Ltd.'s operations and turn the company around.

One of the executive directors of Coronation FRM took over as interim managing director (MD) of IST Ltd. in March 2000 and set about restructuring the company. He dismissed the company's founders and joint group MDs, and sold or closed down the two divisions in which most of the problems were being experienced. He also commissioned an audit of the company's IT systems. He wanted to know why the system had allowed project managers to hide financial irregularities, and how to remedy this situation.

Information Technology at IST Ltd.

IST Ltd. had developed, expanded and adapted its IT systems itself. Because the company placed great emphasis on providing flexibility and freedom for its project managers, the system had been designed accordingly. The MIS that had developed as a result, was a somewhat untidy mix of various systems with a strong project focus. The major functionality of the MIS was in the areas of project budgeting and review, timesheet capturing, and order and invoice capturing. As a financial reporting tool it was entirely project-based. There was no production, operations or trading functionality, and overhead expenses were all treated as project expenses. Most divisions made use of other applications in addition to the group MIS. IST Energy, for example, had a home-grown materials-resource planning (MRP) system. Other production and trading operations in the company had little or no IT support. The audit showed that while the financial losses at IST Ltd. could not be blamed on the MIS, its basic functional architecture was seriously flawed. It exacerbated the lack of project knowledge on the part of

new or inexperienced project managers and made it possible for project managers who were experienced on the system to hide problems with relative ease.

The audit report concluded that IST Ltd.'s IT and MIS systems did not provide adequate information for even the most basic control of projects, without significant manual effort on the part of the project managers. It recommended that the system be replaced as a matter of urgency. The interim managing director himself had been involved in successful ES implementations before, and therefore recommended that IST Ltd. should go this route. He was certain that an ES was simply essential to rational and efficient business practice. Some managers and project managers expressed concern that by enforcing rigid procedures on the company, an ES system would take away the flexibility that they believed to be the group's competitive advantage. The management committee nevertheless decided that the benefits of implementing an ES outweighed these concerns. They were aware that ES software was notoriously complex to implement, but felt they needed the control and real-time information that such a system would afford them. They resolved, however, to look for a system that would fit both IST Ltd.'s functional requirements and its culture of flexibility.

The search for an ES supplier

The management team delegated responsibility for driving the ES implementation process to the MIS manager. The MIS director had been a casualty of the restructuring process and, in his absence, the MIS manager appeared to be the most logical choice. He and the MIS director had been investigating ES systems since 1996, and he therefore had some understanding of the subject. He had to do this in addition to his other responsibilities, however, as there was no-one else within the company who could take on any of his other tasks. In any event, IST Ltd. did not foresee the implementation taking up a significant amount of his time. The financial director was appointed project sponsor.

The MIS manager identified suitable software vendors and invited them to present their product to the management committee and to personnel from different departments and functions in the business to assist IST in deciding whether the solution would be suitable in terms of functionality, price and availability. The MIS manager then drew up a request for proposal (RFP) that specified that the system would have to provide functionality in the following areas: financial management, project management, manufacturing, product data management, inventory management, workflow, quality assurance, customer relationship management, e-business, human resources and payroll, and service and maintenance management. He consulted widely within the company in drawing up the specifications, to be sure that the RFP specified everything that IST Ltd. required, and then sent the RFP out to those providers that had indicated an interest in supplying the software.

Five responses were received and the choice was narrowed down to two, based on the fit to required functionality. One was an Oracle system (O-SYS[2]) that would be implemented by INT-CO, an international company that had very recently been established in South Africa. Its proposal indicated that the system had the best fit with IST Ltd.'s requirements and that the only modification required was a taxation amendment in the payroll software.

The other was an accounting package-based system (A-SYS[2]) that would be implemented by LO-CO, a local value-added-reseller (VAR) that had been operating in South Africa for some time. This proposal indicated three areas where the core product could not offer the high-level processes required by IST Ltd.: product development, engineering and design, and environmental management. The areas in which it indicated that its software would need the greatest degree of customisation were quality assurance and project management − although in both cases LO-CO said that this was restricted to the need for minor modifications only.

After some consideration IST Ltd. decided to award the contract to LO-CO, who would implement A-SYS. Although O-SYS fitted the specifications more closely, IST was concerned that it might lack after-sales support, as INT-CO had no track record in South Africa. In addition, the South African currency was weakening at the time, and IST Ltd. did not want to run the risk of having to pay international consultants if the implementation ran into difficulty. Moreover, IT research company, Gartner, had rated the accounting software of A-SYS very highly, and its developers had rated LO-CO in the top 1% of all its VARs worldwide. Moreover, LO-CO had stressed that it could guarantee implementation on deadline. IST Ltd. therefore awarded the contract to LO-CO and signed, in August 2000, a fixed-price contract for the implementation project.

ES implementation

IST Ltd. and LO-CO agreed that the project should be approached in two phases. The financial, inventory, manufacturing, product data management (PDM), project and workflow modules would be implemented in the first phase, which would be complete by the end of February 2001 (which was IST Ltd.'s financial year-end). The customer relationship management, e-business, human resources, payroll and service functionality would be held over for implementation in phase two.

LO-CO undertook to project manage everything from start to finish, and guaranteed that it would be able to meet the deadlines successfully. IST Ltd.'s input was to provide the information and assistance needed to develop the system and to be available for training workshops. This fitted very well with the company's own project management approach, which was to offer a turnkey project management service to its clients. The MD of IST Ltd.'s Dynamics (one of the company's divisions) summed it up: "You'll beat the drum and we'll march to the beat."

As the ES software did not have all the workflow, PDM or project management functionality that IST Ltd. required, LO-CO agreed to develop the additional software and to design the PDM module. IST Ltd. agreed to look for a workflow system that could be integrated into this software. To monitor the progress of the project, IST Ltd. established a project progress committee, consisting of the financial director, MIS manager, quality control manager, and representatives of LO-CO. It met every week to discuss problems, project needs and the way forward. The interim managing director was concerned with the strategic and operational restructuring of the group and therefore took a back seat in the ES project.

LO-CO conducted a series of needs analysis workshops with IST Ltd. project management, manufacturing and finance representatives in August and September 2000. Its focus at that stage was on finding out how IST Ltd. conducted its business at the time, so that it could configure the system accordingly. This conflicted somewhat with IST Ltd.'s expectations, as its representatives were expecting to give details of how they wanted the system to function. The head of LO-CO's Pretoria office conducted these workshops, but did not find this an easy process. Without a comprehensive understanding of IST Ltd.'s somewhat idiosyncratic business, it was difficult to know how to elicit the information needed. In addition, the IST Ltd. project managers, in particular, had conflicting expectations of the system, which had to be resolved in the workshops.

In October 2000, having conducted the workshops, LO-CO then set about developing and configuring the software. Progress on the financial and inventory modules, in particular, was good, but in January 2001 it became clear that LO-CO was not going to be successful in designing a suitable PDM module. IST Ltd. therefore bought a third party system to integrate into the ES software. Moreover, there were significant problems with the manufacturing module. The MRP2 functionality was still in development, and LO-CO had initially planned on implementing another package and integrating it into the ES software. But even this package was not fully developed. The icons indicated that certain functionalities were available, but there was nothing behind them.

In addition, what had not come to light during the selection process was that LO-CO had not implemented an ES manufacturing module before. The company's experience was largely in implementing accounting systems. Its representatives would have to receive training on the MRP2 module in April 2001, when the module had been developed. This meant that the initial "go live" deadline would not be met.

In the meantime, in March 2001, a new group MD had taken up his position at IST Ltd. On seeing the state of the ES implementation process, he decided to contract a firm of consultants with which he had worked before, to evaluate IST Ltd.'s business model and the functionality of the ES software being implemented. The new MD also decided that IST Ltd's manufacturing representatives should attend the training in the manufacturing module, but that this training should be delayed until after the study was complete.

The study was conducted in April and May of 2001. It confirmed that the move to an ES was correct for IST Ltd., that the systems requirements specifications that had been drawn up in the beginning were correct; and that the ES software being implemented could indeed provide the functionality that IST Ltd. required. However, it also found that IST Ltd. as a company was not ready for an ES. Its business processes and disciplines were not adequate, and there was a general lack of understanding about ES and its implications within the company.

With this input, the MD decided to press ahead with the ES implementation. He returned to LO-CO to say that the company's manufacturing representatives were now ready for the MRP2 training in the USA. He was told that no training date had yet been set, as the bugs in the software had not yet been fixed. On discovering this, the MD was tempted to terminate IST Ltd.'s contract with the current VAR and look for another. However, the management team was not convinced that another VAR had the experience to do any better and they decided not to change.

The MD did decide, nevertheless, that IST Ltd. had to take ownership of the project and not leave its management to the external service provider. He insisted that a project charter be drawn up, having found these to be particularly useful in previous ES implementations that he had been involved in. He established manufacturing, finance, project, PDM, and process and documentation task teams to assist with developing the various ES modules. He also appointed a full-time project manager, who took up this position in September 2001. Bearing in mind the finding that IST Ltd. was not ready for an ES system, the MD also initiated a process of generic ES education that targeted everyone in the company, and a programme to document and define the company's business processes.

With the arrival of the full-time project manager, the process started working more smoothly, but by December 2001 it was evident that all the Phase 1 modules would not be ready by the new 1 March 2002 deadline. The manufacturing module had been developed, but it had not been integrated into IST Ltd.'s system. In addition, owing to the attacks on the World Trade Centre on 11 September 2001, training had been postponed yet again. The PDM module had still not been fully integrated into the ES software. Neither had the workflow module. Work on the project module had advanced, but was not complete, and there were bugs in the financial system that had not yet

been sorted out. Switching over on the 1 March deadline would leave little time for proper testing of the system.

Internal resistance to the system

The new project manager also discovered that there was still some debate within IST Ltd. as to the necessity of an ES for the company. On the manufacturing side, the divisional MDs saw the need and potential benefits of such a system. Nevertheless, they were still cautious about it. The divisional MD who had developed the materials-resource planning system for IST Ltd. Energy pointed out that it had taken him a year to gain acceptance for this system, and he felt that it would take time for the new system to gain acceptance throughout the company. Moreover, he was not convinced that ES being implemented would offer much more in terms of functionality than his existing Access system. There were further concerns that the processes imposed by the ES would be more cumbersome and would remove some of the flexibility necessary to the divisions.

It was not yet clear how the project managers would adapt. Some managers did not see any major problems, believing that the changes simply came down to a need for discipline. The project management module was a project-accounting system, and therefore would not interfere with day-to-day running of the projects. Other managers saw the change as running deeper. One project manager described it as "a bit of a philosophical change". "ES is more than just software. There are lots of soft issues involved," he said. "Up until now IST Ltd.'s philosophy was 'just get the job done'. We're too big for that now, but the new system will impose a big change."

Another divisional MD summed up the concern of the project managers. He had been integrally involved in specifying the project module, and although he was prepared to give the new system a chance, he was not convinced it would be beneficial. "What we had, had its flaws, but we could work it. You could get the right information if you know how to operate it," he said. He believed that "gut feel" was very important in knowing how a project was progressing, and that the old system forced project managers to "listen to their gut". He thought that the new system, in requiring project managers to pay a lot of attention to detailed numbers, might make them focus too much on the numbers, and forget about the bigger picture and listening to their intuition.

He was also concerned that in imposing the best practice enforced by the ES, IST Ltd. might lose its flexibility, and thus its competitive edge. He saw a danger that the company would become an "also ran" with nothing to distinguish itself in the marketplace. "I hope we can stop the ES system from becoming the culture," he said. "These systems were designed by bean counters and they're all control freaks. You don't need control freaks in a high-tech environment."

Implementation at last

In spite of the resistance and risks, the new ES project manager decided to implement at the beginning of March. The system went live on 3 March 2002, although not without some minor problems, as the March month-end was closed only on 18 April. In implementing the project management module, IST Ltd. ensured that the project manager still had ultimate control over the project, including the authority to adjust budgets, as had been the case before. Furthermore, the workflow module, which would formalise control in the project environment much more extensively than the project accounting software, was not implemented at this stage at all. At the end of 2002, the project manager appointed to salvage the project left IST Ltd.

It was only by mid-2003 that the MIS manager reported that the system was "fading into the background. It has taken more than a year to bed down", he said. By April 2003, IST Ltd. was ready to implement the workflow module. After some resistance from the project managers, the MIS manager "laid down the law", and they were forced to use it. Although the customer relationship management, e-business, human resources, payroll and service functionality had never been implemented, the MIS manager's concern at that stage, was more focused on the ES software itself. He had learnt that IST Ltd. was to be the first and last MRP site for this software in South Africa. A new prospect, of having to convert to another ES system, had thus arisen.

DISCUSSION: THE ORGANISATIONAL CONTEXT AND ITS EFFECT ON THE ES IMPLEMENTATION

In the following discussion the authors pinpoint some of the issues that emerge from the case in response to the specific research question: "How did the context of this particular company affect the implementation of the ES?"

In analysing the case narrative as presented in this study, the authors have identified two major themes that describe the context of IST Ltd., namely *resource constraints* and the *social/political context* (which might also be termed *organisational culture*). Each of these themes has various contributing factors, which are described briefly in the next two paragraphs, and discussed further in the sections following.

Firstly, both the size and the history of the company created a situation where IST Ltd. was resource-constrained with regard to the ES project. At the time of the case, IST Ltd. was a small-capitalisation company on the JSE Securities Exchange. As might be expected of a small-capitalisation company, it did not have vast financial resources available for the ES project. In addition, the turnaround situation of the company further limited the funds available. Certainly, where "large" in the ES context, refers to installations

"with individual investment costs of well over $100 million"(Muscatello, Small and Chen, 2003: 850), the IST Ltd. case, of having only about $500 000 to spend, was small. Some of the lessons learned are therefore particular to smaller or otherwise resource-constrained organisations.

Secondly, IST Ltd. had a very particular social/political context, or organisational culture, which was vehemently anti-bureaucratic. This culture evolved from the history of the company, which grew rapidly from a small, flexible project-driven company into a more complex one with both project and production environments, and which was now additionally stressed by the difficulties of the turnaround situation. The culture was also derived from the nature of the individuals involved in product development − independent, technically-minded engineers, many of them with PhDs. The high-tech nature of the products further led them to believe that the company required innovation and flexibility.

Therefore, while two major themes can be identified for analytical purposes, the underlying contextual factors contribute to one or both of them, as shown in Figure 1.

We concluded that it is precisely the simultaneity of the factors, and the interplay of the themes (in that various factors affect both themes, and various outcomes, each other) that creates a particular situation or context, that leads to a particular outcome. The authors will then discuss how the resource constraints affected the evaluation process; how the resource constraints and the social/political context together with the flawed evaluation delayed the implementation; and how the social/political context, together with the delayed implementation, led to user resistance. All of this then compromised the implementation as a whole, as shown in Figure 1.

Therefore, in addressing the research question, the authors address each of the outcomes (themselves interrelated and affected by one or more themes), in order to derive some lessons for managers involved in, or considering, an ES implementation. In other words, each of the headings completes the statement: "This is how the context affected the implementation".

Resource constraints affected the evaluation process

The flawed software configuration at IST Ltd. is directly attributable to the company's capacity to pre-evaluate the product it was purchasing. In the end, IST had to scale back considerably on the functionality initially specified, and ensure the working of that functionality themselves. While these events were, most obviously, the result of at least a misunderstanding between IST Ltd.and LO-CO (at worst, a misrepresentation), the question remains how such miscommunication can be avoided. Given that a central feature of an enterprise system is its configurability (Koch, 2001a, 2001b), the purchase of any ES package is to a

FIGURE 1
THE CONTEXT, OUTCOMES AND RESULT OF THE
ES IMPLEMENTATION AT IST LTD.
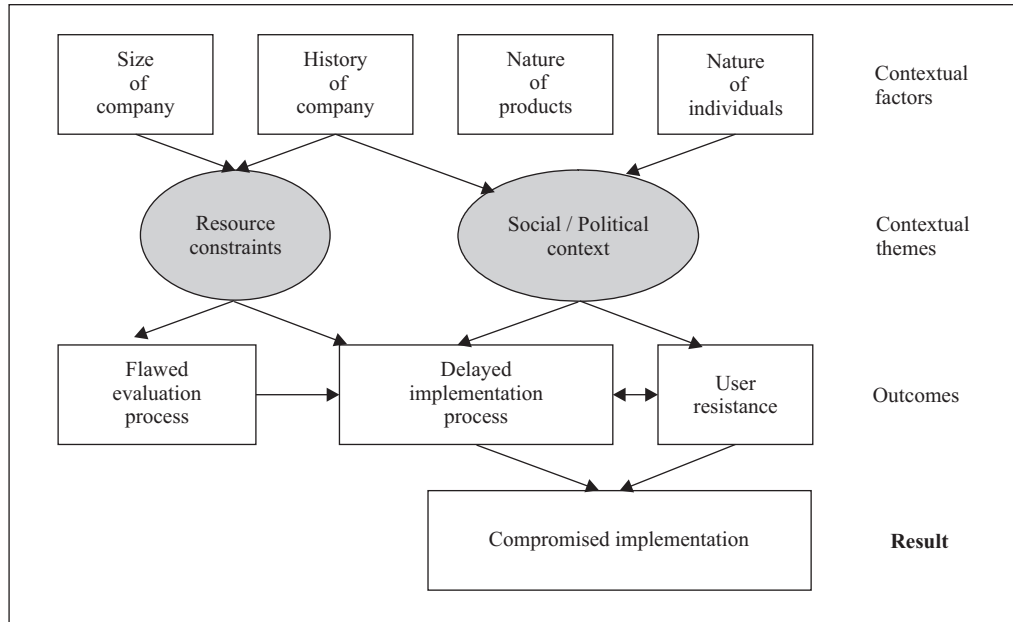
certain extent a purchase of the unknown. It would seem that the only way to avoid such problems is to invest substantially in pre-purchase evaluation of a prototype, and not only of the vendor's claims for the technology. Smaller, or more resource-limited companies, however, tend not to employ more expensive methods of evaluation (Bernroider and Koch, 2001), or to use the process merely to determine the software requirements of the ES (Muscatello, Small and Chen, 2003). By contrast, larger companies more often undertake the analysis of a prototype, the buying of relevant studies, and an examination by third-party consultants (Bernroider and Koch, 2001), in a "highly intensive and involved" evaluation (Verville and Halingten, 2003: 590) .

It has been shown that in general, IS evaluation, even where elaborate, is often more ritualistic than substantial (Seddon, Graeser and Willcocks, 2002; Farbey, Targett and Land, 1995), but larger companies at least have the option of pursuing more detailed evaluative procedures. Smaller companies simply may not have the financial or human resources to invest significantly in the evaluation process. This is particularly unfortunate as it is these self-same companies that, being resource-constrained, are more likely to purchase mid-or low-end systems, or employ a small -- and itself less well-resourced -- VAR.

Potential vendors should also invest in more in-depth evaluation of the requirements specification than was the case at IST Ltd., and even some pre-sales customisation of

key modules. However, the contract to supply an ES to a smaller company may not be sufficiently attractive for the vendor to do much pre-sales evaluation and customisation. Thus, while it seems obvious that ES architecture should be beneficial to companies of all sizes, the practical limitations of size and project profitability (to the vendor) may severely limit the capacity of some companies to evaluate the package.

While the evaluation of any information system may be seen as more of a project or technical issue (one in which "technical, operational and legal" aspects must be considered to ensure success (Grossman and Walsh, 2004), the nature of that evaluation will necessarily be affected by the resources available. Therefore, the nature of the company will affect the nature of the evaluation, and in the long term the converse will hold too. If this cannot be escaped, it may seem that some companies are paralysed, or in a position where they cannot undertake an implementation of a system such as an ES at all. In such a situation, managers need to work within the constraints of the company, while explicitly acknowledging those constraints, so that they are not proceeding blindly, or under an illusion of seeing everything (when they don't), but rather with caution and insight into the situation as it is.

Lesson One: Not only the choice of package, but also the actual evaluation process itself, which may depend significantly on the resources available, can prejudice the implementation**.**

Resource constraints and social/political context delayed implementation

A corollary to Lesson One may be that smaller or resource-constrained companies may have to take what they can afford as far as ES systems go. In this case a second lesson becomes apposite, namely that the company may have to be willing to re-engineer substantially, or accept an extended implementation. In other words, the alternative to finding software that fits is to re-engineer the business processes to fit the software (Barker and Frolich, 2003). To a certain extent IST Ltd. did this in respect of the manufacturing processes. If the technology itself is seen merely as a tool (Orlikowski and Iacono, 2001), and processes are purely technical in nature, this approach should be unproblematic. As soon as the technology is more intricately embedded in the company (as it most often is), however, the inherent complexity of technology in companies becomes evident. The question then arises as to whether the "more than a year" that it takes a company such as IST Ltd. to "bed down" the system, is owing to gradual learning and acceptance of the system, or whether this is the period that it takes for the company to develop the kinds of workarounds "that enable people to make dynamically complex systems work in practice" (Orlikowski and Iacono, 2001). In other words, if the company does not re-engineer itself thoroughly, *in practice*, then the new theory built into the system will have to be "worked around" or bedded into the old processes that persist in people's heads.

That this bedding down, or "shakedown phase"(Markus *et al.*, 2000) is a far from simple matter, particularly with ES technologies, has become received wisdom. Lee and Lee (2000), for example, suggest that this phase, which they refer to as integration, necessarily involves conflict between current organisational values and new business rules. As Markus *et al.* note: "In general [ES] adopters seem both physically and psychologically unprepared for shakedown phase difficulties"(Markus *et al.*, 2000: 255). Ongoing concerns with "assimilation knowledge barriers" associated with new work processes appear to be the norm (Robey, Ross and Boudreau, 2002). These observations, and the case of IST Ltd. in particular (in both the earlier Access MRP implementation and the ES implementation), are in fact sensible when one considers that an ES is a configurational technology, i.e., "a technology comprising varying software and hardware blended with organisational practices in order to meet the particular needs of the adopting organisation" (Swan, Newell and Robertson, 2000: 28). As Swan *et al.* (2000) point out, such technologies, because they are configurational, are also interpretively flexible (Orlikowski, 1992), which means they are themselves shaped by the social context of the organisation. A process of "blackboxing" the system and best-practice processes for the purpose of "insertion" into the organisation will almost certainly lead to difficulties, or more neutrally, "push back" shaping of the system, during and after implementation.

Thus, although process re-engineering is both a necessary part of an ES implementation (if not part of the *promise* of an ES), and a technical issue, the success of the implementation of the whole will depend not on technical best-practice processes, but on the social shaping of those processes during and after the ES implementation. At IST Ltd., the difficulties of implementation were attributed, in part, to the fact that the company was not ready for an ES, because it lacked the appropriate "business processes and disciplines". The authors would suggest that "appropriate" must mean "the same as the system" unless re-engineering is to be undertaken. In many cases, the implemented system itself will be "re-engineered", which is usually called "bedded down" or "integrated", because companies are really no more or less malleable than systems. Best practice will eventually be emergent practice, and extended shakedown periods will probably therefore be the norm, rather than the exception.

Lesson Two: Unless the software is an exact fit, or the organisation re-engineers itself in practice, it will take time - probably an extended time - for staff to accept and use the system.

Lesson Three: The system itself may need to be adapted to the emergent practice of the organisation, and therefore a certain amount of adaptability in the use of the system is important.

The social/political context led to user resistance

The specific organisational complexities of IST Ltd. presented a serious risk factor in this project from the outset. The nature of IST Ltd. was, and continues to be, one in which independence and flexibility are encouraged. The company develops and delivers very high-end innovative technological products, and while these products themselves are subject to stringent quality and conformance controls, the innovation process itself is considered by definition to require room for manoeuvre. In this context, ongoing scepticism was expressed by some senior members of management as to the appropriateness of the system. Some managers thought that best practice might compromise IST Ltd.'s competitive edge. While this might be apparently contradictory, if best practice is perceived as "what everybody else who is any good does", in a company that prides itself of doing things differently, this idea will make sense.

The withdrawal of line management from active involvement in the implementation process can with hindsight be interpreted as a form of passive resistance, rather than acquiescence. It is also interesting to note that since IST Ltd. delivers turn-key technology solutions to its clients, this culture of packaged delivery may well have affected their own expectations of service from the ES supplier. Furthermore, in the context of a turnaround situation, where interim management sought to establish more stringent controls, the ES may have been perceived

as a "steamroller" for this political programme (Koch, 2001b), although the interim managing director himself simply saw the system as a *sine qua non* of rational and efficient business.

Where the objective of the implementation is to effect organisational change, the conflict between the discipline and visibility promoted by ES (Evgeniou, 2002; McAfee, 1999) and the existing organisational culture (Walsham, 1993) may in fact be desirable, provided the issue of resistance is addressed explicitly, as it was at IST Ltd. in the ultimate workflow implementation, when the MD finally "laid down the law". If, however, ES implementation is seen *merely* as a technological and process-oriented exercise, to be pursued for reasons of efficiency alone, then unanticipated and undesirable effects of the type seen at IST Ltd. can be expected to be the norm rather than the exception. At IST Ltd., an ES was seen by the interim MD as rational and obvious, and indeed to him it was. But the effect and intentions of the implementation were read very differently by the company's project managers. This may seem surprising, as an obviously rational system should be seen as such by rational managers, but the obviousness of the system is itself an interpretation. Koch (2001b: 65) following Weick, (1990) points out that technologies as part of change are the "object of different assignment[s] of meaning, they are equivocal" . Thus the interpretive flexibility of the ES extends not just to the system, but to the motivation for the system itself.

Therefore, it is important that ES managers understand that ES implementation is difficult not only because it is large-scale and technically complex, but because it is a "complex, incompatible, altering innovation"[3] (Galliers and Swan, 1999: 380). Enterprise Systems are *never* "just systems", but always drivers of organisational change.[4] The explicit management of that change in the context of the organisation *generally* (the culture, norms etc), and the company *at that particular time* (the power relations, initiatives, intentions of management etc.) is essential to the successful implementation of the system. This management of change is, furthermore, not only a communicative process, but a political one, requiring the enrolment and mobilisation of actors, based on their interests and their understanding of the situation in the organisation (Koch, 2001a).

It has been noted by many authors that human and organisational factors are critical to the success of ES projects (Barker and Frolick, 2003; Duplaga and Astani, 2003; Kumar and Hillergersberg, 2000; Scheer and Habermann, 2000; Sumner, 2000; Parr, Shanks and Darke, 1999). And at one level it may seem that the case of IST Ltd. simply confirms this. The authors would suggest, however, that what this company's case shows, is that it is not only the factors present in the project implementation itself that are critical to its success, but the context more broadly. For example, according to Sarker and Lee[5] (2003), the three key social enablers of ES implementation identified in the literature are strong and committed leadership, open and honest communication, and a balanced and empowered implementation team, although they found that only the first was a necessary precursor to success. These are all enablers of, and within, the implementation effort. At IST Ltd., it is interesting to note, while the implementation effort was certainly strengthened by the stronger leadership provided by the MD and a full-time project manager, the success of the ES continued to be at least partially thwarted by *contextual* social/political issues such as the uncertainty of the project managers as to the applicability of the system in a flexible organisation and the appropriateness of a control-motivated initiative at all. This particular case study indicates that it is not just social enablers as factors (such as those mentioned above) that have a critical effect on ES implementation, but also the social/political context. Straightforward factor-based interventions that are not sensitive to these nuances will be inadequate to deal with the complexity of the situation.

In other words, whereas most prescriptions suggest that strong leadership, open and honest communication and a balanced team will lead to success, these factors will not be adequate if they do not address the social/political context within the organisatsion *directly*, and with particular attention to the particular context as mentioned above. This particular context will include the social/political dynamic at play in the organisation, and not just the economic/rational motivation for the implementation. Therefore, while a "non-rational" or political assessment (Koch, 2001b ; Smithson and Hirschheim, 1998) of the situation is not the norm, it may be most revealing. Hedman and Borell (2004), building on Smithson and Hirschheim's (1998) suggestions that we should seek to *understand* the evaluation process, propose a narrative as an ongoing and continuous evaluation tool. Chartering stories, project stories, shakedown stories, and onward and upward stories need to be told in organisations in all their sometimes daunting detail, as "tools for making the irrational rational" (Hedman and Borell, 2004: 288). IST Ltd. is such a story.

Lesson Four*:* The specific social/political context in the organisation will affect the implementation. Managers need to think very carefully about how this will happen, and be prepared to manage the political implications.

Lesson Five: It is not just the characteristics of the organisation, but how they affect each other, and how the project unfolds over time - the social-dynamic at play - that will affect the success of the project.

CONCLUSION

The case of ES implementation at IST Ltd. demonstrates that while structural features of the project such as size, desired outcome, and technology, affect its outcomes (McFarlan, 1980), it is also important to consider those complications that "aris[e] over time from their interconnection with history, process and external and internal context" (Willcocks and Griffiths, 1997: 233).

Perhaps the single most important lesson to learn from this case is that ES implementation is inherently complex, even where the absolute size of the project is small, the desired outcome quite well-defined, and the technology not necessarily cutting-edge. And it is not enough to consider complexity as "the organizational scope of the project in terms of users involved an overall company size" (Francalanci, 2001: 33), or even in terms of perceived complexity of the system (Bradford and Florin, 2003). In addition we need to consider the nature of the organisation, and the events surrounding the implementation.

While it is certainly the case that IST Ltd. is a very particular kind of company, in that it is project-oriented and technically specialised, it can be argued that many organisations will face challenges in pre-implementation evaluation similar to those experienced by IST Ltd. Furthermore, no organistaion is without its own social/political context, and this can always be expected to both influence, and be influenced by, as significant a social-technical innovation as an enterprise system. Therefore the lessons to be drawn from this do not necessarily apply only to organisations that have the same context (which is unlikely if not impossible), but rather to any organisation, each in the context of its own particular situation. The case of IST Ltd. is certainly not generalisable, because it is certainly (indeed most crucially) not context-free. The authors do believe, however, that the lessons to be drawn from an understanding of how that context affected the ES implementation are transferable, and thus valuable to the reader. Interpreting how this may occur in any particular situation, and managing project risk appropriately, is the essential management task of ES implementation.

GLOSSARY

Bedded down: integrated and working properly in an organisation (in reference to an information system).

Blackboxing: developing a system in such a way that the users cannot, and do not need to, have any understanding of how it works. The metaphor is that it is placed into a black (opaque) box, so that the inner workings cannot be seen.

Enterprise System (ES): a type of information technology (IT) system that integrates all necessary business functions in an organisation into a single integrated system with a single shared database.

Fit to Functionality: the degree to which the system does what it is supposed to do.

Functionality: what the system needs to be able to do and the functions it must be able to perform.

Project charter: A document that defines the *raison d'etre* and terms of reference of a project.

Request for Proposal (RFP): A document requesting suppliers to provide a proposal to supply a system. The RFP document will broadly specify the functionality (see above) of the required system.

Software vendor: A company that develops software packages for sale.

Turnkey project management: A service that delivers a completed product by project managing the entire development process. All that the customer needs to do is "turn the key" to switch it on.

Value-Added Reseller (VAR): A company that sells and integrates (customises and installs) software on behalf of a software vendor.

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Footnotes:

[1] IST Ltd. was delisted in 2005. At the time of the case it was a public company and is thus referred to here as IST Ltd.

[2] Permission to publish this case was granted by IST and by LO-CO, but not by the software suppliers and INT-CO. Therefore all software systems and their associated resellers are identified by pseudonyms.

[3] Galliers and Swan (1999) made this observation with regard to BPR, but given the degree of BPR generally required by ES implementation, the authors feel justified in using it here, and suggesting that it would apply even more appropriately.

[4] This observation could be made about IS in general, but the authors suggest that it applies even more to extensive, integrated, organisation-wide systems, such as ES.

[5] There are many other writings on this matter, as mentioned in the section on ES systems and their implementation. The authors are using this particular set of factors to illustrate the point that while project factors are important, the social/political context will influence or even override them.

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